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Chapter 1
National Language Support

Overview to National Language Support

National Language Support is a set of features that enable a software product to function properly in every global market for which the product is targeted. SAS contains NLS features to ensure that SAS applications can be written so that they conform to local language conventions. Typically, software that is written in the English language works well for users who speak the English language and use data that is formatted using the conventions that are observed in the United States. However, without NLS, these products might not work well for users in other regions of the world. NLS in SAS enables users in regions such as Asia and Europe to process data successfully in their native languages and environments.

NLS is applied to data that is moved between machines; for example, NLS ensures that the data is converted to the correct format for use on the target machine.

Text-string operations are sensitive to SAS settings for language and region. This action enables correct results for such operations as uppercasing and lowercasing characters, classifying characters, and scanning data. SAS provides features to ensure that national characters, which are characters specific to a particular nation or group of nations, are displayed and printed properly.

Software applications that incorporate NLS can avoid dependencies on language-specific or cultural-specific conventions for software features. Here are some examples:

- string manipulation
- character classifications
- character comparison rules
- code sets
- date and time formatting
- user interfaces
- message-text languages
- numeric and monetary formatting
Definition of Localization and Internationalization

*Internationalization* is the process of designing a software product without making assumptions that are based on a single language or locale, thereby facilitating localization. Internationalization ensures that international conventions (including rules for sorting strings and for formatting dates, times, numbers, and currencies) are supported. It also facilitates a consistent user experience across different language editions of a product. The abbreviation for internationalization is I18N.

Although the application logic might support cultural conventions (for example, the monetary and numeric formats of a particular region), only a localized version of the software presents user interfaces and system messages in the local language.

*Localization* is the process of adapting a product to meet the language, cultural, and other requirements of a specific target environment or market so that users can see results created in their own language and conventions when using the product. Translation of the user interface, system messages, and documentation is part of localization.

SAS NLS features are available for localizing and internationalizing your SAS applications. For more information see “Internationalization Compatibility for SAS String Functions” on page 279.
Chapter 2
Locale for NLS

Overview of Locale Concepts for NLS

A **locale** reflects the language, local conventions such as data formatting, and culture for a geographical region. Local conventions might include specific formatting rules for dates, times, and numbers and a currency symbol for the country or region. Collating sequence, paper size, postal addresses, and telephone numbers can also be included in a locale.

Dates have many representations, depending on the conventions that are accepted in a culture. The month might be represented as a number or as a name. The name might be fully spelled or abbreviated. The order of the month, day, and year might differ according to the locale.

For example, “the third day of October in the year 2016” would be displayed in a different way for each of these locales:

**Germany**

03.10.16

**Italy**

3/10/16

**United States**

10/03/16

Language is part of a locale, but it is not unique to any one locale. For example, Portuguese is spoken in Brazil as well as in Portugal, but the cultures are different. In Brazil and in Portugal, there are similarities in the formatting of data. Numbers are formatted using a comma (,) to separate integers from fractional values and a dot (.) to separate groups of digits to the left of the radix character. However, there are important differences, such as the currency symbols that are used in the two different locales. Portugal uses the euro and requires the euro symbol (€) while Brazil uses the real, which is represented by the two-character currency symbol RS.
Also, a country might have more than one official language. Canada has two official languages: English and French. Two values can be specified for the LOCALE= system option: English_Canada and French_Canada.

Numbers, including currency, can have different representations. For example, the decimal separator, or radix character, is a dot (.) in some regions and a comma (,) in other regions. The thousands separator can be a dot, a comma, or even a space in some regions. Monetary conventions likewise vary between locales; for example, a dollar sign or a yen sign might be attached to a monetary value.

Paper size and measurement are also locale considerations. Standard paper sizes include letter (8-1/2-by-11-inch paper) and A4 (210-by-297-millimeter paper). The letter paper size is mainly used by some English-speaking countries; A4 is used by most other locales. Most locales use centimeters, while some locales use inches.

Time can be represented in one English-speaking country or region by using the 12-hour notation. Other English speakers expect time values to be formatted using the 24-hour notation.

### Specifying a Locale

**How the Locale Is Specified at SAS Invocation**

You can use the LOCALE= system option to specify the locale of the SAS session at SAS invocation. LOCALE= also implicitly sets the following SAS system options:

- DATESTYLE=
- DFLANG=
- ENCODING=
- LOCALEDATA
- MAPEBCDICTOASCII
- ODSLANGCHG
- PAPERSIZE=
- RSASIOTRANSERROR
- TIMEZONE
- URLENCODING

*Note:* Locale can also be specified using POSIX naming standards. For example, en_US is the POSIX equivalent for the SAS value English_UnitedStates.

Default values for the LOCALE= option are the same under each operating environment. For more information, see “LOCALE= Values for PAPERSIZE and DFLANG Options” on page 603.

The English_UnitedStates value for LOCALE= implicitly sets the following options to the specified default values at SAS invocation:

- DATESTYLE=MDY
- DFLANG=English
- ENCODING=UTF-8
- PAPERSIZE=Letter
At invocation, an explicitly set system option overrides any implicitly set option.

At invocation, the explicit setting PAPERSIZE=A4 overrides an implicit setting of the PAPERSIZE= option using the LOCALE= option. For more information, see “PAPERSIZE= System Option” in SAS Viya System Options: Reference.

**How the Locale Is Specified during a SAS Session**

You can use the LOCALE= system option to specify the locale of the SAS session during the SAS session. However, only the values for these system options change implicitly to reflect the changed value of LOCALE=:

- DFLANG=
- PAPERSIZE=

**Note:** The PAPERSIZE= option is affected only if it is set to LOCALE. For more information see “PAPERSIZE= System Option” in SAS Viya System Options: Reference.

The value for the ENCODING= system option does not change implicitly to reflect the changed value of LOCALE=.

The Italian_Italy value that is assigned to the LOCALE= option implicitly resets the following options during the SAS session to reflect the changed value of the LOCALE= system option:

- DFLANG=Italian
- PAPERSIZE=A4

**Language Switching**

SAS messages are displayed in the language that is specified by the settings in the SAS configuration file during startup. You can view SAS messages in another language by using the language switching feature. You can access the language switching feature with the ODSLANGCHG system option. If ODSLANGCHG is enabled, then the value of the LOCALE system option determines the language for procedure output, user interface elements, and ODS fonts. If ODSLANGCHG is disabled, then messages appear in the language that is set during startup. This feature is supported on any server as long as the characters of the messages are supported by the encoding. For more information, see the “ODSLANGCHG System Option” on page 559. The LSWLANG system option specifies the language for the language switching feature when the LOGLANGCHG or ODSLANGCHG system option is set at SAS invocation. The LSWLANG system option has higher priority over the LOCALE system option. If the LSWLANG option is set to a valid SAS language, the SAS log output is controlled by its value. Otherwise, the LOCALE= option determines the language of the SAS log.

The LOGLANGCHG system option controls whether language switching occurs for the SAS log messages. This option controls the language of message switching in SAS log output. If LOGLANGCHG is specified, the language of the SAS log depends on the LSWLANG or LOCALE= option. For more information, see “LOGLANGCHG System Option” on page 554.

The LSWLANG option specifies the language of messages if LOGLANGCHG or ODSLANGCHG are enabled. If LSWLANG is set to LOCALE, the LOCALE= option determines the language for switching. **LSWLANG=LOCALE** is the default. For more information, see “LSWLANG System Option” on page 556.
The LOGLANGENG option is a toggle option that overrides LOGLANGCHG and LSWLANG and sets them to `LOGLANGCHG=ON` and `LSWLANG=EN`. As a result, the LOG output is in English, and the NL format output does not change. This option changes the setting of ODSLANGCHG. If `ODSLANGCHG=OFF`, the system message language for ODS output is determined by the SAS configuration. If `ODSLANGCHG=ON`, all messages are in English because of the LSWLANG setting. For more information, see “LOGLANGENG System Option” on page 555.

For more information about language switching, see Multilingual Computing with SAS® 9.4.
Overview: Encoding for NLS

An encoding maps each character in a character set to a unique numeric representation, which results in a table of all code points. This table is referred to as a code page, which is an ordered set of characters in which a numeric index (code point value) is associated with each character. The position of a character on the code page determines its two-digit hexadecimal number.

UTF-8 is the only SAS session encoding supported by SAS Viya.

A character set is the set of characters and symbols that are used by a language or group of languages. A character set includes national characters (which are characters specific to a particular nation or group of nations), special characters (such as punctuation marks), the unaccented Latin characters A–Z, the digits 0–9, and control characters that are needed by the computer.

An encoding method is a set of rules that assign the numeric representations to the set of characters. These rules govern the size of the encoding (the number of bits used to store the numeric representation of the character) and the ranges in the code page where characters appear. The encoding methods result from the adherence to standards that
have been developed in the computing industry. An encoding method is often specific to the computer hardware vendor.

An encoding results from applying an encoding method to a character set. An individual character can occupy a different position in a code page, depending on the code page used. An example is the euro symbol, €. The Unicode code point for the euro symbol is U+20AC.

Difference between Encoding and Transcoding

Encoding establishes the default working environment for your SAS session. UTF-8 is the only SAS session encoding supported by SAS Viya.

However, if you are working in an international environment (for example, you access SAS data that is encoded in German EBCDIC), the German EBCDIC code point for the uppercase letter Å is 4A hexadecimal. For SAS Viya, which supports only UTF-8, to properly interpret a data set that is encoded in German EBCDIC, the data must be transcoded. Transcoding is the process of converting data from one encoding to another. For conceptual information, see Chapter 4, “Transcoding for NLS,” on page 19.

Common Encoding Methods

An encoding results from applying an encoding method to a coded character set.

An encoding method is the application of established industry rules to a coded character set to produce an encoded character scheme. Such rules prescribe the number of bits required for storing the numeric representation of a specific character and its code position in the encoding. ISO 2022 and UTF-8 are examples of encoding methods. For more information, see “Standards Organizations for NLS Encodings” on page 13.

An encoding method is a set of rules that assign numeric representations to a set of characters. These rules govern the size of the encoding, the number of bits used to store the numeric representation of the characters, and the ranges in the encoding where characters appear.

UTF-8 is the only SAS session encoding supported by SAS Viya.

Common encoding methods are listed here:

Unicode is a common and popular character set.

Unicode provides up to 110,116 character combinations. Unicode can accommodate basically all of the world's languages. Unicode is a coded character set. HTTP and HTML protocols are based on Unicode. The following UTF encodings are part of the Unicode character set:

UTF-8 is an MBCS encoding that contains the Latin-script languages, Greek, Cyrillic, Arabic, and Hebrew. It also includes East Asian languages such as Japanese, Chinese, and Korean. The characters in UTF-8 are of varying width, from 1 to 4 bytes. UTF-8 maintains ASCII compatibility by preserving the ASCII characters in code positions 1 through 128.

UTF-8 is the only SAS session encoding supported by SAS Viya.
UTF-16
is a 16-bit form that contains all of the most common characters in all modern writing systems. Most of the characters are uniformly represented with 2 bytes, although there is extended space, called surrogate space, for additional characters that require 4 bytes.

UTF-32
is a 32-bit form whose characters each occupy 4 bytes.

ASCII (American Standard Code for Information Interchange)
is a 7-bit encoding for the United States that provides 128 character combinations. The encoding contains characters for uppercase and lowercase English, American English punctuation, base 10 numbers, and a few control characters. This set of 128 characters is common to most other encodings. ASCII is used by personal and UNIX computers.

EBCDIC (Extended Binary Coded Decimal Interchange Code) family
is an 8-bit encoding that provides 256 character combinations. There are multiple EBCDIC-based encodings. EBCDIC is used on IBM mainframes and most IBM mid-range computers. EBCDIC follows ISO 646 conventions to facilitate translations between EBCDIC encodings and 7-bit (and 8-bit) ASCII-based encodings. The 95 EBCDIC graphical characters include 82 invariant characters (including a blank space), which occupy the same code positions across most EBCDIC single-byte code pages. It also includes 13 variant graphic characters, which occupy varying code positions across most EBCDIC single-byte code pages. For more information about variant characters, see “Code Point Discrepancies among EBCDIC Encodings” on page 13.

There are also multi-byte character set (MBCS) EBCDIC encodings.

ISO (International Organization for Standardization) 646 family
is a 7-bit encoding that is an international standard and provides 128 character combinations. The ISO 646 family of encodings is similar to ASCII except that it has 12 code points for national variants. The 12 national variants represent specific characters that are needed for a particular language.

ISO 8859 family and Windows family
is an 8-bit extension of ASCII that supports all of the ASCII code points and adds 12 more, providing 256 character combinations. Latin1, which is officially named ISO-8859-1, is the most frequently used member of the ISO 8859 family of encodings. In addition to the ASCII characters, Latin1 contains accented characters, other letters needed for languages of Western Europe, and some special characters.

Other encodings
The ISO 8859 family has other members that are designed for other languages. The following table describes the other encodings that are approved by ISO.

<table>
<thead>
<tr>
<th>ISO Standard</th>
<th>Name of Encoding</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 8859-1</td>
<td>Latin1</td>
<td>US and Western European</td>
</tr>
<tr>
<td>ISO 8859-2</td>
<td>Latin 2</td>
<td>Central and Eastern European</td>
</tr>
<tr>
<td>ISO 8859-3</td>
<td>Latin 3</td>
<td>Southern European, Maltese, and Esperanto</td>
</tr>
<tr>
<td>ISO Standard</td>
<td>Name of Encoding</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>ISO 8859-4</td>
<td>Baltic</td>
<td>Northern European</td>
</tr>
<tr>
<td>ISO 8859-5</td>
<td>Cyrillic</td>
<td>Slavic languages</td>
</tr>
<tr>
<td>ISO 8859-6</td>
<td>Arabic</td>
<td>Arabic</td>
</tr>
<tr>
<td>ISO 8859-7</td>
<td>Greek</td>
<td>Modern Greek</td>
</tr>
<tr>
<td>ISO 8859-8</td>
<td>Hebrew</td>
<td>Hebrew and Yiddish</td>
</tr>
<tr>
<td>ISO 8859-9</td>
<td>Turkish</td>
<td>Turkish</td>
</tr>
<tr>
<td>ISO 8859-10</td>
<td>Latin 6</td>
<td>Nordic (Inuit, Sámi, Icelandic)</td>
</tr>
<tr>
<td>ISO 8859-11</td>
<td>Latin/Thai</td>
<td>Thai</td>
</tr>
<tr>
<td>ISO 8859-13</td>
<td>Latin 7</td>
<td>Baltic Rim</td>
</tr>
<tr>
<td>ISO 8859-14</td>
<td>Latin 8</td>
<td>Celtic</td>
</tr>
<tr>
<td>ISO 8859-15</td>
<td>Latin 9</td>
<td>Western European</td>
</tr>
<tr>
<td>ISO-8859-16</td>
<td>Latin 10</td>
<td>Central and Eastern European</td>
</tr>
</tbody>
</table>

Also, a number of encoding standards have been developed for East Asian languages. Some of these are listed in the following table.

**Table 3.2** Some East Asian Language Encodings Approved by ISO

<table>
<thead>
<tr>
<th>Standard</th>
<th>Name of Encoding</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB 2312-80</td>
<td>Simplified Chinese</td>
<td>People's Republic of China</td>
</tr>
<tr>
<td>CNS 11643</td>
<td>Traditional Chinese</td>
<td>Taiwan</td>
</tr>
<tr>
<td>Big-5</td>
<td>Traditional Chinese</td>
<td>Taiwan</td>
</tr>
<tr>
<td>KS C 5601</td>
<td>Korean National Standard</td>
<td>Korea</td>
</tr>
<tr>
<td>JIS</td>
<td>Japan Industry Standard</td>
<td>Japan</td>
</tr>
<tr>
<td>Shift-JIS</td>
<td>Japan Industry Standard</td>
<td>Japan</td>
</tr>
</tbody>
</table>

There are other encodings in the standards for EBCDIC and Windows that support different languages and locales.
Standards Organizations for NLS Encodings

Encodings that are supported by SAS are defined by the following standards organizations:

International Organization for Standardization (ISO)
promotes the development of standardization and related activities to facilitate the free flow of goods and services between nations and to advocate for the exchange of intellectual, scientific, and technological information. ISO also establishes standards for encodings.

American National Standards Institute (ANSI)
coordinates voluntary standards and conformity to those standards in the United States. ANSI works with ISO to establish global standards.

Unicode Consortium
develops and promotes the Unicode standard, which provides a unique number for every character.

Code Point Discrepancies among EBCDIC Encodings

The following characters are considered variant because they can have different code positions in various EBCDIC variations: ! # $ @ \ [ ] ^ ` { } ~ These characters exist in every encoding, but their hexadecimal values might change from one encoding to another, as shown in the following table.

<table>
<thead>
<tr>
<th>Character</th>
<th>1047</th>
<th>838</th>
<th>870</th>
<th>1025</th>
<th>1141</th>
<th>1142</th>
<th>1143</th>
<th>1144</th>
<th>1145</th>
<th>1146</th>
<th>1147</th>
<th>1148</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>5A</td>
<td>5A</td>
<td>4F</td>
<td>4F</td>
<td>4F</td>
<td>4F</td>
<td>4F</td>
<td>BB</td>
<td>5A</td>
<td>4F</td>
<td>4F</td>
<td>4F</td>
</tr>
<tr>
<td>#</td>
<td>7B</td>
<td>7B</td>
<td>7B</td>
<td>7B</td>
<td>4A</td>
<td>63</td>
<td>B1</td>
<td>69</td>
<td>7B</td>
<td>B1</td>
<td>7B</td>
<td>7B</td>
</tr>
<tr>
<td>$</td>
<td>5B</td>
<td>5B</td>
<td>5B</td>
<td>5B</td>
<td>67</td>
<td>67</td>
<td>5B</td>
<td>5B</td>
<td>4A</td>
<td>5B</td>
<td>5B</td>
<td>5B</td>
</tr>
<tr>
<td>@</td>
<td>7C</td>
<td>7C</td>
<td>7C</td>
<td>7C</td>
<td>B5</td>
<td>80</td>
<td>EC</td>
<td>B5</td>
<td>7C</td>
<td>7C</td>
<td>44</td>
<td>7C</td>
</tr>
<tr>
<td>\</td>
<td>E0</td>
<td>E0</td>
<td>E0</td>
<td>E0</td>
<td>EC</td>
<td>E0</td>
<td>71</td>
<td>48</td>
<td>E0</td>
<td>E0</td>
<td>48</td>
<td>E0</td>
</tr>
<tr>
<td>[</td>
<td>AD</td>
<td>49</td>
<td>4A</td>
<td>4A</td>
<td>63</td>
<td>9E</td>
<td>B5</td>
<td>90</td>
<td>4A</td>
<td>B1</td>
<td>90</td>
<td>4A</td>
</tr>
<tr>
<td>]</td>
<td>BD</td>
<td>59</td>
<td>5A</td>
<td>5A</td>
<td>FC</td>
<td>9F</td>
<td>9F</td>
<td>51</td>
<td>5A</td>
<td>BB</td>
<td>B5</td>
<td>5A</td>
</tr>
<tr>
<td>^</td>
<td>5F</td>
<td>69</td>
<td>5F</td>
<td>5F</td>
<td>5F</td>
<td>5F</td>
<td>5F</td>
<td>5F</td>
<td>BA</td>
<td>BA</td>
<td>5F</td>
<td>5F</td>
</tr>
<tr>
<td>`</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>51</td>
<td>DD</td>
<td>79</td>
<td>79</td>
<td>A0</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>{</td>
<td>C0</td>
<td>C0</td>
<td>C0</td>
<td>C0</td>
<td>43</td>
<td>9</td>
<td>43</td>
<td>44</td>
<td>C0</td>
<td>C0</td>
<td>51</td>
<td>C0</td>
</tr>
</tbody>
</table>
Examples of characters that are commonly used in programming languages are \{ and \$.
These characters are known as variant characters. For example, if a German mainframe user entered an ä, which occupies code point C0, an American compiler would interpret code point C0 as a \{.

### Collating Sequence

#### Overview to Collating Sequence

The **collating sequence** is the order in which characters are sorted. For example, when the SORT procedure is executed, the collating sequence determines the sort order (higher, lower, or equal to) of a particular character in relation to other characters.

The default collating sequence is binary collation, which sorts characters according to each character's location in the code page of the session encoding. The sort order corresponds directly to the arrangement of the code points within the code page. UTF-8 is the only SAS session encoding supported by SAS Viya.

Binary collation is the fastest type of collation because it is the most efficient for the computer. However, locating characters within a binary-collated report might be difficult if you are not familiar with this method. For example, a binary-collated report lists words beginning with uppercase characters separately from words beginning with lowercase characters, and it lists words beginning with accented characters after words beginning with unaccented characters. Therefore, for ASCII-based encodings, the capital letter **Z** precedes the lowercase letter **a**. Similarly, for EBCDIC-based encodings, the lowercase letter **z** precedes the capital letter **A**.

You can request an alternate collating sequence that overrides the binary collation. To request an alternate collating sequence, specify one of the following sequences:

- a translation table name
- an encoding value
- a linguistic collation

Table 3.4 on page 14 illustrates the results of using different collating sequences to sort a short list of words.

<table>
<thead>
<tr>
<th>Binary</th>
<th>Translation Table</th>
<th>Encoding Value</th>
<th>Linguistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaron</td>
<td>aardvark</td>
<td>Aaron</td>
<td>aardvark</td>
</tr>
</tbody>
</table>
The first column shows the results of binary collation on characters that are represented in an ASCII-based encoding. The alphabetization is not consistent because of the separate grouping of words that begin with uppercase and lowercase characters. For example, the word Zeus appears before aardvark because of the code points that are assigned to the characters within the ASCII-based encoding.

The second column shows the results of specifying a translation table that alternates the ordering of lowercase and uppercase characters. If you use the translation table, the word aardvark appears before Zeus. However, the word azimuth appears before Aaron because the translation table assigns a weight value to the lowercase character a that is less than the weight value of the uppercase character A. In addition, accents are sorted from left to right. For example, coté comes before côte.

The last column shows the results of linguistic collation for the session locale fr_FR (French_France), which uses a collation algorithm to alphabetize words. The algorithm specifies that words beginning with lowercase characters appear before words beginning with uppercase characters. In addition, this linguistic collation sorts accents from right to left because of the French locale specification.

SAS has adopted the International Components for Unicode (ICU) to implement linguistic collation. The ICU and its implementation of the Unicode Collation Algorithm (UCA) have become a standard. The collating sequence is the default provided by the ICU for the specified locale.

### Specifying Linguistic Collation

*Linguistic collation* sorts characters according to rules of language and produces results that are intuitive and culturally acceptable. The results are similar to the collation used in printed materials such as dictionaries, phone books, and book indexes. Linguistic collation is useful for generating reports or other data presentations and for achieving compatibility between systems.
SAS incorporates the International Components for Unicode (ICU), which is an open-source library that provides routines for linguistic collation that are compatible with the Unicode Collation Algorithm (UCA). The UCA is a standard by which Unicode strings can be compared and ordered.

To request linguistic collation, you must use the SORTSEQ= option in the PROC SORT statement because the SORTSEQ= system option does not support linguistic collation. For example, in the following statements, the SORT procedure collates linguistically, in accordance with the French_France locale:

```sas
options locale=fr_FR;
proc sort data=myfiles.test sortseq=linguistic;
  by name;
run;
```

When linguistic collation is requested, SAS uses the default linguistic collation algorithm that is provided by the ICU for the SAS session locale. This algorithm reflects the language, the local conventions such as data formatting, and the culture for a geographical region. You can modify the algorithm by specifying options in parentheses following the LINGUISTIC keyword. For example, you can specify a different locale, you can specify the CASE_FIRST= option to collate lowercase characters before uppercase characters or vice versa, and so on. Generally, it is not necessary to specify options, because the ICU associates defaults with the various languages and locales. For more information about the linguistic options, see the SORTSEQ= option in “Collating Sequence Option” on page 573 or the SORTSEQ= option in the PROC SORT statement in SAS Viya Data Management and Utility Procedures Guide.

A SAS data set that is sorted linguistically contains a sort indicator that displays the collating sequence LINGUISTIC in the CONTENTS procedure output. Along with the sort indicator, the data set also records a complete description of the linguistic collating sequence in the file's descriptor information, which is also displayed in the CONTENTS procedure output.

---

### Determining the Encoding of a SAS Data Set

#### Using PROC CONTENTS to Display the Encoding of a SAS Data Set

You can display the encoding of a data set by using PROC CONTENTS:

```sas
proc contents data=sashelp.class; run;
```

Here is the output from the PROC CONTENTS code. The encoding is US–ASCII.
Encoding Behavior in a SAS Session

Encoding Support for Data Sets by SAS Release

Data sets that are created in SAS automatically have UTF-8 set in the encoding attribute, which is in the descriptor portion of the file.

Output Processing

When you create a data set in SAS, the encoding is determined as follows:

• If a new output file is created, the data is written to the current session encoding, UTF-8.

• If a new output file is created using the OUTREP= option, the data is written to the file using the default session encoding for the operating system that is specified by the OUTREP= value. For more information, see “OUTREP= Data Set Option” on page 44.

• If a new output file replaces an existing file, the new file inherits the encoding of the existing file. For output processing that replaces an existing file that is from another operating environment or if the existing file has no encoding specified, then the current session encoding is used.

Input Processing

For input (read) processing in SAS, the encoding behavior is as follows:

• Most users choose the default behavior that does not specify an encoding for the input file.

• If the session encoding and the encoding that is specified in the file are incompatible, the data is transcoded to the session encoding. For example, if the encoding specified for the file is LATIN1, SAS Viya transcodes the file from LATIN1 to its session encoding of UTF-8.

• If a file does not have an encoding specified, SAS transcodes the data only if the file’s data representation is different from the current session.

Reading and Writing External Files

SAS reads and writes external files using the current session encoding. SAS assumes that the external file has the same encoding as the session encoding. SAS Viya assumes that the encoding of the file is UTF-8. For example, if you are creating a new SAS data set by reading an external file, SAS assumes that the encoding of the external file and the current session are the same. If the encodings are not the same, the external data could be written incorrectly to the new SAS data set. You need to specify an appropriate ENCODING option. The following example specifies the Shift-JIS encoding:

```plaintext
filename in 'external-file'
  encoding='Shift-JIS';
data mylib.contacts;
infile in;
```
length name $ 30 first $ 30 street $ 60 zip $ 10 city $ 30;
input name first street zip city;
run;

For details about the syntax for the SAS statements that perform input and output processing, see “SAS Options That Transcode SAS Data” on page 20.
Chapter 4
Transcoding for NLS

Overview to Transcoding

Transcoding is the process of converting data from one encoding to another. Transcoding is necessary when the SAS session encoding and the encoding of the data are different. Transcoding is often necessary when you move data between operating environments that use different locales and encoding. UTF-8 is the only SAS session encoding supported by SAS Viya.

The sort order corresponds directly to the arrangement of the code points within the code page.

For example, consider a file that was created under a Linux operating environment that uses the Latin1 encoding and then moved to SAS Viya, which uses the UTF-8 encoding. When the file is processed on SAS Viya, the data is remapped from the Latin1 encoding to the UTF-8 encoding.

Transcoding does not translate between languages; transcoding remaps characters.

To dynamically transcode data between operating environments that use different encodings, an explicit encoding value must be specified. For more information, see Chapter 18, “Encoding Values in SAS Language Elements,” on page 617.
Common Reasons for Transcoding

Some situations where data might commonly be transcoded are:

- sharing data between two different SAS sessions that are running in different locales or in different operating environments
- reading an external file with an encoding other than UTF-8.

SAS Options That Transcode SAS Data

The following SAS options for various language elements enable you to transcode or to override the default encoding behavior. These elements enable you to specify a different encoding for a SAS file or a SAS application or to suppress transcoding.

<table>
<thead>
<tr>
<th>Option</th>
<th>Where Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHARSET=</td>
<td>ODS MARKUP statement</td>
</tr>
<tr>
<td>CORRECTENCODING=</td>
<td>MODIFY statement of the DATASETS procedure</td>
</tr>
<tr>
<td>ENCODING=</td>
<td>%INCLUDE, FILE, FILENAME, INFILE, ODS statements; FILE and INCLUDE commands</td>
</tr>
<tr>
<td>ENCODING=</td>
<td>DATA step</td>
</tr>
<tr>
<td>INENCODING=</td>
<td>LIBNAME statement</td>
</tr>
<tr>
<td>ODSCHARSET=</td>
<td>LIBNAME statement for XML</td>
</tr>
<tr>
<td>ODSTRANTAB=</td>
<td>LIBNAME statement for XML</td>
</tr>
<tr>
<td>OUTENCODING=</td>
<td>LIBNAME statement</td>
</tr>
<tr>
<td>XMLENCODING=</td>
<td>LIBNAME statement for XML</td>
</tr>
</tbody>
</table>

For a list of supported encoding values to use for these options, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.
Transcoding Considerations

Although transcoding usually occurs without problems, there are situations that can affect your data and produce unsatisfactory results. For example:

- One encoding can conflict with another. That is, two encodings can use different code points for the same character or use the same code points for two different characters.

- Characters in one encoding might not be present in another encoding. For example, a specific encoding might not have a character for the dollar sign ($). Transcoding the data to an encoding that does not support the dollar sign would result in the character not printing or displaying.

- The number of bytes for a character in one encoding can be different from the number of bytes for the same character in another encoding. An example is transcoding from a double-byte character set (DBCS) to an SBCS. Therefore, transcoding can result in character value truncation.

- If an error occurs during transcoding so that the data cannot be transcoded back to its original encoding, data can be lost. That is, if you open a data set for update processing, the observation might not be updated. However, if you open the data set for input (read) processing and no output data set is open, SAS issues a warning that can be printed. Processing proceeds and allows a PRINT procedure or other Read operation to show the data that does not transcode.

- CEDA has some processing limitations. For example, CEDA does not support update processing.

- Incorrect encoding can be stamped on a SAS 7 or SAS 8 data set if it is copied or replaced in a SAS Viya session. The incorrect encoding stamp can be corrected with the CORRECTENCODING= option in the MODIFY statement in PROC DATASETS. If a character variable contains binary data, transcoding might corrupt the data.

Compatible and Incompatible Encodings

Overview to Compatible and Incompatible Encodings

ASCII has been the foundation for most encodings, and it is used by most personal computers, minicomputers, and workstations. However, the IBM mainframe uses an EBCDIC encoding. Therefore, ASCII and EBCDIC machines and data are incompatible. Transcoding is necessary if some or all characters in one encoding are different from the characters in the other encoding.

UTF-8 is the only SAS session encoding supported by SAS Viya.

However, to avoid transcoding, you can create a data set and specify an encoding value that SAS does not transcode. For example, if you use the following values in either the ENCODING= data set option or the INENCODING= or the OUTENCODING= option in the LIBNAME statement, transcoding is not performed:
• ANY specifies that no transcoding is desired, even between EBCDIC and ASCII encodings.

    Note: ANY is a synonym for binary. Because the data is binary, the actual encoding is irrelevant.

• ASCIIANY enables you to create a data set that is compatible with all ASCII-based encodings.

• EBCDICANY enables you to create a data set that is compatible with all EBCDIC-based encodings.

You might want to create a SAS data set that contains mixed encodings. An example is both Latin1 and Latin2. You do not want the data transcoded for either input or output processing. By default, data is transcoded to the current session encoding.

Data must be transcoded when the SAS file does not match the SAS Viya session encoding of UTF-8.

In some cases, transcoding is not required because the SAS file and the SAS session have compatible encodings.

**Line-feed Characters and Transferring Data between EBCDIC and ASCII**

Software that runs under ASCII operating environments requires that the end of the line be specified by the line-feed character. When data is transferred from z/OS to a machine that supports ASCII encodings, formatting problems can occur, particularly in HTML output, because the EBCDIC newline character is not recognized. SAS supports two sets of EBCDIC-based encodings for z/OS:

• The encodings that have EBCDIC in their names use the traditional mapping of an EBCDIC line-feed character to an ASCII line-feed character, which can cause data to appear as one stream.

• The encodings that have Open Edition in their names use the line-feed character as the end-of-line character. When the data is transferred to an operating environment that uses ASCII, the EBCDIC newline character maps to an ASCII line-feed character. This mapping enables ASCII applications to interpret the end of the line correctly, resulting in better formatting.

---

### Preventing Transcoding

Some encoding values enable you to create a data set that SAS does not transcode. You might not want to transcode data for input or output processing. You might want to create a SAS library that contains data in mixed encodings instead. An example is both Latin1 and Latin2.

For example, you can avoid transcoding if you use the following values in either the ENCODING= data set option or the INENCODING= or OUTENCODING= option in the LIBNAME statement:

• ANY specifies that no transcoding is desired, even between EBCDIC and ASCII encodings.

    Note: ANY is a synonym for binary. Because the data is binary, the actual encoding is irrelevant.
• ASCIIANY specifies that no transcoding is required between any ASCII-based encodings.

• EBCDICANY specifies that no transcoding is required between any EBCDIC-based encodings.

For more information, see “ENCODING= Data Set Option” on page 41 and “INENCODING= and OUTENCODING= Options” on page 589.

You can prevent transcoding for a specific column of data while the rest of the character data in the data set is transcoded by using the TRANSCODE= option. For more information, see “TRANSCODE= Column Modifier on PROC SQL” on page 592.

---

**Avoiding Character Data Truncation By Using the CVP Engine**

If your data set encoding does not match the encoding of your SAS session, the character data in your data set might need more space in the new encoding. For example, if your SAS session is using a UTF-8 session encoding and you are reading a data set with an encoding of Windows cp 1252 (W LATIN1), some of the characters that require 1 byte in W LATIN1 might require 2 or 3 bytes in UTF-8. To avoid data truncation, your character variables need to expand to a width that is 1.5 times greater than the width of the original data.

When you process a SAS data file that requires transcoding, you can request that the CVP (character variable padding) engine expand character variable lengths so that character data truncation does not occur. (A variable's length is the number of bytes used to store each of the variable's values.)

Character data truncation can occur when the number of bytes for a character in one encoding is different from the number of bytes for the same character in another encoding, such as when a single-byte character set is transcoded to a double-byte character set or to a multi-byte character set (MBCS). An SBCS represents each character in 1 byte, and a DBCS represents each character in 1 or 2 bytes. An MBCS represents characters in a varying length from 1 to 4 bytes. For example, when transcoding from W LATIN2 to a Unicode encoding, such as UTF-8, the variable lengths (in bytes) might not be sufficient to hold the values, and the result is character data truncation.

Using the CVP engine, you specify an expansion amount so that variable lengths are expanded before transcoding, and then the data is processed. Think of the CVP engine as an intermediate engine that prepares the data for transcoding. After the lengths are increased, the primary engine, such as the default base engine, actually processes the file.

The CVP engine is a read-only engine for SAS data files only. You can request character variable expansion (for example, with the LIBNAME statement) in either of the following ways:

• explicitly specify the CVP engine and use the default expansion of 1.5 times the variable lengths.

• implicitly specifying the CVP engine with the LIBNAME options CVPBYTES= or CVPMULTIPLIER=. These options specify the expansion amount. In addition, you can use the CVPPROCESS= option to specify the primary engine to process the SAS file; the default is the default SAS engine.
For example, the following LIBNAME statement explicitly assigns the CVP engine. Character variable lengths are increased using the default expansion, which multiples the lengths by 1.5. For example, a character variable with a length of 10 has a new length of 15, and a character variable with a length of 100 has a new length of 150:

```
libname expand cvp ' SAS data-library';
```

**Note:** The expansion amount must be large enough to accommodate any expansion. Otherwise, truncation still occurs. An error is written to the SAS log.

**Note:** For processing that conditionally selects a subset of observations by using a WHERE expression, using the CVP engine might affect performance. Processing the file without using the CVP engine might be faster than processing the file using the CVP engine. For example, if the data set has indexes, the indexes are not used in order to optimize the WHERE expression if you use the CVP engine.

**Note:** The CVP engine does not adjust formats or informats automatically. If you have attached formats to your data variables, you might have truncation issues. Adjust these formats manually or programmatically.

**Note:** CVP creates a read-only copy of the data. If you want to save a permanent copy of the data, you need to create a new data set.

For more information and examples, see “CVPBYTES=, CVPENGINE=, and CVPMULTIPLIER= Options” on page 579.
Chapter 5
Time Zones

Overview of SAS Time Zone IDs

SAS must process local and international time and date values to accommodate international customers. This chapter explains time zones and how SAS processes the following:

• time zones
• Daylight Saving Time (DST)
• local time
• SAS datetime values

Specifying Time Zones in SAS

Definitions

Daylight Saving Time (DST)
Also referred to as Summer Time, Daylight Saving Time (DST) is a way of making better use of the daylight in the evenings by setting the clocks forward one hour during the longer days of summer and back again in the fall. DST begins in the northern hemisphere between March–April and ends between September–November. Standard time begins in the northern hemisphere between September–November and ends between March–April. DST begins in the southern hemisphere between September–November and ends between March–April. Standard time begins in the southern hemisphere between March–April and ends between September–November.
Many of the countries in the northern hemisphere observe DST. DST is not a standard for all countries.

Local time
-Specifies the local time when a time zone is not specified by the TIMEZONE= system option.

Time zone
-An area of the earth’s surface in which an identical and standard time is used. It is usually referred to as the local time. Time zones have political and geographical boundaries and might be adjusted for the convenience of local populations. Some geographically large countries, such as India and China, use only one time zone, but other large countries, such as Russia and the United States, have more than one time zone.

Time zone ID
-Specifies a region and area separated by a forward slash (/). Asia/Tokyo is a time zone ID. Time zone IDs are compatible with Java time zones. For a list of time zone IDs, see Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629.

Time zone name
-Specifies three or four characters that indicate a time zone. For a list of time zone names, see Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629.

Time zone offset
-Specifies the number of hours and minutes that a time zone is off from the Universal Coordinated Time (UTC) in the form +|-hh:mm or +|-hhmm.

User local time
-Specifies the local time for the time zone that is specified by the TIMEZONE= system option.

Universal Coordinated Time (UTC)
-Specifies the time at the zero meridian, near Greenwich, England. UTC is a datetime value that uses the ISO 8601 basic form yyyy-mm-ddThh:mm:ss±|-hh:mm or the ISO 8601 extended form yyyy-mm-ddThh:mm:ss±|-hh:mm.

About Time Zones in SAS

SAS datetime values are measured in seconds, beginning with 01Jan1960 00:00:00 local time. For example, the SAS datetime value for 01Jan1960 00:00:00 in England is 0. In Japan, the SAS datetime value for 01Jan1960 00:00:00 is also 0. There is a nine-hour difference between England and Japan. At the same point in time, the datetime in England and the datetime in Japan cannot be 0. In order to work with absolute time and datetime values, SAS supports the UTC date, time, and datetime values in time zones.

You can name a time zone either by specifying a time zone ID or a time zone name. Time zone IDs name a region and an area in the form region/area. An example of a time zone ID is America/New_York. A time zone name specifies the time zone. An example of a time zone name is EST for Eastern Standard Time. When a specific time zone changes the time for DST or summer time, a separate time zone name is available for that alternate time. PST is Pacific Standard Time. PDT is Pacific Daylight Time. EET is Eastern European Time. EEST is Eastern European Summer Time. When you specify a time zone ID, SAS determines the time using DST. You do not need to determine whether the region/area uses alternate times. For a list of time zone IDs and time zone names, see Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629.

When you specify a time zone, SAS adds a time-zone-specific timestamp to data sets and SAS catalogs when the data set or catalog is created or modified. The time-zone-
specific timestamp is also added to the SAS log when SAS starts and to the output at execution. The SAS timestamp constant enables you to specify a timestamp using the ISO 8601 standard. Here is a timestamp using the SAS timestamp constant:

\[
timestamp='2013-05-17T09:15:30-05:00'dt;
\]

When you specify a SAS timestamp constant, SAS converts the timestamp to a local datetime value by using the current time zone and the time zone offset.

Time zone settings affect the `TIME( )` function, the `TODAY( )` function, the `DATE( )` function, and the `DATETIME( )` function. When a time zone is set, the date and datetime values use the current time zone.

### Tasks and SAS Language Elements for Time Zone Processing

#### Set a Time Zone

To set a time zone, use the `TIMEZONE=` system option:

\[
\text{options timezone='asia/tokyo';}
\]

Use time zone names or time zone IDs for the value of the option. Enclose the value in quotation marks. For time zone names and time zone IDs, see Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629. For more information, see “TIMEZONE= System Option” on page 562.

#### Determine a Time Zone ID Offset

You use the `TZONEOFF( )` function to determine a time zone name or time zone ID offset:

- The `TZONEOFF( )` function returns the time zone offset for the current time zone.
- The `TZONEOFF('time-zone-ID')` function returns the time zone offset for the `'time-zone-ID'`.

This program returns the time zone offset for the current time zone (EST) and for Tokyo:

\[
data _null_;  
  o1=tzoneoff();  
  o2=tzoneoff('asia/tokyo');  
  put o1 time.;  
  put o2 time.;  
run;
\]

Here is the output in the SAS log:

```
-5:00:00
9:00:00
```

To find the difference between two time zones, you can use the `ABS( )` function:

\[
diff=\text{abs}(\text{tzoneoff('america/new_york')} - \text{tzoneoff('asia/tokyo')});
\]

For more information, see “TZONEOFF Function” on page 388.

#### Determine a Time Zone ID or Time Zone Name

Use these functions to determine a time zone name or time zone ID:

- The `TZONEID( )` function returns the current time zone ID.
• The TZONENAME( ) function returns the current time zone name based on a time zone ID and a SAS datetime value or based on a SAS datetime value only.

Here are some examples of using these functions. March 10 of 2013 is the first day of DST:

options timezone='America/Chicago';
data _null_;  
tzid=tzoneid();  
put 'Current time zone is ' tzid;  
tzn=tzonename('america/los_angeles');  
put 'Time zone for Los Angeles: ' tzn;  
tznST=tzonename('america/los_angeles','10mar2013:01:00:00'dt);  
put 'Time zone for Los Angeles standard time: ' tznST;  
tznDT=tzonename('america/los_angeles','10mar2013:02:00:00'dt);  
put 'Time zone for Los Angeles daylight time: ' tznDT;  
tznSDT=tzonename('10mar2013:02:00:00'dt);  
put 'Time zone name for this SAS datetime: ' tznSDT;  
run;

Here is the output:

Current time zone is AMERICA/CHICAGO
Time zone for Los Angeles: PST
Time zone for Los Angeles standard time: PST
Time zone for Los Angeles daylight time: PDT
Time zone name for this SAS datetime: CDT

For more information, see “TZONEID Function” on page 385 and “TZONENAME Function” on page 386.

**Convert Datetime Values between SAS and UTC**

These functions convert SAS datetime values to UTC and UTC to SAS datetime values:

• The TZONE2U( ) converts a SAS datetime value to a UTC datetime value.

• The TZONEU2S( ) function converts a UTC datetime value to a SAS datetime value.

Here are some examples of using these functions:

options timezone='est';
data _null_;  
put ' The time zone is EST';  
diff=abs(tzoneoff('america/new_york') - tzoneoff('europe/london'));  
put ' New York-London difference: ' diff time.;  
diff=abs(tzoneoff('america/new_york') - tzoneoff('asia/tokyo'));  
put ' New York-Tokyo difference: ' diff time.;  
put ' The SAS datetime is 2013-03-15T09:15:00+00:00 ';
put ' ';
put ' Change a SAS datetime to a UTC value ';
put ' ';
put ' The time zone offset +00:00 is for London ';
put ' Subtract the 5 hours for the EST time zone offset';
stu1=zones2u('2013-03-15T09:15:00+00:00'dt);
put ' STU1 Using E8601DX:' stu1 e8601dx.;
put ' ';
put ' 2013-03-15 9:15 AM in Tokyo is 2013-03-14 7:15 PM in New York';
put ' Subtract the 5 hours for the EST time zone offset';
specifying-time-zones-in-sas

The time zone is EST
New York-London difference: 5:00:00
New York-Tokyo difference: 14:00:00
The SAS datetime is 2013-03-15T09:15:00+00:00

Change a SAS datetime to a UTC value

The time zone offset +00:00 is for London
Subtract the 5 hours for the EST time zone offset
STU1 Using E8601DX: 2013-03-15T04:15:00-05:00

2013-03-15 9:15 AM in Tokyo is 2013-03-14 7:15 PM in New York
Subtract the 5 hours for the EST time zone offset
STU2 Using E8601DX: 2013-03-14T14:15:00-05:00

Change a UTC to a SAS datetime value.

+00:00 is the time zone offset for London.
Subtract the 5 hours for the EST time zone offset
UTS1 Using DATETIME: 14MAR13:23:15:00

9:15:00+00:00 is 18:15:00 in Tokyo.
Subtract the 5 hours for the EST time zone offset
UTS2 Using DATETIME: 15MAR13:13:15:00

For more information, see “TZONES2U Function” on page 389.

Write ISO 8601 Time and Datetime Values Based on the Time Zone

These formats write ISO 8601 time and datetime values using basic and extended notation. The time, the UTC offset, or both are based on the value of the TIMEZONE= system option:

- The B8601TX. and E8601TX. formats convert a UTC time value to a user’s local time and write the time value with a time zone offset.
- The B8601DX. and E8601DX. formats convert a UTC datetime value to a user’s local time and write the datetime value with a time zone offset.
- The B8601LX. and E8601LX. formats write a local datetime value using the UTC offset for the user’s local time zone.

This program formats time and datetime values based on the time zone ID Australia/Sydney:
Write SAS Datetime Values Using a Time Zone Offset

These formats write SAS datetime values using a UTC offset based on the value of the TIMEZONE= system option:

- The NLDATMTZ. format writes a SAS datetime value using the form `ddmmmyyyy:hh:mm:ss +|- hhmm.`
- The NLDATMZ. format writes a SAS time value using the form `hh:mm:ss +|- hhmm.`
- The NLDATMWZ. format writes a SAS datetime value as the day of the week, the month, the day, the year, and AM | PM in the form `day-of-week, month-name dd, yyyy AM|PM +hhmm.`

This program formats SAS time and datetime values using a time zone offset:

```sas
options timezone='Indian/Maldives';
data _null_;  
  st='18:33:40't;  
  sdt='2013-03-17T14:30:22+00:00'dt;  
  put 'Time NLDATMTZ:' st nldatmtz.;  
  put 'SAS datetime NLDATMZ:' sdt nldatmz.;  
  put 'SAS datetime NLDATMWZ:' sdt nldatmwz.;  
run;
```

Here is the output:

```
Time NLDATMTZ: 18:33:40 +0500
SAS datetime NLDATMZ: 2013-03-17 19:30:22 +0500
SAS datetime NLDATMWZ: Sunday, March 17, 2013 07:30:22 PM +0500
```

For more information, see “NLDATMTZ Format” on page 138, “NLDATMZ Format” on page 151, and “NLDATMWZ Format” on page 141.
Time Zone Example

This example shows the arrival time of a flight from Los Angeles to Tokyo:

```sas
/* Set the time zone */
options timezone='America/Los_Angeles';
data depart;
/* Set the departure time */
   depart='2013-05-17T09:15:00-08:00' dt;
   put 'Depart Los Angeles: ' depart nldatmwz.;
/* Set the flight time */
   ftime='13:00' t;
   put 'Flight time=' ftime time.;
   utc=depart+ftime;
   put 'Arrive PST=' utc nldatmwz.;
   put 'Arrive UTC=' utc nldatmwz.;
run;
/* Set the time zone for Tokyo */
options timezone='Asia/Tokyo';
data arrive;
   set depart;
   put 'Arrive in Tokyo ' utc nldatmwz.;
run;
```

Here is the output:
/* Set the time zone */
options timezone='America/Los_Angeles';
data depart;
/* Set the departure time */
depart='2013-05-17T09:15:00-08:00'dt;
put 'Depart Los Angeles: ' depart nldatmwz.;
/* Set the flight time */
ftime='13:00't;
put 'Flight time=' ftime time.;
utc=depart+ftime;
put 'Arrive PST=' utc nldatmwz.;
run;

Depart Los Angeles: Friday, May 17, 2013 10:15:00 AM -0700
Flight time=13:00:00
Arrive PST=Friday, May 17, 2013 11:15:00 PM -0700
Arrive UTC=Friday, May 17, 2013 11:15:00 PM -0700
NOTE: The data set WORK.DEPART has 1 observations and 3 variables.
NOTE: DATA statement used (Total process time):
       real time           0.01 seconds
       cpu time            0.01 seconds

/* Set the time zone for Tokyo */
options timezone='Asia/Tokyo';
data arrive;
set depart;
put 'Arrive in Tokyo ' utc nldatmwz.;
run;

Arrive in Tokyo Friday, May 17, 2013 11:15:00 PM +0900
NOTE: There were 1 observations read from the data set WORK.DEPART.
NOTE: The data set WORK.ARRIVE has 1 observations and 3 variables.
NOTE: DATA statement used (Total process time):
       real time           0.01 seconds
       cpu time            0.01 seconds
Part 2

Autocall Macros for NLS

Chapter 6

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Chapter 6
Dictionary of Autocall Macros for NLS

Autocall Macro Entries by Category

The following table provides brief descriptions of the SAS NLS autocall macros. For more detailed descriptions, see the NLS entry for each macro.

<table>
<thead>
<tr>
<th>Category</th>
<th>Language Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBCS</td>
<td>%KLOWCASE and %QKLOWCAS Autocall Macros (p. 35)</td>
<td>Change uppercase characters to lowercase.</td>
</tr>
<tr>
<td></td>
<td>%KTRIM and %QKTRIM Autocall Macros (p. 36)</td>
<td>Trim trailing blanks.</td>
</tr>
<tr>
<td></td>
<td>%KVERIFY Autocall Macro (p. 36)</td>
<td>Returns the position of the first character unique to an expression.</td>
</tr>
</tbody>
</table>

Dictionary

%KLOWCASE and %QKLOWCAS Autocall Macros

Change uppercase characters to lowercase.

Category: DBCS

Requirement: MAUTOSOURCE system option
%KLOWCASE (text | text expression)

%QKLOWCAS (text | text expression)

Details
The %KLOWCASE and %QKLOWCAS macros change uppercase alphabetic characters to their lowercase equivalents. If the argument might contain a special character or mnemonic operator, listed below, use %QKLOWCAS.

%KLOWCASE returns a result without quotation marks, even if the argument has quotation marks. %QKLOWCAS produces a result with the following special characters and mnemonic operators masked so that the macro processor interprets them as text instead of as elements of the macro language:

& % ` " ( ) + - * / < > = ¬ ^ ~ ; , blank AND OR NOT EQ NE LE LT GE GT IN

Autocall macros are included in a SAS library. This library might not be installed at your site or might be a site-specific version. If you cannot access this macro or if you want to find out if the library is a site-specific version, see your on-site SAS support personnel.

%KTRIM and %QKTRIM Autocall Macros
Trim trailing blanks.

Category: DBCS
Requirement: MAUTOSOURCE system option

%KTRIM (text | text expression)

%QKTRIM (text | text expression)

Details
The KTRIM macro and the QKTRIM macro trim trailing blanks. If the argument contains a special character or mnemonic operator, listed below, use %QKTRIM.

QKTRIM produces a result with the following special characters and mnemonic operators masked so that the macro processor interprets them as text instead of as elements of the macro language:

& % ` " ( ) + - * / < > = ¬ ^ ~ ; , blank AND OR NOT EQ NE LE LT GE GT IN

Autocall macros are included in a SAS library. This library might not be installed at your site or might be a site-specific version. If you cannot access this macro or if you want to find out if the library is a site-specific version, see your on-site SAS support personnel.

%KVERIFY Autocall Macro
Returns the position of the first character unique to an expression.

Category: DBCS
Requirement: MAUTOSOURCE system option
Syntax

%KVERIFY (source, excerpt)

Syntax

source
   is text or a text expression that you want to examine for characters that do not exist in excerpt.

excerpt
   is text or a text expression that defines the set of characters that %KVERIFY uses to examine source.

Details

%KVERIFY returns the position of the first character in source that is not also present in excerpt. If all characters in source are present in excerpt, %KVERIFY returns 0.

Autocall macros are included in a SAS library. This library might not be installed at your site or might be a site-specific version. If you cannot access this macro or if you want to find out if the library is a site-specific version, see your on-site SAS support personnel.
Part 3

Data Set Options for NLS

Chapter 7

Dictionary of Data Set Options for NLS

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Chapter 7
Dictionary of Data Set Options for NLS

Data Set Options by Category

NLS affects the data set control category of options for selected data set options. The following table provides brief descriptions of the data set options. For more detailed descriptions, see the dictionary entry for each data set option.

<table>
<thead>
<tr>
<th>Category</th>
<th>Language Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Set Control</td>
<td>ENCODING= Data Set Option (p. 41)</td>
<td>Overrides the encoding to use for reading or writing a SAS data set.</td>
</tr>
<tr>
<td></td>
<td>OUTREP= Data Set Option (p. 44)</td>
<td>Specifies the data representation for the output SAS data set.</td>
</tr>
</tbody>
</table>

Dictionary

ENCODING= Data Set Option

Overrides the encoding to use for reading or writing a SAS data set.

Valid in: DATA step and PROC steps

Category: Data Set Control

Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.
Syntax

ENCODING = ANY | ASCIIANY | EBCDICANY | encoding-value

Syntax Description

ANY
specifies that no transcoding occurs.

Note  ANY is a synonym for binary. Because the data is binary, the actual encoding
is irrelevant.

ASCIIANY
specifies that no transcoding occurs when the mixed encodings are ASCII encodings.

EBCDICANY
specifies that no transcoding occurs when the mixed encodings are EBCDIC
encodings.

encoding-value
specifies an encoding value.

See  Chapter 3, “Encoding for NLS,” on page 9

Details

The value for ENCODING= indicates that the SAS data set has a different encoding
from the current session encoding. When you read data from a data set, SAS transcodes
the data from the specified encoding to the session encoding. When you write data to a
data set, SAS transcodes the data from the session encoding to the specified encoding.

UTF-8 is the only SAS session encoding supported by SAS Viya.

Input Processing

By default, encoding for input processing is determined as follows:

• If the session encoding and the encoding that is specified in the file are different,
  SAS transcodes the data to the session encoding.

• If a file has no encoding specified, but the file's data representation is different from
  the encoding of the current session, then SAS transcodes the data to the current
  session.

Output Processing

By default, encoding for output processing is determined as follows:

• Data is written to a file using the encoding of the current session, except when a
different output representation is specified using the OUTREP= data set option, the
OUTENCODING= option in the LIBNAME statement, or the ENCODING= data set
option.

• If a new file replaces an existing file, then the new file inherits the encoding of the
  existing file.

• If an existing file is replaced by a new file that was created under a different
  operating environment or that has no encoding specified, the new file uses the
  encoding of the current session.

Note: Character metadata and data output appears garbled if you specify a different
encoding from where the data set was created. In this example, the data set to be
printed is internally encoded as ASCII. However, the data set option specifies an
EBCDIC encoding. SAS attempts to transcode the data from EBCDIC to ASCII, but
the data is already in ASCII. The result is garbled data.

data a;
  x=1;
  abc='abc';
run;
proc print data=a (encoding="ebcdic");
run;

Note: The following values for ENCODING= are invalid:
  • UCS2
  • UCS4
  • UTF16
  • UTF32

Comparisons

• Session encoding is specified using the ENCODING= system option or the
  LOCALE= system option, with each operating environment having a default
  encoding.UTF-8 is the only SAS session encoding supported by SAS Viya.

• You can specify encoding for a SAS library by using the LIBNAME statement's
  INENCODING= option (for input files) and the OUTENCODING= option (for
  output files). If both the LIBNAME statement option and the ENCODING= data set
  option are specified, SAS uses the data set option.

Examples

Example 1: Creating a SAS Data Set with Mixed Encodings and with
  Transcoding Suppressed

By specifying the data set option ENCODING=ANY, you can create a SAS data set that
contains mixed encodings, and suppress transcoding for either input or output
processing.

In this example, the new data set MYFILES.MIXED contains some data that uses the
Latin1 encoding, and some data that uses the Latin2 encoding. When the data set is
processed, no transcoding occurs. For example, the correct Latin1 characters in a Latin1
session encoding and correct Latin2 characters in a Latin2 session encoding are
displayed.

libname myfiles 'SAS data-library';
data myfiles.mixed (encoding=any);
  set work.latin1;
  set work.latin2;
run;

Example 2: Creating a SAS Data Set with a Particular Encoding

For output processing, you can override the current session encoding. This action might
be necessary, for example, if the data set is being created for use in a SAS environment
other than SAS Viya.

For example, if the current session encoding is UTF-8, you can specify
ENCODING=WLATIN2 in order to create the data set that uses the encoding Wlatin2.
The following statements tell SAS to write the data to the new data set using the WLatin2
encoding instead of the session encoding. The encoding is also specified in the descriptor portion of the file.

libname myfiles 'SAS data-library';
data myfiles.difencoding (encoding=wlatin2);
  .
  .
  .
run;

See Also

• Conceptual discussion in Chapter 3, “Encoding for NLS,” on page 9

Options in Statements and Commands:

• “ENCODING= Option” on page 586
• “INENCODING= and OUTENCODING= Options” on page 589

System Options:

• “ENCODING System Option” on page 551
• “LOCALE System Option” on page 552

OUTREP= Data Set Option

Specifies the data representation for the output SAS data set.

Valid in: DATA step and PROC steps
Category: Data Set Control
See: “OUTREP= Data Set Option” in SAS Viya Data Set Options: Reference.

Syntax

OUTREP= format

See Also

“OUTREP= Data Set Option” in SAS Viya Data Set Options: Reference
Part 4

Formats for NLS

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Chapter 8
Overview to NLS Formats

International Date and Datetime Formats

SAS supports international formats that are equivalent to some of the most commonly used English-language date formats. In each case the format works like the corresponding English-language format. Only the maximum, minimum, and default widths are different.

Table 8.1  International Date and Datetime Formats

<table>
<thead>
<tr>
<th>Language</th>
<th>English Format</th>
<th>International Format</th>
<th>Min</th>
<th>Max</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaans (AFR)</td>
<td>DATE.</td>
<td>NLDATE.</td>
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<td>200</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>DATETIME.</td>
<td>NLDATM.</td>
<td>10</td>
<td>200</td>
<td>30</td>
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<tr>
<td></td>
<td>DOWNNAME.</td>
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<td>4</td>
<td>200</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>MONNAME.</td>
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</tr>
<tr>
<td></td>
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<td>9</td>
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<tr>
<td>Language</td>
<td>English Format</td>
<td>International Format</td>
<td>Min</td>
<td>Max</td>
<td>Default</td>
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<td>---------</td>
</tr>
<tr>
<td>Catalan (CAT)</td>
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</tr>
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<td><strong>Finnish (FIN)</strong></td>
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<td>4</td>
<td>200</td>
<td>9</td>
<td></td>
</tr>
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<td>WORDDATX.</td>
<td>NLDATE.</td>
<td>10</td>
<td>200</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>French (FRA)</strong></td>
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<td></td>
<td></td>
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<tr>
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<tr>
<td>MONNAME.</td>
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<tr>
<td>MONYY.</td>
<td>NLDATEYM.</td>
<td>6</td>
<td>200</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>WEEKDATX.</td>
<td>NLDATEW.</td>
<td>10</td>
<td>200</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>WEEKDAY.</td>
<td>NLDATEN.</td>
<td>4</td>
<td>200</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>WORDDATX.</td>
<td>NLDATE.</td>
<td>10</td>
<td>200</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>German (DEU)</strong></td>
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<td>105</td>
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<tr>
<td></td>
<td>DOWNNAME.</td>
<td>NLDATEWN.</td>
<td>4</td>
<td>200</td>
<td>9</td>
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</tr>
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<td>WORDDATX.</td>
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<td>200</td>
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</tbody>
</table>
Currency Representation

Overview to Currency

Currency is the medium of exchange, which is specific to a country. SAS provides formats and informats for reading and writing currency.

U.S. Dollars

The DOLLARw.d formats and informats were first introduced to read and write American currency. DOLLARw.d

- uses the dollar sign ($) currency symbol to precede U.S. currency
- uses a comma (,) as the thousands separator and a dot (.) as the decimal separator.

Example:

$12,345.00

DOLLARXw.d also writes currency with a leading dollar sign ($), but it uses a dot (.) as the thousands separator and a comma (,) as the decimal separator. The reversal of the dot and comma for currency formatting is a convention used in many European countries.

Example:

$12.345,00

Limitations of the DOLLAR formats and informats are

- lack of support for all currency symbols is a limitation
- reversal of the dot and comma for currency formatting is not used by all European countries
- appearance of the currency symbol varies by computer (an EBCDIC-based computer and an ASCII-based computer render characters differently).

Euros

The EUROw.d formats and informats were introduced to support the euro currency that was established by the European Monetary Union (EMU), which was formed in 1999.

EUROw.d

Example:

options locale=English_UnitedKingdom;
data _null_;   x=12345;   put x euro10.2;   run;

Output:

E12,345.00
Euro format is not locale-sensitive. It uses a comma (,) as the thousands separator and a dot (.) as the decimal separator.

**Customized Currency Representations**

To create a customized currency representation, you can use the FORMAT procedure. The following example shows the creation of unique formats for the Australian dollar, the Swiss franc, and the British pound. For more information about the FORMAT procedure, see *SAS Viya Data Management and Utility Procedures Guide*.

**Example Code 8.1  SAS Code that Customizes Currency Representations**

```sas
proc format;

   picture aud low-<0='0,000,000,009.00'
               (prefix='-AU$' mult=100)
          0–high='0,000,00,009.00 '
               (prefix='AU$' mult=100);

   picture sfr low-<0='0,000,000,009.00'
               (prefix='-SFr.' mult=100)
          0–high='0,000,00,009.00 '
               (prefix='-SFr.' mult=100);

   picture bpd low-<0='0,000,000,009.00'
               (prefix='-BPd.' mult=100)
          0–high='0,000,00,009.00 '
               (prefix='BPd.' mult=100);

run;

data currency;
  input aud sfr bpd 12.2;
  datalines;
  12345 12345 12345
  0 0 0
  -12345 -12345 -12345
  ;

proc print data=currency noobs;
  var aud sfr bpd;
  format aud aud. sfr sfr. bpd bpd.;
  title 'Unique Currency Formats';
run;
```

Customizing currency representations offers flexibility, but they require a programming solution.
Localized National and International Currency Representations

The NLMNYw.d and NLMNYIw.d formats and informats were introduced to represent localized currency in two forms:

Localized national currency representation
reflects the customs and conventions of the locale. National formats are specified using the NLMNYw.d formats and informats. You must also use the LOCALE= option to specify the locale when using the NLMNYw.d formats and informats.

Example:

```sas
options locale=english_UnitedStates;
data _null_;   
x=12345;   
put x nlmny15.2;   
run;
```

Output:

$12,345.00

Selected national currency representations follow:

Table 8.2  Localized National Currency Representations

<table>
<thead>
<tr>
<th>LOCALE=</th>
<th>Currency</th>
<th>National Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>English_UnitedStates</td>
<td>U.S. dollars</td>
<td>$12,345.00</td>
</tr>
<tr>
<td>French_Canada</td>
<td>Canadian dollars</td>
<td>12 345,00 $</td>
</tr>
<tr>
<td>French_France</td>
<td>Euros</td>
<td>12 345,00 €</td>
</tr>
<tr>
<td>French_Switzerland</td>
<td>Swiss francs</td>
<td>SFr. 12'345.00</td>
</tr>
<tr>
<td>German_Germany</td>
<td>Euros</td>
<td>12.345,00 €</td>
</tr>
<tr>
<td>German_Luxembourg</td>
<td>Euros</td>
<td>12.345,00 €</td>
</tr>
<tr>
<td>Spanish_Spain</td>
<td>Euros</td>
<td>12.345,00 €</td>
</tr>
<tr>
<td>Spanish_Venezuela</td>
<td>Venezuelan bolivars</td>
<td>VEF12.345,00</td>
</tr>
</tbody>
</table>

The localized renderings show the native customs for representing currency. For example, although these selected EMU countries might use the same euro currency, their depiction of the currency varies. French_France uses no thousands separator but uses a comma as a decimal separator, while German_Germany and Spanish_Spain use a dot as a thousands separator and a comma as a decimal separator.

Localized international currency representation
conforms to ISO standard 4217. International forms are specified using the NLMNYIw.d formats and informats. International forms are commonly used to show a comparison of world currencies (for example, airline ticket, trade, and stock market pricing). You must also use the LOCALE= option to specify the locale when using...
the NLMNYIw.d formats and informats. The letter “I,” which signifies “International,” is appended to the format and informat names. Here is an example:

```plaintext
options locale=english_UnitedStates;
data _null_; 
   x=12345; put x nlmnyi15.2; 
run;
```

Output:
USD12,345.00

Example:
Selected international currency representations follow:

Table 8.3  International Currency Representations by Locale (ISO Standard 4217)

<table>
<thead>
<tr>
<th>LOCALE=</th>
<th>Currency</th>
<th>International Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>English_UnitedStates</td>
<td>U.S. dollars</td>
<td>USD12,345.00</td>
</tr>
<tr>
<td>French_Canada</td>
<td>Canadian dollars</td>
<td>12 345,00 CAD</td>
</tr>
<tr>
<td>French_France</td>
<td>Euros</td>
<td>12 345,00 EUR</td>
</tr>
<tr>
<td>French_Luxembourg</td>
<td>Euros</td>
<td>12,345,00 EUR</td>
</tr>
<tr>
<td>German_Germany</td>
<td>Euros</td>
<td>12,345,00 EUR</td>
</tr>
<tr>
<td>German_Switzerland</td>
<td>Swiss francs</td>
<td>CHF 12'345.00</td>
</tr>
<tr>
<td>Spanish_Spain</td>
<td>Euros</td>
<td>12,345,00 EUR</td>
</tr>
<tr>
<td>Spanish_Venezuela</td>
<td>Venezuelan bolivars</td>
<td>VEF12,345,00</td>
</tr>
</tbody>
</table>

The international renderings also reflect native customs for representing currency. For example, not every locale uses a comma as the thousands separator and a dot as the decimal separator. When used, the ISO currency code placement varies by locale. The EMU countries put the currency code after the currency, while English_UnitedStates, German_Switzerland, and Spanish_Venezuela precede the currency with the ISO code.


A primary limitation of using localized national and international currency representations is their dependence on a value for the LOCALE= system option.

**Unique National and International Monetary Representations**

The NLMNLISOw.d and NLMNIISOw.d formats and informats were introduced to uniquely represent each currency without having to also use the LOCALE= option. Each currency is specified by a unique ISO standard 4217 currency code.
Unique national monetary representation
is specified by the unique ISO currency code. National formats are specified using
the NLMNLIISOw.d formats and informats. In the following example, USD is the
ISO currency code for American dollars.

Note: When using the NLMNLIISOw.d formats and informats, the LOCALE= option
is optional.

Example: data _null_; x=12345; put x nlmnlusd15.2; run;
Output: US$12,345.00

Selected unique national currency representations follow:
In this example, locale is specified as fr_FR.

data _null_; x=12345; put x nlmnleur15.2; run;
Output: €12,345.00

Table 8.4 Unique Currency Representations by ISO Currency Code

<table>
<thead>
<tr>
<th>ISO Currency Code</th>
<th>Currency</th>
<th>National Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD</td>
<td>U.S. dollars</td>
<td>US$12,345.00</td>
</tr>
<tr>
<td>CAD</td>
<td>Canadian dollars</td>
<td>CA$12,345.00</td>
</tr>
<tr>
<td>EUR</td>
<td>Euros</td>
<td>€12,345.00</td>
</tr>
<tr>
<td>CHF</td>
<td>Swiss francs</td>
<td>SFr.12,345.00</td>
</tr>
<tr>
<td>EUR</td>
<td>Euros</td>
<td>€12,345.00</td>
</tr>
<tr>
<td>EUR</td>
<td>Euros</td>
<td>€12,345.00</td>
</tr>
<tr>
<td>EUR</td>
<td>Euros</td>
<td>€12,345.00</td>
</tr>
<tr>
<td>VEB</td>
<td>Venezuelan bolivars</td>
<td>BsF.12,345.00</td>
</tr>
</tbody>
</table>

A currency symbol or a currency code precedes most currencies. Also used are a
comma as the thousands separator and a dot as the decimal separator. If the currency
symbol of the local currency is not supported in the current SAS session encoding,
the NLMNLxxxw.d format formats the value with the three-letter ISO currency code.

Unique international monetary representation
is specified by the unique ISO currency code. International formats are specified
using the NLMNIISOw.d formats and informats. International formats are commonly
used to show a comparison of world currencies (for example, airline ticket, trade,
and stock market pricing). The letter “I”, which signifies “International”, is appended
to the format and informat names. In the following example, USD is the ISO
currency code for American dollars.

Note: When using the NLMNIISOw.d formats and informats, do not use the
LOCALE= option to specify the locale.
Example: `data _null_; x=12345; put x nlmniusd15.2; run;` Output: USD12,345.00

Selected international currency representations follow:

<table>
<thead>
<tr>
<th>ISO Currency Code</th>
<th>Currency</th>
<th>International Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD</td>
<td>U.S. dollars</td>
<td>USD12,345.00</td>
</tr>
<tr>
<td>CAD</td>
<td>Canadian dollars</td>
<td>CAD12,345.00</td>
</tr>
<tr>
<td>EUR</td>
<td>Euros</td>
<td>EUR12,345.00</td>
</tr>
<tr>
<td>CHF</td>
<td>Swiss francs</td>
<td>CHF12,345.00</td>
</tr>
<tr>
<td>EUR</td>
<td>Euros</td>
<td>EUR12,345.00</td>
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<tr>
<td>EUR</td>
<td>Euros</td>
<td>EUR12,345.00</td>
</tr>
<tr>
<td>EUR</td>
<td>Euros</td>
<td>EUR12,345.00</td>
</tr>
<tr>
<td>VEB</td>
<td>Venezuelan bolivars</td>
<td>Not found</td>
</tr>
</tbody>
</table>

The international renderings precede the currency with the appropriate ISO code. Also used are a comma as the thousands separator and a dot as the decimal separator.

**Example: Representing Currency in National and International Formats**

This SAS program uses the exchange rates for selected Asia-Pacific countries against the U.S. dollar. In the output, each country's currency is represented using a national format and an international format.

**Example Code 8.2  SAS Code that Formats National and International Currency Formats**

```
data curr;
  input ex_date mmddyy. usd aud hkd jpy sgd 12.2;
datalines;
061704  1.00000  1.45349  7.79930  110.110  1.71900
;
proc print data=curr noobs label;
  var ex_date usd aud hkd jpy sgd;
```
These exchange rates, which were effective June 17, 2004, are specified as data in the SAS program. These NLML/ISO formats are applied to each of the numeric data items that are specified in the INPUT statement. These formats show currencies in the appropriate national formats.

3. These NLML/ISO formats are applied to each of the numeric data items that are specified in the INPUT statement. These formats show currencies in the appropriate international formats.

**Figure 8.1 National and International Format Output**
### Exceptions for Date and Time Default Widths

This table lists the recommended widths for UTF-8.

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<th>Locale</th>
<th>Format</th>
<th>Default Width</th>
<th>Recommended Width (≥)</th>
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<td>11</td>
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<td>30</td>
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## Chapter 9

### Dictionary of Formats for NLS

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NLPCTF Format .......................................................... 232
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NLSTMON Format ....................................................... 237
NLSTRQTR Format ....................................................... 238
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NLTIMATE Format ....................................................... 240
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Categories of NLS Formats

Some formats run in SAS only, and some formats run in SAS and on the CAS engine. If CAS is specified for the format category, then the format runs in SAS and on the CAS server. If CAS is not specified for the format category, then the format runs in SAS only. For example, the NLSDATE format runs in SAS and on the CAS server, so CAS is specified as a category. The $UNCR format runs on SAS only, so CAS is not specified as a category.

The following categories relate to NLS issues:

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<th>Category</th>
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<td>BIDI Text Handling</td>
<td>Instructs SAS to write bidirectional data values from data variables.</td>
</tr>
<tr>
<td>CAS</td>
<td>Instructs SAS that these formats run on the CAS server.</td>
</tr>
<tr>
<td>Character</td>
<td>Instructs SAS to write character data values from character variables.</td>
</tr>
<tr>
<td>Currency Conversion</td>
<td>Instructs SAS to convert an amount from one currency to another currency.</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
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<tr>
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<td>----------------------------------------------------------------------------</td>
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<tr>
<td>DBCS</td>
<td>Instructs SAS to translate double-byte character sets that are used in Asian languages.</td>
</tr>
<tr>
<td>Hebrew Text Handling</td>
<td>Instructs SAS to read Hebrew data from data variables.</td>
</tr>
<tr>
<td>International Date and Time</td>
<td>Instructs SAS to write data values from variables that represent dates, times, and datetimes.</td>
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<tr>
<td>Numeric</td>
<td>Instructs SAS to write numeric data values from numeric variables.</td>
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<table>
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<th>Description</th>
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<td>CAS</td>
<td>EURO Format (p. 96)</td>
<td>Writes numeric values with a leading euro symbol (€), a comma that separates every three digits, and a period that separates the decimal fraction.</td>
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<tr>
<td></td>
<td>EUROX Format (p. 99)</td>
<td>Writes numeric values with a leading euro symbol (€), a period that separates every three digits, and a comma that separates the decimal fraction.</td>
</tr>
<tr>
<td></td>
<td>NENGO Format (p. 102)</td>
<td>Writes date values as Japanese dates in the form e.ymmd.</td>
</tr>
<tr>
<td></td>
<td>NLBEST Format (p. 104)</td>
<td>Writes the best numerical notation based on the locale.</td>
</tr>
<tr>
<td></td>
<td>NLDATE Format (p. 106)</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the date value as a date.</td>
</tr>
<tr>
<td></td>
<td>NLDATEL Format (p. 107)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date in the form, date, month, year.</td>
</tr>
<tr>
<td></td>
<td>NLDATEM Format (p. 108)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date.</td>
</tr>
<tr>
<td></td>
<td>NLDATEMD Format (p. 109)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the value as the name of the month and the day of the month.</td>
</tr>
<tr>
<td></td>
<td>NLDATEMDL Format (p. 110)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.</td>
</tr>
<tr>
<td></td>
<td>NLDATEMDM Format (p. 111)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NLDatemds Format (p. 111)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.</td>
<td></td>
</tr>
<tr>
<td>NLDatemn Format (p. 112)</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the value as the name of the month.</td>
<td></td>
</tr>
<tr>
<td>Nldates Format (p. 113)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date string.</td>
<td></td>
</tr>
<tr>
<td>NLDatew Format (p. 114)</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the value as the date and the day of the week.</td>
<td></td>
</tr>
<tr>
<td>NLDatewn Format (p. 116)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the day of the week.</td>
<td></td>
</tr>
<tr>
<td>NLDatemy Format (p. 117)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the name of the month.</td>
<td></td>
</tr>
<tr>
<td>NLDatemyml Format (p. 118)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the month and year.</td>
<td></td>
</tr>
<tr>
<td>NLDatemymm Format (p. 119)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date values as the month and year with abbreviations.</td>
<td></td>
</tr>
<tr>
<td>NLDatemyms Format (p. 120)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date and year.</td>
<td></td>
</tr>
<tr>
<td>NLDatemyq Format (p. 121)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the quarter.</td>
<td></td>
</tr>
<tr>
<td>NLDatemyql Format (p. 122)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year’s quarter value (Q1–Q4) using abbreviations.</td>
<td></td>
</tr>
<tr>
<td>NLDatemyqm Format (p. 123)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year’s quarter value (Q1–Q4) using abbreviations.</td>
<td></td>
</tr>
<tr>
<td>NLDatemyqs Format (p. 124)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year’s quarter value (1–4) with numbers and delimiters.</td>
<td></td>
</tr>
<tr>
<td>NLDateryr Format (p. 125)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year.</td>
<td></td>
</tr>
<tr>
<td>NLDateryw Format (p. 126)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the week.</td>
<td></td>
</tr>
<tr>
<td>NLDatm Format (p. 127)</td>
<td>Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime.</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NLDATMAP Format</td>
<td>(p. 128)</td>
<td>Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime with a.m. or p.m.</td>
</tr>
<tr>
<td>NLDATMDT Format</td>
<td>(p. 129)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month, day of the month and year.</td>
</tr>
<tr>
<td>NLDATML Format</td>
<td>(p. 130)</td>
<td>Converts a SAS datetime value to the date string of the specified locale, and then writes the date value as a date in the form, month, date, year, and time.</td>
</tr>
<tr>
<td>NLDATMM Format</td>
<td>(p. 131)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date and time with abbreviations for the month and time.</td>
</tr>
<tr>
<td>NLDATMMD Format</td>
<td>(p. 131)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month and the day of the month.</td>
</tr>
<tr>
<td>NLDATMMDL Format</td>
<td>(p. 132)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the full-length of the month and day of the month.</td>
</tr>
<tr>
<td>NLDATMMDM Format</td>
<td>(p. 133)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month using abbreviations.</td>
</tr>
<tr>
<td>NLDATMMDS Format</td>
<td>(p. 134)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month using numbers and delimiters.</td>
</tr>
<tr>
<td>NLDATMMN Format</td>
<td>(p. 135)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month.</td>
</tr>
<tr>
<td>NLDATMS Format</td>
<td>(p. 136)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date in the form, MM/DD/YYYY.</td>
</tr>
<tr>
<td>NLDATMTM Format</td>
<td>(p. 137)</td>
<td>Converts the time portion of a SAS datetime value to the time-of-day value of the specified locale, and then writes the value as a time of day.</td>
</tr>
<tr>
<td>NLDATMTZ Format</td>
<td>(p. 138)</td>
<td>Converts the time portion of the SAS datetime of the locale to the time of day and time zone.</td>
</tr>
<tr>
<td>NLDATMW Format</td>
<td>(p. 139)</td>
<td>Converts SAS datetime values to the locale sensitive datetime string as the day of the week and the datetime.</td>
</tr>
<tr>
<td>NLDATMWN Format</td>
<td>(p. 140)</td>
<td>Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as the day of the week.</td>
</tr>
<tr>
<td>NLDATMWZ Format</td>
<td>(p. 141)</td>
<td>Converts SAS date values of the specified locale to a day-of-week, datetime, and time zone value.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NLDATMYM Format (p. 142)</td>
<td></td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the month.</td>
</tr>
<tr>
<td>NLDATMYML Format (p. 143)</td>
<td></td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and the year.</td>
</tr>
<tr>
<td>NLDATMYMM Format (p. 144)</td>
<td></td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and the year.</td>
</tr>
<tr>
<td>NLDATMYMS Format (p. 144)</td>
<td></td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and the year with numbers and delimiters.</td>
</tr>
<tr>
<td>NLDATMYQ Format (p. 145)</td>
<td></td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the quarter of the year.</td>
</tr>
<tr>
<td>NLDATMYQL Format (p. 146)</td>
<td></td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year’s quarter value (1–4) and the year.</td>
</tr>
<tr>
<td>NLDATMYQM Format (p. 147)</td>
<td></td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year’s quarter (1–4) and then the year.</td>
</tr>
<tr>
<td>NLDATMYQS Format (p. 148)</td>
<td></td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the quarter (1–4) using numbers and delimiters.</td>
</tr>
<tr>
<td>NLDATMYR Format (p. 149)</td>
<td></td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year.</td>
</tr>
<tr>
<td>NLDATMYW Format (p. 150)</td>
<td></td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the week.</td>
</tr>
<tr>
<td>NLDATMZ Format (p. 151)</td>
<td></td>
<td>Converts SAS datetime values to the locale-sensitive datetime string as time zone and datetime.</td>
</tr>
<tr>
<td>NLMNY Format (p. 226)</td>
<td></td>
<td>Writes the monetary format of the local expression in the specified locale using local currency.</td>
</tr>
<tr>
<td>NLMNYI Format (p. 227)</td>
<td></td>
<td>Writes the monetary format of the international expression in the specified locale.</td>
</tr>
<tr>
<td>NLNUM Format (p. 228)</td>
<td></td>
<td>Writes the numeric format of the local expression in the specified locale.</td>
</tr>
<tr>
<td>NLNUMI Format (p. 230)</td>
<td></td>
<td>Writes the numeric format of the international expression in the specified locale.</td>
</tr>
<tr>
<td>NLPCT Format (p. 231)</td>
<td></td>
<td>Writes percentage data of the local expression in the specified locale.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>NLPCTI Format (p. 232)</td>
<td>Writes percentage data of the international expression in the specified locale.</td>
<td></td>
</tr>
<tr>
<td>NLPCTN Format (p. 234)</td>
<td>Produces percentages, using a minus sign for negative values.</td>
<td></td>
</tr>
<tr>
<td>NLPCTP Format (p. 235)</td>
<td>Writes locale-specific numeric values as percentages.</td>
<td></td>
</tr>
<tr>
<td>NLPVALUE Format (p. 236)</td>
<td>Writes p-values of the local expression in the specified locale.</td>
<td></td>
</tr>
<tr>
<td>NLSTRMON Format (p. 237)</td>
<td>Writes the month name in the specified locale.</td>
<td></td>
</tr>
<tr>
<td>NLSTRQTR Format (p. 238)</td>
<td>Writes a numeric value as the quarter-of-the-year in the specified locale.</td>
<td></td>
</tr>
<tr>
<td>NLSTRWK Format (p. 239)</td>
<td>Writes a numeric value as the day-of-the-week in the specified locale.</td>
<td></td>
</tr>
<tr>
<td>NLTIMAP Format (p. 241)</td>
<td>Converts a SAS time value to the time value of a specified locale, and then writes the value as a time value with a.m. or p.m. NLTIMAP also converts SAS date-time values.</td>
<td></td>
</tr>
<tr>
<td>NLTIME Format (p. 242)</td>
<td>Converts a SAS time value to the time value of the specified locale, and then writes the value as a time value. NLTIME also converts SAS date-time values.</td>
<td></td>
</tr>
<tr>
<td>YEN Format (p. 271)</td>
<td>Writes numeric values with yen signs, commas, and decimal points.</td>
<td></td>
</tr>
<tr>
<td>YYWEEKU Format (p. 272)</td>
<td>Writes a week number in decimal format by using the U algorithm, excluding day-of-the-week information.</td>
<td></td>
</tr>
<tr>
<td>YYWEEKV Format (p. 273)</td>
<td>Writes a week number in decimal format by using the V algorithm, excluding day-of-the-week information.</td>
<td></td>
</tr>
<tr>
<td>YYWEEKW Format (p. 275)</td>
<td>Writes a week number in decimal format by using the W algorithm, excluding the day-of-week information.</td>
<td></td>
</tr>
<tr>
<td>Character</td>
<td>$EBCDIC Format (p. 90)</td>
<td>Converts native format character data to EBCDIC representation.</td>
</tr>
<tr>
<td>Character</td>
<td>$UCS2B Format (p. 243)</td>
<td>Processes a character string that is in the encoding of the current SAS session, and then writes the character string in big-endian, 16-bit, UCS2, Unicode encoding.</td>
</tr>
<tr>
<td>Character</td>
<td>$UCS2BE Format (p. 244)</td>
<td>Processes a character string that is in big-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>Character</td>
<td>$UCS2L Format (p. 245)</td>
<td>Processes a character string that is in the encoding of the current SAS session, and then writes the character string in little-endian, 16-bit, UCS2, Unicode encoding.</td>
</tr>
<tr>
<td>Character</td>
<td>$UCS2LE Format (p. 247)</td>
<td>Processes a character string that is in little-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>$UCS2X Format</td>
<td>(p. 248)</td>
<td>Processes a character string that is in the encoding of the current SAS session, and then writes the character string in native-endian, 16-bit, UCS2, Unicode encoding.</td>
</tr>
<tr>
<td>$UCS2XE Format</td>
<td>(p. 249)</td>
<td>Processes a character string that is in native-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>$UCS4B Format</td>
<td>(p. 250)</td>
<td>Processes a character string that is in the encoding of the current SAS session, and then writes the character string in big-endian, 32-bit, UCS4, Unicode encoding.</td>
</tr>
<tr>
<td>$UCS4BE Format</td>
<td>(p. 251)</td>
<td>Processes a character string that is in big-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>$UCS4L Format</td>
<td>(p. 252)</td>
<td>Processes a character string that is in the encoding of the current SAS session, and then writes the character string in little-endian, 32-bit, UCS4, Unicode encoding.</td>
</tr>
<tr>
<td>$UCS4LE Format</td>
<td>(p. 254)</td>
<td>Processes a character string that is in little-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>$UCS4X Format</td>
<td>(p. 255)</td>
<td>Processes a character string that is in the encoding of the current SAS session, and then writes the character string in native-endian, 32-bit, UCS4, Unicode encoding.</td>
</tr>
<tr>
<td>$UCS4XE Format</td>
<td>(p. 256)</td>
<td>Processes a character string that is in native-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>$UESC Format</td>
<td>(p. 257)</td>
<td>Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode escape (UESC) representation.</td>
</tr>
<tr>
<td>$UESCE Format</td>
<td>(p. 259)</td>
<td>Processes a character string that is in Unicode escape (UESC) representation, and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>$UNCR Format</td>
<td>(p. 260)</td>
<td>Processes a character string that is encoded in the current SAS session, and then writes the character string in numeric character representation (NCR).</td>
</tr>
<tr>
<td>$UNCRE Format</td>
<td>(p. 261)</td>
<td>Processes a character string that is in numeric character representation (NCR), and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>$UPAREN Format</td>
<td>(p. 262)</td>
<td>Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode parenthesis (UPAREN) representation.</td>
</tr>
<tr>
<td>$UPARENE Format</td>
<td>(p. 263)</td>
<td>Processes a character string that is in Unicode parenthesis (UPAREN), and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>$UTF8X Format</td>
<td>Processes a character string that is in the encoding of the current SAS session, and then writes the character string in universal transformation format (UTF-8) encoding.</td>
</tr>
<tr>
<td></td>
<td>$UTF8XE Format</td>
<td>Processes a character string that is in universal transformation format (UTF-8), and then writes the character string in the encoding of the current SAS session.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>B8601DX Format</td>
<td>Adjusts a Coordinated Universal Time (UTC) datetime value to the user local date and time. Then, writes the local date and time by using the ISO 8601 datetime and time zone basic notation yyyymmddThhmmss+hhmm.</td>
</tr>
<tr>
<td></td>
<td>B8601LX Format</td>
<td>Writes datetime values as local time by appending a time zone offset difference between the local time and UTC, using the ISO 8601 basic notation yyyymmddThhmmss+</td>
</tr>
<tr>
<td></td>
<td>B8601TX Format</td>
<td>Adjusts a Coordinated Universal Time (UTC) value to the user local time. Then, writes the local time by using the ISO 8601 basic time notation hhmmss+</td>
</tr>
<tr>
<td></td>
<td>E8601DX Format</td>
<td>Adjusts a Coordinated Universal Time (UTC) datetime value to the user local date and time. Then, writes the local date and time by using the ISO 8601 datetime and time zone extended notation yyyy-mm-ddThh:mm:ss+hh:mm.</td>
</tr>
<tr>
<td></td>
<td>E8601LX Format</td>
<td>Writes datetime values as local time by appending a time zone offset difference between the local time and UTC, using the ISO 8601 extended notation yyyy-mm-ddThh:mm:ss+</td>
</tr>
<tr>
<td></td>
<td>E8601TX Format</td>
<td>Adjusts a Coordinated Universal Time (UTC) value to the user local time. Then, writes the local time by using the ISO 8601 extended time notation hh:mm:ss+</td>
</tr>
<tr>
<td></td>
<td>MINGUO Format</td>
<td>Writes date values as Taiwanese dates in the form yyyymmd.</td>
</tr>
<tr>
<td></td>
<td>NENGO Format</td>
<td>Writes date values as Japanese dates in the form e.yymmdd.</td>
</tr>
<tr>
<td></td>
<td>NLDATE Format</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the date value as a date.</td>
</tr>
<tr>
<td></td>
<td>NLDATEL Format</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date in the form, date, month, year.</td>
</tr>
<tr>
<td></td>
<td>NLDATEM Format</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date.</td>
</tr>
<tr>
<td></td>
<td>NLDATEMD Format</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the value as the name of the month and the day of the month.</td>
</tr>
<tr>
<td></td>
<td>NLDATEMDL Format</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NLDATEMDM</td>
<td>(p. 111)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.</td>
</tr>
<tr>
<td>NLDATEMDS</td>
<td>(p. 111)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.</td>
</tr>
<tr>
<td>NLDATEMN</td>
<td>(p. 112)</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the value as the name of the month.</td>
</tr>
<tr>
<td>NLDATES</td>
<td>(p. 113)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date string.</td>
</tr>
<tr>
<td>NLDATEW</td>
<td>(p. 114)</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the value as the date and the day of the week.</td>
</tr>
<tr>
<td>NLDATENW</td>
<td>(p. 116)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the day of the week.</td>
</tr>
<tr>
<td>NLDATEYM</td>
<td>(p. 117)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the name of the month.</td>
</tr>
<tr>
<td>NLDATEYML</td>
<td>(p. 118)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the month and year.</td>
</tr>
<tr>
<td>NLDATEYMM</td>
<td>(p. 119)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date values as the month and year with abbreviations.</td>
</tr>
<tr>
<td>NLDATEYMS</td>
<td>(p. 120)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date and year.</td>
</tr>
<tr>
<td>NLDATEYQ</td>
<td>(p. 121)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the quarter.</td>
</tr>
<tr>
<td>NLDATEYQL</td>
<td>(p. 122)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year’s quarter value (Q1–Q4) using abbreviations.</td>
</tr>
<tr>
<td>NLDATEYQM</td>
<td>(p. 123)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year’s quarter value (Q1–Q4) using abbreviations.</td>
</tr>
<tr>
<td>NLDATEYQS</td>
<td>(p. 124)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year’s quarter value (1–4) with numbers and delimiters.</td>
</tr>
<tr>
<td>NLDATYR</td>
<td>(p. 125)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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</tr>
<tr>
<td>NLDATEYW Format (p. 126)</td>
<td>Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the week.</td>
<td></td>
</tr>
<tr>
<td>NLDATM Format (p. 127)</td>
<td>Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime.</td>
<td></td>
</tr>
<tr>
<td>NLDATMAP Format (p. 128)</td>
<td>Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime with a.m. or p.m.</td>
<td></td>
</tr>
<tr>
<td>NLDATMDT Format (p. 129)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month, day of the month and year.</td>
<td></td>
</tr>
<tr>
<td>NLDATML Format (p. 130)</td>
<td>Converts a SAS datetime value to the date string of the specified locale, and then writes the date value as a date in the form, month, date, year, and time.</td>
<td></td>
</tr>
<tr>
<td>NLDATMM Format (p. 131)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date and time with abbreviations for the month and time.</td>
<td></td>
</tr>
<tr>
<td>NLDATMMD Format (p. 131)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month and the day of the month.</td>
<td></td>
</tr>
<tr>
<td>NLDATMMDL Format (p. 132)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the full-length of the month and day of the month.</td>
<td></td>
</tr>
<tr>
<td>NLDATMMDM Format (p. 133)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month using abbreviations.</td>
<td></td>
</tr>
<tr>
<td>NLDATMMDS Format (p. 134)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month using numbers and delimiters.</td>
<td></td>
</tr>
<tr>
<td>NLDATMMN Format (p. 135)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month.</td>
<td></td>
</tr>
<tr>
<td>NLDATMS Format (p. 136)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date in the form, MM/DD/YYYY.</td>
<td></td>
</tr>
<tr>
<td>NLDATMTM Format (p. 137)</td>
<td>Converts the time portion of a SAS datetime value to the time-of-day value of the specified locale, and then writes the value as a time of day.</td>
<td></td>
</tr>
<tr>
<td>NLDATMTZ Format (p. 138)</td>
<td>Converts the time portion of the SAS datetime of the locale to the time of day and time zone.</td>
<td></td>
</tr>
<tr>
<td>NLDATMW Format (p. 139)</td>
<td>Converts SAS datetime values to the locale sensitive datetime string as the day of the week and the datetime.</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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</tr>
<tr>
<td>NLDATMWN Format (p. 140)</td>
<td>Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as the day of the week.</td>
<td></td>
</tr>
<tr>
<td>NLDATMWZ Format (p. 141)</td>
<td>Converts SAS date values of the specified locale to a day-of-week, datetime, and time zone value.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYM Format (p. 142)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the month.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYML Format (p. 143)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and the year.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYMM Format (p. 144)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and the year.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYMS Format (p. 144)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the month and year with numbers and delimiters.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYQ Format (p. 145)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the quarter of the year.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYQL Format (p. 146)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year’s quarter value (1–4) and the year.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYQM Format (p. 147)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year’s quarter (1–4) and then the year.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYQS Format (p. 148)</td>
<td>Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the quarter (1–4) using numbers and delimiters.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYR Format (p. 149)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year.</td>
<td></td>
</tr>
<tr>
<td>NLDATMYW Format (p. 150)</td>
<td>Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the week.</td>
<td></td>
</tr>
<tr>
<td>NLDATMZ Format (p. 151)</td>
<td>Converts SAS datetime values to the locale-sensitive datetime string as time zone and datetime.</td>
<td></td>
</tr>
<tr>
<td>NLTIMAP Format (p. 241)</td>
<td>Converts a SAS time value to the time value of a specified locale, and then writes the value as a time value with a.m. or p.m. NLTIMAP also converts SAS date-time values.</td>
<td></td>
</tr>
<tr>
<td>NLTIME Format (p. 242)</td>
<td>Converts a SAS time value to the time value of the specified locale, and then writes the value as a time value. NLTIME also converts SAS date-time values.</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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<tr>
<td></td>
<td>WEEKU Format (p. 266)</td>
<td>Writes a week number in decimal format by using the U algorithm.</td>
</tr>
<tr>
<td></td>
<td>WEEKV Format (p. 267)</td>
<td>Writes a week number in decimal format by using the V algorithm.</td>
</tr>
<tr>
<td></td>
<td>WEEKW Format (p. 269)</td>
<td>Writes a week number in decimal format by using the W algorithm.</td>
</tr>
<tr>
<td></td>
<td>YYWEEKU Format (p. 272)</td>
<td>Writes a week number in decimal format by using the U algorithm, excluding day-of-the-week information.</td>
</tr>
<tr>
<td></td>
<td>YYWEEKV Format (p. 273)</td>
<td>Writes a week number in decimal format by using the V algorithm, excluding day-of-the-week information.</td>
</tr>
<tr>
<td></td>
<td>YYWEEKW Format (p. 275)</td>
<td>Writes a week number in decimal format by using the W algorithm, excluding the day-of-week information.</td>
</tr>
<tr>
<td>Hebrew Text Handling</td>
<td>$CPTDW Format (p. 88)</td>
<td>Processes a character string that is in Hebrew text, encoded in IBM-PC (cp862), and then writes the character string in Windows Hebrew encoding (cp 1255).</td>
</tr>
<tr>
<td></td>
<td>$CPTWD Format (p. 89)</td>
<td>Processes a character string that is encoded in Windows (cp1255), and then writes the character string in Hebrew DOS (cp862) encoding.</td>
</tr>
<tr>
<td>ISO 8601</td>
<td>B8601DX Format (p. 82)</td>
<td>Adjusts a Coordinated Universal Time (UTC) datetime value to the user local date and time. Then, writes the local date and time by using the ISO 8601 datetime and time zone basic notation yyyymmddThhmmss+hhmm.</td>
</tr>
<tr>
<td></td>
<td>B8601LX Format (p. 84)</td>
<td>Writes datetime values as local time by appending a time zone offset difference between the local time and UTC, using the ISO 8601 basic notation yyyymmddThhmmss+</td>
</tr>
<tr>
<td></td>
<td>B8601TX Format (p. 85)</td>
<td>Adjusts a Coordinated Universal Time (UTC) value to the user local time. Then, writes the local time by using the ISO 8601 basic time notation hh:mm:ss+</td>
</tr>
<tr>
<td></td>
<td>E8601DX Format (p. 91)</td>
<td>Adjusts a Coordinated Universal Time (UTC) datetime value to the user local date and time. Then, writes the local date and time by using the ISO 8601 datetime and time zone extended notation yyyy-mm-ddThh:mm:ss+hh:mm.</td>
</tr>
<tr>
<td></td>
<td>E8601LX Format (p. 93)</td>
<td>Writes datetime values as local time by appending a time zone offset difference between the local time and UTC, using the ISO 8601 extended notation yyyy-mm-ddThh:mm:ss+</td>
</tr>
<tr>
<td></td>
<td>E8601TX Format (p. 94)</td>
<td>Adjusts a Coordinated Universal Time (UTC) value to the user local time. Then, writes the local time by using the ISO 8601 extended time notation hh:mm:ss+</td>
</tr>
<tr>
<td>Numeric</td>
<td>BESTDOTX Format (p. 87)</td>
<td>Specifies that SAS choose the best notation and use a dot as a decimal separator.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
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</tr>
<tr>
<td>EURO Format</td>
<td>(p. 96)</td>
<td>Writes numeric values with a leading euro symbol (€), a comma that separates every three digits, and a period that separates the decimal fraction.</td>
</tr>
<tr>
<td>EUROX Format</td>
<td>(p. 99)</td>
<td>Writes numeric values with a leading euro symbol (€), a period that separates every three digits, and a comma that separates the decimal fraction.</td>
</tr>
<tr>
<td>NLBEST Format</td>
<td>(p. 104)</td>
<td>Writes the best numerical notation based on the locale.</td>
</tr>
<tr>
<td>NLMNIAED Format</td>
<td>(p. 152)</td>
<td>Writes the monetary format of the international expression for the United Arab Emirates.</td>
</tr>
<tr>
<td>NLMNIAUD Format</td>
<td>(p. 153)</td>
<td>Writes the monetary format of the international expression for Australia.</td>
</tr>
<tr>
<td>NLMNIBGN Format</td>
<td>(p. 154)</td>
<td>Writes the monetary format of the international expression for Bulgaria.</td>
</tr>
<tr>
<td>NLMNIBRL Format</td>
<td>(p. 155)</td>
<td>Writes the monetary format of the international expression for Brazil.</td>
</tr>
<tr>
<td>NLMNICAD Format</td>
<td>(p. 156)</td>
<td>Writes the monetary format of the international expression for Canada.</td>
</tr>
<tr>
<td>NLMNICHF Format</td>
<td>(p. 157)</td>
<td>Writes the monetary format of the international expression for Liechtenstein and Switzerland.</td>
</tr>
<tr>
<td>NLMNICNY Format</td>
<td>(p. 158)</td>
<td>Writes the monetary format of the international expression for China.</td>
</tr>
<tr>
<td>NLMNICZK Format</td>
<td>(p. 159)</td>
<td>Writes the monetary format of the international expression for the Czech Republic.</td>
</tr>
<tr>
<td>NLMNIDKK Format</td>
<td>(p. 160)</td>
<td>Writes the monetary format of the international expression for Denmark, Faroe Island, and Greenland.</td>
</tr>
<tr>
<td>NLMNIEEEK Format</td>
<td>(p. 161)</td>
<td>Writes the monetary format of the international expression for Estonia.</td>
</tr>
<tr>
<td>NLMNIEGP Format</td>
<td>(p. 162)</td>
<td>Writes the monetary format of the international expression for Egypt.</td>
</tr>
<tr>
<td>NLMNIEUR Format</td>
<td>(p. 163)</td>
<td>Writes the monetary format of the international expression for Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.</td>
</tr>
<tr>
<td>NLMNIGBP Format</td>
<td>(p. 164)</td>
<td>Writes the monetary format of the international expression for the United Kingdom.</td>
</tr>
<tr>
<td>NLMNIHKD Format</td>
<td>(p. 165)</td>
<td>Writes the monetary format of the international expression for Hong Kong.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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<tr>
<td>NLMNIHRK Format (p. 166)</td>
<td>Writes the monetary format of the international expression for Croatia.</td>
<td></td>
</tr>
<tr>
<td>NLMNIHUF Format (p. 167)</td>
<td>Writes the monetary format of the international expression for Hungary.</td>
<td></td>
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<tr>
<td>NLMNIIDR Format (p. 168)</td>
<td>Writes the monetary format of the international expression for Indonesia.</td>
<td></td>
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<tr>
<td>NLMNIILS Format (p. 169)</td>
<td>Writes the monetary format of the international expression for Israel.</td>
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<tr>
<td>NLMNIINR Format (p. 170)</td>
<td>Writes the monetary format of the international expression for India.</td>
<td></td>
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<tr>
<td>NLMNIJPY Format (p. 171)</td>
<td>Writes the monetary format of the international expression for Japan.</td>
<td></td>
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<tr>
<td>NLMNIKRW Format (p. 172)</td>
<td>Writes the monetary format of the international expression for South Korea.</td>
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<tr>
<td>NLMNILTL Format (p. 173)</td>
<td>Writes the monetary format of the international expression for Lithuania.</td>
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<tr>
<td>NLMNILVL Format (p. 174)</td>
<td>Writes the monetary format of the international expression for Latvia.</td>
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<tr>
<td>NLMNIMOP Format (p. 175)</td>
<td>Writes the monetary format of the international expression for Macau.</td>
<td></td>
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<tr>
<td>NLMNIMXN Format (p. 176)</td>
<td>Writes the monetary format of the international expression for Mexico.</td>
<td></td>
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<tr>
<td>NLMNIMYR Format (p. 177)</td>
<td>Writes the monetary format of the international expression for Malaysia.</td>
<td></td>
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<tr>
<td>NLMNINOK Format (p. 178)</td>
<td>Writes the monetary format of the international expression for Norway.</td>
<td></td>
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<tr>
<td>NLMNINZD Format (p. 179)</td>
<td>Writes the monetary format of the international expression for New Zealand.</td>
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<tr>
<td>NLMNIPLN Format (p. 180)</td>
<td>Writes the monetary format of the international expression for Poland.</td>
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<tr>
<td>NLMNIRUB Format (p. 181)</td>
<td>Writes the monetary format of the international expression for Russia.</td>
<td></td>
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<tr>
<td>NLMNISEK Format (p. 182)</td>
<td>Writes the monetary format of the international expression for Sweden.</td>
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<tr>
<td>NLMNISGD Format (p. 183)</td>
<td>Writes the monetary format of the international expression for Singapore.</td>
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<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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<td></td>
<td>NLMNITHB Format (p. 184)</td>
<td>Writes the monetary format of the international expression for Thailand.</td>
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<td>NLMNITRY Format (p. 185)</td>
<td>Writes the monetary format of the international expression for Turkey.</td>
</tr>
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<td></td>
<td>NLMNITWD Format (p. 186)</td>
<td>Writes the monetary format of the international expression for Taiwan.</td>
</tr>
<tr>
<td></td>
<td>NLMNIUSD Format (p. 187)</td>
<td>Writes the monetary format of the international expression for Puerto Rico and the United States.</td>
</tr>
<tr>
<td></td>
<td>NLMNIZAR Format (p. 188)</td>
<td>Writes the monetary format of the international expression for South Africa.</td>
</tr>
<tr>
<td></td>
<td>NLMNLAED Format (p. 189)</td>
<td>Writes the monetary format of the local expression for the United Arab Emirates.</td>
</tr>
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<td></td>
<td>NLMNLAUD Format (p. 190)</td>
<td>Writes the monetary format of the local expression for Australia.</td>
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<td></td>
<td>NLMNLBGN Format (p. 191)</td>
<td>Writes the monetary format of the local expression for Bulgaria.</td>
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<td></td>
<td>NLMNLBRL Format (p. 192)</td>
<td>Writes the monetary format of the local expression for Brazil.</td>
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<td></td>
<td>NLMNLCAD Format (p. 193)</td>
<td>Writes the monetary format of the local expression for Canada.</td>
</tr>
<tr>
<td></td>
<td>NLMNILCHF Format (p. 194)</td>
<td>Writes the monetary format of the local expression for Liechtenstein and Switzerland.</td>
</tr>
<tr>
<td></td>
<td>NLMNLCNY Format (p. 195)</td>
<td>Writes the monetary format of the local expression for China.</td>
</tr>
<tr>
<td></td>
<td>NLMNLCZK Format (p. 196)</td>
<td>Writes the monetary format of the local expression for the Czech Republic.</td>
</tr>
<tr>
<td></td>
<td>NLMNLDDK Format (p. 197)</td>
<td>Writes the monetary format of the local expression for Denmark, Faroe Island, and Greenland.</td>
</tr>
<tr>
<td></td>
<td>NLMNLEEK Format (p. 198)</td>
<td>Writes the monetary format of the local expression for Estonia.</td>
</tr>
<tr>
<td></td>
<td>NLMNLEGP Format (p. 199)</td>
<td>Writes the monetary format of the local expression for Egypt.</td>
</tr>
<tr>
<td></td>
<td>NLMNLEUR Format (p. 200)</td>
<td>Writes the monetary format of the local expression for Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.</td>
</tr>
<tr>
<td></td>
<td>NLMNLGBP Format (p. 201)</td>
<td>Writes the monetary format of the local expression for the United Kingdom.</td>
</tr>
<tr>
<td></td>
<td>NLMNLHKD Format (p. 202)</td>
<td>Writes the monetary format of the local expression for Hong Kong.</td>
</tr>
<tr>
<td></td>
<td>NLMNLHRK Format (p. 203)</td>
<td>Writes the monetary format of the local expression for Croatia.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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<tr>
<td>NLMNLHUF Format (p. 204)</td>
<td>Writes the monetary format of the local expression for Hungary.</td>
<td></td>
</tr>
<tr>
<td>NLMNLIDR Format (p. 205)</td>
<td>Writes the monetary format of the local expression for Indonesia.</td>
<td></td>
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<tr>
<td>NLMNLILS Format (p. 206)</td>
<td>Writes the monetary format of the local expression for Israel.</td>
<td></td>
</tr>
<tr>
<td>NLMNLINR Format (p. 207)</td>
<td>Writes the monetary format of the local expression for India.</td>
<td></td>
</tr>
<tr>
<td>NLMNLJPY Format (p. 208)</td>
<td>Writes the monetary format of the international expression for Japan.</td>
<td></td>
</tr>
<tr>
<td>NLMNLKRW Format (p. 209)</td>
<td>Writes the monetary format of the local expression for South Korea.</td>
<td></td>
</tr>
<tr>
<td>NLMNLLTL Format (p. 210)</td>
<td>Writes the monetary format of the local expression for Lithuania.</td>
<td></td>
</tr>
<tr>
<td>NLMNLLVL Format (p. 211)</td>
<td>Writes the monetary format of the local expression for Latvia.</td>
<td></td>
</tr>
<tr>
<td>NLMNLMOB Format (p. 212)</td>
<td>Writes the monetary format of the local expression for Macau.</td>
<td></td>
</tr>
<tr>
<td>NLMNLMXN Format (p. 213)</td>
<td>Writes the monetary format of the local expression for Mexico.</td>
<td></td>
</tr>
<tr>
<td>NLMNLMYR Format (p. 214)</td>
<td>Writes the monetary format of the local expression for Malaysia.</td>
<td></td>
</tr>
<tr>
<td>NLMNLNOK Format (p. 215)</td>
<td>Writes the monetary format of the local expression for Norway.</td>
<td></td>
</tr>
<tr>
<td>NLMNLNZD Format (p. 216)</td>
<td>Writes the monetary format of the local expression for New Zealand.</td>
<td></td>
</tr>
<tr>
<td>NLMNLPEN Format (p. 217)</td>
<td>Writes the monetary format of the local expression for Poland.</td>
<td></td>
</tr>
<tr>
<td>NLMNLPRB Format (p. 218)</td>
<td>Writes the monetary format of the local expression for Russia.</td>
<td></td>
</tr>
<tr>
<td>NLMNLSEK Format (p. 219)</td>
<td>Writes the monetary format of the local expression for Sweden.</td>
<td></td>
</tr>
<tr>
<td>NLMNLSGD Format (p. 220)</td>
<td>Writes the monetary format of the local expression for Singapore.</td>
<td></td>
</tr>
<tr>
<td>NLMNLTHB Format (p. 221)</td>
<td>Writes the monetary format of the local expression for Thailand.</td>
<td></td>
</tr>
<tr>
<td>NLMNLTRY Format (p. 222)</td>
<td>Writes the monetary format of the local expression for Turkey.</td>
<td></td>
</tr>
<tr>
<td>NLMNLTWD Format (p. 223)</td>
<td>Writes the monetary format of the local expression for Taiwan.</td>
<td></td>
</tr>
<tr>
<td>NLMNLUSD Format (p. 224)</td>
<td>Writes the monetary format of the local expression for Puerto Rico and the United States.</td>
<td></td>
</tr>
<tr>
<td>NLMNLZAR Format (p. 225)</td>
<td>Writes the monetary format of the local expression for South Africa.</td>
<td></td>
</tr>
<tr>
<td>NLMNY Format (p. 226)</td>
<td>Writes the monetary format of the local expression in the specified locale using local currency.</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>NLMNYI Format (p. 227)</td>
<td>Writes the monetary format of the international expression in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>NLNUM Format (p. 228)</td>
<td>Writes the numeric format of the local expression in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>NLNUMI Format (p. 230)</td>
<td>Writes the numeric format of the international expression in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>NLPCT Format (p. 231)</td>
<td>Writes percentage data of the local expression in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>NLPCTI Format (p. 232)</td>
<td>Writes percentage data of the international expression in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>NLPCTN Format (p. 234)</td>
<td>Produces percentages, using a minus sign for negative values.</td>
</tr>
<tr>
<td></td>
<td>NLPCTP Format (p. 235)</td>
<td>Writes locale-specific numeric values as percentages.</td>
</tr>
<tr>
<td></td>
<td>NLPVALUE Format (p. 236)</td>
<td>Writes p-values of the local expression in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>NLSTRMON Format (p. 237)</td>
<td>Writes the month name in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>NLSTRQTR Format (p. 238)</td>
<td>Writes a numeric value as the quarter-of-the-year in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>NLSTRWK Format (p. 239)</td>
<td>Writes a numeric value as the day-of-the-week in the specified locale.</td>
</tr>
<tr>
<td></td>
<td>YEN Format (p. 271)</td>
<td>Writes numeric values with yen signs, commas, and decimal points.</td>
</tr>
</tbody>
</table>

**Dictionary**

**B8601DX Format**

Adjusts a Coordinated Universal Time (UTC) datetime value to the user local date and time. Then, writes the local date and time by using the ISO 8601 datetime and time zone basic notation **yyyyymmddTthmmss +hhmm**.

- **Categories:** Date and Time
- **Alignment:** Left
- **Supports:** ISO 8601 Element 5.4.1, complete representation
Syntax

B8601DXw.

Syntax Description

w
  specifies the width of the output field.

  Default  26

  Range    20–35

Details

UTC values specify a date and a time that are based on the zero meridian in Greenwich, England. Using this format, SAS converts a datetime value to the UTC value and determines the user local date and time by using the value of the TIMEZONE= system option. If the TIMEZONE= option is not set, then the user local date and time are based on the local date and time. The B8601DX format writes SAS datetime values by using the following ISO 8601 basic datetime notation:

•  yyyyymmddThhmmss+hhmm

  yyyy
    is a four-digit year.

  mm
    is a two-digit month (zero padded) between 01 and 12.

  dd
    is a two-digit day of the month (zero padded) between 01 and 31.

  hh
    is a two-digit hour (zero padded) between 00 and 23.

  mm
    is a two-digit minute (zero padded) between 00 and 59.

  ss
    is a two-digit second (zero padded) between 00 and 59.

  +|–hhmm
    is an hour and minute signed offset from zero meridian time. The offset must be +|–hhmm (that is, + or – and four characters).

Use + for time zones east of the zero meridian, and use – for time zones west of the zero meridian. For example, +0200 indicates a two-hour time difference to the east of the zero meridian, and –0600 indicates a six-hour time difference to the west of the zero meridian.

Restriction: The shorter form +|–hh is not supported.

Example

The first example uses the local time to determine the time and the time zone offset. The second example changes the time zone to America/Adak, which is Hawaii-Aleutian Time.
## B8601LX Format

Writes datetime values as local time by appending a time zone offset difference between the local time and UTC, using the ISO 8601 basic notation `yyyyymmddThhmmss+|-hhmm`.

<table>
<thead>
<tr>
<th>Categories:</th>
<th>Date and Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 8601</td>
<td></td>
</tr>
<tr>
<td>Alignment:</td>
<td>Right</td>
</tr>
<tr>
<td>Supports:</td>
<td>ISO 8601 Elements 5.3.3 and 5.3.4.2</td>
</tr>
</tbody>
</table>

### Syntax

**B8601LX**

### Syntax Description

- **w**
  - specifies the width of the output field.
  - **Default**: 26
  - **Range**: 20–35

### Details

The B8601LX format writes datetime values without making any adjustments, and appends the UTC time zone offset for the local SAS session by using the ISO 8601 basic datetime notation:

- `yyyyymmddThhmmss+|-hhmm`

  - `yyyy` is a four-digit year.

---

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td></td>
</tr>
<tr>
<td>t='01Feb2013T12:34:56'dt ;</td>
<td></td>
</tr>
<tr>
<td>put t b8601dx.;</td>
<td>20130201T073456-0500</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>options timezone='America/Adak';</td>
<td></td>
</tr>
<tr>
<td>data <em>null</em> ;</td>
<td></td>
</tr>
<tr>
<td>t='01Feb2013T12:34:56'dt ;</td>
<td></td>
</tr>
<tr>
<td>put t b8601dx.;</td>
<td>20130201T023456-1000</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

### See Also

“Working with Dates and Times By Using the ISO 8601 Basic and Extended Notations” in *SAS Viya Formats and Informats: Reference*
mm
is a two-digit month (zero padded) between 01 and 12.

dd
is a two-digit day of the month (zero padded) between 01 and 31.

hh
is a two-digit hour (zero padded) between 00 and 23.

mm
is a two-digit minute (zero padded) between 00 and 59.

ss
is a two-digit second (zero padded) between 00 and 59.

+|–hhmm
is an hour and minute signed offset from zero meridian time. The offset must be +|–hhmm (that is, + or – and four characters).

Use + for time zones east of the zero meridian, and use – for time zones west of the zero meridian. For example, +0200 indicates a two-hour time difference to the east of the zero meridian, and –0600 indicates a six-hour time difference to the west of the zero meridian.

Restriction: The shorter form +|−hh is not supported.

Example
This PUT statement writes the time for the Eastern Standard time zone:

```bash
blx='01Feb2013T12:34:56'dt;
pblx b8601lx.;
```

<table>
<thead>
<tr>
<th>Value of blx</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1675341296</td>
<td>20130201T123456-0500</td>
</tr>
</tbody>
</table>

See Also

“Working with Dates and Times By Using the ISO 8601 Basic and Extended Notations” in *SAS Viya Formats and Informats: Reference*

---

**B8601TX Format**

Adjusts a Coordinated Universal Time (UTC) value to the user local time. Then, writes the local time by using the ISO 8601 basic time notation *hhmmss*+|−*hhmm*.

**Categories:** Date and Time
ISO 8601

**Alignment:** Right

**Supports:** ISO 8601 Elements 5.3.3 and 5.3.4
Syntax
B8601TX\textsubscript{w}.

Syntax Description
\(w\)
specifies the width of the output field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>9–20</td>
</tr>
</tbody>
</table>

Details
UTC values specify a time based on the zero meridian in Greenwich, England. Using this format, SAS converts a time value to the UTC value and determines the user local time by using the TIMEZONE= system option. If the TIMEZONE= option is not set, then the user local time is based on the local time. The B8601TX format writes SAS datetime values by using the following ISO 8601 basic time notation:

- \(hh:mm:ss+|–hh:mm\)
- \(hh\)
is a two-digit hour (zero padded) between 00 and 23.
- \(mm\)
is a two-digit minute (zero padded) between 00 and 59.
- \(ss\)
is a two-digit second (zero padded) between 00 and 59.
- \(+|–hh:mm\)
is an hour and minute signed offset from zero meridian time. The offset must be \(+|–hh:mm\) (that is, + or − and four characters).

Use + for time zones east of the zero meridian, and use − for time zones west of the zero meridian. For example, +0200 indicates a two-hour time difference to the east of the zero meridian, and –0600 indicates a six-hour time difference to the west of the zero meridian.

Restriction: The shorter form \(+|–hh\) is not supported.

When SAS reads a UTC time by using the B8601TZ informat, and the adjusted time is greater than 24 hours or less than 00 hours, SAS adjusts the value so that the time is between 000000 and 240000. If the B8601TX format attempts to format a time outside of this time range, the time is formatted with asterisks to indicate that the value is out of range.

Example
The first example uses the local time to determine the time and the time zone offset. The second example changes the time zone to America/Adak, which is Hawaii-Aleutian Time.
### BESTDOTX Format

Specifies that SAS choose the best notation and use a dot as a decimal separator.

**Category:** Numeric  
**Alignment:** Right

#### Syntax

\[
\text{BESTDOTX}\ w
\]

#### Syntax Description

- \(w\) specifies the width of the output field.
  - **Default:** 12
  - **Range:** 1–32
  - **Tip:** If you print numbers between 0 and .01 exclusively, use a field width of at least 7 to avoid excessive rounding. If you print numbers between 0 and -0.01 exclusively, use a field width of at least 8.

#### Details

If the NLDECSEPARATOR system option is disabled, the BEST\(w\) and BESTDOTX\(w\) formats process data the same way. If the NLDECSEPARATOR system option is enabled, then the results from the BEST and BESTDOTX formats are different. See the following table to understand the differences:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>073456-0500</td>
</tr>
<tr>
<td>t='12:34:56't;</td>
<td></td>
</tr>
<tr>
<td>put t b8601tx.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
<tr>
<td>options timezone='America/Adak';</td>
<td>023456-1000</td>
</tr>
<tr>
<td>data <em>null</em>;</td>
<td></td>
</tr>
<tr>
<td>t='12:34:56't;</td>
<td></td>
</tr>
<tr>
<td>put t b8601tx.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

---

### See Also

“Working with Dates and Times By Using the ISO 8601 Basic and Extended Notations” in *SAS Viya Formats and Informats: Reference*
<table>
<thead>
<tr>
<th>LOCALE option</th>
<th>Default decimal separator character for the locale</th>
<th>NLDECSEPARATOR option</th>
<th>Separator character used by BESTw.</th>
<th>Separator character used by BESTDOTXw.</th>
</tr>
</thead>
<tbody>
<tr>
<td>en_US</td>
<td>Dot</td>
<td>Disabled (default)</td>
<td>Dot</td>
<td>Dot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enabled</td>
<td>Dot</td>
<td>Dot</td>
</tr>
<tr>
<td>fr_FR</td>
<td>Comma</td>
<td>Disabled (default)</td>
<td>Dot</td>
<td>Dot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enabled</td>
<td>Comma</td>
<td>Dot</td>
</tr>
</tbody>
</table>

**Example**

The following code produces results using the BESTDOTX format with the NLDECSEPARATOR option enabled and the locale set to fr_FR.

**Statements**

```sas
options nld locale=fr_FR;
data _null_
   x=1.2;
   call symput('macx', put(x, BESTDOTX.));
   put x; /* Result is printed as "1,2" */
y=put(x, BESTDOTX.); /* Result is printed as "1,2" */
run;
&put &macx; /* Result is printed as "1,2" */
data _null_
   bx=&macx; /* Succeeds because the value of &macx is 1.2 */
   put bx;
run;
```

**See Also**

- “BEST Format” in *SAS Viya Formats and Informats: Reference*
- “NLDECSEPARATOR System Option” on page 558

**$CPTDW Format**

Processes a character string that is in Hebrew text, encoded in IBM-PC (cp862), and then writes the character string in Windows Hebrew encoding (cp 1255).

**Category:** Hebrew Text Handling

**Alignment:** Left
Syntax
$\text{SCPTDW}_w$.

**Syntax Description**

\[ w \]

specifies the width of the output field.

Default: 200

Range: 1–32767

**Comparisons**

The $\text{SCPTDW}_w$ format performs processing that is the opposite of the $\text{SCPTWD}_w$ format.

**Example**

The following example uses the input value of “808182x.”

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>put text $\text{cptdw3.}$</td>
<td>11K</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “$\text{SCPTWD Format}$” on page 89

**Informats:**

- “$\text{SCPTDW Informat}$” on page 416
- “$\text{SCPTWD Informat}$” on page 417

---

**$\text{SCPTWD Format}$**

Processes a character string that is encoded in Windows (cp1255), and then writes the character string in Hebrew DOS (cp862) encoding.

**Category:** Hebrew Text Handling

**Alignment:** Left

**Syntax**

$\text{SCPTWD}_w$.
**Syntax Description**

\( w \)

specifies the width of the output field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>1–32767</td>
</tr>
</tbody>
</table>

**Comparisons**

The $\text{CPTWD}w$ format performs processing that is the opposite of the $\text{CPTDW}w$ format.

**Example**

The following example uses the input value of “を探”.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>put text $\text{cptwd3.}$;</td>
<td>€□,</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “$\text{CPTDW Format}$” on page 88

**Informats:**

- “$\text{CPTDW Informat}$” on page 416
- “$\text{CPTWD Informat}$” on page 417

---

**$\text{EBCDIC Format}**

Converts native format character data to EBCDIC representation.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment:</td>
<td>Left</td>
</tr>
<tr>
<td>Note:</td>
<td>UTF-8 is the only supported session encoding. $\text{EBCDIC format}$ works only for 7bit ASCII characters.</td>
</tr>
</tbody>
</table>

**Syntax**

\( \text{SEBCDIC}w \)
**Syntax Description**

\[ w \]

specifies the width of the output field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1–32767</td>
</tr>
</tbody>
</table>

**Details**

If EBCDIC is the native format, no conversion occurs.

On ASCII systems, the \$EBCDIC\[w\]. format is based on the default encoding value of the LOCALE= option that is specified when SAS starts. For example, if the locale was set to en_US locale, the default encoding that is used by the \$EBCDIC\[w\]. format is Open ed-1047. If the locale is de_DE (German_Germany), the default encoding that is used by the \$EBCDIC\[w\]. format is Open ed–1141. For a list of locales and encoding values, see Table 17.2 on page 610.

You can specify the translation table that is used to map characters between EBCDIC and ASCII by using the MAPEBCDIC2ASCII system option. For more information, see “MAPEBCDIC2ASCII= System Option” on page 557.

**Comparisons**

- On ASCII systems, \$EBCDIC\[w\]. converts ASCII character data to EBCDIC.
- On all other systems, \$EBCDIC\[w\]. behaves like the \$CHAR\[w\]. format.

**Example**

```
put name $ebcdic3.;
```

<table>
<thead>
<tr>
<th>Value of name</th>
<th>Locale Value Is en_US</th>
<th>Locale Value Is fr_FR</th>
<th>Locale Value Is de_DE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC</td>
<td>C1C2C3</td>
<td>C1C2C3</td>
<td>C1C2C3</td>
</tr>
<tr>
<td>{ä}</td>
<td>C043D0</td>
<td>514354</td>
<td>43C0DC</td>
</tr>
<tr>
<td>[@]</td>
<td>AD7CBD</td>
<td>9044B5</td>
<td>63B5FC</td>
</tr>
</tbody>
</table>

The results are shown as hexadecimal representations of EBCDIC codes for characters. Each two hexadecimal characters correspond to one byte of binary data, and each byte corresponds to one character.

---

**E8601DX Format**

Adjusts a Coordinated Universal Time (UTC) datetime value to the user local date and time. Then, writes the local date and time by using the ISO 8601 datetime and time zone extended notation yyyy-mm-ddThh:mm:ss+hh:mm.

**Categories:** Date and Time

ISO 8601
**Syntax**

E8601DX\(w\).

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default**: 26
- **Range**: 20–35

**Details**

UTC values specify a date and time that are based on the zero meridian in Greenwich, England. Using this format, SAS converts a datetime value to the UTC value and determines the user local date and time by using the value of the TIMEZONE= system option. If the TIMEZONE= option is not set, the user local date and time are based on the local date and time. The E8601DX format writes SAS datetime values by using the following ISO 8601 basic datetime notation:

- \(yyyy-mm-ddThh:mm:ss+hh:mm\)

  \(yyyy\)
  
  is a four-digit year.

  \(mm\)
  
  is a two-digit month (zero padded) between 01 and 12.

  \(dd\)
  
  is a two-digit day of the month (zero padded) between 01 and 31.

  \(hh\)
  
  is a two-digit hour (zero padded) between 00 and 23.

  \(mm\)
  
  is a two-digit minute (zero padded) between 00 and 59.

  \(ss\)
  
  is a two-digit second (zero padded) between 00 and 59.

  \(+|–hh:mm\)

  is an hour and minute signed offset from zero meridian time. The offset must be \(+|–hh:mm\) (that is, + or – and four characters).

  Use + for time zones east of the zero meridian, and use – for time zones west of the zero meridian. For example, +02:00 indicates a two-hour time difference to the east of the zero meridian, and –06:00 indicates a six-hour time difference to the west of the zero meridian.

**Restriction**: The shorter form \(+|–hh\) is not supported.
Example

The first example uses the local time to determine the time. The second example changes the time zone to America/Adak, which is Hawaii-Aleutian Time.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>; t='01Feb2013T12:34:56'dt ;</td>
<td>2013-02-01T07:34:56-05:00</td>
</tr>
<tr>
<td>put t e8601dx.; run;</td>
<td></td>
</tr>
<tr>
<td>options timezone='America/Adak';</td>
<td>2013-02-01T02:34:56-10:00</td>
</tr>
<tr>
<td>data <em>null</em>; t='01Feb2013T12:34:56'dt ;</td>
<td></td>
</tr>
<tr>
<td>put t e8601dx.; run;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

“Working with Dates and Times By Using the ISO 8601 Basic and Extended Notations” in SAS Viya Formats and Informats: Reference

E8601LX Format

Writes datetime values as local time by appending a time zone offset difference between the local time and UTC, using the ISO 8601 basic datetime notation yyyy-mm-ddThh:mm:ss±hh:mm.

Categories: Date and Time  
ISO 8601
Alignment: Right
Supports: ISO 8601 Elements 5.3.3 and 5.3.4.2

Syntax

E8601LXw

Syntax Description

w

specifies the width of the output field.

Default 26
Range 20–35

Details

The E8601LX format writes datetime values without making any adjustments, and appends the UTC time zone offset for the local SAS session by using the ISO 8601 basic datetime notation:

- yyyy-mm-ddThh:mm:ss±hh:mm
yyyy
is a four-digit year.

mm
is a two-digit month (zero padded) between 01 and 12.

dd
is a two-digit day of the month (zero padded) between 01 and 31.

hh
is a two-digit hour (zero padded) between 00 and 23.

mm
is a two-digit minute (zero padded) between 00 and 59.

ss
is a two-digit second (zero padded) between 00 and 59.

+|--hh:mm
is an hour and minute signed offset from zero meridian time. The offset must be +|-- hh:mm (that is, + or – and four characters).

Use + for time zones east of the zero meridian, and use – for time zones west of the zero meridian. For example, +02:00 indicates a two-hour time difference to the east of the zero meridian, and –06:00 indicates a six-hour time difference to the west of the zero meridian.

Restriction: The shorter form +|--hh is not supported.

Example

This PUT statement writes the time for the Eastern time zone:

blx='01Feb2013T12:34:56'dt;
pout blx e8601lx.;

<table>
<thead>
<tr>
<th>Value of blx</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1675341296</td>
<td>2013-02-01T12:34:56-05:00</td>
</tr>
</tbody>
</table>

See Also

“Working with Dates and Times By Using the ISO 8601 Basic and Extended Notations” in *SAS Viya Formats and Informats: Reference*

E8601TX Format

Adjusts a Coordinated Universal Time (UTC) value to the user local time. Then, writes the local time by using the ISO 8601 extended time notation hh:mm:ss+|--hh:mm.

Categories: Date and Time
ISO 8601

Alignment: Right

Supports: ISO 8601 Elements 5.3.3 and 5.3.4
Syntax

\texttt{E8601TXw}.

**Syntax Description**

\textit{w} specifies the width of the output field.

- **Default**: 14
- **Range**: 9–20

**Details**

UTC values specify a time based on the zero meridian in Greenwich, England. Using this format, SAS converts a time value to the UTC value and determines the user local time by using the value of the TIMEZONE= system option. If the TIMEZONE= option is not set, the user local time is based on the local time. The E8601TX format writes SAS datetime values by using the following ISO 8601 basic time notation:

- \texttt{hh:mm:ss+|-hh:mm}

  - \textit{hh} is a two-digit hour (zero padded) between 00 and 23.
  
  - \textit{mm} is a two-digit minute (zero padded) between 00 and 59.
  
  - \textit{ss} is a two-digit second (zero padded) between 00 and 59.

- \texttt{+|-hh:mm}

  - is an hour and minute signed offset from zero meridian time. The offset must be \texttt{+|-hhmm} (that is, + or – and four characters).

  Use + for time zones east of the zero meridian, and use – for time zones west of the zero meridian. For example, \texttt{+0200} indicates a two-hour time difference to the east of the zero meridian, and \texttt{–0600} indicates a six-hour time difference to the west of the zero meridian.

  **Restriction**: The shorter form \texttt{+|-hh} is not supported.

When SAS reads a UTC time by using the E8601TZ informat, and the adjusted time is greater than 24 hours or less than 00 hours, SAS adjusts the value so that the time is between 000000 and 240000. If the E8601TX format attempts to format a time outside of this time range, the time is formatted with asterisks to indicate that the value is out of range.

**Example**

The first example uses the local time to determine the time and the time zone offset. The second example changes the time zone to America/Adak, which is Hawaii-Aleutian Time.
Statement | Result
--- | ---
data _null_;  
t='12:34:56't;  
put t e8601tx.;  
run;  
| 07:34:56-05:00

options timezone='America/Adak';
data _null_;  
t='12:34:56't;  
put t e8601tx.;  
run;  
| 02:34:56-10:00

See Also

“Working with Dates and Times By Using the ISO 8601 Basic and Extended Notations” in *SAS Viya Formats and Informats: Reference*

**EURO Format**

Writes numeric values with a leading euro symbol (E), a comma that separates every three digits, and a period that separates the decimal fraction.

- **Categories:** Numeric, CAS
- **Alignment:** Right

**Syntax**

EURO\(w.d\)

**Syntax Description**

- **\(w\)** specifies the width of the output field.
  - Default: 6
  - Range: 1-32
  - Tip: If you want the euro symbol to be part of the output, be sure to choose an adequate width.

- **\(d\)** specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 0
  - Range: 0-31
  - Requirement: must be less than \(w\)
Comparisons

- The EUROw.d format is similar to the EUROXw.d format, but EUROXw.d format reverses the roles of the decimal point and the comma. This convention is common in European countries.

- The EUROw.d format is similar to the DOLLARw.d format, except that DOLLARw.d format writes a leading dollar sign instead of the euro symbol.

Example

These examples use 1254.71 as the value of amount.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put amount euro10.2;</td>
<td>E1,254.71</td>
</tr>
<tr>
<td>put amount euro5.;</td>
<td>E1255</td>
</tr>
<tr>
<td>put amount euro9.2;</td>
<td>E1,254.71</td>
</tr>
<tr>
<td>put amount euro15.3;</td>
<td>E1,254.710</td>
</tr>
</tbody>
</table>

```sas
data _null_
  input x;
  put x euro10.2;
  put x euro5.;
  put x euro9.2;
  put x euro15.3;
datalines;
1254.71
; run;
SAS Log:
E1,254.71
E1255
E1,254.71
E1,254.710
/* This code determines the default length. */
data _null_
  input x;
  put x euro.;
datalines;
1
22
333
4444
55555
666666
777777
88888888
999999999
```
1234561234
;run;
SAS Log:
datalines;
E1
E22
E333
E4,444
55,555
666666
7.78E6
8.89E7
1E9
1.23E9
NOTE: At least one W.D format was too small for the number to be printed. The decimal may be shifted by the "BEST" format.

/* This code determines the range. */
data _null_
   input x;
   put x euro5.;
   put x euro6.;
   put x euro7.;
   put x euro8.;
   put x euro9.;
   put x euro9.2;
   put x euro10.;
   put x euro10.2;
   put x euro10.4;
   put x euro11.;
   put x euro11.3;
   put x euro12.;
   put x euro12.2;
   put x euro13.;
   put x euro13.2;
   datalines;
333
4444
55555
666666
7777777
88888888
999999999
1234561234
;run;

See Also

Format:
• “EUROX Format” on page 99

Informat:
• “EURO Informat” on page 418
• “EUROX Informat” on page 420
EUROX Format

Writes numeric values with a leading euro symbol (E), a period that separates every three digits, and a comma that separates the decimal fraction.

**Categories:** Numeric  
CAS  
**Alignment:** Right

---

**Syntax**

\[ \text{EUROX}w.d \]

**Syntax Description**

- \( w \) specifies the width of the output field.
  - Default: 6
  - Range: 1-32
  - Tip: If you want the euro symbol to be part of the output, be sure to choose an adequate width.

- \( d \) specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 0
  - Range: 0-31
  - Requirement: must be less than \( w \)

**Comparisons**

- The EUROX\( w.d \) format is similar to the EURO\( w.d \) format, but EURO\( w.d \) format reverses the roles of the comma and the decimal point. This convention is common in English–speaking countries.

- The EUROX\( w.d \) format is similar to the DOLLARX\( w.d \) format, except that DOLLARX\( w.d \) format writes a leading dollar sign instead of the euro symbol.

**Example**

These examples use 1254.71 as the value of amount.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put amount eurox10.2;</td>
<td>E1.254,71</td>
</tr>
</tbody>
</table>
**Statements** | **Results**
---|---
put amount eurox5.; | E1255

put amount eurox9.2; | E1.254,71

put amount eurox15.3; | E1.254,710

data _null_;  
   input x;  
   put x eurox10.2;  
   put x eurox5.;  
   put x eurox9.2;  
   put x eurox15.3;  
   datalines;
1254.71  
; run;
SAS Log:
   E1.254,71
   E1255
   E1.254,71
   E1.254,710

/* This code determines the default length. */
data _null_;  
   input x;  
   put x eurox.;  
   datalines;
1
22
333
4444
55555
666666
7777777
88888888
999999999
1234561234
;run;
SAS Log:
   E1
   E22
   E333
   E4.444
   S5.555
   666666
   7.78E6
   8.89E7
   1E9
   1.23E9

*Note:* At least one W.D format was too small for the number to be printed. The decimal might be shifted by the "BEST" format.
See Also

Format:
- “EURO Format” on page 96

Informats:
- “EURO Informat” on page 418
- “EUROX Informat” on page 420

MINGUO Format

Writes date values as Taiwanese dates in the form yyyymmdd.

Category: Date and Time
Alignment: Left

Syntax

MINGUOW.

Syntax Description

w
  specifies the width of the output field.

  Default 8
  Range 1–10

Details

The MINGUOW. format writes SAS date values in the form yyyymmdd, where

  yyyy
  is an integer that represents the year.

  mm
  is an integer that represents the month.

  dd
  is an integer that represents the day of the month.

The Taiwanese calendar uses 1912 as the base year (01/01/01 is January 1, 1912). Dates before 1912 appear as a series of asterisks. Year values do not roll around after 100 years. Instead, they continue to increase.

Example

The example table uses the following input values:

- 12054 is the SAS date value that corresponds to January 1, 1993.
- 18993 is the SAS date value that corresponds to January 1, 2012.
• -20088 is the SAS date value that corresponds to January 1, 1905.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=put(12054,minguo7.); put x=;</td>
<td>x=820101</td>
</tr>
<tr>
<td>x=put(12054,minguo9.); put x=;</td>
<td>x=0082/01/01</td>
</tr>
<tr>
<td>x=put(12054,minguo10.); put x=;</td>
<td>x=0101/01/01</td>
</tr>
<tr>
<td>x=put(18993,minguo7.); put x=;</td>
<td>x=1000101</td>
</tr>
<tr>
<td>x=put(18993,minguo9.); put x=;</td>
<td>x=100/01/01</td>
</tr>
<tr>
<td>x=put(18993,minguo10.); put x=;</td>
<td>x=0101/01/01</td>
</tr>
<tr>
<td>x=put(-20088,minguo7.); put x=;</td>
<td>**********</td>
</tr>
<tr>
<td>x=put(-20088,minguo9.); put x=;</td>
<td>**********</td>
</tr>
<tr>
<td>x=put(-20088,minguo10.); put x=;</td>
<td>**********</td>
</tr>
</tbody>
</table>

See Also

Informat:
• “MINGUO Informat” on page 421

NENGO Format

Writes date values as Japanese dates in the form e.yymmdd.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Date and Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td></td>
</tr>
</tbody>
</table>

Alignment: Left

Syntax

NENGOw:
Syntax Description

\( w \)

specifies the width of the output field.

**Default** 10

**Range** 2–10

Details

The NENGO\( w \) format writes SAS date values in the form \( e.yymmdd \), where

- \( e \) is the first letter of the name of the emperor (Meiji, Taisho, Showa, or Heisei).
- \( yy \) is an integer that represents the year.
- \( mm \) is an integer that represents the month.
- \( dd \) is an integer that represents the day of the month.

If the width is too small, SAS omits the period.

Example

The example table uses the input value of 15342, which is the SAS date value that corresponds to January 2, 2002.

```
data _null_;  
date=15342;  
put date nengo3.;  
put date nengo6.;  
put date nengo8.;  
put date nengo9.;  
put date nengo10.;  
run  
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>put date nengo1.;</td>
<td>H14</td>
</tr>
<tr>
<td>put date nengo6.;</td>
<td>H14/01</td>
</tr>
<tr>
<td>put date nengo8.;</td>
<td>H.140102</td>
</tr>
<tr>
<td>put date nengo9.;</td>
<td>H14/01/02</td>
</tr>
<tr>
<td>put date nengo10.;</td>
<td>H.14/01/02</td>
</tr>
</tbody>
</table>
See Also

Informat:
- “NENGO Informat” on page 423

NLBEST Format

Writes the best numerical notation based on the locale.

Categories: Numeric
CAS
Alignment: Right

Syntax

NLBEST\(w\).

Syntax Description

\(w\)

specifies the width of the output field.

Default 12
Range 1–32
Tip If you print numbers between 0 and .01 exclusively, then use a field width of at least 7 to avoid excessive rounding. If you print numbers between 0 and -.01 exclusively, use a field width of at least 8.

Details

The NLBEST format writes the best numerical value based on the locale's decimal point and the sign mark's location. NLBEST is similar to the BEST format. For more information, see the BEST format in the *SAS Viya Formats and Informat Reference*.

Example

The following code produces results based on the locale:

```sas
x=-1257000
    put x nlbest6.;
    put x nlbest3.;
    put "=====";
    x=-0.1
    put x nlbest6.;
    put x nlbest3.;
    put "=====";
    x=0.1
    put x nlbest6.;
    put x nlbest3.;
    put "=====";
```
```
x=1257000
put x nlbest6.;
put x nlbest3.;
```

<table>
<thead>
<tr>
<th>Locales</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>locale=English_UnitedStates</td>
<td>-126E4</td>
</tr>
<tr>
<td></td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>-0.1</td>
</tr>
<tr>
<td></td>
<td>-.1</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>1.26E6</td>
</tr>
<tr>
<td></td>
<td>1E6</td>
</tr>
<tr>
<td>locale=German_Germany</td>
<td>-126E4</td>
</tr>
<tr>
<td></td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>-0,1</td>
</tr>
<tr>
<td></td>
<td>-,1</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>0,1</td>
</tr>
<tr>
<td></td>
<td>0,1</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>1,26E6</td>
</tr>
<tr>
<td></td>
<td>1E6</td>
</tr>
<tr>
<td>locale=ar_BH</td>
<td>126E4-</td>
</tr>
<tr>
<td></td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>0,1-</td>
</tr>
<tr>
<td></td>
<td>.1-</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>0,1</td>
</tr>
<tr>
<td></td>
<td>0,1</td>
</tr>
<tr>
<td></td>
<td>=========</td>
</tr>
<tr>
<td></td>
<td>1,26E6</td>
</tr>
<tr>
<td></td>
<td>1E6</td>
</tr>
</tbody>
</table>
NLDATE Format

Converts a SAS date value to the date value of the specified locale, and then writes the date value as a date.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Note:** Use the NLDATE format in the CAS server instead of the WORDDATE format.

**Syntax**

NLDATEw.

**Syntax Description**

`w` specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

**Note:** The format pattern, long, medium, short, is used according to the specified width.

**Default** 20

**Range** 10–200

**Comparisons**

NLDATEw. is similar to DATEw. and WORDDATEw. except that NLDATEw. is locale-specific.

**Example**

These examples use the input value of 15760, which is the SAS date value that corresponds to February 24, 2003.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>February 24, 2003</td>
</tr>
<tr>
<td>put day nldate.;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>24. Februar 2003</td>
</tr>
<tr>
<td>put day nldate.;</td>
<td></td>
</tr>
</tbody>
</table>
See Also

Formats:

• “NLDATEMN Format” on page 112
• “NLDATEW Format” on page 114
• “NLDATEWN Format” on page 116

NLDATEL Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as a
date in the form, date, month, year.

**Syntax**

```
NLDATELw.
```

**Syntax Description**

`w`

specifies the width of the output field. If necessary, SAS abbreviates the date to fit
the format width.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>2–220</td>
</tr>
</tbody>
</table>

**Details**

NLDATEL writes the date in a long-uniform pattern with the full length of the month
and week names.

**Example**

This example uses the date November 19, 2012.
NLDATEM Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date.

Categories: Date and Time

CAS

Alignment: Left

Syntax

\[
\text{NLDATEM}_w
\]

Syntax Description

\[w\]

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

Default 14

Range 2–200

Details

NLDATEM writes the date in a medium-uniform pattern such as Nov 19, 2012.

Example

This example uses the date November 19, 2012.
NLDATEMD Format

Converts the SAS date value to the date value of the specified locale, and then writes the value as the name of the month and the day of the month.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Syntax**

NLDATEMDw.

**Syntax Description**

w

specifies the width of the output field.

**Default** 16

**Range** 6-200

**Example**

This example uses the en_US locale option.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>put 1 nldatemd.;</td>
<td>January 02</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “NLDATEYM Format” on page 117
**NLDATEmDL Format**

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.

**Categories:**
- Date and Time
- CAS

**Alignment:**
- Left

### Syntax

NLDATEmDL<sub>w</sub>.

### Syntax Description

<sub>W</sub>

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

**Default**
- 12

**Range**
- 5–200

### Details

NLDATEmDL writes the date in a long-uniform pattern with full length of the month and the day, such as November 19.

### Example

The following example uses the date of November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+---- NLDATEmDL min=5 default=12 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>November 19</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/19</td>
</tr>
<tr>
<td>put &quot;<em>---- NLDATEmDL min=5 default=12 max=200 ----</em>&quot;;</td>
<td>Nov 19</td>
</tr>
<tr>
<td>put dy nldatemdl.;</td>
<td>November 19</td>
</tr>
<tr>
<td>put dy nldatemdl15.;</td>
<td>November 19</td>
</tr>
<tr>
<td>put dy nldatemdl19.;</td>
<td>November 19</td>
</tr>
<tr>
<td>put dy nldatemdl112.;</td>
<td>November 19</td>
</tr>
<tr>
<td>put dy nldatemdl200.;</td>
<td>November 19</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

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**NLDatemdm Format**

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.

**Categories:**  
Date and Time  
CAS

**Alignment:**  
Left

**Syntax**

\[ \text{NLDatemdm}_w. \]

**Syntax Description**

\( w \)

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

- **Default:** 9
- **Range:** 5–200

**Details**

NLDatemdm writes the date in a medium-uniform pattern with abbreviation of the month and the day using numbers and delimiters, such as Nov 19.

**Example**

The following example uses the date of November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDatemdm min=5 default=9 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>Nov 19</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/19</td>
</tr>
<tr>
<td>put &quot;---- NLDatemdm min=5 default=9 max=200 ----&quot;;</td>
<td>Nov 19</td>
</tr>
<tr>
<td>put dy nldatemdm.;</td>
<td>Nov 19</td>
</tr>
<tr>
<td>put dy nldatemdm5.;</td>
<td>Nov 19</td>
</tr>
<tr>
<td>put dy nldatemdm9.;</td>
<td>Nov 19</td>
</tr>
<tr>
<td>put dy nldatemdm200.;</td>
<td>Nov 19</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**NLDatemds Format**

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month.
Syntax
NLDATEMDS\(w\).

Syntax Description
\(w\) specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

Default 5
Range 5–200

Details
NLDATEMDS writes the date in a short-uniform pattern in full length of the month and the day using numbers and delimiters, such as MM/dd.

Example
The following example uses the date of November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATEMDS min=5 default=5 max=200 ---+</td>
</tr>
<tr>
<td>d = datetime();</td>
<td>11/19</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/19</td>
</tr>
<tr>
<td>put &quot;+--- NLDATEMDS min=5 default=5 max=200 ---+&quot;;</td>
<td>11/19</td>
</tr>
<tr>
<td>put dy nldatemds.;</td>
<td>11/19</td>
</tr>
<tr>
<td>put dy nldatemds5.;</td>
<td>11/19</td>
</tr>
<tr>
<td>put dy nldatemds5.;</td>
<td>11/19</td>
</tr>
<tr>
<td>run;</td>
<td>11/19</td>
</tr>
</tbody>
</table>

NLDATEMN Format
Converts a SAS date value to the date value of the specified locale, and then writes the value as the name of the month.

Categories: Date and Time
CAS
Alignment: Left
Syntax
NLDATEMN\textsubscript{w}.

Syntax Description
\text{w}

\text{w} specifies the width of the output field. If necessary, SAS abbreviates the name of the month to fit the format width.

Default 9

Range 4–200

Comparisons
NLDATEMN\textsubscript{w}. is similar to MONNAME\textsubscript{w}. except that NLDATEMN\textsubscript{w}. is locale-specific.

Example
These examples use the input value of 15760, which is the SAS date value that corresponds to February 24, 2003.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>February</td>
</tr>
<tr>
<td>put month nldatemn.;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>Februar</td>
</tr>
<tr>
<td>put month nldatemn.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
- “NLDATE Format” on page 106
- “NLDATEW Format” on page 114
- “NLDATEWN Format” on page 116

NLDATES Format
Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date string.

Categories: Date and Time
CAS
Syntax

**NLDATES**\(w\).

**Syntax Description**

\(w\)

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

**Default** 10

**Range** 2–200

**Details**

NLDATES writes the date in a short-uniform pattern that contains only numbers and delimiters, such as mm/dd/yyyy.

**Example**

This example uses the date November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATES min=2 default=10 max=200 ---+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>11/19/2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/19/12</td>
</tr>
<tr>
<td>put &quot;+--- NLDATES min=2 default=10</td>
<td>11/19/2012</td>
</tr>
<tr>
<td>max=200 ----+&quot;;</td>
<td>11/19/2012</td>
</tr>
<tr>
<td>put dy nldates.;</td>
<td></td>
</tr>
<tr>
<td>put dy nldates8.;</td>
<td></td>
</tr>
<tr>
<td>put dy nldates10.;</td>
<td></td>
</tr>
<tr>
<td>put dy nldates200.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**NLDATEW Format**

Converts a SAS date value to the date value of the specified locale, and then writes the value as the date and the day of the week.

**Categories:** Date and Time  
CAS

**Alignment:** Left

**Note:** Use the NLDATEW format in the CAS server instead of the WEEKDATE format.
Syntax

NLDATEWw.

Syntax Description

w

specifies the width of the output field. If necessary, SAS abbreviates the date and the
day of the week to fit the format width.

Default 29

Range 10–200

Details

The NLDATEW format might produce inaccurate localized output when using the
default width with some encoding and locale combinations because the date and time
names are too long. Please refer to Exceptions for Date and Time Default Widths on
page 60 for information about recommended widths for locale and encoding
combinations. You might need to use the recommended width.

Comparisons

NLDATEWw. is similar to WEEKDATEw. except that NLDATEWw. is locale specific.

Example

These examples use the input value of 15760, which is the SAS date value that
corresponds to February 24, 2003.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>Monday, February 24, 2003</td>
</tr>
<tr>
<td>date=15760;</td>
<td>Mon, Feb 24, 2003</td>
</tr>
<tr>
<td>x=put(date,nldatew.);</td>
<td>Monday, February 24, 2003</td>
</tr>
<tr>
<td>y=put(date,nldatew20.);</td>
<td>Monday, February 24, 2003</td>
</tr>
<tr>
<td>z=put(date,nldatew200.);</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

| options locale=German_Germany;                                            | Mo., 24. Feb 2003                |
| date=15760;                                                                | Mo., 24. Feb 2003                |
| x=put(date,nldatew.);                                                     | Mo., 24. Feb 2003                |
| y=put(date,nldatew20.);                                                   | Montag, 24. Februar 2003         |
| z=put(date,nldatew200.);                                                  |                                   |
| run;                                                                       |                                  |
See Also

Formats:
- “NLDATE Format” on page 106
- “NLDATEMN Format” on page 112
- “NLDATENW Format” on page 116

NLDATEWN Format

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the day of the week.

**Categories:** Date and Time  
CAS

**Alignment:** Left

**Syntax**

\[
\text{NLDATEWN}_w.
\]

**Syntax Description**

\[w\]

specifies the width of the output field. If necessary, SAS abbreviates the day of the week to fit the format width.

**Default** 9

**Range** 4–200

**Comparisons**

NLDATEW\(_N\)\(_w\). is similar to DOWNAME\(_w\). except that NLDATEW\(_N\)\(_w\). is locale-specific.

**Example**

These examples use the input value of 15760, which is the SAS date value that corresponds to February 24, 2003.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>Monday</td>
</tr>
<tr>
<td>put date nldatewn;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>---------</td>
</tr>
</tbody>
</table>
Statements | Results
--- | ---
options locale='German_Germany'; | Montag
put date nldatewn;

See Also

Formats:

- “NLDATE Format” on page 106
- “NLDATEMN Format” on page 112
- “NLDATEW Format” on page 114

**NLDATEYM Format**

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the name of the month.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Syntax**

NLDATEYMw.

**Syntax Description**

w

specifies the width of the output field.

**Default** 16

**Range** 6–200

**Details**

If you specify a width of 6, but your data is larger than 6, your output contains asterisks: `d=******`. To remove the asterisks, you can use PROC LOCALEDATA. The following example uses PROC LOCALEDATA to write the date without the asterisks:

```sas
PROC LOCALEDATA;
  LOAD SASLOCALE;
  MODIFY key=DATE_YYMM_SHORT_FORMAT value='%b %y' ;
  SAVE REGISTRY / _ALL_ syntax=SAS;

data _null_;
  format d nldateym6.;
  d = '17OCT14'd;
  put d=;
```
Example

This example uses the spanish_Spain locale option, and the date of August 2010.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=spanish_Spain;</td>
<td></td>
</tr>
<tr>
<td>data_null_;</td>
<td></td>
</tr>
<tr>
<td>dy=today();</td>
<td>agosto de 2010</td>
</tr>
<tr>
<td>x=put(dy, nldateym.);</td>
<td>ago de 10</td>
</tr>
<tr>
<td>y=put(dy, nldateym12.);</td>
<td>agosto de 2010</td>
</tr>
<tr>
<td>z=put(dy, nldateym200.);</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLDATEDM Format” on page 109

NLDATEYML Format

Converts a SAS date value to the date string of the specified locale, and then writes the month and year.

**Categories:** Date and Time  
CAS

**Alignment:** Left

**Syntax**

NLDATEYML

**Syntax Description**

`w` specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

**Default** 14

**Range** 5–200
Details

NLDATEYML writes the date in a long-uniform pattern with abbreviations for the month and year, such as November 2012.

Example

The following example uses the date November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATEYML min=5 default=14 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>November 2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/2012</td>
</tr>
<tr>
<td>put &quot;+--- NLDATEYML min=5 default=14 max=200 ----&quot;;</td>
<td>November 2012</td>
</tr>
<tr>
<td>put dy nldateyml.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dy nldateyml7.;</td>
<td>November 2012</td>
</tr>
<tr>
<td>put dy nldateyml11.;</td>
<td>November 2012</td>
</tr>
<tr>
<td>put dy nldateyml14.;</td>
<td>November 2012</td>
</tr>
<tr>
<td>put dy nldateyml200.;</td>
<td>November 2012</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATEYMM Format

Converts a SAS date value to the date string of the specified locale, and then writes the date values as the month and year with abbreviations.

Categories: Date and Time
CAS
Alignment: Left

Syntax

NLDATEYMMw.

Syntax Description

w

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

Default 11
Range 5–200

Details

NLDATEYMS writes the date in a medium-uniform pattern with abbreviations for the month and year, such as Nov 2012.
**Example**

The following example uses the date November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATEYMM min=5 default=11 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/2012</td>
</tr>
<tr>
<td>put &quot;+--- NLDATEYMM min=5 default=11 max=200 ---+&quot;;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dy nldateymm.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dy nldateymm7.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dy nldateymm11.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dy nldateymm200.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**NLDATEYMS Format**

Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date and year.

- **Categories:** Date and Time
- **Alignment:** Left

**Syntax**

NLDATEYMS\(w\).

**Syntax Description**

\(w\)

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

- **Default:** 7
- **Range:** 5–200

**Details**

NLDATEYMS writes the date in a short-uniform pattern with numbers and delimiters such as mm/yyyy.

**Example**

This example uses the date November 19, 2012.
Statements

```sas
data _null_;  
  dt = datetime();  
  dy = date();  
  put "+--- NLDATEYMS min=5 default=7 max=200 ---+", dy nldateyms.;  
  put dy nldateyms5.;  
  put dy nldateyms7.;  
  put dy nldateyms200.;  
run;
```

Results

```
+--- NLDATEYMS min=5 default=7 max=200 ---+
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11/2012</td>
<td>11/12</td>
<td>11/2012</td>
</tr>
</tbody>
</table>
```

**NLDATEYQ Format**

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the quarter.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Syntax**

```
NLDATEYQw.
```

**Syntax Description**

`w`

specifies the width of the output field.

- **Default:** 16
- **Range:** 4–200

**Details**

The NLDATEYQ format might produce inaccurate localized output when using the default width with some encoding and locale combinations because the date and time names are too long. Please refer to Exceptions for Date and Time Default Widths on page 60 for information about recommended widths for locale and encoding combinations. You might need to use the recommended width.

**Example**

This example uses the fr_FR locale option.
### NLDATEYQL Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year's quarter value (Q1–Q4) using abbreviations.

**Categories:** Date and Time  
CAS  

**Alignment:** Left

#### Syntax

\[
\text{NLDATEYQL} \ w. 
\]

#### Syntax Description

\( w \)

 specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>4–200</td>
</tr>
</tbody>
</table>

#### Details

NLDATEYQL writes the date in a long-uniform pattern with full length for the year and year’s quarter value, such as 4th quarter 2012.

#### Example

The following example uses the date November 19, 2012.
### Statements

```sas
data _null_;  
dt = datetime();  
dy = date();  
put +++- NLDATEYQL min=4 default=18 max=200 ++++  
        4th quarter 2013
        2013/4
        Q4 2013
        4th quarter 2013
max=200 +++-'';
        4th quarter 2013
        4th quarter 2013
        4th quarter 2013
put dy nldateyql1.;
put dy nldateyql6.;
put dy nldateyql7.;
put dy nldateyql18.;
put dy nldateyql200.;
run;
```

### Results


<table>
<thead>
<tr>
<th></th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>dt</td>
<td>datetime()</td>
</tr>
<tr>
<td>dy</td>
<td>date()</td>
</tr>
<tr>
<td>put</td>
<td>+++- NLDATEYQL min=4 default=18 max=200 ++++</td>
</tr>
<tr>
<td></td>
<td>4th quarter 2013</td>
</tr>
<tr>
<td></td>
<td>2013/4</td>
</tr>
<tr>
<td></td>
<td>Q4 2013</td>
</tr>
<tr>
<td></td>
<td>4th quarter 2013</td>
</tr>
<tr>
<td>max=200</td>
<td>+++-'';</td>
</tr>
<tr>
<td>put dy</td>
<td>nldateyql1.</td>
</tr>
<tr>
<td>put dy</td>
<td>nldateyql6.</td>
</tr>
<tr>
<td>put dy</td>
<td>nldateyql7.</td>
</tr>
<tr>
<td>put dy</td>
<td>nldateyql18.</td>
</tr>
<tr>
<td>put dy</td>
<td>nldateyql200.</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

---

### NLDATEYQM Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year’s quarter value (Q1–Q4) using abbreviations.

- **Categories:** Date and Time
- **Alignment:** Left

### Syntax

`NLDATEYQMw.`

### Syntax Description

`w`

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

- **Default:** 7
- **Range:** 4–200

### Details

NLDATEYQM writes the date in a medium-uniform pattern with abbreviations for the year and year’s quarter value, such as Q4 2012.

### Example

The following example uses the date November 19, 2012.
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATEYQM min=4 default=7 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>2012/4</td>
</tr>
<tr>
<td>put &quot;+--- NLDATEYQM min=4 default=7 max=200 ---+&quot;;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dy nldateyqm.;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dy nldateyqm6.;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dy nldateyqm7.;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dy nldateyqm200.;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**NLDATEYQS Format**

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the year’s quarter value (1–4) with numbers and delimiters.

**Categories:** Date and Time  
CAS  
**Alignment:** Left

---

**Syntax**

NLDATEYQS<sub>w</sub>.

**Syntax Description**

<sub>w</sub>

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

**Default** 6

**Range** 4–200

---

**Details**

NLDATEYQS writes the date in a short-uniform pattern with numbers and delimiters for the year and year’s quarter value, such as 2012/4.

---

**Example**

The following example uses the date November 19, 2012.
Statements | Results
---|---
data _null_;  
dt = datetime();  
dy = date();  
put "+--- NLDATEYQS min=4 default=6 max=200 ---+
2012/4
12/4
2012/4
2012/4
run;

--- NLDATEYQS min=4 default=6 max=200 ---+
2012/4
12/4
2012/4
2012/4

**NLDATEYR Format**

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year.

- **Categories:** Date and Time, CAS
- **Alignment:** Left

### Syntax

`NLDATEYRw.`

**Syntax Description**

`w`

specifies the width of the output field.

- **Default:** 16
- **Range:** 2–200

### Example

This example uses the fr_FR locale option.
 NLDATEYW Format

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the week.

<table>
<thead>
<tr>
<th>Categories:</th>
<th>Date and Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td></td>
</tr>
<tr>
<td>Alignment:</td>
<td>Left</td>
</tr>
</tbody>
</table>

**Syntax**

`NLDATEYWw`.  

**Syntax Description**

- `w` specifies the width of the output field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>5–200</td>
</tr>
</tbody>
</table>

**Example**

This example uses the fr_FR locale option.
Statements | Results
--- | ---
options locale=fr_FR;

data _null_;
dy=today();
dt=datetime();
put "+--- NLDATEYW min=5 default=16 max=200 ---+";
put '16' +5 dy nldateyw.;
put '5' +5 dy nldateyw5.;
put '8' +5 dy nldateyw8.;
put '32' +5 dy nldateyw32.;
put '200' +5 dy nldateyw200.;
run;

### NLDATM Format

Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime.

**Categories:** Date and Time

**CAS:**

**Alignment:** Left

### Syntax

**NLDATMw.**

### Syntax Description

**w**

specifies the width of the output field. If necessary, SAS abbreviates the datetime value to fit the format width.

**Default** 30

**Range** 10–200

### Comparisons

The NLDATMw. format is similar to the DATETIMEw. format except that the NLDATMw. format is locale-specific.

### Example

These examples use the input value of 1361709583, which is the SAS datetime value that corresponds to 12:39:43 p.m. on February 24, 2003.
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>24Feb2003:12:39:43</td>
</tr>
<tr>
<td>put day nldatm.;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>24. Februar 2003 12.39 Uhr</td>
</tr>
<tr>
<td>put day nldatm.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
- “NLDATMAP Format” on page 128
- “NLDATMTM Format” on page 137
- “NLDATMW Format” on page 139

NLDATMAP Format
Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime with a.m. or p.m.

Categories: Date and Time
           CAS
Alignment: Left

Syntax
NLDATMAPw.

Syntax Description

w specifies the width of the output field. If necessary, SAS abbreviates the date-time value to fit the format width.

Default 32
Range 16–200

Comparisons
The NLDATMAPw. format is similar to DATEAMPMw. except that the NLDATMAPw. format is locale-specific.
Example

These examples use the input value of 1361709583, which is the SAS date-time value that corresponds to 12:39:43 p.m. on February 24, 2003.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates; put event nldatmap.;</td>
<td>February 24, 2003 12:39:43 PM</td>
</tr>
<tr>
<td>options locale=Spanish_Mexico; put event nldatmap.;</td>
<td>24/02/2003 12:39:43 PM</td>
</tr>
</tbody>
</table>

See Also

Formats:
- “NLDATM Format” on page 127
- “NLDATMTM Format” on page 137
- “NLDATMW Format” on page 139

### NLDATMDT Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month, day of the month and year.

**Categories:** Date and Time  
CAS

**Alignment:** Left

#### Syntax

```
NLDATMDT w;
```

#### Syntax Description

- `w` specifies the width of the output field

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>10-200</td>
</tr>
</tbody>
</table>

#### Example

This example uses the en_US locale option.
Statements

options locale=en_US;
data _null_;  
x=86400;  
put x nldatmdt.;  
run;  
options locale=en_US;  
data _null_;  
x=86400;  
put x dtdate.;  
run;

Results
January 02, 1960  
02JAN60

See Also

Formats:
• “NLDATMMD Format” on page 131

NLDATML Format

Converts a SAS datetime value to the date string of the specified locale, and then writes the date value as a date in the form, month, date, year, and time.

Categories: Date and Time
CAS

Alignment: Left

Syntax

NLDATMLw.

Syntax Description

w
specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

Default 30

Range 9–200

Details

NLDATML writes the date in a long-uniform pattern with the full length of the month date, year, and time, such as, November 19, 2012 02:57:44 PM.

Example

This example uses the date November 19, 2012.
NLDATMM Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date and time with abbreviations for the month and time.

**Categories:** Date and Time, CAS

**Alignment:** Left

**Syntax**

```
NLDATMMw.
```

**Syntax Description**

- `w` specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>9–200</td>
</tr>
</tbody>
</table>

**Details**

NLDATMM writes the date in a medium-uniform pattern with abbreviations of the month and week names, such as Nov 19, 2012 02:51:40 PM.

NLDATMMD Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month and the day of the month.

**Categories:** Date and Time, CAS

**Alignment:** Left
Syntax

NLDATMMDw.

Syntax Description

w

specifies the width of the output field.

Default 16
Range 6–200

Example

This example uses the en_US locale option.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=en_US;</td>
<td>January 02</td>
</tr>
<tr>
<td>data <em>null</em></td>
<td></td>
</tr>
<tr>
<td>x=put(86400,nldatmmd.);</td>
<td></td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLDATMYM Format” on page 142

NLDATMMDL Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the full-length of the month and day of the month.

Categories: Date and Time
CAS

Alignment: Left

Syntax

NLDATMMDLw.
**Syntax Description**

$w$

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

- **Default**: 12
- **Range**: 5–200

**Details**

NLDATMMDL writes the date in a long-uniform pattern with full-length of the month and the day, such as November 19.

**Example**

The following example uses the date of November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATMMDL min=5 default=12 max=200 ---+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>November 19</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/19</td>
</tr>
<tr>
<td>put &quot;+---- NLDATMMDL min=5 default=12 max=200 ----&quot;;</td>
<td>Nov 19</td>
</tr>
<tr>
<td>put dt nldatmmdl.;</td>
<td>November 19</td>
</tr>
<tr>
<td>put dt nldatmmdl15.;</td>
<td>November 19</td>
</tr>
<tr>
<td>put dt nldatmmdl19.;</td>
<td>November 19</td>
</tr>
<tr>
<td>put dt nldatmmdl2.;</td>
<td>November 19</td>
</tr>
<tr>
<td>put dt nldatmmdl1200.;</td>
<td>November 19</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**NLDATMMDM Format**

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month using abbreviations.

**Categories:** Date and Time

**CAS**: Left

**Syntax**

NLDATMMDM$w$.

**Syntax Description**

$w$

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.
NLDATMMDM writes the date in a medium-uniform pattern with abbreviations of the month and the day, such as Nov 19.

Example

The following example uses the date of November 19, 2012.

```
data _null_;  +--- NLDATMMDM min=5 default=9 max=200 ---+  dt = datetime();  Nov 19  dy = date();  11/19  put "+---- NLDATMMDM min=5 default=9 max=200 ----";  Nov 19  put dt nldatmmdm.;  Nov 19  put dt nldatmmdm5.;  Nov 19  put dt nldatmmdm9.;  Nov 19  put dt nldatmmdm200.;  Nov 19  run;```

NLDATMMDS Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and day of the month using numbers and delimiters.

**Categories:** Date and Time
CAS

**Alignment:** Left

**Syntax**

```
NLDATMMDS\w.
```

**Syntax Description**

`\w` specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

**Default** 5

**Range** 5–200
Details

NLDATMMDS writes the date in a short-uniform pattern with numbers and delimiters of the month and the day, such as 11/19.

Example

The following example uses the date of November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+---- NLDATMMDS min=5 default=5 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>11/19</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/19</td>
</tr>
<tr>
<td>put &quot;+---- NLDATMMDS min=5 default=5 max=200 ----+&quot;;</td>
<td>11/19</td>
</tr>
<tr>
<td>put dt nldatmmds.;</td>
<td>11/19</td>
</tr>
<tr>
<td>put dt nldatmmds5.;</td>
<td>11/19</td>
</tr>
<tr>
<td>put dt nldatmmds5.;</td>
<td>11/19</td>
</tr>
<tr>
<td>put dt nldatmmds200.;</td>
<td>11/19</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATMMN Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month.

- **Categories:** Date and Time, CAS
- **Alignment:** Left

**Syntax**

`NLDATMMNw.`

**Syntax Description**

`w` specifies the width of the output field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>4–200</td>
</tr>
</tbody>
</table>

**Example**

This example uses the en_US locale option.
### Statements

```sas
data _null_;
  dt = datetime();
  dy = date();
  put "++--- NLDATMMN min=4 default=10 max=200 +++";
  put dt nldatmmn.;
  put dt nldatmmn4.;
  put dt nldatmmn10.;
  put dt nldatmmn200.;
run;
```

### Results

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>dt NLDATMMN</td>
<td>October</td>
</tr>
<tr>
<td>dt NLDATMMN4</td>
<td>Oct</td>
</tr>
<tr>
<td>dt NLDATMMN10</td>
<td>October</td>
</tr>
<tr>
<td>dt NLDATMMN200</td>
<td>October</td>
</tr>
</tbody>
</table>

---

### NLDATMS Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as a date in the form, MM/DD/YYYY.

**Categories:**
- Date and Time
- CAS

**Alignment:**
- Left

#### Syntax

```
NLDATMSw.
```

#### Syntax Description

- `w` specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

  **Default**
  - 19

  **Range**
  - 9–200

#### Details

NLDATMS writes the date in a short-uniform pattern with number and delimiters, such as MM/DD/YYYY hh:mm:ss.

#### Example

This example uses the date November 19, 2012.
NLDATMTM Format

Converts the time portion of a SAS datetime value to the time-of-day value of the specified locale, and then writes the value as a time of day.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Syntax**

NLDATMTM\textit{w}.

**Syntax Description**

\textit{w}

specifies the width of the output field.

**Default** 16

**Range** 16–200

**Comparisons**

The NLDATMTM\textit{w} format is similar to the TOD\textit{w} format except that the NLDATMTM\textit{w} format is locale-specific.

**Example**

These examples use the input value of 1361709583, which is the SAS datetime value that corresponds to 12:39:43 p.m. on February 24, 2003.

<table>
<thead>
<tr>
<th>Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
</tr>
<tr>
<td>dt = datetime();</td>
</tr>
<tr>
<td>dy = date();</td>
</tr>
<tr>
<td>put &quot;+--- NLDATMS min=9 default=19 max=200 ---+&quot;;</td>
</tr>
<tr>
<td>put dt nldatms.;</td>
</tr>
<tr>
<td>put dt nldatms10.;</td>
</tr>
<tr>
<td>put dt nldatms19.;</td>
</tr>
<tr>
<td>put dt nldatms200.;</td>
</tr>
<tr>
<td>run;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/19/2012 14:38:52</td>
</tr>
<tr>
<td>11/19/2012 14:38:52</td>
</tr>
<tr>
<td>11/19/2012 14:38:52</td>
</tr>
<tr>
<td>11/19/2012 14:38:52</td>
</tr>
</tbody>
</table>
See Also

Formats:

- “NLDATM Format” on page 127
- “NLDATMAP Format” on page 128
- “NLDATMW Format” on page 139

NLDATMTZ Format

Converts the time portion of the SAS datetime of the locale to the time of day and time zone.

**Categories:** Date and Time

**CAS:**

**Alignment:** Left

**Syntax**

NLDATMTZ\(w\).

**Syntax Description**

\(w\)

specifies the width of the output field.

**Default** 32

**Range** 16–200

**Example**

This example uses the current datetime value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=fr_FR;</td>
<td>x=10 h 40 -0400</td>
</tr>
<tr>
<td>data test;</td>
<td></td>
</tr>
<tr>
<td>x=datetime();</td>
<td></td>
</tr>
<tr>
<td>put x=nldatmtz.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>
NLDATMW Format

Converts SAS datetime values to the locale sensitive datetime string as the day of the week and the datetime.

**Categories:**
- Date and Time
- CAS

**Alignment:**
- Left

**Syntax**

NLDATMWw.

**Syntax Description**

w

specifies the width of the output field. If necessary, SAS abbreviates the day of week and datetime to fit the format width.

Default 41

Range 16–200

**Details**

The NLDATMW format might produce inaccurate localized output when using the default width with some encoding and locale combinations because the date and time names are too long. Please refer to Exceptions for Date and Time Default Widths on page 60 for information about recommended widths for locale and encoding combinations. You might need to use the suggested width for the NLDATMW format.

**Comparisons**

The NLDATMWw. format is similar to the TWMDYw. format except that the NLDATMWw. format is locale-specific.

**Example**

These examples use the input value of 1361709583, which is the SAS datetime value that corresponds to 12:39:43 p.m. on February 24, 2003.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>----+----1----+----2----+----3</td>
<td></td>
</tr>
</tbody>
</table>

-----+-----1-----+-----2-----+-----3
Statements | Results
--- | ---
```options locale=English_UnitedStates;
data _null_;
x=put(1361709583,nldatmw.);
y=put(1361709583,nldatmw30.);
z=put(1361709583,nldatmw200.);
run;
```
```options locale=german_germany;
data _null_;
x=put(1361709583,nldatmw.);
y=put(1361709583,nldatmw30.);
z=put(1361709583,nldatmw200.);
run;
```

See Also

Formats:

- “NLDATM Format” on page 127
- “NLDATMAP Format” on page 128
- “NLDATMTM Format” on page 137

NLDATMWN Format

Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as the day of the week.

**Categories:** Date and Time

**CAS:**

**Alignment:** Left

**Syntax**

```
NLDATMWNw.
```

**Syntax Description**

w

specifies the width of the output field.

**Default**  9

**Range**  4–200
Example

This example writes the SAS datetime value as a day of the week.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATMWN min=4 default=9 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>Monday</td>
</tr>
<tr>
<td>dy = date();</td>
<td>Mon</td>
</tr>
<tr>
<td>put &quot;+---- NLDATMWN min=4 default=9</td>
<td>Monday</td>
</tr>
<tr>
<td>max=200 ----+&quot;;</td>
<td>Monday</td>
</tr>
<tr>
<td>put dt nldatmwn.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmwn4.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmwn9.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmwn200.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATMWZ Format

Converts SAS date values of the specified locale to a day-of-week, datetime, and time zone value.

- **Categories:** Date and Time, CAS
- **Alignment:** Left

**Syntax**

NLDATMWZw.

**Syntax Description**

- **w** specifies the width of the output field. If necessary, SAS abbreviates the day of week and datetime to fit the format width.

  - Default: 40
  - Range: 16–200

**Details**

The NLDATMWZ format might produce inaccurate localized output when using the default width with some encoding and locale combinations because the date and time names are too long. Please refer to Exceptions for Date and Time Default Widths on page 60 for information about recommended widths for locale and encoding combinations. You might need to use the recommended width.

**Example**

This example uses the current datetime value.
Statements | Result
---|---
options locale=fr_FR; | x=vendredi 18 mars 2011 10 h 40 -0400
data test;
x=datetime();
put x=nldatmwmz.;
runcas

**NLDATMYM Format**

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the month.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Syntax**

`NLDATMYMw.`

**Syntax Description**

`w` specifies the width of the output field.

**Default** 16

**Range** 6–200

**Example**

This example uses the en_US locale option.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=en_US;</td>
<td>January 1960</td>
</tr>
<tr>
<td>data <em>null</em>;</td>
<td>January 1960</td>
</tr>
<tr>
<td>x=put(86400,nldatmym.);</td>
<td>January 1960</td>
</tr>
<tr>
<td>y=put(86400,nldatmym12.);</td>
<td>January 1960</td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>
See Also

Format:

- “NLDATMMD Format” on page 131

NLDATMYML Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and the year.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

Syntax

NLDATMYML\(w\).

**Syntax Description**

\(w\)

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

**Default** 14

**Range** 5–200

Details

NLDATMYML writes the date in a long-uniform pattern with full length of the month and year, such as November 2012.

Example

The following example uses the date November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+---- NLDATMYML min=5 default=14 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>November 2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put &quot;<em>---- NLDATMYML min=5 default=14 max=200 ----</em>&quot;;</td>
<td>November 2012</td>
</tr>
<tr>
<td>put dt nldatymml.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dt nldatymml7.;</td>
<td>November 2012</td>
</tr>
<tr>
<td>put dt nldatymml11.;</td>
<td>November 2012</td>
</tr>
<tr>
<td>put dt nldatymml14.;</td>
<td>November 2012</td>
</tr>
<tr>
<td>put dt nldatymml200.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>
NLDATMYMM Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the month and the year.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Syntax**

NLDATMYMMw.

**Syntax Description**

w

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

**Default** 11

**Range** 5–200

**Details**

NLDATMYMM writes the date in a medium-uniform pattern with abbreviations of the month and year, such as Nov 2012.

**Example**

The following example uses the date November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATMYMM min=5 default=11 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put &quot;+--- NLDATMYMM min=5 default=11 max=200 ----&quot;;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dt nldatymm.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dt nldatymm7.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dt nldatymm11.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>put dt nldatymm200.;</td>
<td>Nov 2012</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATMYMS Format

Converts a SAS date value to the date string of the specified locale, and then writes the month and year with numbers and delimiters.
Syntax

NLDATMYMS\(w\).

Syntax Description

\(w\)

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

Default 7

Range 5–200

Details

NLDATMYMS writes the date in a short-uniform pattern with numbers and delimiters for the month and year, such as 11/2012.

Example

The following example uses the date November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+---- NLDATMYMS min=5 default=7 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>11/2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>11/12</td>
</tr>
<tr>
<td>put &quot;+---- NLDATMYMS min=5 default=7 max=200 ----+&quot;;</td>
<td>11/2012</td>
</tr>
<tr>
<td>put dt nldatmyms.;</td>
<td>11/2012</td>
</tr>
<tr>
<td>put dt nldatmyms5.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyms7.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyms200.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATMYQ Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the quarter of the year.

Categories: Date and Time
CAS

Alignment: Left
Syntax

NLDATMYQw.

Syntax Description

w
specifies the width of the output field.

Default 16
Range 4–200

Details

The NLDATMYQ format might produce inaccurate localized output when using the default width with some encoding and locale combinations because the date and time names are too long. Please refer to Exceptions for Date and Time Default Widths on page 60 for information about recommended widths for locale and encoding combinations. You might need to use the recommended width.

Example

This example uses the fr_FR locale option.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=fr_FR;</td>
<td>+--- NLDATMYQ min=4 default=16 max=200 ---+</td>
</tr>
<tr>
<td>data <em>null</em>;</td>
<td>16 T3 08</td>
</tr>
<tr>
<td>dy=today();</td>
<td>4 ****</td>
</tr>
<tr>
<td>dt=datetime();</td>
<td>14 T3 08</td>
</tr>
<tr>
<td>put &quot;+--- NLDATMYQ min=4 default=16 max=200 ---+&quot;;</td>
<td>32 3e trimestre 2008</td>
</tr>
<tr>
<td>put '16' +5 dt nldatmyq.;</td>
<td>200 3e trimestre 2008</td>
</tr>
<tr>
<td>put '4' +5 dt nldatmyq4.;</td>
<td></td>
</tr>
<tr>
<td>put '14' +5 dt nldatmyq14.;</td>
<td></td>
</tr>
<tr>
<td>put '32' +5 dt nldatmyq32.;</td>
<td></td>
</tr>
<tr>
<td>put '200' +5 dt nldatmyq200.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATMYQL Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year’s quarter value (1–4) and the year.

**Categories:** Date and Time

**CAS**

**Alignment:** Left
Syntax

\texttt{NLDATMYQL} w.

Syntax Description

\textit{w}

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

Default 18

Range 4–200

Details

\texttt{NLDATMYQL} writes the date in a long uniform pattern in full length of the year’s quarter and then the year, such as 4th quarter 2012.

Example

The following example uses the date of November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATMYQL min=4 default=18 max=200 ---+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>4th quarter 2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>2012/4</td>
</tr>
<tr>
<td>put &quot;+--- NLDATMYQL min=4 default=18 max=200 ---+&quot;;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dt nldatmyql.;</td>
<td>4th quarter 2012</td>
</tr>
<tr>
<td>put dt nldatmyql6.;</td>
<td>4th quarter 2012</td>
</tr>
<tr>
<td>put dt nldatmyql7.;</td>
<td>4th quarter 2012</td>
</tr>
<tr>
<td>put dt nldatmyql18.;</td>
<td>4th quarter 2012</td>
</tr>
<tr>
<td>put dt nldatmyql200.;</td>
<td>4th quarter 2012</td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

\textit{NLDATMYQM} Format

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year’s quarter (1–4) and then the year.

Categories: Date and Time

CAS

Alignment: Left

Syntax

\texttt{NLDATMYQM} w.
**Syntax Description**

\[ w \]

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

- **Default**: 7
- **Range**: 4–200

**Details**

NLDATMYQM writes the date in a medium uniform pattern of the year’s quarter and then the year, such as Q4 2012.

**Example**

The following example uses the date of November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+--- NLDATMYQM min=4 default=7 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>dy = date();</td>
<td>2012/4</td>
</tr>
<tr>
<td>put &quot;++++ NLDATMYQM min=4 default=7 max=200 ++++&quot;;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dt nldatmyqm.;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dt nldatmyqm6.;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dt nldatmyqm7.;</td>
<td>Q4 2012</td>
</tr>
<tr>
<td>put dt nldatmyqm200.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**NLDATMYQS Format**

Converts a SAS date value to the date string of the specified locale, and then writes the date value as the year and the quarter (1-4) using numbers and delimiters.

- **Categories**: Date and Time
- **CAS**
- **Alignment**: Left

**Syntax**

NLDATMYQS\[ w \].

**Syntax Description**

\[ w \]

specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.
Details
NLDATMYQS writes the date in a short-uniform pattern of the year and year’s quarter value using numbers and delimiters, such as 2012/4.

Example
The following example uses the date November 19, 2012.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>+----- NLDATMYQS min=4 default=6 max=200 ----+</td>
</tr>
<tr>
<td>dt = datetime();</td>
<td>2012/4</td>
</tr>
<tr>
<td>dy = date();</td>
<td>12/4</td>
</tr>
<tr>
<td>put <em>+----- NLDATMYQS min=4 default=6 max=200 ----</em>;</td>
<td>2012/4</td>
</tr>
<tr>
<td>max=200 ----*;</td>
<td>2012/4</td>
</tr>
<tr>
<td>put dt nldatmyqs.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyqs4.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyqs6.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyqs200.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATMYR Format
Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year.

**Categories:** Date and Time
CAS

**Alignment:** Left

**Syntax**
NLDATMYRw.

**Syntax Description**

- `w` specifies the width of the output field.

  **Default:** 16

  **Range:** 2–200
Example

This example uses the en_US locale option.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale(fr_FR);</td>
<td>+--- NLDATMYR min=2 default=16 max=200 ---+</td>
</tr>
<tr>
<td>data <em>null</em>; dy=today(); dt=datetime();</td>
<td>2008 08 2008 2008</td>
</tr>
<tr>
<td>put &quot;+--- NLDATMYR min=2 default=16 max=200 ---+&quot;;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyr.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyr2.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyr32.;</td>
<td></td>
</tr>
<tr>
<td>put dt nldatmyr200.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATMYW Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the week.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Syntax**

NLDATMYW<sub>w</sub>.

**Syntax Description**

<sub>w</sub>

specifies the width of the output field.

**Default** 16

**Range** 5–200

**Example**

This example uses the fr_FR locale option.
### Statements

```latex
options locale=fr_FR;
data _null_;
dy=today();
dt=datetime();
put "+--- NLDATMYW min=5 default=16
    max=200 ---+
    16 Week 33 2008
    5 *****
    8 W33 08
    32 Week 33 2008
    200
    Week 33 2008"
    8 W33 08
    32 Week 33 2008
    200
    Week 33 2008
run;
```

### NLDATMZ Format

Converts SAS datetime values to the locale-sensitive datetime string as time zone and datetime.

**Categories:**
- Date and Time
- CAS

**Alignment:**
- Left

### Syntax

```
NLDATMZw.
```

### Syntax Description

- `w` specifies the width of the output field.

  **Default**
  - 40

  **Range**
  - 16–200

### Example

This example uses the current datetime value.
Statements | Result
---|---
options locale=fr_FR;
data test;
x=datetime();
put x=nldatmz.;
run; | x=18 mars 2011 10 h 40 -0400

### NLMNIAED Format

Writes the monetary format of the international expression for the United Arab Emirates.

**Category:** Numeric  
**Alignment:** Left

#### Syntax

NLMNIAEDw.d

#### Syntax Description

- **w**
  - Specifies the width of the output field.  
  - Default: 12  
  - Range: 8–32
- **d**
  - Specifies the number of digits to the right of the decimal point in the numeric value.  
  - Default: 3  
  - Range: 0–28

#### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```sql
x=put(-1234.56789,nlmniaed32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(AED1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>
NLMNIAUD Format

Writes the monetary format of the international expression for Australia.

Category: Numeric
Alignment: Left

Syntax

NLMNIAUDw.d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

$\text{d}$
specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
\begin{align*}
x &= \text{put}(-1234.56789, \text{nlmniaud32.2}); \\
y &= \text{put}(-1234.56789, \text{dollar32.2}); \\
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{put x=;}</td>
<td>(AUD1,234.57)</td>
</tr>
<tr>
<td>\text{put y=;}</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

See Also

Format:
NLMNIBGN Format

Writes the monetary format of the international expression for Bulgaria.

Category: Numeric
Alignment: Left

Syntax

NLMNIBGN w.d

Syntax Description

\( w \)

specifies the width of the output field.
Default 12
Range 8–32

\( d \)

specifies the number of digits to the right of the decimal point in the numeric value.
Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[ x=\text{put}(-1234.56789, \text{nlnibgn32.2}); \]
\[ y=\text{put}(-1234.56789, \text{dollar32.2}); \]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put ( x=; )</td>
<td>( \text{(BGN1,234.57)} )</td>
</tr>
<tr>
<td>put ( y=; )</td>
<td>( -$1,234.57 )</td>
</tr>
</tbody>
</table>

See Also

Format:

• “NLMNLBGN Format” on page 191
NLMNIBRL Format

Writes the monetary format of the international expression for Brazil.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

NLMNIBRL \( w.d \)

**Syntax Description**

- \( w \)
  - specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- \( d \)
  - specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2
  - Range: 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
x=\text{put}(-1234.56789, \text{nlmnibrl32.2});
y=\text{put}(-1234.56789, \text{dollar32.2});
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{put} x=;</td>
<td>(BRL1,234.57)</td>
</tr>
<tr>
<td>\text{put} y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

Format:
- “NLMNLBRL Format” on page 192


**NLMNICAD Format**

Writes the monetary format of the international expression for Canada.

- **Category:** Numeric
- **Alignment:** Left

---

**Syntax**

\[ \text{NLMNICAD}w,d \]

**Syntax Description**

- **w**
  - specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d**
  - specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2
  - Range: 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
\begin{align*}
x &= \text{put}(-1234.56789, \text{nlmnicad}32.2); \\
y &= \text{put}(-1234.56789, \text{dollar}32.2); \\
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>{(CAD1, 234.57}}</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

- “NLMNLCAD Format” on page 193
**NLMNICHF Format**

Writes the monetary format of the international expression for Liechtenstein and Switzerland.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

\[ \text{NLMNICHF}_{w,d} \]

**Syntax Description**

- **w**
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **d**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

**Example**

In the following example, the `LOCATE=` system option is set to English UnitedStates.

```plaintext
x=put(-1234.56789,nlmnichf32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(CHF1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

**See Also**

- “NLMNICHF Format” on page 194
NLMNICNY Format

Writes the monetary format of the international expression for China.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

NLMNICNY\(w,d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 02
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnicny32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(CNY1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLCNY Format” on page 195
NLMNICZK Format

Writes the monetary format of the international expression for the Czech Republic.

**Category:** Numeric  
**Alignment:** Left

### Syntax

NLMNICZKw.d

### Syntax Description

- **w**  
  specifies the width of the output field.  
  - Default: 12  
  - Range: 8–32

- **d**  
  specifies the number of digits to the right of the decimal point in the numeric value.  
  - Default: 4  
  - Range: 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmniczk32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>put x=;</code></td>
<td>(CZK1, 234.57)</td>
</tr>
<tr>
<td><code>put y=;</code></td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

### See Also

- “NLMNLCKZK Format” on page 196
NLMNIDKK Format

Writes the monetary format of the international expression for Denmark, Faroe Island, and Greenland.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNIDKK\(w,d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

---

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```plaintext
x=put(-1234.56789,nlmnidkk32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(DKK1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

Format:

- “NLMNLDKK Format” on page 197
NLMNIEEK Format

Writes the monetary format of the international expression for Estonia.

Category: Numeric
Alignment: Left

Syntax

NLMNIEEKw.d

Syntax Description

w
specifies the width of the output field.

 Default 12
Range 8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

 Default 4
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnieek32.2);
y=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(EEK1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

• “NLMNLEEK Format” on page 198
NLMNIEGP Format

Writes the monetary format of the international expression for Egypt.

**Category:** Numeric

**Alignment:** Left

### Syntax

NLMNIEGPw.d

### Syntax Description

**w**

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

**d**

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 3
- **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmniegp32.2);  
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(EGP1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

### See Also

**Format:**

- “NLMNLEG Format” on page 199
NLMNIEUR Format

Writes the monetary format of the international expression for Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

Category: Numeric
Alignment: Left

Syntax

NLMNIEURw,d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to Locale=German_Germany.

x=put(-1234.56789,nlmnieur32.2);
y=put(-1234.56789,nlmnieur32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>x=-1.234,57 EUR</td>
</tr>
<tr>
<td>put y=;</td>
<td>y=-1.234,57 €</td>
</tr>
</tbody>
</table>

See Also

Format:
- “NLMNLEUR Format” on page 200
**NLMNIGBP Format**

Writes the monetary format of the international expression for the United Kingdom.

- **Category:** Numeric
- **Alignment:** Left

### Syntax

\[ \text{NLMNIGBP}w.d \]

### Syntax Description

- **\(w\)**
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **\(d\)**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2
  - Range: 0–28

### Example

In the following example, the **LOCALE=** system option is set to **English_UnitedStates**.

\[
x = \text{put}(-1234.56789, \text{nlmnigbp32.2}); \\
y = \text{put}(-1234.56789, \text{dollar32.2});
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put (x=);</td>
<td>(GBP1,234.57)</td>
</tr>
<tr>
<td>put (y=);</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

### See Also

- **Format:**
  - “NLMNIGBP Format” on page 201
NLMNIHKD Format

Writes the monetary format of the international expression for Hong Kong.

Category: Numeric
Alignment: Left

Syntax

NLMNIHKD_{w,d}

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[ \begin{align*}
  x &= \text{put}(-1234.56789, \text{nlmnihk}32.2); \\
  y &= \text{put}(-1234.56789, \text{dollar}32.2); 
\end{align*} \]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>HKD1,234.57</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNLHKD Format” on page 202
NLMNIHRK Format

Writes the monetary format of the international expression for Croatia.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNIHRK\(w.d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[x=\text{put(-1234.56789,nlmnihrk32.2);}\]
\[y=\text{put(-1234.56789,dollar32.2);}\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{put x=;}</td>
<td>(HRK1,234.57)</td>
</tr>
<tr>
<td>\text{put y=;}</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLHRK Format” on page 203
NLMNIHUF Format

Writes the monetary format of the international expression for Hungary.

Category: Numeric
Alignment: Left

Syntax

NLMNIHUFw.d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnihuf32.2);
y=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(HUF1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:
- “NLMNLHUF Format” on page 204
**NLMNIIDR Format**

Writes the monetary format of the international expression for Indonesia.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

```
NLMNIIDR w.d
```

**Syntax Description**

- **w**
  - Specifies the width of the output field.  
  - **Default**: 12  
  - **Range**: 8–32

- **d**
  - Specifies the number of digits to the right of the decimal point in the numeric value.  
  - **Default**: 2  
  - **Range**: 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniidr32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(IDR1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLIDR Format” on page 205
NLMNIILS Format

Writes the monetary format of the international expression for Israel.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

`NLMNIILSw.d`

**Syntax Description**

- `w` specifies the width of the output field.
  
  - Default: 12
  
  - Range: 8–32

- `d` specifies the number of digits to the right of the decimal point in the numeric value.
  
  - Default: 4
  
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmniils32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>put x=;</code></td>
<td>(ILS1,234.57)</td>
</tr>
<tr>
<td><code>put y=;</code></td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLILS Format” on page 206
NLMNIIINR Format

Writes the monetary format of the international expression for India.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNIIINR\(w.d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmniinr32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(INR1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLINR Format” on page 207
**NLMNIJPY Format**

Writs the monetary format of the international expression for Japan.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

\[\text{NLMNIJPY} w.d\]

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 0
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[x=\text{put}(-1234.56789,\text{nlniijpy32.2});\]
\[y=\text{put}(-1234.56789,\text{dollar32.2});\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(JPY1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLJJPY Format” on page 208
NLMNIKRW Format

Writes the monetary format of the international expression for South Korea.

Category: Numeric
Alignment: Left

Syntax

NLMNIKRW\textsubscript{w.d}

Syntax Description

\textit{w}

specifies the width of the output field.

Default: 12
Range: 8–32

\textit{d}

specifies the number of digits to the right of the decimal point in the numeric value.

Default: 0
Range: 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\begin{verbatim}
x=put(-1234.56789,nlmnikrw32.2);
y=put(-1234.56789,dollar32.2);
\end{verbatim}

\begin{tabular}{ll}
\hline
\textbf{Statements} & \textbf{Results} \\
\hline
\texttt{put x=;} & (KRW1,234.57) \\
\texttt{put y=;} & $-1,234.57$ \\
\hline
\end{tabular}

See Also

Format:

- “NLMNLKRW Format” on page 209
NLMNILTL Format

Writes the monetary format of the international expression for Lithuania.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

NLMNILTL \(w.d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>8–32</td>
</tr>
</tbody>
</table>

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0–28</td>
</tr>
</tbody>
</table>

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[\begin{align*}
\texttt{x=put(-1234.56789,nlmniltl32.2);} \\
\texttt{y=put(-1234.56789,dollar32.2);} \\
\end{align*}\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(LTL1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

- “NLMNLLTL Format” on page 210
NLN MILVL Format

Writes the monetary format of the international expression for Latvia.

**Category:** Numeric
**Alignment:** Left

### Syntax

\[ \text{NLN MILVL}_w.d \]

### Syntax Description

- **\( w \)**
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **\( d \)**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 4
  - **Range:** 0–28

### Example

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

\[
\begin{align*}
  x &= \text{put}(-1234.56789, \text{nlmnilvl}32.2); \\
  y &= \text{put}(-1234.56789, \text{dollar}32.2);
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>{LVL1, 234.57}</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

### See Also

- “NLMN LLVL Format” on page 211
NLMNIMOP Format

Writes the monetary format of the international expression for Macau.

**Category:** Numeric

**Alignment:** Left

### Syntax

\[ \text{NLMNIMOP} w.d \]

### Syntax Description

- **\( w \)**
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **\( d \)**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
\begin{align*}
  x &= \text{put}(-1234.56789, \text{nlmnimop}32.2); \\
  y &= \text{put}(-1234.56789, \text{dollar}32.2);
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{put } x=; )</td>
<td>(MOP1, 234.57)</td>
</tr>
<tr>
<td>( \text{put } y=; )</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

### See Also

**Format:**
- “NLMNLMOP Format” on page 212
**NLMNIMXN Format**

Writes the monetary format of the international expression for Mexico.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

NLMNIMXNw,d

**Syntax Description**

\( w \)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\( d \)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnimxn32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(MXN1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLMXN Format” on page 213
**NLMNIMYR Format**

Writes the monetary format of the international expression for Malaysia.

- **Category:** Numeric
- **Alignment:** Left

### Syntax

```
NLMNIMYRw,d
```

### Syntax Description

- **`w`**
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **`d`**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnimyr32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>put x=;</code></td>
<td>(MYR1,234.57)</td>
</tr>
<tr>
<td><code>put y=;</code></td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

### See Also

**Format:**

- “NLMNLMYR Format” on page 214
**NLMNINOK Format**

Writes the monetary format of the international expression for Norway.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

\[ \text{NLMNINOK}w.d \]

**Syntax Description**

\( w \)

- specifies the width of the output field.
  - Default: 12
  - Range: 8–32

\( d \)

- specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2
  - Range: 0–28

---

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

\[
\begin{align*}
x &= \text{put}(-1234.56789, \text{nlmninok}32.2); \\
y &= \text{put}(-1234.56789, \text{dollar}32.2);
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{put } x=;</td>
<td>(NOK1,234.57)</td>
</tr>
<tr>
<td>\text{put } y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**
- “NLMNLNOK Format” on page 215
NLMNINZD Format

Writes the monetary format of the international expression for New Zealand.

**Category:** Numeric

**Alignment:** Left

### Syntax

NLMNINZD_{w.d}

### Syntax Description

\( w \)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\( d \)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmninzd32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(NZD1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

### See Also

**Format:**

- “NLMNINZD Format” on page 216
NLMNIPLN Format

Writes the monetary format of the international expression for Poland.

**Category:** Numeric  
**Alignment:** Left

---

### Syntax

\[ \text{NLMNIPLN}_w.d \]

### Syntax Description

**w**  
specifies the width of the output field.

- **Default:** 12  
- **Range:** 8–32

**d**  
specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2  
- **Range:** 0–28

---

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
\begin{align*}
x &= \text{put}(-1234.56789,\text{nlmnipln}32.2); \\
y &= \text{put}(-1234.56789,\text{dollar}32.2);
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(PLN1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

### See Also

**Format:**

- “NLMNLPLN Format” on page 217
NLMNIRUB Format

Writes the monetary format of the international expression for Russia.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNIRUB w.d

**Syntax Description**

- **w** specifies the width of the output field.
  
  - Default: 12
  - Range: 8–32

- **d** specifies the number of digits to the right of the decimal point in the numeric value.
  
  - Default: 2
  - Range: 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnirub32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(RUB1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLRUB Format” on page 218
NLMNISEK Format

Writes the monetary format of the international expression for Sweden.

Category: Numeric
Alignment: Left

Syntax

NLMNISEK\textsubscript{\textit{w.d}}

Syntax Description

\textit{w}

specifies the width of the output field.

Default 12
Range 8–32

\textit{d}

specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\texttt{x=put(-1234.56789,nlmnisek32.2)};
\texttt{y=put(-1234.56789,dollar32.2)};

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put \texttt{x=;}</td>
<td>(SEK1,234.57)</td>
</tr>
<tr>
<td>put \texttt{y=;}</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

See Also

Format:

• “NLMNLSEK Format” on page 219
NLMNISGD Format

 Writes the monetary format of the international expression for Singapore.

 Category: Numeric
 Alignment: Left

 Syntax

 NLMNISGDw.d

 Syntax Description

 w
 specifies the width of the output field.
 Default 12
 Range 8–32

d
 specifies the number of digits to the right of the decimal point in the numeric value.
 Default 2
 Range 0–28

 Example

 In the following example, the LOCALE= system option is set to English_UnitedStates.

 x=put(-1234.56789,nlmnisgd32.2);
 y=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(SGD1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

 See Also

 Format: 
 - “NLMNLSGD Format” on page 220
NLMNITHB Format

Writes the monetary format of the international expression for Thailand.

**Category:** Numeric  
**Alignment:** Left

### Syntax

NLMNITHBw.d

### Syntax Description

**w**  
Specifies the width of the output field.

- **Default:** 12  
- **Range:** 8–32

**d**  
Specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2  
- **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnithb32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(THB1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

### See Also

**Format:**  
- “NLMNLTHB Format” on page 221
**NLMNITRY Format**

Writes the monetary format of the international expression for Turkey.

- **Category:** Numeric
- **Alignment:** Left

### Syntax

\[ \text{NLMNITRY}_{w.d} \]

### Syntax Description

- **\( w \)**
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **\( d \)**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 4
  - Range: 0–28

### Example

In the following example, the \texttt{LOCALE=} system option is set to English UnitedStates.

```plaintext
x=put(-1234.56789,nlmnity32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>TRY1,234.57</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

### See Also

**Format:**

- “NLMNLTRY Format” on page 222
NLMNITWD Format

Writes the monetary format of the international expression for Taiwan.

Category: Numeric
Alignment: Left

Syntax

NLMNITWD<\text{n}.<\text{d}>

Syntax Description

\text{w}

specifies the width of the output field.

- Default: 12
- Range: 8–32

\text{d}

specifies the number of digits to the right of the decimal point in the numeric value.

- Default: 2
- Range: 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\text{x=}put(-1234.56789,nlmnitwd32.2);
\text{y=}put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put \text{x=};</td>
<td>$\text{TWD1,234.57}$</td>
</tr>
<tr>
<td>put \text{y=};</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNLTWD Format” on page 223
NLMNIUSD Format

Writes the monetary format of the international expression for Puerto Rico and the United States.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNIUSD\(w.d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

(Default: 12)  
(Range: 8–32)

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

(Default: 2)  
(Range: 0–28)

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\(x=\text{put}(-1234.56789,\text{nlmniusd32.2});\)

\(y=\text{put}(-1234.56789,\text{dollar32.2});\)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put (x=;)</td>
<td>{USD1,234.57}</td>
</tr>
<tr>
<td>put (y=;)</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNLUSD Format” on page 224
**NLMNIZAR Format**

Writes the monetary format of the international expression for South Africa.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

\[ \text{NLMNIZAR}w.d \]

**Syntax Description**

- **w**
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnizar32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(\text{ZAR1,234.57})</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

**See Also**

- “**NLMNLZAR Format**” on page 225
NLMNLAED Format

Writes the monetary format of the local expression for the United Arab Emirates.

Category: Numeric
Alignment: Left

Syntax

NLMNLAED \textit{w} . \textit{d}

Syntax Description

\textit{w}

specifies the width of the output field.

Default 12
Range 8–32

\textit{d}

specifies the number of digits to the right of the decimal point in the numeric value.

Default 3
Range 0–28

Example

In the following example, the LOCALE= system option is set to English\_UnitedStates.

\begin{verbatim}
x=p\text{ut}(-1234.56789, nlmnlaed32.2);
y=p\text{ut}(-1234.56789, dollar32.2);
\end{verbatim}

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put \textit{x}=;</td>
<td>\textit{(AED1,234.57)}</td>
</tr>
<tr>
<td>put \textit{y}=;</td>
<td>\textit{$-1,234.57}</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNIAED Format” on page 152
**NLMNLAUD Format**

Writes the monetary format of the local expression for Australia.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

\[ \text{NLMNLAUD}_{w.d} \]

**Syntax Description**

- **w**
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[ \begin{align*}
  x &= \text{put(-1234.56789,nlmnlaud32.2)}; \\
  y &= \text{put(-1234.56789,dollar32.2)};
\end{align*} \]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(AU$1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

**See Also**

- “NLMNIAUD Format” on page 153
NLMNLBGN Format

Writes the monetary format of the local expression for Bulgaria.

Category: Numeric
Alignment: Left

Syntax

NLMNLBGNw.d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnlbgn32.2);
y=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(BGN1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:
- “NLMNIBGN Format” on page 154
NLMNLBRL Format

Writes the monetary format of the local expression for Brazil.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNLBRL\(w.d\)

**Syntax Description**

\(w\)

- specifies the width of the output field.
- **Default:** 12
- **Range:** 8–32

\(d\)

- specifies the number of digits to the right of the decimal point in the numeric value.
- **Default:** 2
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[x = \text{put}(-1234.56789, \text{nlmnlbrl32.2});\]
\[y = \text{put}(-1234.56789, \text{dollar32.2});\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put (x=);</td>
<td>(R$1,234.57)</td>
</tr>
<tr>
<td>put (y=);</td>
<td>$1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNIBRL Format” on page 155
NLMNLCAD Format

Writes the monetary format of the local expression for Canada.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

NLMNLCAD\(w.d\)

**Syntax Description**

\(w\)

- Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

\(d\)

- Specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnlcad32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(CA$1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

**See Also**

Format:

- “NLMNICAD Format” on page 156
NLMNLCHF Format

Writes the monetary format of the local expression for Liechtenstein and Switzerland.

**Category:** Numeric  
**Alignment:** Left

### Syntax

\[ \text{NLMNLCHF}_w,d \]

### Syntax Description

\( w \)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\( d \)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

### Example

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

\[
\begin{align*}
\text{x} &= \text{put}(-1234.56789, \text{nlmnlchf32.2}); \\
\text{y} &= \text{put}(-1234.56789, \text{dollar32.2});
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>SFr.1,234.57</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

### See Also

**Format:**

- “NLMNICHF Format” on page 157
NLMNLNCY Format

Writes the monetary format of the local expression for China.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

\[ \text{NLMNLNCY}_w.d \]

**Syntax Description**

\[ w \]

specifies the width of the output field.

- Default: 12
- Range: 8–32

\[ d \]

specifies the number of digits to the right of the decimal point in the numeric value.

- Default: 2
- Range: 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[ \text{x=put}(-1234.56789,\text{nlmnlcny32.2}); \]
\[ \text{y=put}(-1234.56789,\text{dollar32.2}); \]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(RMB1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNICNY Format” on page 158
NLMNLCZK Format

W rites the monetary format of the local expression for the Czech Republic.

Category: Numeric
Alignment: Left

Syntax

NLMNLCZK\textsubscript{w}.d

Syntax Description

\textit{w}

specifies the width of the output field.

Default 12
Range 8–32

\textit{d}

specifies the number of digits to the right of the decimal point in the numeric value.

Default 4
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\begin{verbatim}
x=put(-1234.56789,nlmnlczk32.2);
y=put(-1234.56789,dollar32.2);
\end{verbatim}

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{put x=;}</td>
<td>{CZK1,234.57}</td>
</tr>
<tr>
<td>\texttt{put y=;}</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNICZK Format” on page 159
**NLMNLDKK Format**

Writes the monetary format of the local expression for Denmark, Faroe Island, and Greenland.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

NLMNLDKKw.d

**Syntax Description**

- \( w \)
  - specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- \( d \)
  - specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
\begin{align*}
x =& \text{put}(-1234.56789,\text{nlmnldkk32.2}); \\
y =& \text{put}(-1234.56789,\text{dollar32.2});
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{put } x=;</td>
<td>(kr1,234.57)</td>
</tr>
<tr>
<td>\text{put } y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNIDKK Format” on page 160
NLMNLEEK Format

Writes the monetary format of the local expression for Estonia.

Category: Numeric
Alignment: Left

Syntax

NLMNLEEKw,d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default 4
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnleek32.2);
y=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(Kr1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNIEEK Format” on page 161
NLMNLEGP Format

Writes the monetary format of the local expression for Egypt.

Category: Numeric
Alignment: Left

Syntax

NLMNLEGPw,d

Syntax Description

w

specifies the width of the output field.

Default 12
Range 8–32

d

specifies the number of digits to the right of the decimal point in the numeric value.

Default 3
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnlegp32.2);
y=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(EGP1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

• “NLMNIEGP Format” on page 162
NLMNLEUR Format

Writes the monetary format of the local expression for Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

Category: Numeric
Alignment: Left

Syntax

NLMNLEURw.d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to German_Germany.

x=put(-1234.56789,nlmnieur32.2);
y=put(-1234.56789,nlmnieur32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>x=-1.234,57 EUR</td>
</tr>
<tr>
<td>put y=;</td>
<td>y=-1.234,57 €</td>
</tr>
</tbody>
</table>

See Also

Format:
- “NLMNIEUR Format” on page 163
NLMNLGBP Format

Writes the monetary format of the local expression for the United Kingdom.

**Category:** Numeric  
**Alignment:** Left

### Syntax

\[ \text{NLMNLGBP}w.d \]

### Syntax Description

- **w**  
  specifies the width of the output field.
  - Default: 12  
  - Range: 8–32

- **d**  
  specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2  
  - Range: 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnlGBP32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(£1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

### See Also

**Format:**  
- “NLMNIGBP Format” on page 164
NLMNLHKD Format

Writes the monetary format of the local expression for Hong Kong.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNLHKD\(w.d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- Default: 12
- Range: 8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

- Default: 2
- Range: 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[x=\text{put}(\text{-1234.56789}, \text{nlmnlhkd32.2});\]
\[y=\text{put}(\text{-1234.56789}, \text{dollar32.2});\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put (x=);</td>
<td>HK$1,234.57</td>
</tr>
<tr>
<td>put (y=);</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNHKD Format” on page 165

---
NLMNLHRK Format

Writes the monetary format of the local expression for Croatia.

Category: Numeric
Alignment: Left

Syntax

NLMNLHRKw.d

Syntax Description

\( w \)

specifies the width of the output field.

Default 12
Range 8–32

\( d \)

specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[\begin{align*}
x &= \text{put}(-1234.56789, \text{nlmnlhrk32.2}); \\
y &= \text{put}(-1234.56789, \text{dollar32.2});
\end{align*}\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(Kn1, 234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNIHRK Format” on page 166
NLMNLHUF Format

Writes the monetary format of the local expression for Hungary.

Category: Numeric
Alignment: Left

Syntax

NLMNLHUFw,d

Syntax Description

w
specifies the width of the output field.

Default 12
Range  8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range  0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnlhuf32.2);
y=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(Ft1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

•  “NLMNIHUF Format” on page 167
**Syntax**

```plaintext
NLMNLIDRw.d
```

**Syntax Description**

- **w**
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789, nlmnlidr32.2);
y=put(-1234.56789, dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(Rp1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “NLMNIIDR Format” on page 168

**NLMNLIDR Format**

Writes the monetary format of the local expression for Indonesia.

- **Category:** Numeric
- **Alignment:** Left
**NLMNLILS Format**

Writes the monetary format of the local expression for Israel.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

NLMNLILS<var>\textit{w}d</var>

**Syntax Description**

- **\textit{w}**
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **\textit{d}**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 4
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789, nlmnlils32.2);
y=put(-1234.56789, dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(ILS1, 234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

**See Also**

- “NLMNIIILS Format” on page 169
NLMNLINR Format

Writes the monetary format of the local expression for India.

- **Category:** Numeric
- **Alignment:** Left

### Syntax

\[
\text{NLMNLINR}w,d
\]

### Syntax Description

- **\( w \)**
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **\( d \)**
  - Specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

### Example

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

\[
x=\text{put}(-1234.56789, \text{nlmnlinr32.2});
y=\text{put}(-1234.56789, \text{dollar32.2});
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>put x=;</code></td>
<td>![INR1,234.57]</td>
</tr>
<tr>
<td><code>put y=;</code></td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

### See Also

- “NLMNIINR Format” on page 170
NLMNLJPY Format

Writes the monetary format of the international expression for Japan.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNLJPY\textit{w.d}

**Syntax Description**

\textit{w}

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\textit{d}

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 0
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\begin{verbatim}
  x=put(-1234.56789,nlmnljpy32.2);
  y=put(-1234.56789,dollar32.2);
\end{verbatim}

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(JPY1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

Format:

- “NLMNIJPY Format” on page 171
**NLMNLKRW Format**

Writes the monetary format of the local expression for South Korea.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

\[ \text{NLMNLKRW} \, w \cdot d \]

**Syntax Description**

\( w \)

specifies the width of the output field.

- Default: 12
- Range: 8–32

\( d \)

specifies the number of digits to the right of the decimal point in the numeric value.

- Default: 0
- Range: 0–28

---

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

\[ x = \text{put}(-1234.56789, \text{nlmnlkrw}32.2); \]
\[ y = \text{put}(-1234.56789, \text{dollar}32.2); \]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put ( x= );</td>
<td>( \text{[KRW} 1,234.57] )</td>
</tr>
<tr>
<td>put ( y= );</td>
<td>( $-1,234.57 )</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**
- “NLMNIKRW Format” on page 172
**NLMNLLTL Format**

Writes the monetary format of the local expression for Lithuania.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

\texttt{NLMNLLTLw.d}

**Syntax Description**

\textbf{\textit{w}}

specifies the width of the output field.

\begin{itemize}
  \item Default: 12
  \item Range: 8–32
\end{itemize}

\textbf{\textit{d}}

specifies the number of digits to the right of the decimal point in the numeric value.

\begin{itemize}
  \item Default: 4
  \item Range: 0–28
\end{itemize}

**Example**

In the following example, the \texttt{LOCALE= system option is set to English\_UnitedStates.}

\begin{verbatim}
x=put(-1234.56789,nlmnllt132.2);
y=put(-1234.56789,dollar32.2);
\end{verbatim}

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{Statements} & \textbf{Results} \\
\hline
\texttt{put x=} & \texttt{(LT1,234.57)} \\
\texttt{put y=} & \texttt{\$-1,234.57} \\
\hline
\end{tabular}
\end{center}

**See Also**

**Format:**

- “NLMNILTL Format” on page 173
NLMNLLVL Format

Writes the monetary format of the local expression for Latvia.

Category: Numeric
Alignment: Left

Syntax

NLMNLLVL w.d

Syntax Description

w

specifies the width of the output field.

Default 12
Range 8–32

d

specifies the number of digits to the right of the decimal point in the numeric value.

Default 4
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnllvl32.2);
y=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(Ls1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNILVL Format” on page 174
NLMNLMOP Format

Writes the monetary format of the local expression for Macau.

**Category:** Numeric

**Alignment:** Left

### Syntax

NLMNLMOPw.d

### Syntax Description

- **w** specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d** specifies the number of digits to the right of the decimal point in the numeric value.
  - Default: 2
  - Range: 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```%
\begin{verbatim}
x=\text{put}(-1234.56789, \text{nlmnlmop32.2});
y=\text{put}(-1234.56789, \text{dollar32.2});
\end{verbatim}
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{put } x=;</td>
<td>(P1, 234.57)</td>
</tr>
<tr>
<td>\text{put } y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

### See Also

Format:

- “NLMNIMOP Format” on page 175
NLMNLMXN Format

Writes the monetary format of the local expression for Mexico.

Category: Numeric
Alignment: Left

Syntax

NLMNLMXNw.d

Syntax Description

w
  specifies the width of the output field.
  Default 12
  Range 8–32

d
  specifies the number of digits to the right of the decimal point in the numeric value.
  Default 2
  Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnlxn32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(MX$1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>-$1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNIMXN Format” on page 176
NLMNLMYR Format

Writes the monetary format of the local expression for Malaysia.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

\[
\text{NLMNLMYR}_w.d
\]

**Syntax Description**

\( w \)

- Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

\( d \)

- Specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

---

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

\[
x=\text{put}(-1234.56789, \text{nlmnlmyr32.2});
y=\text{put}(-1234.56789, \text{dollar32.2});
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{put x=};</td>
<td>$(R1,234.57)$</td>
</tr>
<tr>
<td>\text{put y=};</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**
- “NLMNIMYR Format” on page 177
NLMNLNOK Format

Writes the monetary format of the local expression for Norway.

**Category:** Numeric
**Alignment:** Left

## Syntax

NLMNLNOKW.d

### Syntax Description

\( w \)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\( d \)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

## Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnlno32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(kr1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

## See Also

**Format:**

- “NLMNINOK Format” on page 178
NLMNLNZD Format

 Writes the monetary format of the local expression for New Zealand.

 **Category:** Numeric  
 **Alignment:** Left

### Syntax

\[
\text{NLMNLNZD}\, w.d
\]

### Syntax Description

\[w\]

specifies the width of the output field.

- Default: 12
- Range: 8–32

\[d\]

specifies the number of digits to the right of the decimal point in the numeric value.

- Default: 2
- Range: 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[x=\text{put}(\{-1234.56789,\text{nlmnlnzd32.2}\});\]
\[y=\text{put}(\{-1234.56789,\text{dollar32.2}\});\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put (x=);</td>
<td>(NZ$1,234.57)</td>
</tr>
<tr>
<td>put (y=);</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

### See Also

**Format:**

- “NLMNINZD Format” on page 179
NLMNLPLN Format

Writes the monetary format of the local expression for Poland.

Category: Numeric
Alignment: Left

Syntax

NLMNLPLNw.d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnlpln32.2);
y=put(-1234.56789,dollar32.2)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(PLN1,234.57</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

• “NLMNIPLN Format” on page 180
NLMNLRUB Format

Writes the monetary format of the local expression for Russia.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNLRUB<sub>w,d</sub>

**Syntax Description**

<sub>w</sub>

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

<sub>d</sub>

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnlrub32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>{RUB1,234.57}</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNIRUB Format” on page 181
NLMNLSEK Format

Writes the monetary format of the local expression for Sweden.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

NLMNLSEK\(w,d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789, nlmnlsek32.2);
y=put(-1234.56789, dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(kr1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNISEK Format” on page 182
NLMNLSGD Format

Writes the monetary format of the local expression for Singapore.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

\[ \text{NLMNLSGD}_{w,d} \]

**Syntax Description**

- **w**
  - specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **d**
  - specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
\begin{align*}
x &= \text{put}(-1234.56789, \text{nlnsld32.2}) \\
y &= \text{put}(-1234.56789, \text{dollar32.2})
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(SG$1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

- “NLMNISGD Format” on page 183
**NLMNLTHB Format**

Writes the monetary format of the local expression for Thailand.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

\[ \text{NLMNLTHB} \_w.d \]

**Syntax Description**

- **\( w \)** specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32
- **\( d \)** specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 2
  - **Range:** 0–28

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```plaintext
x=put(-1234.56789,nlmnlthb32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(THB1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

**See Also**

- **Format:**
  - “NLMNITHB Format” on page 184
**NLMNLTRY Format**

Writes the monetary format of the local expression for Turkey.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

\texttt{NLMNLTRY}w.d

**Syntax Description**

\textit{w}

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\textit{d}

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 4
- **Range:** 0–28

---

**Example**

In the following example, the \texttt{LOCALE=} system option is set to English\_UnitedStates.

\begin{verbatim}
x=put(-1234.56789,nlmnltry32.2);
y=put(-1234.56789,dollar32.2);
\end{verbatim}

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(YTL1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57$</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “NLMNITRY Format” on page 185
NLMNLTWD Format

Writes the monetary format of the local expression for Taiwan.

**Category:** Numeric

**Alignment:** Left

---

**Syntax**

\texttt{NLMNLTWD} \texttt{w.d}

**Syntax Description**

\(w\)

specifies the width of the output field.

- Default: 12
- Range: 8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

- Default: 2
- Range: 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnltdw32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(NT$1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNITWD Format” on page 186
NLMNLUSD Format

Writes the monetary format of the local expression for Puerto Rico and the United States.

Category: Numeric
Alignment: Left

Syntax

NLMNLUSD\_w.d

**Syntax Description**

\(w\)

specifies the width of the output field.

Default 12
Range  8–32

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value.

Default 2
Range  0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\(x=\text{put}(-1234.56789,\text{nlmnlusd32}.2)\);
\(y=\text{put}(-1234.56789,\text{dollar32}.2)\);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put (x=);</td>
<td>(US$1,234.57)</td>
</tr>
<tr>
<td>put (y=);</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

**See Also**

Format:
- “NLMNIUSD Format” on page 187
NLMNLZAR Format

Writes the monetary format of the local expression for South Africa.

**Category:** Numeric  
**Alignment:** Left

---

**Syntax**

NLMNLZARw,d

**Syntax Description**

w

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

**d**

specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 2
- **Range:** 0–28

---

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmnlzar32.2);
y=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(R1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

---

**See Also**

**Format:**

- “NLMNIZAR Format” on page 188
NLMNY Format
Wrie the monetary format of the local expression in the specified locale using local currency.

**Categories:** Numeric  
CAS

**Alignment:** Left

### Syntax

\[ \text{NLMNY} \, w.d \]

### Syntax Description

\( w \)
- specifies the width of the output field.

- **Default:** 9
- **Range:** 1–32

\( d \)
- specifies the number of digits to the right of the decimal point in the numeric value.

- **Default:** 0
- **Range:** 0–31

### Details

The NLMNY\( w.d \) informat reads integer binary (fixed-point) values, including negative values that are represented in two's-complement notation. The NLMNY\( w.d \) format writes numeric values by using the currency symbol, the thousands separator, and the decimal separator that is used by the locale.

*Note:* The NLMNY\( w.d \) format does not convert currency format. Therefore, the value of the formatted number should equal the currency of the current locale value.

### Comparisons

The NLMNY\( w.d \) and NLMNYI\( w.d \) formats write the monetary format with locale-dependent thousands and decimal separators. However, the NLMNYI\( w.d \) format uses three-letter international currency codes, such as USD, while NLMNY\( w.d \) format uses local currency symbols, such as $.

The NLMNY\( w.d \) format is similar to the DOLLAR\( w.d \) format except that the NLMNY\( w.d \) format is locale-specific.

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put(-1234.56789,nlmny32.2);
y=put(-1234.56789,dollar32.2);
```
## Statements

<table>
<thead>
<tr>
<th></th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x=;</td>
<td>$(1,234.57)</td>
</tr>
<tr>
<td>$y=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

## See Also

**Format:**

- “NLMNYI Format” on page 227

**Informats:**

- “NLMNY Informat” on page 503
- “NLMNYI Informat” on page 504

## NLMNYI Format

Writes the monetary format of the international expression in the specified locale.

### Categories:

- Numeric
- CAS

### Alignment:

- Left

### Syntax

\[ \text{NLMNYI} \text{w.d} \]

### Syntax Description

- \( w \)
  - specifies the width of the output field.
  - Default 9
  - Range 1–32

- \( d \)
  - specifies the number of digits to the right of the decimal point in the numeric value.
  - Default 0
  - Range 0–31

### Details

The NLMNYI\(w.d\) informat reads integer binary (fixed-point) values, including negative values that are represented in two's-complement notation. The NLMNYI\(w.d\) format writes numeric values by using the international currency code, and locale-dependent
thousands and decimal separators. The position of international currency code is also locale dependent.

Note: The NLMNYIw.d format does not convert currency format. Therefore, the value of the formatted number should equal the currency of the current locale value.

Comparisons

The NLMNYw.d and NLMNYIw.d formats write the monetary format with locale-dependent thousands and decimal separators. However, the NLMNYIw.d format uses three-letter international currency codes, such as USD, while NLMNYw.d format uses local currency symbols, such as $.

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=put(-1234.56789,nlmnyi32.2);
y=put(-1234.56789,nlmny32.2);
z=put(-1234.56789,dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(USD1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>($1,234.57)</td>
</tr>
<tr>
<td>put z=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNY Format” on page 226

Informs:

- “NLMNY Informat” on page 503
- “NLMNYI Informat” on page 504

NLNUM Format

Writes the numeric format of the local expression in the specified locale.

**Categories:** Numeric

**CAS:**

**Alignment:** Left

**Syntax**

NLNUMw.d
**Syntax Description**

*w*

- Specifies the width of the output field.
  - Default: 6
  - Range: 1–32

*d*

- Specifies to divide the number by $10^d$. If the data contains decimal separators, the $d$ value is ignored.
  - Default: 0
  - Range: 0–31

**Details**

The NLNUMw,d informat reads integer binary (fixed-point) values, including negative values that are represented in two's-complement notation. The NLNUMw,d format writes numeric values by using the thousands separator and the decimal separator that is used by the locale.

**Comparisons**

The NLNUMw,d format writes the numeric value with locale-dependent thousand and decimal separators. The NLNUMIw,d format writes the numeric value with a comma (,) as thousands separator and a period (.) as a decimal separator.

If the $w$ or $d$ values are not large enough to generate a formatted number, the NLNUMw,d format uses an algorithm that prints the thousands-separator characters whenever possible, even if some decimal precision is lost.

**Example**

```plaintext
x=put(-1234356.7891,nlnum32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates;</td>
<td>-1,234,356.79</td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>options LOCALE=German_Germany;</td>
<td>-1.234.356,79</td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

Format:

- “NLNUMI Format” on page 230
Informs:
- “NLNUM Informat” on page 506
- “NLNUMI Informat” on page 507

NLNUMI Format
Writes the numeric format of the international expression in the specified locale.

**Categories:**
- Numeric
- CAS

**Alignment:**
- Left

**Syntax**

```plaintext
NLNUMIw.d
```

**Syntax Description**

**w**
- specifies the width of the output field.
  
  Default: 6
  
  Range: 1–32

**d**
- specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  
  Default: 0
  
  Range: 0–31

**Details**

The NLNUMIw.d informat reads integer binary (fixed-point) values, including negative values that are represented in two's-complement notation. The NLNUMIw.d format writes numeric values by using a comma (,) as thousands separator and a period (.) as a decimal separator for all locales.

**Comparisons**

The NLNUMIw.d format writes the numeric data of the international expression in the specified locale. The NLNUMIw.d format writes the numeric value with a comma (,) as thousands separator and a period (.) as a decimal separator.

If the $w$ or $d$ values are not large enough to generate a formatted number, the NLNUMIw.d format uses an algorithm that prints the thousands-separator characters whenever possible, even if some decimal precision is lost.
Example

```plaintext
x=put(-1234356.7891,nlnumi32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates; put x=;</td>
<td>-1,234,356.79</td>
</tr>
<tr>
<td>options LOCALE=German_Germany; put x=;</td>
<td>-1,234,356.79</td>
</tr>
</tbody>
</table>

See Also

Format:
- “NLNUM Format” on page 228

Informats:
- “NLNUM Informat” on page 506
- “NLNUMI Informat” on page 507

### NLPCT Format

Writes percentage data of the local expression in the specified locale.

**Categories:** Numeric, CAS

**Alignment:** Left

**Syntax**

`NLPCT w.d`

**Syntax Description**

- **w** specifies the width of the output field.
  - Default: 6
  - Range: 4–32

- **d** specifies to divide the number by $10^d$. If the data contains decimal separators, the $d$ value is ignored.
Comparisons

The NLPCT\textit{w}.\textit{d} format writes percentage data of the local expression in the specified locale. The NLPCT\textit{w}.\textit{d} format writes the percentage value with locale-dependent thousand and decimal separators. The NLPCTI\textit{w}.\textit{d} format writes the percentage value with a comma (,) as thousands separator and a period (.) as a decimal separator.

The NLPCT\textit{w}.\textit{d} format is similar to the PERCENT\textit{w}.\textit{d} format except the NLPCT\textit{w}.\textit{d} format is locale-specific.

Example

\begin{verbatim}
x=put(-12.3456789,nlpct32.2);
y=put(-12.3456789,nlpcti32.2);
z=put(-12.3456789,percent32.2);
\end{verbatim}

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>options LOCALE=English_UnitedStates;</strong></td>
<td>-1,234.57%</td>
</tr>
<tr>
<td>put x=;</td>
<td>-1,234.57%</td>
</tr>
<tr>
<td>put y=;</td>
<td>(1234.57%)</td>
</tr>
<tr>
<td>put z=;</td>
<td></td>
</tr>
</tbody>
</table>

| **options LOCALE=German\_Germany;**                                       | -1,234,57%        |
| put x=;                                                                   | -1,234,57%        |
| put y=;                                                                   | (1234,57%)        |
| put z=;                                                                   |                    |

See Also

Format:

- “NLPCTI Format” on page 232

Informats:

- “NLPCT Informat” on page 508
- “NLPCTI Informat” on page 510

NLPCTI Format

Writes percentage data of the international expression in the specified locale.

Categories: Numeric
Syntax

NLPCTI\textsubscript{w.d}

**Syntax Description**

\textit{w}

specifies the width of the output field.

- Default: 6
- Range: 4–32

\textit{d}

specifies to divide the number by \(10^d\). If the data contains decimal separators, the \(d\) value is ignored.

- Default: 0
- Range: 0–31

**Comparisons**

The NLPCTI\textsubscript{w.d} format writes percentage data of the international expression in the specified locale. The NLPCT\textsubscript{w.d} format writes the percentage value with locale-dependent thousand and decimal separators. The NLPCTI\textsubscript{w.d} format writes the percentage value with a comma (,) as thousands separator and a period (.) as a decimal separator.

The NLPCT\textsubscript{w.d} format is similar to the PERCENT\textsubscript{w.d} format except the NLPCT\textsubscript{w.d} format is locale-specific.

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\begin{verbatim}
  x=put(-12.3456789,nlpcti32.2);
  y=put(-12.3456789,percent32.2);
\end{verbatim}

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-1,234.57%</td>
</tr>
<tr>
<td>put y=;</td>
<td>(1234.57)</td>
</tr>
</tbody>
</table>

**See Also**

Format:
**NLPCTN Format**

Produces percentages, using a minus sign for negative values.

- **Categories:** Numeric
- **CAS:**
- **Alignment:** Right

**Syntax**

NLPCTN\(w.d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default:** 6
- **Range:** 4–32
- **Tip:** The width of the output field must account for the minus sign (–), the percent sign (%), and a trailing blank, whether the number is negative or positive.

\(d\)

specifies the number of digits to the right of the decimal point in the numeric value. This argument is optional.

- **Default:** 0
- **Range:** 0–31
- **Requirement:** must be less than \(w\)

**Details**

The NLPCTN\(w.d\) format multiplies negative values by 100, adds a minus sign to the beginning of the value, and adds a percent sign (%) to the end of the formatted value.

**Example**

\[x=-0.02;\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NLPCTP Format

Writes locale-specific numeric values as percentages.

Categories: Numeric, CAS
Alignment: Right

Syntax

NLPCTP\_w.d

Syntax Description

\( w \)

specifies the width of the output field.

Default: 6
Range: 4–32

Tip: The width of the output field must account for the percent sign (%).

\( d \)

specifies the number of digits to the right of the decimal point in the numeric value. This argument is optional. The thousands separator and decimal symbol for the NLPCTP format is locale-specific.

Default: 0
Range: 0–31
Requirement: must be less than \( w \)

Details

The NLPCTP\_w.d format multiplies values by 100, formats them, and adds a percent sign (%) to the end of the formatted value. The NLPCTP\_w.d format is similar to the The PERCENT\_w.d format except that the thousands separator and decimal symbol for the NLPCTP\_w.d format is locale-specific.

Example

\( x = \frac{0.02}{100}; \)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=-2%</td>
<td></td>
</tr>
<tr>
<td>x=-2%</td>
<td></td>
</tr>
</tbody>
</table>
NLPVALUE Format

Writes p-values of the local expression in the specified locale.

**Categories:**
- Numeric
- CAS

**Alignment:**
- Left

**Syntax**

\( \text{NLPVALUE} w.d \)

**Syntax Description**

\( w \)

specifies the width of the output field.

- Default: 6
- Range: 3–32

\( d \)

specifies to divide the number by \(10^d\). If the data contains decimal separators, the \(d\) value is ignored.

- Default: 4
- Range: 1–30

**Example**

This example uses the german_Germany locale option.

Statements:

```plaintext
options locale=german_germany;
data _null_;  
  put "+--- nlpvalue min=3 default=6 max=32 ---+";  
x=0.1248;  
  put x= +5 x pvalue.    +5 x nlpvalue.;  
  put x= +5 x pvalue1.1 +5 x nlpvalue1.1;  
  put x= +5 x pvalue20.2 +5 x nlpvalue20.2;  
  put x= +5 x pvalue32.3 +5 x nlpvalue32.3;  
run;
```
NLSTRMON Format

Writes the month name in the specified locale.

**Categories:** Numeric
CAS

**Alignment:** Left

**Syntax**

\[ \text{NLSTRMON} w.d \]

**Syntax Description**

\[ w \]

specifies the width of the output field

Default 20
Range 1-200

\[ d \]

specifies the following:

- 00000001: write abbreviated form.
- 00000010: write capitalized form.

Default 0
Range 0-3

**Details**

The NLSTRMONw.d format writes a SAS value, 1–12 as the name-of-the-month in the specified locale. The following examples use the English_UnitedStates locale.

- 1 = the first month (January)
- 2 = the second month (February)
• 3 = the third month (March)
• 4 = the fourth month (April)
• 5 = the fifth month (May)
• 6 = the sixth month (June)
• 7 = the seventh month (July)
• 8 = the eighth month (August)
• 9 = the ninth month (September)
• 10 = the tenth month (October)
• 11 = the eleventh month (November)
• 12 = the twelfth month (December)

Example
This example uses the English_UnitedStates session encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data <em>null</em>;</td>
<td>January</td>
</tr>
<tr>
<td>monnum = 1; /* January=1, December=12 */ put monnum NLSTRMON20.;</td>
<td>Jan</td>
</tr>
<tr>
<td>put monnum NLSTRMON20.1; /* decimal .1 specified use abbreviation. */</td>
<td>JANUARY</td>
</tr>
<tr>
<td>put monnum NLSTRMON20.2;</td>
<td>JAN</td>
</tr>
<tr>
<td>put monnum NLSTRMON20.3;</td>
<td>RUN</td>
</tr>
</tbody>
</table>

**NLSTRQTR Format**

Writes a numeric value as the quarter-of-the-year in the specified locale.

**Categories:** Numeric  
CAS  

**Alignment:** Left

**Syntax**

`NLSTRQTRw.d`

**Syntax Description**

`w`  
specifies the width of the output field

`20`  
Default
Range 1–200

d
specifies the following:

• 00000001: write abbreviated form.
• 00000010: write capitalized form.

Default 0
Range 0–3

Details
The NLSTRQTRw.d format writes a SAS value, 1–4 as the name-of-the-quarter for the year in the specified locale. The following examples use the English_UnitedStates locale.

• 1 = 1st quarter
• 2 = 2nd quarter
• 3 = 3rd quarter
• 4 = 4th quarter

Example
This example uses the English_UnitedStates session encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data <em>null</em>;</td>
<td>1st quarter</td>
</tr>
<tr>
<td>qtrnum = 1; /* January=1, December=12 */</td>
<td>Q1</td>
</tr>
<tr>
<td>put qtrnum NLSTRQTR20. ;</td>
<td>1ST QUARTER</td>
</tr>
<tr>
<td>put qtrnum NLSTRQTR20.1; /* decimal .1 specified use abbreviation. */</td>
<td>Q1</td>
</tr>
<tr>
<td>put qtrnum NLSTRQTR20.2;</td>
<td></td>
</tr>
<tr>
<td>put qtrnum NLSTRQTR20.3;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLSTRWK Format

Writes a numeric value as the day-of-the-week in the specified locale.

Categories: Numeric
CAS

Alignment: Left
Syntax

NLSTRWK\textsubscript{\textit{w}.\textit{d}}

**Syntax Description**

\textit{w}

specifies the width of the output field

Default: \text{20}

Range: \text{1–200}

\textit{d}

specifies the following:

- \text{00000001}: write abbreviated form.
- \text{00000010}: write capitalized form.

Default: \text{0}

Range: \text{0–3}

**Details**

The NLSTRWK\textsubscript{\textit{w}.\textit{d}} format writes a SAS value, \text{1–7} as the name-of-the-week in the specified locale. The following examples use the English_UnitedStates locale.

- \text{1} = First day-of-week (Monday)
- \text{2} = Second day-of-week (Tuesday)
- \text{3} = Third day-of-week (Wednesday)
- \text{4} = Fourth day-of-week (Thursday)
- \text{5} = Fifth day-of-week (Friday)
- \text{6} = Sixth day-of-week (Saturday)
- \text{7} = Seventh day-of-week (Sunday)

**Example**

This example uses the English_UnitedStates session encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data <em>null</em>;</td>
<td></td>
</tr>
</tbody>
</table>
| wknun = 1 ; /* Sunday=1, Saturday=7 */
| put wknun NLSTRWK20. ;                                                                                                                                                                                  | Sunday   |
| put wknun NLSTRWK20.1; /* decimal .1 specified use abbreviation */
| put wknun NLSTRWK20.2;                                                                                                                                                                                   | Sun      |
| put wknun NLSTRWK20.3;                                                                                                                                                                                   | SUNDAY   |
| run;                                                                                                                                                                                                       | SUN      |
NLTIMAP Format

Converts a SAS time value to the time value of a specified locale, and then writes the value as a time value with a.m. or p.m. NLTIMAP also converts SAS date-time values.

**Categories:**
- Date and Time
- CAS

**Alignment:**
- Left

---

**Syntax**

NLTIMAPw.

**Syntax Description**

-w specifies the width of the output field.

- Default: 10
- Range: 4–200

---

**Details**

The NLTIMAP format might produce inaccurate localized output when using the default width with some encoding and locale combinations because the date and time names are too long. Please refer to Exceptions for Date and Time Default Widths on page 60 for information about recommended widths for locale and encoding combinations. You might need to use the recommended width.

---

**Comparisons**

The NLTIMAPw. format is similar to the TIMEAMPMw. format except that the NLTIMAPw. format is locale-specific.

---

**Example**

These examples use the input value of 59083, which is the SAS date-time value that corresponds to 4:24:43 p.m.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>4:24:43 PM</td>
</tr>
<tr>
<td>put time nltimap.;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>4:24:43 nachm</td>
</tr>
<tr>
<td>put time nltimap14.;</td>
<td></td>
</tr>
</tbody>
</table>
**See Also**

**Format:**
- “NLTIME Format” on page 242

---

**NLTIME Format**

Converts a SAS time value to the time value of the specified locale, and then writes the value as a time value. NLTIME also converts SAS date-time values.

- **Categories:** Date and Time
- **CAS**
- **Alignment:** Left

---

**Syntax**

\`NLTIME\w.\`

**Syntax Description**

\`\w\`

- specifies the width of the input field.

- **Default:** 20
- **Range:** 10–200

---

**Comparisons**

The NLTIME\w. format is similar to the TIME\w. format except that the NLTIME\w. format is locale-specific.

---

**Example**

These examples use the input value of 59083, which is the SAS date-time value that corresponds to 4:24:43 p.m.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>---+------</td>
<td>---+------</td>
</tr>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>4:24:43</td>
</tr>
<tr>
<td>put time nlt ime.;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>16.24</td>
</tr>
<tr>
<td>put time nlt ime.;</td>
<td></td>
</tr>
</tbody>
</table>
See Also

Format:
- “NLTMAP Format” on page 241

$UCS2B Format
Processes a character string that is in the encoding of the current SAS session, and then writes the character string in big-endian, 16-bit, UCS2, Unicode encoding.

Category: Character
Alignment: Left

Syntax
$UCS2Bw:

Syntax Description

w
specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default 8
Range 2–32767

Details
The $UCS2Bw. format writes a character string in big-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding. It processes character strings that are in the encoding of the current SAS session.

Comparisons
The $UCS2Bw. format performs processing that is the opposite of the $UCS2BEw. format.

Example
This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>---+-----</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
Statements

```sas
data _null_;  
x = 'X';  
y=put(x,$ucs2b2.);  
puy y $hex.;  
run;
```

See Also

Formats:

- “$UCS2L Format” on page 245
- “$UCS2X Format” on page 248
- “$UTF8X Format” on page 264
- “$UCS2BE Format” on page 244

Informats:

- “$UCS2B Informat” on page 513
- “$UCS2BE Informat” on page 514
- “$UCS2L Informat” on page 515
- “$UCS2X Informat” on page 517
- “$UTF8X Informat” on page 532

$UCS2BE Format

Processes a character string that is in big-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

**Category:** Character

**Alignment:** Left

**Syntax**

```
$UCS2BEw.
```

**Syntax Description**

`w`

specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

**Default** 8

**Range** 2–32767
Details
The $UCS2BEw. format writes a character string in the encoding of the current SAS session. It processes character strings that are in big-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding.

Comparisons
The $UCS2BEw. format performs processing that is the opposite of the $UCS2Bw. format.

Example
This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '592700410042'x;</td>
<td>AB</td>
</tr>
<tr>
<td>put x $ucs2be.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also
Formats:
- “$UCS2B Format” on page 243

Informats:
- “$UCS2B Informat” on page 513
- “$UCS2BE Informat” on page 514

$UCS2L Format
Processes a character string that is in the encoding of the current SAS session, and then writes the character string in little-endian, 16-bit, UCS2, Unicode encoding.

category: Character
Alignment: Left

Syntax
$UCS2Lw:

Syntax Description
w specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.
Default 8
Range 2–32767

Details
The $UCS2Lw. format writes a character string in little-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding. It processes character strings that are in the encoding of the current SAS session.

Comparisons
The $UCS2Lw. format performs processing that is the opposite of the $UCS2LEw. format.

Example
This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>data _null_;</code></td>
<td></td>
</tr>
<tr>
<td><code>x = 'X';</code></td>
<td></td>
</tr>
<tr>
<td><code>y=put(x,$ucs2l2.);</code></td>
<td>2759</td>
</tr>
<tr>
<td><code>put y $hex.;</code></td>
<td></td>
</tr>
<tr>
<td><code>run;</code></td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$UCS2B Format” on page 243
- “$UCS2LE Format” on page 247
- “$UCS2X Format” on page 248
- “$UTF8X Format” on page 264

Informats:
- “$UCS2B Informat” on page 513
- “$UCS2L Informat” on page 515
- “$UCS2LE Informat” on page 516
- “$UCS2X Informat” on page 517
- “$UTF8X Informat” on page 532
$UCS2LE Format

Processes a character string that is in little-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: Left

Syntax

$UCS2LEw.

Syntax Description

\texttt{w}

specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default \ 8

Range \ 2–32767

Details

The $UCS2LEw. format writes a character string in the encoding of the current SAS session. It processes character strings that are in little-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding.

Comparisons

The $UCS2LEw. format performs processing that is the opposite of the $UCS2Lw. format.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>----+----</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>x = '275941004200'x;</td>
<td>AB</td>
</tr>
<tr>
<td>put x $ucs2le.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:
- “$UCS2L Format” on page 245
$UCS2X Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in native-endian, 16-bit, UCS2, Unicode encoding.

| Category: | Character |
| Alignment: | Left |

**Syntax**

```
$UCS2Xw.
```

**Syntax Description**

`w` specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

| Default | 8 |
| Range   | 2–32767 |

**Details**

The $UCS2Xw. format writes a character string in 16-bit, UCS2 (universal character set code in two octets), Unicode encoding, by using byte order that is native to the operating environment.

**Comparisons**

The $UCS2Xw. format performs processing that is the opposite of the $UCS2XEw. format. If you are exchanging data within the same operating environment, use the $UCS2Xw. format. If you are exchanging data with a different operating environment, use the $UCS2Bw. format or $UCS2Lw. format.

**Example**

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>x = '大';</code></td>
<td>'5927'x (binary) or '2759'x (little endian)</td>
</tr>
<tr>
<td><code>put x $ucs2x2.;</code></td>
<td></td>
</tr>
</tbody>
</table>
See Also

Formats:
- “$UCS2B Format” on page 243
- “$UCS2XE Format” on page 249
- “$UCS2L Format” on page 245
- “$UTF8X Format” on page 264

Informats:
- “$UCS2B Informat” on page 513
- “$UCS2L Informat” on page 515
- “$UCS2X Informat” on page 517
- “$UCS2XE Informat” on page 518
- “$UTF8X Informat” on page 532

$UCS2XE Format

Processes a character string that is in native-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: Left

Syntax

$UCS2XEw.

Syntax Description

w

specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default 8
Range 2-32767

Details

The $UCS2XEw. format writes a character string in the encoding of the current SAS session. It processes character strings that are in native-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding.

Comparisons

The $UCS2XEw. format performs processing that is the opposite of the $UCS2Xw. format.
Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = 'e5a4a7'x;</td>
<td>*</td>
</tr>
<tr>
<td>put x $utf8xe10.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:

- “$UCS2X Format” on page 248

Informats:

- “$UCS2X Informat” on page 517
- “$UCS2XE Informat” on page 518

$UCS4B Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in big-endian, 32-bit, UCS4, Unicode encoding.

- Category: Character
- Alignment: Left

Syntax

$UCS4Bw;

Syntax Description

w

specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

- Default 8
- Range 4–32767

Details

The $UCS4Bw format writes a character string in big-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding. It processes character strings that are in the encoding of the current SAS session.
Comparisons

The $UCS4Bw$ format performs processing that is the opposite of the $UCS4BEw$ format.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '犬';</td>
<td>'00005927'x (binary)</td>
</tr>
<tr>
<td>put x $ucs4b4.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$UCS2L Format” on page 245
- “$UCS2X Format” on page 248
- “$UCS4BE Format” on page 251
- “$UCS4L Format” on page 252
- “$UCS4X Format” on page 255
- “$UTF8X Format” on page 264

Informats:
- “$UCS2B Informat” on page 513
- “$UCS2L Informat” on page 515
- “$UCS2X Informat” on page 517
- “$UCS4B Informat” on page 519
- “$UCS4L Informat” on page 520
- “$UCS4X Informat” on page 521
- “$UTF8X Informat” on page 532

$UCS4BE Format

Processes a character string that is in big-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character

Alignment: Left
Syntax

$UCS4BEw.

Syntax Description

\( w \)

specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default 8

Range 4–32767

Details

The $UCS4BEw. format writes a character string in the encoding of the current SAS session. It processes character strings that are in big-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding.

Comparisons

The $UCS4BEw. format performs processing that is the opposite of the $UCS4Bw. format.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '0000592700000004100000042'x;</td>
<td>أخبار</td>
</tr>
<tr>
<td>put x $ucs4be.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:

- “$UCS4B Format” on page 250

Informat:

- “$UCS4B Informat” on page 519

$UCS4L Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in little-endian, 32-bit, UCS4, Unicode encoding.

Category: Character
**Syntax**

$UCS4Lw$

**Syntax Description**

w

specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default 8

Range 4–32767

**Details**

The $UCS4Lw$ format writes a character string in little-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding. It processes character strings that are in the encoding of the current SAS session.

**Comparisons**

The $UCS4Lw$ format performs processing that is the opposite of the $UCS4LEw$ format.

**Example**

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>2759</td>
</tr>
<tr>
<td>x = 'ąż';</td>
<td></td>
</tr>
<tr>
<td>y = put(x,$ucs414.);</td>
<td></td>
</tr>
<tr>
<td>put y $hex.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

**Formats:**

- “$UCS2B Format” on page 243
- “$UCS2X Format” on page 248
- “$UCS4B Format” on page 250
- “$UCS4LE Format” on page 254
- “$UCS4X Format” on page 255
**$UCS4LE Format**

Processes a character string that is in little-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

**Category:** Character  
**Alignment:** Left

### Syntax

$UCS4LEw.

### Syntax Description

$w$

specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

<table>
<thead>
<tr>
<th>Default</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>4–32767</td>
</tr>
</tbody>
</table>

### Details

The $UCS4LEw.$ format writes a character string in the encoding of the current SAS session. It processes character strings that are in little-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding.

### Comparisons

The $UCS4LEw.$ format performs processing that is the opposite of the $UCS4Lw.$ format.

### Example

This example uses UTF-8 encoding.
**Statements** | **Result**
---|---
-----|---

$x = '275900004100000042000000'X;$

put x $ucs4le.;

### See Also

**Format:**
- “$UCS4L Format” on page 252

**Informat:**
- “$UCS4L Informat” on page 520

---

**$UCS4X Format**

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in native-endian, 32-bit, UCS4, Unicode encoding.

- **Category:** Character
- **Alignment:** Left

**Syntax**

\[$UCS4Xw.$\]

**Syntax Description**

\[w\]

specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

- **Default:** 8
- **Range:** 4–32767

**Details**

The \$UCS4Xw. format writes a character string in 32-bit, UCS4 (universal character set code in two octets), Unicode encoding, by using byte order that is native to the operating environment.

**Comparisons**

The \$UCS4Xw. format performs processing that is the opposite of the \$UCS4XEw. format. If you are exchanging data within the same operating environment, use the \$UCS4Xw. format. If you are exchanging data with a different operating environment, use the \$UCS4Bw. format or \$UCS4Lw. format.
Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = ' água ';'</td>
<td>'00005927'x (binary) or '27590000'x (little endian)</td>
</tr>
</tbody>
</table>

put x $ucs4x4.;

See Also

Formats:
- “$UCS2L Format” on page 245
- “$UCS4XE Format” on page 256
- “$UCS2X Format” on page 248
- “$UCS4B Format” on page 250
- “$UCS4L Format” on page 252
- “$UTF8X Format” on page 264

Informats:
- “$UCS2B Informat” on page 513
- “$UCS2L Informat” on page 515
- “$UCS2X Informat” on page 517
- “$UCS4B Informat” on page 519
- “$UCS4B Format” on page 250
- “$UCS4L Informat” on page 520
- “$UCS4X Informat” on page 521
- “$UTF8X Informat” on page 532

$UCS4XE Format

Processes a character string that is in native-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: Left

Syntax

$UCS4XEw.
Syntax Description

\[ w \]

specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 8
Range: 4–32767

Details

The \$UCS4XEw. format writes a character string in the encoding of the current SAS session. It processes character strings that are in native-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding.

Comparisons

The \$UCS4XEw. format performs processing that is the opposite of the \$UCS4Xw. format.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '27590000410000042000000'x;</td>
<td>( \text{AB (little endian)} )</td>
</tr>
<tr>
<td>put x $ucs4be4.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:
- “\$UCS4X Format” on page 255

Informat:
- “\$UCS4X Informat” on page 521

\$UESC Format

Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode escape (UESC) representation.

Category: Character
Alignment: Left
Syntax
$UESCw:

Syntax Description

$UESCw

w specifies the width of the input field.

Default 8

Range 1–32767

Details

If the characters are not available on all operating environments, for example, 0–9, a–z, A–Z, they must be represented in UESC. $UESCw can be nested.

Comparisons

The $UESCw format performs processing that is opposite of the $UESCEw format.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=' ' ; y='u5927' z='uu5927' ; put x = $uesc10 ; put y = $uesc10 ; put z = $uesc10 ;</td>
<td>¥u5927 ¥u5927 ¥uu5927</td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$UESCE Format” on page 259

Informats:
- “$UESC Informat” on page 524
- “$UESCE Informat” on page 525
$UESCE Format

Processes a character string that is in Unicode escape (UESC) representation, and then writes the character string in the encoding of the current SAS session.

**Category:** Character  
**Alignment:** Left

### Syntax

\$UESCEw:

### Syntax Description

\( w \)

- Specifies the width of the output field.

**Default:** 8  
**Range:** 1–32767

### Details

If the data is not supported by the encoding of the current SAS session, the data remains in UESC.

### Comparisons

The $UESCEw. format performs processing that is the opposite of the $UESCw. format.

### Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=put('¥u5927','$uesce10.')</td>
<td>x=¥u5927</td>
</tr>
<tr>
<td>x=put('¥uu5927','$uesce10.')</td>
<td>x=¥uu5927</td>
</tr>
<tr>
<td>x=put('¥uuu5927','$uesce10.')</td>
<td>x=¥uuu5927</td>
</tr>
</tbody>
</table>

### See Also

**Format:**

- “$UESC Format” on page 257

**Informats:**
$UNCR Format

Processes a character string that is encoded in the current SAS session, and then writes the character string in numeric character representation (NCR).

Category: Character

Alignment: Left

Syntax

$UNCR\_w:

Syntax Description

\_w

specifies the width of the output field.

Default 8

Range 1–32767

Comparisons

The $UNCR\_w$ format performs processing that is the opposite of the $UNCRE\_w$ format.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x='91E5'x ; /* Japanese '無' in Shift-JIS */</td>
<td>��22823</td>
</tr>
<tr>
<td>y='abc';</td>
<td>abc</td>
</tr>
<tr>
<td>put x $unr10.;</td>
<td></td>
</tr>
<tr>
<td>put y $unr10.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

• “$UNCRE Format” on page 261
In formats:
- “$UNCR Informat” on page 526
- “$UNCRE Informat” on page 527

$UNCRE Format
Processes a character string that is in numeric character representation (NCR), and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: Left

Syntax
$UNCREw:

Syntax Description

\( w \)

specifies the width of the output field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1–32767</td>
</tr>
</tbody>
</table>

Details
National characters should be represented in NCR.

Comparisons
The $UNCREw. format performs processing that is the opposite of the $UNCRw. format.

Example
This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x='大abc'; put x $uncr10.;</td>
<td>大abc</td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$UNCR Format” on page 260
Informats:
- “$UNCR Informat” on page 526
- “$UNCRE Informat” on page 527

$UPAREN Format
Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode parenthesis (UPAREN) representation.

Category: Character
Alignment: Left

Syntax
$UPARENw.

Syntax Description

`w` specifies the width of the output field.

Default 8
Range 7–32767

Details
The character string is encoded with parentheses and Unicode hexadecimal representation.

Comparisons
The $UPARENw. format performs processing that is the opposite of the $UPARENEw. format.

Example
This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x='¹';</td>
<td>&lt;u5927&gt;</td>
</tr>
<tr>
<td>y='abc3';</td>
<td>&lt;u0061&gt; &lt;u0062&gt; &lt;u0063&gt; &lt;u0033&gt;</td>
</tr>
<tr>
<td>put x $uparen7.;</td>
<td></td>
</tr>
<tr>
<td>put y $uparen28.;</td>
<td></td>
</tr>
</tbody>
</table>
$UPARENE Format

Processes a character string that is in Unicode parenthesis (UPAREN), and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: Left

Syntax
$UPARENE_w;

Syntax Description

w
specifies the width of the output field.

Default 8
Range 1–32767

Comparisons

The $UPARENE_w. format performs processing that is the opposite of the $UPAREN_w. format.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x='&lt;u0061&gt;&lt;u0062&gt;&lt;u0063&gt;&lt;u0033&gt;'; put x $uparene4.;</td>
<td>abc3</td>
</tr>
</tbody>
</table>
$UTF8X Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in universal transformation format (UTF-8) encoding.

**Category:** Character

**Alignment:** Left

### Syntax

$UTF8X_w$

### Syntax Description

$w$

specifies the width of the output field. Specify enough width to include all of the characters in the variable. The width of the characters is dependent on the code point value of the individual characters.

**Default**

8

**Range** 1–32767

### Comparisons

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x = '91E5'x; /* Japanese 'Ȗ' x='e5a4a7'x ' in Shift-JIS */</td>
<td></td>
</tr>
<tr>
<td>put x $utf8x10.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

**Formats:**

- “$SUPAREN Format” on page 262

**Informats:**

- “$SUPAREN Informat” on page 528
- “$SUPARENE Informat” on page 529

See Also

**Formats:**

- “$UCS2B Format” on page 243
$UTF8XE Format

Processes a character string that is in universal transformation format (UTF-8), and then writes the character string in the encoding of the current SAS session.

**Category:** Character  
**Alignment:** Left

### Syntax

$UTF8XE_w.

### Syntax Description

$w$

Specifies the width of the output field. Specify enough width to include all of the characters in the variable. The width of the characters is dependent on the code point value of the individual characters.

- **Default:** 8  
- **Range:** 1–32767

### Comparisons

The $UTF8XE_w.$ format performs processing that is the opposite to the $UTF8X_w.$ format.

### Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = unicode('u5927'); put x $utf8xe10.;</td>
<td>❀</td>
</tr>
</tbody>
</table>
See Also

Formats:
  • “$UTF8X Format” on page 264

Informats:
  • “$UTF8X Informat” on page 532

WEEKU Format

Writes a week number in decimal format by using the U algorithm.

Category: Date and Time
Alignment: Left

Syntax

WEEKUw.

Syntax Description

w
  \(w\) specifies the width of the output field.

Default 11

Range 2–200

Details

The WEEKUw. format writes a week-number format. The WEEKUw. format writes the various formats depending on the specified width. Algorithm U calculates the SAS date value by using the number of the week within the year (Sunday is considered the first day of the week). The number-of-the-week value is represented as a decimal number in the range 0–53, with a leading zero and maximum value of 53. For example, the fifth week of the year would be represented as 05.

For more information about widths, formats, and examples see the following table:

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>Www</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>03W01</td>
</tr>
<tr>
<td>7-8</td>
<td>yyWwwdd</td>
<td>03W0101</td>
</tr>
<tr>
<td>9-10</td>
<td>yyyyWwwdd</td>
<td>2003W0101</td>
</tr>
<tr>
<td>11-200</td>
<td>yyyy-Www-dd</td>
<td>2003-W01-01</td>
</tr>
</tbody>
</table>
Comparisons

The WEEKVw. format writes the week number as a decimal number in the range 01–53, with weeks that begin on a Monday and week 1 of the year including both January 4 and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. The WEEKWw. format writes the week number of the year as a decimal number in the range 00–53, with Monday as the first day of week 1. The WEEKUw. format writes the week number of the year (Sunday as the first day of the week) as a decimal number in the range 0–53, with a leading zero.

Example

```sas
sasdate = '01JAN2003'd;

Statements                   Results
----+----1----+

v=put(sasdate,weeku3.); w=put(sasdate,weeku5.);
x=put(sasdate,weeku7.); y=put(sasdate,weeku9.);
z=put(sasdate,weeku11.);
put v; put w; put x; put y; put z;

W00 03W00 03W0004 2003W0004 2003-W00-04
```

See Also

Formats:

- “WEEKV Format” on page 267
- “WEEKW Format” on page 269

WEEKV Format

Writes a week number in decimal format by using the V algorithm.

**Category:** Date and Time

**Alignment:** Left

**Syntax**

```
WEEKVw:
```
Syntax Description

\[ w \]

specifies the width of the output field.

Default 11
Range 2–200

Details

The WEEKVw. format writes the various formats depending on the specified width. Algorithm V calculates the SAS date value, and the number-of-the-week value is represented as a decimal number in the range 01–53, with a leading zero and maximum value of 53. Weeks begin on a Monday and week 1 of the year is the week that includes both January 4 and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. For example, the fifth week of the year would be represented as 06.

For more information about widths, formats, and examples see the following table:

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>WWW</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWWW</td>
<td>03W01</td>
</tr>
<tr>
<td>7-8</td>
<td>yyWww</td>
<td>03W0101</td>
</tr>
<tr>
<td>9-10</td>
<td>yyyyWww</td>
<td>2003W0101</td>
</tr>
<tr>
<td>11-200</td>
<td>yyyy-Www-dd</td>
<td>2003-W01-01</td>
</tr>
</tbody>
</table>

Comparisons

The WEEKVw. format writes the week number as a decimal number in the range 01–53, with weeks that begin on a Monday and week 1 of the year including both January 4 and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. The WEEKWw. format writes the week number of the year as a decimal number in the range 00–53, with Monday as the first day of week 1. The WEEKUw. format writes the week number of the year (Sunday as the first day of the week) as a decimal number in the range 0–53, with a leading zero.

Example

```sas
sasdate='01JAN2003'd;
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
| ----+-----+-----1----+
Statements

\[ v = \text{put}(\text{sasdate}, \text{weekv3.}); \]
\[ w = \text{put}(\text{sasdate}, \text{weekv5.}); \]
\[ x = \text{put}(\text{sasdate}, \text{weekv7.}); \]
\[ y = \text{put}(\text{sasdate}, \text{weekv9.}); \]
\[ z = \text{put}(\text{sasdate}, \text{weekv11.}); \]

\[
\begin{align*}
\text{put } v; \\
\text{put } w; \\
\text{put } x; \\
\text{put } y; \\
\text{put } z;
\end{align*}
\]

See Also

Formats:
- “WEEKU Format” on page 266
- “WEEKW Format” on page 269

WEEKW Format

Writes a week number in decimal format by using the W algorithm.

Category: Date and Time

Alignment: Left

Syntax

\[ \text{WEEKW}w. \]

Syntax Description

\[ w \]

specifies the width of the output field.

Default 11

Range 2–200

Details

The WEEKW\textit{w}. format writes the various formats depending on the specified width. Algorithm W calculates the SAS date value using the number of the week within the year (Monday is considered the first day of the week). The number-of-the-week value is represented as a decimal number in the range 0–53, with a leading zero and maximum value of 53. For example, the fifth week of the year would be represented as 05.

For more information about widths, formats, and examples see the following table:
### Comparisons

The WEEKVw. format writes the week number as a decimal number in the range 01–53. Weeks beginning on a Monday and on week 1 of the year include both January 4 and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. The WEEKWw. format writes the week number of the year as a decimal number in the range 00–53, with Monday as the first day of week 1. The WEEKUw. format writes the week number of the year (Sunday as the first day of the week) as a decimal number in the range 0–53, with a leading zero.

### Example

```sas
sasdate = '01JAN2003'd;
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>v=put(sasdate,weekw3.);</td>
<td>W03</td>
</tr>
<tr>
<td>w=put(sasdate,weekw5.);</td>
<td>03W03</td>
</tr>
<tr>
<td>x=put(sasdate,weekw7.);</td>
<td>03W0003</td>
</tr>
<tr>
<td>y=put(sasdate,weekw9.);</td>
<td>2003W0003</td>
</tr>
<tr>
<td>z=put(sasdate,weekw11.);</td>
<td>2003-W00-03</td>
</tr>
<tr>
<td>put v;</td>
<td></td>
</tr>
<tr>
<td>put w;</td>
<td></td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>put y;</td>
<td></td>
</tr>
<tr>
<td>put z;</td>
<td></td>
</tr>
</tbody>
</table>

### See Also

**Formats:**
- “WEEKU Format” on page 266
- “WEEKV Format” on page 267
YEN Format

Writes numeric values with yen signs, commas, and decimal points.

- **Categories:**
  - Numeric
  - CAS

- **Alignment:** Right

### Syntax

YEN\[w.d\]

### Syntax Description

- **w**
  - specifies the width of the output field.
  - **Default:** 8
  - **Range:** 1–32

- **d**
  - specifies the number of digits to the right of the decimal point in the numeric value.
  - **Default:** 0
  - **Range:** 0–31

### Details

The YEN\[w.d\] format writes numeric values with a leading yen sign and with a comma that separates every three digits of each value.

The hexadecimal representation of the code for the yen sign character is 5B on EBCDIC systems and 5C on ASCII systems. The monetary character these codes represent might be different in other countries.

### Example

```
put cost yen10.2;

data _null_
   value=1254.71;
   put value yen10.2;
run;
```

<table>
<thead>
<tr>
<th>Cost</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>-------</td>
<td>-----------------</td>
</tr>
<tr>
<td>¥1,254.71</td>
<td>¥1,254.71</td>
</tr>
</tbody>
</table>
YYWEEKU Format

Writes a week number in decimal format by using the U algorithm, excluding day-of-the-week information.

**Categories:** Date and Time

**CAS**

**Alignment:** Left

**Syntax**

```
YYWEEKU\_w.
```

**Syntax Description**

\( w \)

specifies the width of the output field.

**Default** 7

**Range** 2-8

**Details**

The YYWEEKU\_w. format writes a week-number format. The YYWEEKU\_w. format writes the various formats depending on the specified width. Algorithm U calculates the SAS date value by using the number of the week within the year (Sunday is considered the first day of the week).

For more information about widths, formats, and examples see the following table:

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>www</td>
<td>W01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>07W01</td>
</tr>
<tr>
<td>7</td>
<td>yyyyWww</td>
<td>2007W01</td>
</tr>
<tr>
<td>8</td>
<td>yyyy-Www</td>
<td>2007-W01</td>
</tr>
<tr>
<td>9-above</td>
<td>invalid</td>
<td>invalid</td>
</tr>
</tbody>
</table>

**Comparisons**

The YYWEEKU\_w. format is similar to the WEEKU\_w. format except that the YYWEEKU\_w. format does not specify the day-of-week information. Also, the YYWEEKU\_w. format does not accept any width that is greater than 8.
Example

sasdate = '01JAN2007'd;

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>u=put(sasdate,yyweeku3.);</td>
<td>W00</td>
</tr>
<tr>
<td>v=put(sasdate,yyweeku4.);</td>
<td>W00</td>
</tr>
<tr>
<td>w=put(sasdate,yyweeku5.);</td>
<td>07W00</td>
</tr>
<tr>
<td>x=put(sasdate,yyweeku6.);</td>
<td>07W00</td>
</tr>
<tr>
<td>y=put(sasdate,yyweeku7.);</td>
<td>2007W00</td>
</tr>
<tr>
<td>z=put(sasdate,yyweeku8.);</td>
<td>2007-W00</td>
</tr>
<tr>
<td>put u;</td>
<td></td>
</tr>
<tr>
<td>put v;</td>
<td></td>
</tr>
<tr>
<td>put w;</td>
<td></td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>put y;</td>
<td></td>
</tr>
<tr>
<td>put z;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:

- “WEEKU Format” on page 266

YYWEEKV Format

Writes a week number in decimal format by using the V algorithm, excluding day-of-the-week information.

**Categories:**
- Date and Time
- CAS

**Alignment:**
- Left

**Syntax**

**YYWEEKV**

**Syntax Description**

\( w \)

specifies the width of the output field.

**Default**

7

**Range**

2–8

**Details**

The YYWEEKV\( w \) format writes the various formats depending on the specified width. Algorithm V calculates the SAS date value, and the number-of-the-week value is
represented as a decimal number in the range 01–53, with a leading zero and maximum value of 53. Weeks begin on a Monday and week 1 of the year is the week that includes both January 4 and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. For example, the fifth week of the year would be represented as 06.

For more information about widths, formats, and examples see the following table:

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>Www</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>07W01</td>
</tr>
<tr>
<td>7</td>
<td>yyyyWww</td>
<td>2007W01</td>
</tr>
<tr>
<td>8</td>
<td>yyyy-Www</td>
<td>2007-W01</td>
</tr>
<tr>
<td>9-above</td>
<td>invalid</td>
<td>invalid</td>
</tr>
</tbody>
</table>

**Comparisons**

The YYWEEKVw. format is similar to the WEEKVw. format except that the YYWEEKVw. format does not specify the day-of-week information. Also, the YYWEEKVw. format does not accept a width that is greater than 8.

**Example**

```sas
sasdate = '01JAN2007'd;
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>u=put(sasdate,yyweekv3.);</td>
<td>W01</td>
</tr>
<tr>
<td>v=put(sasdate,yyweekv4.);</td>
<td>W01</td>
</tr>
<tr>
<td>w=put(sasdate,yyweekv5.);</td>
<td>07W01</td>
</tr>
<tr>
<td>x=put(sasdate,yyweekv6.);</td>
<td>07W01</td>
</tr>
<tr>
<td>y=put(sasdate,yyweekv7.);</td>
<td>2007W01</td>
</tr>
<tr>
<td>z=put(sasdate,yyweekv8.);</td>
<td>2007-W01</td>
</tr>
<tr>
<td>put u;</td>
<td></td>
</tr>
<tr>
<td>put v;</td>
<td></td>
</tr>
<tr>
<td>put w;</td>
<td></td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>put y;</td>
<td></td>
</tr>
<tr>
<td>put z;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “WEEKV Format” on page 267
**YYWEEKW Format**

Writes a week number in decimal format by using the W algorithm, excluding the day-of-week information.

**Categories:** Date and Time  
CAS  

**Alignment:** Left

**Syntax**

`YYWEEKWw`.

**Syntax Description**

`w`

specifies the width of the output field.

**Default**

7

**Range**

2–8

**Details**

The `YYWEEKWw` format writes the various formats depending on the specified width. Algorithm W calculates the SAS date value using the number of the week within the year.

For more information about widths, formats, and examples see the following table:

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td><code>Www</code></td>
<td><code>W01</code></td>
</tr>
<tr>
<td>5-6</td>
<td><code>yyWww</code></td>
<td><code>07W01</code></td>
</tr>
<tr>
<td>7</td>
<td><code>yyyyWww</code></td>
<td><code>2007W01</code></td>
</tr>
<tr>
<td>8</td>
<td><code>yyyy-Www</code></td>
<td><code>2007-W01</code></td>
</tr>
<tr>
<td>9-above</td>
<td>invalid</td>
<td>invalid</td>
</tr>
</tbody>
</table>

**Comparisons**

The `YYWEEKWw` format is similar to the `WEEKWw` format except that the `YYWEEKWw` format does not specify the day-of-week information. Also, the `YYWEEKWw` format does not accept any width that is greater than 8.
Example

sasdate = '01JAN2007'd

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>u=put(sasdate,yyweekw3.);</td>
<td>W01</td>
</tr>
<tr>
<td>v=put(sasdate,yyweekw4.);</td>
<td>W01</td>
</tr>
<tr>
<td>w=put(sasdate,yyweekw5.);</td>
<td>07W01</td>
</tr>
<tr>
<td>x=put(sasdate,yyweekw6.);</td>
<td>07W01</td>
</tr>
<tr>
<td>y=put(sasdate,yyweekw7.);</td>
<td>2007W01</td>
</tr>
<tr>
<td>z=put(sasdate,yyweekw8.);</td>
<td>2007-W01</td>
</tr>
</tbody>
</table>

See Also

Format:

- “WEEKW Format” on page 269
Part 5

Functions for NLS

Chapter 10
  *Internationalization Compatibility for SAS String Functions* .................. 279

Chapter 11
  *VARCHAR Support in Functions* ................................................. 299

Chapter 12
  *Dictionary of NLS Functions* ................................................... 303
Chapter 10

Internationalization Compatibility for SAS String Functions

SAS provides string functions and CALL routines that enable you to easily manipulate your character data. Many of the original SAS string functions assume that the size of one character is always 1 byte. This process works well for data in a single-byte character set (SBCS). However, when some of these functions and CALL routines are used with data in a double-byte character set (DBCS) or a multi-byte character set (MBCS) such as UTF-8, the data is often handled improperly, and the string functions produce incorrect results.

To solve this problem, SAS introduced a set of string functions and CALL routines, called K functions, for those string manipulations where DBCS or MBCS data must be handled carefully. The K functions do not make assumptions about the size of a character string. The Table 10.1 on page 280 shows the level of I18N compatibility for each SAS string function. I18N is the abbreviation for internationalization. Compatibility indicates whether a program using a particular string function can be adapted to different languages and locales without program changes.

It is important to understand the difference between byte-based offset-length and character-based offset-length in order to use the K functions properly.

A byte-based offset assumes that the starting position specified for a character is the byte position of that character in the string. For SBCS data, where one character is always 1 byte in length, you can assume that the second character in the string begins in byte 2. However, if the data in the string is multi-byte data, the data in byte 2 might be one of the following, depending on the data and the encoding of the data:

- the second character in the string
- the second byte of a 2-byte character
- the first byte of the first character in the string.

A byte-based length represents the number of bytes in the string.

A character-based offset assumes that the position specified is the position of the character in the string. For all encodings, a character-based position of 2 is always the second character in the string. You cannot assume that you know the size of the characters in the string.
A character-based length represents the number of characters in the string.

K functions use a character-based offset or length, which does not take into consideration the byte position of the character in the string. For SAS Viya, you should consider using the K functions to process your UTF-8 data.

Here is an example of the functionality of a SAS string function and its corresponding K function.

In the UTF8 encoding, the STR=”E282AC313233’x string has 6 bytes and represents four characters. Table 10.1 on page 280

<table>
<thead>
<tr>
<th>Hexadecimal Representation</th>
<th>31</th>
<th>32</th>
<th>33</th>
</tr>
</thead>
<tbody>
<tr>
<td>E282AC</td>
<td>31</td>
<td>32</td>
<td>33</td>
</tr>
</tbody>
</table>

| € | 1 | 2 | 3 |

The following example uses this same hexadecimal string in the SUBSTR function, which returns an unexpected value in UTF-8. The expected returned string would be the first character, the euro symbol. However, the result is an invalid character. The LENGTH function is byte-oriented, so it reads the individual bytes of data. The SUBSTR function returns the first byte of the first character, which is an incomplete value because the first character is encoded on 3 bytes.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
| /* SAS program to submit in a UTF-8 SAS session */
| data _null_;
| str= "€123" ;
| s=substr(str,1,1) ;
| sl=length(s);
| l=length(str) ;
| put str= $hex16. /s= sl= s=E22020202020 /
| run ; |

The code in Table 10.3 on page 281 solves this issue by substituting the SUBSTR() function, which only works on single-byte data, with the KSUBSTR() function, which works on single- and multi-byte data. Direct substitutions can also be made for other string functions, such as changing the LENGTH() or INDEX() functions to use the KLENGTH() or KINDEX() functions. Because the two functions read the data differently, you get different results when running this code in a multi-byte environment.
Table 10.3  Code Example Using K Functions

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>/* SAS program to submit in a UTF-8 SAS session */</td>
<td>str=E282AC313233</td>
</tr>
<tr>
<td>data <em>null</em>;</td>
<td>s=€</td>
</tr>
<tr>
<td>str= &quot;€123&quot; ;</td>
<td>l=4</td>
</tr>
<tr>
<td>s=ksubstr(str,1,1) ;</td>
<td></td>
</tr>
<tr>
<td>s1=klength(s);</td>
<td></td>
</tr>
<tr>
<td>l=klength(str) ;</td>
<td></td>
</tr>
<tr>
<td>put str=$hex16. /s= s1= / s= $hex. /l=;</td>
<td></td>
</tr>
<tr>
<td>run ;</td>
<td></td>
</tr>
</tbody>
</table>

Before replacing all of the original SAS string-handling functions with K functions, examine your SAS program. If the string function processes data that contains only single-byte characters, K functions are not necessary. For example, strings containing XML tags do not require the use of K functions. Knowing the character data that is in your SAS programs and how it is processed can save unnecessary updates to your SAS code. The processing of binary data is not supported by the string-handling K functions, which expect strings to match the current session encoding. UTF-8 is the only SAS session encoding supported by SAS Viya.

String functions are assigned I18N levels depending on whether the functions can process MBCS or SBCS data. Here are descriptions of the levels:

I18N Level 0
This function is designed for SBCS data. Do not use this function to process MBCS data.

I18N Level 1
This function should be avoided, if possible, if you are processing MBCS data. The I18N Level 1 functions might not work correctly with DBCS or MBCS encodings under certain circumstances.

I18N Level 2
This function can be used for SBCS and MBCS (UTF-8) data.

Table 10.4  SAS String Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>I18N Level 0</th>
<th>I18N Level 1</th>
<th>I18N Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>“ANORM420 Function” (p. 309)</td>
<td>Returns a normalized string from an input string encoded in EBCDIC420.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“ANYALNUM Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for an alphanumeric character, and returns the first position at which the character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
<td>I18N Level 2</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>“ANYALPHA Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for an alphabetic character, and returns the first position at which the character is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“ANYCNTRL Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a control character, and returns the first position at which that character is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“ANYDIGIT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a digit, and returns the first position at which the digit is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“ANYFIRST Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a character that is valid as the first character in a SAS variable name under $\text{VALIDVARNAMES}=$V7, and returns the first position at which that character is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“ANYGRAPH Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a graphical character, and returns the first position at which that character is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“ANYLOWER Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a lowercase letter, and returns the first position at which the letter is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“ANYNAME Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a character that is valid in a SAS variable name under $\text{VALIDVARNAMES}=$V7, and returns the first position at which that character is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
<td>I18N Level 2</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>“ANYPRINT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a printable character, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“ANYPUNCT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a punctuation character, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“ANYSPACE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a white-space character (blank, horizontal and vertical tab, carriage return, line feed, and form feed). Returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“ANYUPPER Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for an uppercase letter, and returns the first position at which the letter is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“ANYDIGIT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a hexadecimal character that represents a digit, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“BASECHAR Function” (p. 314)</td>
<td>Converts characters to base characters.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“BYTE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns one character in the ASCII or the EBCDIC collating sequence.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“CAT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Does not remove leading or trailing blanks, and returns a concatenated character string.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
<td>I18N Level 2</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>“CATQ Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Concatenates character or numeric values by using a delimiter to separate items and by adding quotation marks to strings that contain the delimiter.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“CATS Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Removes leading and trailing blanks, and returns a concatenated character string.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“CATT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Removes trailing blanks, and returns a concatenated character string.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“CATX Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Removes leading and trailing blanks, inserts delimiters, and returns a character string.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“CHAR Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a single character from a specified position in a character string.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“CHOOSEC Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a character value that represents the results of choosing from a list of arguments.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“CHOOSEN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a numeric value that represents the results of choosing from a list of arguments.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“COALESCEC Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the first nonmissing value from a list of numeric arguments.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“COLLATE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a character string in ASCII or EBCDIC collating sequence.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
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<tr>
<td>“COMPARE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the position of the leftmost character by which two strings differ, or returns 0 if there is no difference.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“COMPBL Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Removes multiple blanks from a character string.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“COMPGED Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the generalized edit distance between two strings.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“COMPLEV Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the Levenshtein edit distance between two strings.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“COMPRESS Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a character string with specified characters removed from the original string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“COUNT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Counts the number of times that a specified substring appears within a character string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“COUNTC Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Counts the number of characters in a string that appear or do not appear in a list of characters.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“COUNTW Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Counts the number of words in a character string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“DEQUOTE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Removes matching quotation marks from a character string that begins with a quotation mark, and deletes all characters to the right of the closing quotation mark.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
<td>I18N Level 2</td>
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</tr>
<tr>
<td>“FIND Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches for a specific substring of characters within a character string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“FINDC Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a string for any character in a list of characters.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“FINDW Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the character position of a word in a string, or returns the number of the word in a string.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“FIRST Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the first character in a character string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“GETLOCENV Function” (p. 317)</td>
<td>Returns the current locale/language environment.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“GETPXLANGUAGE Function” (p. 318)</td>
<td>Returns the current two-letter language code.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“GETPXLOCALE Function” (p. 319)</td>
<td>Returns the POSIX locale value for a SAS locale.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“GETPXREGION Function” (p. 321)</td>
<td>Returns the current two-letter region code.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“HTMLDECODE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Decodes a string that contains HTML numeric character references or HTML character entity references, and returns the decoded string.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“HTMLENCODE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Encodes characters using HTML character entity references, and returns the encoded string.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“IFC Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a character value based on whether an expression is true, false, or missing.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
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<tr>
<td>“IFN Function” in <em>SAS Viya Functions and CALL Routines: Reference</em></td>
<td>Returns a numeric value based on whether an expression is true, false, or missing.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“INDEX Function” in <em>SAS Viya Functions and CALL Routines: Reference</em></td>
<td>Searches a character expression for a string of characters, and returns the position of the string’s first character for the first occurrence of the string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“INDEXC Function” in <em>SAS Viya Functions and CALL Routines: Reference</em></td>
<td>Searches a character expression for any of the specified characters, and returns the position of that character.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“INDEXW Function” in <em>SAS Viya Functions and CALL Routines: Reference</em></td>
<td>Searches a character expression for a string that is specified as a word, and returns the position of the first character in the word.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KCOMPARE Function” (p. 322)</td>
<td>Returns the result of a comparison of character expressions.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KCOMPRESS Function” (p. 323)</td>
<td>Removes specified characters from a character expression.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KCOUNT Function” (p. 324)</td>
<td>Returns the number of double-byte characters in an expression.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KCVT Function” (p. 325)</td>
<td>Converts data from one type of encoding data to another type of encoding data.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KINDEX Function” (p. 326)</td>
<td>Searches a character expression for a string of characters.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KINDEXB Function” (p. 327)</td>
<td>Searches a character expression for a string of characters.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
<td>I18N Level 2</td>
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</tr>
<tr>
<td>“KINDEXCB Function” (p. 330)</td>
<td>Searches a character expression for specified characters.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“KINDEXC Function” (p. 329)</td>
<td>Searches a character expression for specified characters.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“KLEFT Function” (p. 331)</td>
<td>Left-aligns a character expression by removing unnecessary leading DBCS blanks and Shift out/Shift in (SO-SI) .</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KLENGTH Function” (p. 332)</td>
<td>Returns the length of an argument.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KLOWCASE Function” (p. 333)</td>
<td>Converts all letters in an argument to lowercase.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KPROPCASE Function” (p. 334)</td>
<td>Converts Chinese, Japanese, Korean, Taiwanese (CJKT) characters.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“KPROPCHAR Function” (p. 337)</td>
<td>Converts special characters to normal characters.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KPROCDATA Function” (p. 338)</td>
<td>Removes or converts unprintable characters.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KREVERSE Function” (p. 340)</td>
<td>Reverses a character expression.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KRIGHT Function” (p. 341)</td>
<td>Right-aligns a character expression by trimming trailing DBCS blanks and SO-SI.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KSCAN Function” (p. 342)</td>
<td>Selects a specified word from a character expression.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KSTRCAT Function” (p. 344)</td>
<td>Concatenates two or more character expressions.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KSTRIP Function” (p. 345)</td>
<td>Removes leading and trailing blanks from a character string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
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</tr>
<tr>
<td>“KSUBSTR Function” (p. 346)</td>
<td>Extracts a substring from an argument.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KSUBSTRN Function” (p. 347)</td>
<td>Returns a substring, allowing a result with a length of 0.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KSUBSTRB Function” (p. 349)</td>
<td>Extracts a substring from an argument according to the byte position of the substring in the argument.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KTRIM Function” (p. 351)</td>
<td>Removes trailing DBCS blanks and SO-SI from character expressions.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KTRUNCATE Function” (p. 353)</td>
<td>Truncates a character string to a specified length in byte units without breaking multibyte characters.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KUPCASE Function” (p. 354)</td>
<td>Converts all letters in an argument to uppercase.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KUPDATE Function” (p. 355)</td>
<td>Inserts, deletes, and replaces character value contents.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KUPDATEB Function” (p. 357)</td>
<td>Inserts, deletes, and replaces the contents of the character value according to the byte position of the character value in the argument.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KDATES Function” (p. 358)</td>
<td>Inserts, deletes, and replaces character value contents.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KVERIFYB Function” (p. 361)</td>
<td>Returns the position of the first character that is unique to an expression.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“KVERIFY Function” (p. 360)</td>
<td>Returns the position of the first character that is unique to an expression.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
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</tr>
<tr>
<td>“LEFT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Left-aligns a character string.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“LENGTH Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the length of a non-blank character string, excluding trailing blanks, and returns 1 for a blank character string.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“LENGTHC Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the length of a character string, including trailing blanks.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“LENGTHM Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the amount of memory (in bytes) that is allocated for a character string.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“LENGTHN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the length of a character string, excluding trailing blanks.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“LOWCASE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Converts all letters in an argument to lowercase.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“MD5 Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the result of the message digest of a specified string.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“MISSING Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a numeric result that indicates whether the argument contains a missing value.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“MVALID Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Checks the validity of a character string for use as a SAS member name.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“NLDATE Function” (p. 362)</td>
<td>Converts the SAS date value to the date value of the specified locale by using the date format descriptors.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
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</tr>
<tr>
<td>“NLDATM Function” (p. 365)</td>
<td>Converts the SAS datetime value to the time value of the specified locale by using the datetime-format descriptors.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“NLTME Function” (p. 368)</td>
<td>Converts the SAS time or the datetime value to the time value of the specified locale by using the NLTME descriptors.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NLITERAL Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Converts a character string that you specify to a SAS name literal.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“NOTALNUM Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a non-alphanumeric character, and returns the first position at which the character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NOTALPHA Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a non-alphabetic character, and returns the first position at which the character is found.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“NOTCNTRL Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a character that is not a control character, and returns the first position at which that character is found.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“NOTDIGIT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for any character that is not a digit, and returns the first position at which that character is found.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
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<tr>
<td>“NOTFIRST Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for an invalid first character in a SAS variable name under VALIDVARNAME=V7, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NOTGRAPH Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a non-graphical character, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NOTLOWER Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a character that is not a lowercase letter, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NOTNAME Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for an invalid character in a SAS variable name under VALIDVARNAME=V7, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NOTPRINT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a non-printable character, and returns the first position at which that character is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“NOTPUNCT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a character that is not a punctuation character, and returns the first position at which that character is found.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
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</tr>
<tr>
<td>“NOTSPACE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a character that is not a white-space character (blank, horizontal and vertical tab, carriage return, line feed, and form feed), and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NOTUPPER Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a character that is not an uppercase letter, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NOTXDIGIT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches a character string for a character that is not a hexadecimal character, and returns the first position at which that character is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“NVALID Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Checks the validity of a character string for use as a SAS variable name.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“PROPCASE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Converts all words in an argument to proper case.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“PRXCHANGE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Performs a pattern-matching replacement.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“PRXMATCH Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches for a pattern match, and returns the position at which the pattern is found.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“PRXPAREN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the last bracket match for which there is a match in a pattern.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
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<tr>
<td>“PRXPARSE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Compiles a Perl regular expression (PRX) that can be used for pattern matching of a character value.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“PRXPOSN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a character string that contains the value for a capture buffer.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“PUT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a value using a specified format.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“PUTC Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Enables you to specify a character format at run time.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“PUTN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Enables you to specify a numeric format at run time.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“QUOTE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Adds double quotation marks to a character value.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“RANK Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the position of a character in the ASCII or EBCDIC collating sequence.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“REPEAT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a character value that consists of the first argument repeated ( n+1 ) times.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“REVERSE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Reverses a character string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“RIGHT Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Right-aligns a character expression.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“SASMSG Function” (p. 369)</td>
<td>Specifies a message from a data set. The returned message is based on the current locale and a specified key.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
<td>I18N Level 2</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>“SASMSGL Function” (p. 372)</td>
<td>Specifies a message from a data set. The message is based on a specified locale value and a specified key value.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“SCAN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the nth word from a character string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“SETLOCALE Function” (p. 378)</td>
<td>Specifies the locale keys for the current SAS locale.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“SHA256 Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the result of the message digest of a specified string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“SORTKEY Function” (p. 375)</td>
<td>Creates a linguistic sort key.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“SOUNDEX Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Encodes a string to facilitate searching.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“SPEDIS Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Determines the likelihood of two words matching, expressed as the asymmetric spelling distance between the two words.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“STRIP Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a character string with all leading and trailing blanks removed.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>“SUBPAD Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a substring that has a length that you specify, using blank padding if necessary.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“SUBSTR (left of =) Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Extracts a substring from an argument.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“SUBSTR (right of =) Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Extracts a substring from an argument.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“SUBSTRN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a substring, allowing a result with a length of 0.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
<td>I18N Level 2</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>“TRANSLATE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Replaces specific characters in a character string.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“TRANSTRN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Replaces or removes all occurrences of a substring in a character string.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TRANTAB Function” on page 394</td>
<td>Transcodes data by using the specified translation table.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“TRANWRD Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Replaces or removes all occurrences of a substring in a character string.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TRIM Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Removes trailing blanks from a character string, and returns one blank if the string is missing.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TRIMN Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Removes trailing blanks from character expressions, and returns a string with a length of 0 if the expression is missing.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TZONEDSTNAME Function” (p. 390)</td>
<td>Returns a daylight savings time name.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TZONEDSTOFF Function” (p. 391)</td>
<td>Returns the time zone offset value for the specified daylight savings time.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TZONEID Function” (p. 385)</td>
<td>Returns the current time zone ID.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TZONENAME Function” (p. 386)</td>
<td>Returns the current standard or daylight savings time time zone name.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TZONEOFF Function” (p. 388)</td>
<td>Returns the user time zone offset.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TZONES2U Function” (p. 389)</td>
<td>Converts a SAS datetime value to a UTC datetime value.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>“TZONESTTNAME Function” (p. 392)</td>
<td>Returns a standard time zone name.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
<td>I18N Level 0</td>
<td>I18N Level 1</td>
<td>I18N Level 2</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>“TZONESTTOFF Function” (p. 393)</td>
<td>Returns the time zone offset value for the specified standard time.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“TZONEU2S Function” (p. 393)</td>
<td>Converts a UTC datetime value to a SAS datetime value.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“UNICODE Function” (p. 395)</td>
<td>Converts Unicode characters to the current SAS session encoding.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“UNICODEC Function” (p. 397)</td>
<td>Converts characters in the current SAS session encoding to Unicode characters.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“UNICODELEN Function” (p. 398)</td>
<td>Specifies the length of the character unit for the Unicode data.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“UNICODEWIDTH Function” (p. 399)</td>
<td>Specifies the length of a display unit for the Unicode data.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“UPCASE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Converts all letters in an argument to uppercase.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“URLDECODE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a string that was decoded using the URL escape syntax.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“URLENCODE Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns a string that was encoded using the URL escape syntax.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“VERIFY Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Returns the position of the first character in a string that is not in any of several other strings.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“WHICHIC Function” in SAS Viya Functions and CALL Routines: Reference</td>
<td>Searches for a character value that is equal to the first argument, and returns the index of the first matching value.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 11
VARCHAR Support in Functions

VARCHAR Data Type in String Functions

SAS Viya supports the VARCHAR data type for character data. Variables created using the VARCHAR data type vary in width and use character semantics, rather than being fixed-width and using byte semantics of the original SAS character data type. When a VARCHAR variable is passed to any string function, including the traditional string functions or the K functions, SAS assumes that the length represents the number of characters. An offset for a VARCHAR variable represents the position of a character in the string. The fixed-width character data type is better suited for binary data.

VARCHAR is supported in CAS tables and is used in a data_NULL_step. Some procedures support VARCHAR columns. Procedures that do not support VARCHAR columns convert the columns to a fixed-width character column. VARCHAR is not supported in data sets.

Here is an example of the data types using the SUBSTR function `substr(X, 10, 2)`.

If the variable X is defined as a fixed-width character variable, SUBSTR returns the 10th and 11th bytes in the string. If X is defined as a VARCHAR variable, SUBSTR returns the 10th and 11th characters in the string.

A variable that is assigned a VARCHAR data type of length 10 can hold up to 10 characters.

This table shows the differences between fixed-width and VARCHAR data types. The fixed-width character data type uses byte semantics and VARCHAR uses character semantics.

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Traditional String Function</th>
<th>K Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-width character</td>
<td>byte</td>
<td>character</td>
</tr>
<tr>
<td>VARCHAR</td>
<td>character</td>
<td>character</td>
</tr>
</tbody>
</table>

The SAS Viya session encoding, UTF-8, supports data that can be 1 or multiple bytes. An example of a multi-byte UTF-8 character is the euro (€) character, which has 3 bytes. Here is a table that shows the representation of the string €123. The € character has 3 bytes and each number has 1 byte.
The following examples compare the fixed-width data type and the VARCHAR data type. Table 11.1 on page 300 shows results from the fixed-width variable using the data €123. Table 11.2 on page 301 shows results using VARCHAR.

K functions should be used for fixed-width character data that might contain multi-byte characters:

1. The example in the first row assigns the string to a fixed-width character column. The PUT statement displays the characters and then displays the hexadecimal value for those characters.

2. The example in the second row uses the SUBSTR function with a position of 2. Because the variable x is a fixed-width character column, the position interpreted as the second byte of the string in x, which is also the second byte of the € character. The result is that the first 2 bytes assigned to xsub are invalid UTF-8 data. The results displayed here show garbage (or the Unicode replacement character) as the first 2 bytes of xsub.

3. The example in the third row uses the INDEX function to locate the 1 in the string. Because the variable x is a fixed-width character column, the result returned by the INDEX function is the byte position of the character in the string. The result is \texttt{xidx=4} because the 1 is located at the fourth byte in x.

### Table 11.1 Fixed-Width Character Example

<table>
<thead>
<tr>
<th>Character</th>
<th>€</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexadecimal value</td>
<td>E2</td>
<td>82</td>
<td>AC</td>
<td>31</td>
</tr>
</tbody>
</table>

1. The example in the first row assigns the string to a VARCHAR column. The PUT statement displays the characters and then the hexadecimal value for those characters.

2. The example in the second row uses the SUBSTR function with a position of 2. In this example, the variable v is defined as a VARCHAR so that the position is interpreted as the second character of the string in v. The result assigned to vsub is the string '123', which contains valid UTF-8 characters.

3. The example in the third row uses the INDEX function to locate the 1 in the string. Because the variable v is a VARCHAR column, the result returned by the INDEX function is the byte position of the character in the string. The result is \texttt{vidx=4} because the 1 is located at the fourth byte in v.
function is the character position of the character in the string. The result is $v_{idx}=2$ because 1 is the second character in $v$.

**Table 11.2  VARCHAR Character Example**

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>; length v VARCHAR(6); v='€123'; put v= v= $hex.; vsub=substr(v,2); put vsub= vsub= $hex.; vidx=index(v,'1'); put vidx=; run;</td>
<td>v=€123 v=E282AC313233 vsub=123 vsub=313233202020202020202020202020202020202020202020 vidx=2</td>
</tr>
</tbody>
</table>
Chapter 12
Dictionary of NLS Functions

Functions by Category

Dictionary

ANORM420 Function .................................................. 309
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ENCODCOMPAT Function .......................................... 315
ENCODISVALID Function ........................................... 317
GETLOCENV Function ............................................. 317
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GETPXLOCALE Function .......................................... 319
GETPXREGION Function ........................................... 321
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KCOMPRESS Function .............................................. 323
KCOUNT Function ..................................................... 324
KCVT Function ........................................................ 325
KINDEX Function ..................................................... 326
KINDEXB Function .................................................... 327
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KSTRIP Function ....................................................... 345
KSUBSTR Function ..................................................... 346
KSUBSTRN Function ................................................... 347
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KUPDATE Function .................................................... 354
KUPDATES Function ................................................... 355
KUPDATER Function .................................................. 357
KVERIFY Function ...................................................... 360
KVERIFYB Function .................................................... 361
### Functions by Category

The following categories relate to NLS issues:

Some functions run in SAS only, and some functions run in SAS and on the CAS engine. If CAS is specified for the function category, then the function runs in SAS and on the CAS server. If CAS is not specified for the function category, then the function runs in SAS only. For example, the BASECHAR function runs in SAS and on the CAS server, so CAS is specified as a category. The KCVT function runs on SAS only, so CAS is not specified as a category.

**Table 12.1 Categories of NLS Functions**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td>Functions that run on the CAS server.</td>
</tr>
<tr>
<td>Character</td>
<td>Processes character data.</td>
</tr>
<tr>
<td>Currency Conversion</td>
<td>Converts one currency to another currency.</td>
</tr>
<tr>
<td>DBCS</td>
<td>Processes double-byte character set.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>Processes data and time data.</td>
</tr>
<tr>
<td>Locale</td>
<td>Processes data based on the specified locale.</td>
</tr>
</tbody>
</table>
## Variable Information

Processes variable information.

<table>
<thead>
<tr>
<th>Category</th>
<th>Language Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td>BASECHAR Function (p. 314)</td>
<td>Converts characters to base characters.</td>
</tr>
<tr>
<td></td>
<td>KCOMPRESS Function (p. 323)</td>
<td>Removes specified characters from a character expression.</td>
</tr>
<tr>
<td></td>
<td>KCOUNT Function (p. 324)</td>
<td>Returns the number of double-byte characters in an expression.</td>
</tr>
<tr>
<td></td>
<td>KINDEX Function (p. 326)</td>
<td>Searches a character expression for a string of characters.</td>
</tr>
<tr>
<td></td>
<td>KINDEXC Function (p. 329)</td>
<td>Searches a character expression for specified characters.</td>
</tr>
<tr>
<td></td>
<td>KLEFT Function (p. 331)</td>
<td>Left-aligns a character expression by removing unnecessary leading DBCS blanks and SO/SI.</td>
</tr>
<tr>
<td></td>
<td>KLENGTH Function (p. 332)</td>
<td>Returns the length of an argument.</td>
</tr>
<tr>
<td></td>
<td>KLOWCASE Function (p. 333)</td>
<td>Converts all single-width English alphabet letters in an argument to lowercase.</td>
</tr>
<tr>
<td></td>
<td>KREVERSE Function (p. 340)</td>
<td>Reverses a character expression.</td>
</tr>
<tr>
<td></td>
<td>KRIGHT Function (p. 341)</td>
<td>Right-aligns a character expression by trimming trailing DBCS blanks and SO/SI.</td>
</tr>
<tr>
<td></td>
<td>KSCAN Function (p. 342)</td>
<td>Selects a specified word from a character expression.</td>
</tr>
<tr>
<td></td>
<td>KSTRCAT Function (p. 344)</td>
<td>Concatenates two or more character expressions.</td>
</tr>
<tr>
<td></td>
<td>KSTRIP Function (p. 345)</td>
<td>Removes leading and trailing blanks from a character string.</td>
</tr>
<tr>
<td></td>
<td>KSUBSTR Function (p. 346)</td>
<td>Extracts a substring from an argument.</td>
</tr>
<tr>
<td></td>
<td>KTRANSOLVE Function (p. 350)</td>
<td>Replaces specific characters in a character expression.</td>
</tr>
<tr>
<td></td>
<td>KTRIM Function (p. 351)</td>
<td>Removes trailing DBCS blanks and SO/SI from character expressions.</td>
</tr>
<tr>
<td></td>
<td>KUPCASE Function (p. 354)</td>
<td>Converts all single-width English alphabet letters in an argument to uppercase.</td>
</tr>
<tr>
<td></td>
<td>KUPDATE Function (p. 355)</td>
<td>Inserts, deletes, and replaces character value contents.</td>
</tr>
<tr>
<td></td>
<td>KUPDATES Function (p. 358)</td>
<td>Inserts, deletes, and replaces character value contents.</td>
</tr>
<tr>
<td></td>
<td>KVERIFY Function (p. 360)</td>
<td>Returns the position of the first character that is unique to an expression.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Character</td>
<td>VTRANSCODE Function (p. 401)</td>
<td>Returns a value that indicates whether transcoding is enabled for the specified character variable.</td>
</tr>
<tr>
<td>Character</td>
<td>VTRANSCODEX Function (p. 402)</td>
<td>Returns a value that indicates whether transcoding is enabled for the specified argument.</td>
</tr>
<tr>
<td>Character</td>
<td>ANORM420 Function (p. 309)</td>
<td>Returns a normalized string from an input string encoded in EBCDIC420.</td>
</tr>
<tr>
<td>Character</td>
<td>BASECHAR Function (p. 314)</td>
<td>Converts characters to base characters.</td>
</tr>
<tr>
<td>Character</td>
<td>KCVT Function (p. 325)</td>
<td>Converts data from one type of encoding data to another type of encoding data.</td>
</tr>
<tr>
<td>Character</td>
<td>KSTRIP Function (p. 345)</td>
<td>Removes leading and trailing blanks from a character string.</td>
</tr>
<tr>
<td>Character</td>
<td>TRANTAB Function (p. 394)</td>
<td>Transcodes data by using the specified translation table.</td>
</tr>
<tr>
<td>Character</td>
<td>UNICODE Function (p. 395)</td>
<td>Converts Unicode characters to the current SAS session encoding.</td>
</tr>
<tr>
<td>Character</td>
<td>UNICODEC Function (p. 397)</td>
<td>Converts characters in the current SAS session encoding to Unicode characters.</td>
</tr>
<tr>
<td>Character</td>
<td>UNICODELEN Function (p. 398)</td>
<td>Specifies the length of the character unit for the Unicode data.</td>
</tr>
<tr>
<td>Character</td>
<td>UNICODEWIDTH Function (p. 399)</td>
<td>Specifies the length of a display unit for the Unicode data.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>NLDATE Function (p. 362)</td>
<td>Converts the SAS date value to the date value of the specified locale by using the date format descriptors.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>NLDATM Function (p. 365)</td>
<td>Converts the SAS datetime value to the time value of the specified locale by using the datetime-format descriptors.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>NLTIME Function (p. 368)</td>
<td>Converts the SAS time or the datetime value to the time value of the specified locale by using the NLTIME descriptors.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>TZONEID Function (p. 385)</td>
<td>Returns the current time zone ID.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>TZONENAME Function (p. 386)</td>
<td>Returns the current standard or daylight savings time, time zone name.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>TZONEOFF Function (p. 388)</td>
<td>Returns the user time zone offset.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>TONES2U Function (p. 389)</td>
<td>Converts a SAS date time value to a UTC date time value.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>TZONEDSTNAME Function (p. 390)</td>
<td>Returns a daylight savings time name.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>TZONEDSTOFF Function (p. 391)</td>
<td>Returns the time zone offset value for the specified daylight savings time.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>TZONESTTNAME Function (p. 392)</td>
<td>Returns a standard time zone name.</td>
</tr>
<tr>
<td></td>
<td>TZONESTTOFF Function (p. 393)</td>
<td>Returns the time zone offset value for the specified standard time.</td>
</tr>
<tr>
<td></td>
<td>TZONEU2S Function (p. 393)</td>
<td>Converts a UTC date time value to a SAS date time value.</td>
</tr>
<tr>
<td>DBCS</td>
<td>KCOMPARE Function (p. 322)</td>
<td>Returns the result of a comparison of character expressions.</td>
</tr>
<tr>
<td></td>
<td>KCOMPRESS Function (p. 323)</td>
<td>Removes specified characters from a character expression.</td>
</tr>
<tr>
<td></td>
<td>KCOUNT Function (p. 324)</td>
<td>Returns the number of double-byte characters in an expression.</td>
</tr>
<tr>
<td></td>
<td>KINDEX Function (p. 326)</td>
<td>Searches a character expression for a string of characters.</td>
</tr>
<tr>
<td></td>
<td>KINDEXB Function (p. 327)</td>
<td>Searches a character expression for a string of characters.</td>
</tr>
<tr>
<td></td>
<td>KINDEXC Function (p. 329)</td>
<td>Searches a character expression for specified characters.</td>
</tr>
<tr>
<td></td>
<td>KINDEXCB Function (p. 330)</td>
<td>Searches a character expression for specified characters.</td>
</tr>
<tr>
<td></td>
<td>KLEFT Function (p. 331)</td>
<td>Left-aligns a character expression by removing unnecessary leading DBCS blanks and SO/SI.</td>
</tr>
<tr>
<td></td>
<td>KLENGTH Function (p. 332)</td>
<td>Returns the length of an argument.</td>
</tr>
<tr>
<td></td>
<td>KLOWCASE Function (p. 333)</td>
<td>Converts all single-width English alphabet letters in an argument to lowercase.</td>
</tr>
<tr>
<td></td>
<td>KPROPCCHAR Function (p. 337)</td>
<td>Converts special characters to normal characters.</td>
</tr>
<tr>
<td></td>
<td>KPROPDATA Function (p. 338)</td>
<td>Removes or converts unprintable characters.</td>
</tr>
<tr>
<td></td>
<td>KREVERSE Function (p. 340)</td>
<td>Reverses a character expression.</td>
</tr>
<tr>
<td></td>
<td>KRIGHT Function (p. 341)</td>
<td>Right-aligns a character expression by trimming trailing DBCS blanks and SO/SI.</td>
</tr>
<tr>
<td></td>
<td>KSCAN Function (p. 342)</td>
<td>Selects a specified word from a character expression.</td>
</tr>
<tr>
<td></td>
<td>KSTRCAT Function (p. 344)</td>
<td>Concatenates two or more character expressions.</td>
</tr>
<tr>
<td></td>
<td>KSUBSTR Function (p. 346)</td>
<td>Extracts a substring from an argument.</td>
</tr>
<tr>
<td></td>
<td>KSUBSTRN Function (p. 347)</td>
<td>Returns a substring, allowing a result with a length of zero.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>KSUBSTRB Function (p. 349)</strong></td>
<td>Extracts a substring from an argument according to the byte position of the substring in the argument.</td>
<td></td>
</tr>
<tr>
<td><strong>KTRANSLATE Function (p. 350)</strong></td>
<td>Replaces specific characters in a character expression.</td>
<td></td>
</tr>
<tr>
<td><strong>KTRIM Function (p. 351)</strong></td>
<td>Removes trailing DBCS blanks and SO/SI from character expressions.</td>
<td></td>
</tr>
<tr>
<td><strong>KTRUNCATE Function (p. 353)</strong></td>
<td>Truncates a string to a specified length in byte unit without breaking multibyte characters.</td>
<td></td>
</tr>
<tr>
<td><strong>KUPCASE Function (p. 354)</strong></td>
<td>Converts all single-width English alphabet letters in an argument to uppercase.</td>
<td></td>
</tr>
<tr>
<td><strong>KUPDATE Function (p. 355)</strong></td>
<td>Inserts, deletes, and replaces character value contents.</td>
<td></td>
</tr>
<tr>
<td><strong>KUPDATEB Function (p. 357)</strong></td>
<td>Inserts, deletes, and replaces the contents of the character value according to the byte position of the character value in the argument.</td>
<td></td>
</tr>
<tr>
<td><strong>KUPDATES Function (p. 358)</strong></td>
<td>Inserts, deletes, and replaces character value contents.</td>
<td></td>
</tr>
<tr>
<td><strong>KVERIFY Function (p. 360)</strong></td>
<td>Returns the position of the first character that is unique to an expression.</td>
<td></td>
</tr>
<tr>
<td><strong>KVERIFYB Function (p. 361)</strong></td>
<td>Returns the position of the first character that is unique to an expression.</td>
<td></td>
</tr>
</tbody>
</table>

**Encoding**

<table>
<thead>
<tr>
<th>Encoding</th>
<th>ENCODCOMPAT Function (p. 315)</th>
<th>Verifies the transcoding compatibility between two encodings.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ENCODISVALID Function (p. 317)</td>
<td>Verifies a valid encoding name.</td>
</tr>
</tbody>
</table>

**Locale**

<table>
<thead>
<tr>
<th>Locale</th>
<th>GETLOCENV Function (p. 317)</th>
<th>Returns the current locale/language environment.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GETPXLANGUAGE Function (p. 318)</td>
<td>Returns the current two-letter language code.</td>
</tr>
<tr>
<td></td>
<td>GETPXLOCALE Function (p. 319)</td>
<td>Returns the POSIX locale value for a SAS locale.</td>
</tr>
<tr>
<td></td>
<td>GETPXREGION Function (p. 321)</td>
<td>Returns the current two-letter region code.</td>
</tr>
<tr>
<td></td>
<td>SASMSG Function (p. 369)</td>
<td>Specifies a message from a data set. The returned message is based on the current locale and a specified key.</td>
</tr>
<tr>
<td></td>
<td>SASMSGL Function (p. 372)</td>
<td>Specifies a message from a data set. The message is based on a specified locale value and a specified key value.</td>
</tr>
<tr>
<td></td>
<td>SORTKEY Function (p. 375)</td>
<td>Creates a linguistic sort key.</td>
</tr>
</tbody>
</table>
Dictionary

ANORM420 Function

Returns a normalized string from an input string encoded in EBCDIC420.

**Category:** Character  
**Restriction:** This function is assigned an I18N Level 1 status. If possible, avoid I18N Level 1 functions if you are using a non-English language. Under certain circumstances, the I18N Level 1 functions might not work correctly with Double-Byte Character Set (DBCS) or Multi-Byte Character Set (MBCS) encodings. For more information, see Internationalization Compatibility on page 279.

**Syntax**

\[ \text{ANORM420}(\text{string},<\text{modifiers}>) \]

**Required Argument**

`string`

specifies an input string that is encoded in EBCDIC420.

**Optional Argument**

`modifiers`

are character constants, variables, or expressions that specify one or more modifiers. The following modifiers can be in uppercase or lowercase:

- `g` ignores the ligature
- `i` ignores the Arabic-Indic numbers
- `p` ignores mapping of shaped characters
- `s` ignores the addition of space
- `t` ignores transcoding
ignores mapping of the zero-length-space character

**Details**

The ANORM420 function processes data that is encoded in EBCDIC420.

Refer to the following tables for information about the modifier variables:

The ANORM420 function replaces the following character and code points with the appropriate ligature unless the modifier \( g \) is specified.

**Table 12.2 Modifier \( g \): Arabic Ligatures**

<table>
<thead>
<tr>
<th>Character</th>
<th>Unicode Value</th>
<th>From</th>
<th>To</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ﾏ</td>
<td>(U+FEF5)</td>
<td>0xB2</td>
<td>0xB1 + 0x47</td>
<td>Arabic Ligature Lam with Aleph with Madda above - Isolated form</td>
</tr>
<tr>
<td>ﾐ</td>
<td>(U+FEF6)</td>
<td>0xB3</td>
<td>0xB1 + 0x47</td>
<td>Arabic Ligature Lam with Aleph with Madda above - Final form</td>
</tr>
<tr>
<td>ﾑ</td>
<td>(U+FEF7)</td>
<td>0xB4</td>
<td>0xB1 + 0x49</td>
<td>Arabic Ligature Lam with Aleph with Hamza above - Isolated form</td>
</tr>
<tr>
<td>ﾒ</td>
<td>(U+FEF8)</td>
<td>0xB5</td>
<td>0xB1 + 0x49</td>
<td>Arabic Ligature Lam with Aleph with Hamza above - Final form</td>
</tr>
<tr>
<td>ﾓ</td>
<td>(U+FEFC)</td>
<td>0xB8</td>
<td>0xB1 + 0x56</td>
<td>Arabic Ligature Lam with Aleph - Isolated form</td>
</tr>
<tr>
<td>ﾔ</td>
<td>(U+FEFD)</td>
<td>0xB9</td>
<td>0xB1 + 0x56</td>
<td>Arabic Ligature Lam with Aleph - Final form</td>
</tr>
</tbody>
</table>

The ANORM420 function remaps the Arabic-Indic numbers to the digit unless the modifier \( i \) is specified and no transcoding occurs.

**Table 12.3 Modifier \( i \): Arabic-Indic Numbers**

<table>
<thead>
<tr>
<th>From</th>
<th>( ) U+0660</th>
<th>﷠ U+0661</th>
<th>﷡ U+0662</th>
<th>﷢ U+0663</th>
<th>﷣ U+0664</th>
<th>﷤ U+0665</th>
<th>﷥ U+0666</th>
<th>﷦ U+0667</th>
<th>﷧ U+0668</th>
<th>﷨ U+0669</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexadecimal</td>
<td>0xDF</td>
<td>0xEA</td>
<td>0xEB</td>
<td>0xED</td>
<td>0xEE</td>
<td>0xEF</td>
<td>0xFB</td>
<td>0xFC</td>
<td>0xFD</td>
<td>0xFE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexadecimal</td>
<td>0xF0</td>
<td>0xF1</td>
<td>0xF2</td>
<td>0xF3</td>
<td>0xF4</td>
<td>0xF5</td>
<td>0xF6</td>
<td>0xF7</td>
<td>0xF8</td>
<td>0xF9</td>
</tr>
</tbody>
</table>
The ANORM420 function remaps the shaped characters to their unshaped equivalent unless the modifier p is specified.

**Table 12.4** Modifier p: Shaped Characters Mapping

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0x43</td>
<td>U+FE7D</td>
<td>0x42</td>
<td>U+0651</td>
</tr>
<tr>
<td>0x48</td>
<td>FE82</td>
<td>0x47</td>
<td>U+0622</td>
</tr>
<tr>
<td>0x51</td>
<td>U+FE84</td>
<td>0x49</td>
<td>U+0623</td>
</tr>
<tr>
<td>0x57</td>
<td>U+FE8E</td>
<td>0x56</td>
<td>U+0627</td>
</tr>
<tr>
<td>0x59</td>
<td>U+FE91</td>
<td>0x58</td>
<td>U+0628</td>
</tr>
<tr>
<td>0x64</td>
<td>U+FE97</td>
<td>0x63</td>
<td>U+062A</td>
</tr>
<tr>
<td>0x66</td>
<td>U+FE9B</td>
<td>0x65</td>
<td>U+062B</td>
</tr>
<tr>
<td>0x68</td>
<td>U+FE9F</td>
<td>0x67</td>
<td>U+062C</td>
</tr>
<tr>
<td>0x70</td>
<td>U+FEA3</td>
<td>0x69</td>
<td>U+062D</td>
</tr>
<tr>
<td>0x72</td>
<td>U+FEA7</td>
<td>0x71</td>
<td>U+062E</td>
</tr>
<tr>
<td>0x78</td>
<td>U+FEB3</td>
<td>0x77</td>
<td>U+0633</td>
</tr>
<tr>
<td>0x8A</td>
<td>U+FEB7</td>
<td>0x80</td>
<td>U+0634</td>
</tr>
<tr>
<td>0x8C</td>
<td>U+FEBB</td>
<td>0x8B</td>
<td>U+0635</td>
</tr>
<tr>
<td>0x8E</td>
<td>U+FEBF</td>
<td>0x8D</td>
<td>U+0636</td>
</tr>
<tr>
<td>0x9B</td>
<td>U+FECA</td>
<td>0x9A</td>
<td>U+0639</td>
</tr>
<tr>
<td>0x9C</td>
<td>U+FECB</td>
<td>0x9A</td>
<td>U+0639</td>
</tr>
<tr>
<td>0x9D</td>
<td>U+FECC</td>
<td>0x9A</td>
<td>U+0639</td>
</tr>
<tr>
<td>0x9F</td>
<td>U+FECE</td>
<td>0x9E</td>
<td>U+063A</td>
</tr>
<tr>
<td>0xA0</td>
<td>U+FECF</td>
<td>0x9E</td>
<td>U+063A</td>
</tr>
<tr>
<td>0xAA</td>
<td>U+FED0</td>
<td>0x9E</td>
<td>U+063A</td>
</tr>
<tr>
<td>0xAC</td>
<td>U+FED3</td>
<td>0xAB</td>
<td>U+0641</td>
</tr>
<tr>
<td>0xAE</td>
<td>U+FED7</td>
<td>0xAD</td>
<td>U+0642</td>
</tr>
<tr>
<td>0xB0</td>
<td>U+FEDB</td>
<td>0xAF</td>
<td>U+0643</td>
</tr>
</tbody>
</table>
The ANORM420 function adds a space after the following characters unless the modifier $s$ is specified.

**Table 12.5** Modifier $s$: ignores the addition of a space

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Modifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xBA</td>
<td>U+FEDF</td>
<td>0xB1</td>
</tr>
<tr>
<td>0xBC</td>
<td>U+FEE3</td>
<td>0xBB</td>
</tr>
<tr>
<td>0xBE</td>
<td>U+FEE7</td>
<td>0xBD</td>
</tr>
<tr>
<td>0xCB</td>
<td>U+FEEB</td>
<td>0xBF</td>
</tr>
<tr>
<td>0xCD</td>
<td>U+FEEC</td>
<td>0xBF</td>
</tr>
<tr>
<td>0xDB</td>
<td>U+FEF0</td>
<td>0xDA</td>
</tr>
<tr>
<td>0xDD</td>
<td>U+FEF2</td>
<td>0xDC</td>
</tr>
<tr>
<td>0xDE</td>
<td>U+FEF3</td>
<td>0xDC</td>
</tr>
</tbody>
</table>

| ب | 0x58 | (U+0628) | Arabic Letter BEH |
| ء | 0x62 | (U+0629) | Arabic Letter TEH MARBUTA |
| ت | 0x63 | (U+062A) | Arabic Letter TEH |
| ث | 0x65 | (U+062B) | Arabic Letter THEH |
| ج | 0x67 | (U+062C) | Arabic Letter JEEM |
| ح | 0x69 | (U+062D) | Arabic Letter HAH |
| خ | 0x71 | (U+062E) | Arabic Letter KHAH |
| س | 0x77 | (U+0633) | Arabic Letter SEEN |
| ش | 0x80 | (U+0634) | Arabic Letter SHEEN |
| ص | 0x8B | (U+0635) | Arabic Letter SAD |
| ض | 0x8D | (U+0636) | Arabic Letter DAD |
| ع | 0x9A | (U+0639) | Arabic Letter AIN |
| غ | 0x9B | (U+FECA) | Arabic Letter AIN final form |
The ANORM420 function transcodes the normalized string to the session encoding unless the modifier \( t \) is specified.

The ANORM420 function remaps the zero-length-break-space character (U+200B), also abbreviated ZWSP, to a space character unless the modifier \( z \) is specified. The zero-length character is located at code position 0x45.

**Example**

The following example demonstrates the ANORM420 function:
### Statements

```
data _null_;  
a = '59CD57BC577745'x  ;  
s1 = anorm420(a) ;  
/* Turn off addition of space and mapping of 
Arabic-Indic numbers */  
s2 = anorm420(a,"si") ;  
/* Turn off transcoding */  
s3 = anorm420(a,'t') ;  
put s1= $hex20. / s2= $hex20. / s3=$hex20.;  
run;  
```

### Results

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>s1</td>
<td>C8E5C7E3C7D320A02020</td>
</tr>
<tr>
<td>s2</td>
<td>C8E5C7E3C7D3A0202020</td>
</tr>
<tr>
<td>s3</td>
<td>59CD57BC577740454040</td>
</tr>
</tbody>
</table>

---

## BASECHAR Function

Converts characters to base characters.

**Categories:**
- Character
- CAS

**Restriction:**
This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see [Internationalization Compatibility on page 279](#).

### Syntax

```
STR=BASECHAR(<instr>,(<Unicode type>))
```

### Required Arguments

- **str**
  - data string that is converted.
- **instr**
  - input data string.

### Unicode type

If one of the following Unicode character formats is specified, national characters are represented in the specified format:

- **ESC** Unicode Escape (u00cd).
- **NCR** Numeric Character Representation (&#x00e5;).
- **PAREN** Unicode Parenthesis Escape (<u00c5>).

### Details

The BASECHAR function reads characters and converts them to base characters. Some characters consist of a base character and one or more accents or combining characters. The BASECHAR function reads the characters in the string and converts them to the base character form without the accents based on Unicode specifications. When Unicode type is specified, national characters are represented in the specified format. For example, the data string Mühlennfließ is converted to Muhlenflie\&#{x00df};.
Example

The following examples demonstrate using the Unicode types:

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: The SAS session encoding is UTF-8. data cities; length name$24 name_utf8$24; input name; name_utf8 = basechar(name); put name_utf8=; cards; Mühlenfließ LaUña ZielonaGóra run;</td>
<td>Note: The BASECHAR function uses Unicode character decomposition mappings, so the sharp s, ß, is valid. <a href="http://www.unicode.org/reports/tr44/#Character_Decomposition_Mappings">http://www.unicode.org/reports/tr44/#Character_Decomposition_Mappings</a> Mühlenfließ LaUna ZielonaGóra</td>
</tr>
</tbody>
</table>

| Note: The SAS session encoding is UTF-8 and the ESC option is specified. data cities; length name$24 name_utf8$80; input name; name_utf8 = basechar(name, "ESC"); put name_utf8=; cards; Mühlenfließ LaUña ZielonaGóra run; | Mühlenfließ\u00df LaUna ZielonaGóra |

| Note: The SAS session encoding is UTF-8 and the NCR option is specified. data cities; length name$24 name_utf8$80; input name; name_utf8 = basechar(name, "NCR"); put name_utf8=; cards; Mühlenfließ LaUña ZielonaGóra run; | Mühlenfließ\x00df LaUna ZielonaGóra |

ENCODCOMPAT Function

Verifies the transcoding compatibility between two encodings.

Category: Encoding

Syntax

ENCODCOMPAT(source1,<source2>)
**Required Arguments**

*source1*

a character string that represents an encoding.

*source2*

a character string that represents an encoding. This argument is optional.

**Details**

If you specify one encoding, the function verifies the compatibility of the specified encoding with the current SAS session encoding.

If you specify two encodings, the function verifies the compatibility of the two encodings.

The function compares two encoding identifiers and determines whether the data needs to be transcoded. *Source1* is the source encoding. *Source2* is the destination encoding. Transcoding 7-bit ASCII to another type of ASCII is compatible, but transcoding ASCII to 7-bit ASCII might not be compatible.

The ENCODCOMPAT function specifies the following values:

-1  *Source1* is not a valid encoding name.

-2  *Source2* is not a valid encoding name.

0   The encodings are not compatible. Transcoding is needed.

1   The encodings are compatible. Transcoding is not needed.

2   A newline character is detected.

**Example**

The following examples demonstrate the ENCODCOMPAT features:

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>/* session encoding is wlatin1 */</td>
<td>-1</td>
</tr>
<tr>
<td>isCompat= EncodCompat(&quot;xyz&quot;);</td>
<td></td>
</tr>
<tr>
<td>put isCompat;</td>
<td></td>
</tr>
<tr>
<td>/* session encoding is wlatin1 */</td>
<td>1</td>
</tr>
<tr>
<td>isCompat= EncodCompat(&quot;cp1252&quot;);</td>
<td></td>
</tr>
<tr>
<td>put isCompat;</td>
<td></td>
</tr>
<tr>
<td>isCompat= EncodCompat(&quot;ebcdic1149&quot;,&quot;open_ed-1149&quot;);</td>
<td>2</td>
</tr>
<tr>
<td>put isCompat;</td>
<td></td>
</tr>
<tr>
<td>isCompat= EncodCompat(&quot;cp1251&quot;,&quot;ebcdic1149&quot;);</td>
<td>0</td>
</tr>
<tr>
<td>put isCompat;</td>
<td></td>
</tr>
</tbody>
</table>
ENCODISVALID Function
Verifies a valid encoding name.

Category: Encoding

Syntax
ENCODISVALID(source)

Required Argument
source
a character string that represents an encoding name.

Details
The ENCODISVALID function returns the following values:

- 0  the character string is not a valid encoding name.
- 1  the character string is a valid short encoding name.
- 2  the character string is a valid long encoding name.
- 3  the character string is a valid alias encoding name.

Example
The following examples demonstrate the ENCODISVALID features:

<table>
<thead>
<tr>
<th>SAS Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>isValid= EncodIsValid(&quot;xyz&quot;);</td>
<td>0</td>
</tr>
<tr>
<td>put isValid;</td>
<td></td>
</tr>
<tr>
<td>isValid= EncodIsValid(&quot;wlt2&quot;);</td>
<td>1</td>
</tr>
<tr>
<td>put isValid;</td>
<td></td>
</tr>
<tr>
<td>isValid= EncodIsValid(&quot;wlatin2&quot;);</td>
<td>2</td>
</tr>
<tr>
<td>put isValid;</td>
<td></td>
</tr>
<tr>
<td>isValid= EncodIsValid(&quot;cp1250&quot;);</td>
<td>3</td>
</tr>
<tr>
<td>put isValid;</td>
<td></td>
</tr>
</tbody>
</table>

GETLOCENV Function
Returns the current locale/language environment.

Category: Locale
Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Syntax

GETLOCENV()

Details

The GETLOCENV function returns the locale/language environment value for a valid SAS locale. The following environment values are possible:

SBCS
The SAS session encoding is SBCS (Single-Byte Character Set). SASWZSD is loaded for string manipulation.

DBCS
The SAS session encoding is DBCS (Double-Byte Character Set). SASWZSD is loaded for string manipulation.

MBCS
The SAS session encoding is Unicode(UTF8). SASWZSU is loaded for string manipulation.

If you receive a blank value, then the WZSS subsystem is not available. This action suggests a configuration or installation error.

Example

In the following example, the LOCALE= system option is set to French_France.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>option locale=french_france;</td>
<td></td>
</tr>
<tr>
<td>environ=getlocenv();</td>
<td>SBCS</td>
</tr>
<tr>
<td>put environ;</td>
<td></td>
</tr>
</tbody>
</table>

GETPXLANGUAGE Function

Returns the current two-letter language code.

Category: Locale

Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Syntax

GETPXLANGUAGE()
Details
The GETPXLANGUAGE function returns the two-letter language code based on the current value of the LOCALE= SAS system option. The length of the language name is two characters. If the size of the variable that receives the value is less than two characters, the value is truncated.

Example
In the first example, the LOCALE= system option is set to French_France. The second example is set to German. The third example is set to English_United States.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
| option locale=french_france;  
lang=getpxLanguage();  
put lang; | fr |
| option locale=German;  
lang=getpxLanguage();  
put lang; | de |
| option locale=en_US;  
lang=getpxLanguage();  
put lang; | en |

See Also
System Options:
- “LOCALE System Option” on page 552

Functions:
- “GETPXREGION Function” on page 321
- “GETPXLOCALE Function” on page 319

GETPXLOCALE Function
Returns the POSIX locale value for a SAS locale.

Category: Locale
Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.
Syntax

GETPXLOCALE(<source>)

Required Argument

<source>

is an optional argument that specifies a locale name.

Details

The GETPXLOCALE function returns the POSIX locale value for a valid SAS locale name. If you specify an invalid locale name, then a null string is returned. If you do not specify a value for the <source> argument, then the function returns the POSIX name for the current SAS session. The length of the POSIX locale name is five characters. If the size of the variable that receives the value is less than five characters, the value is truncated.

Example

In the first example, the LOCALE= system option is set to French_France. In the second example, the <source> argument is set to German_Germany. In the third example, the <source> argument is set to English_United States.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>option locale=french_france; locale=getpxLocale(); put locale;</td>
<td>fr_FR</td>
</tr>
<tr>
<td>locale=getpxLocale(&quot;german_germany&quot;); put locale;</td>
<td>de_DE</td>
</tr>
<tr>
<td>locale=getpxLocale(&quot;english_unitedstates&quot;); put locale;</td>
<td>en_US</td>
</tr>
</tbody>
</table>

See Also

System Options:

- “LOCALE System Option” on page 552

Functions:

- “GETPXLANGUAGE Function” on page 318
- “GETPXREGION Function” on page 321
GETPXREGION Function

Returns the current two-letter region code.

**Category:** Locale

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Syntax**

GETPXREGION()

**Details**

The GETPXREGION function returns the two-letter region code based on the current LOCALE= SAS system option. The length of the region name is two characters. If the size of the variable that receives the value is less than two characters, the value is truncated.

**Example**

In the first example the LOCALE= system option is set to French_France. The second example is set to German. The third example is set to English_United States.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>option locale=french_france;</td>
<td>FR</td>
</tr>
<tr>
<td>region=getpxRegion();</td>
<td></td>
</tr>
<tr>
<td>put region;</td>
<td></td>
</tr>
<tr>
<td>option locale=German;</td>
<td>DE</td>
</tr>
<tr>
<td>region=getpxRegion();</td>
<td></td>
</tr>
<tr>
<td>put region;</td>
<td></td>
</tr>
<tr>
<td>option locale=en_US;</td>
<td>US</td>
</tr>
<tr>
<td>region=getpxRegion();</td>
<td></td>
</tr>
<tr>
<td>put region;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

**System Options:**

- “LOCALE System Option” on page 552

**Functions:**

- “GETPXLOCALE Function” on page 319
KCOMPARE Function

Returns the result of a comparison of character expressions.

**Category:** DBCS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Tip:** Non-DBCS equivalent function is the “COMPARE Function” in SAS Viya Functions and CALL Routines: Reference.

**Syntax**

\[
\text{KCOMPARE}(\text{source,}\langle \text{pos,} <\text{count,}> \rangle \text{findstr})
\]

**Required Arguments**

- **source**
  - specifies the character expression to be compared.

- **pos**
  - specifies the starting position in source to begin the comparison. If pos is omitted, the entire source is compared. If pos is less than 0, source is assumed as extended DBCS data that does not contain any SO/SI characters.

- **count**
  - specifies the number of bytes to compare. If count is omitted, all of source that follows pos is compared, except for any trailing blanks.

- **findstr**
  - specifies the character expression to compare to source.

**Details**

KCOMPARE returns values as follows:

- a negative value if source is less than findstr
- 0 if source is equal to findstr
- a positive value if source is greater than findstr

**Example**

The following example uses Japanese characters.
Statements

options pageno=1 nodate ls=80 ps=60;

data test;
  rc1 = kcompare('漢字のテスト', '漢字');
  rc2 = kcompare('漢字のテスト', 'テスト');
  rc3 = kcompare('漢字のテスト', '1,8', '漢字');
  rc4 = kcompare('漢字のテスト', 'ABC');
  rc5 = kcompare('ABCDEF', 'ABC');
run;

proc print data=test; run;

---

KCOMPRESS Function

Removes specified characters from a character expression.

**Categories:**
- DBCS
- CAS

**Restriction:**
This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:**
This function supports the varchar type.

**Tip:**
Non-DBCS equivalent function is COMPRESS in SAS Viya Functions and CALL Routines: Reference.

**Syntax**

KCOMPRESS(source,<characters-to-remove> )

**Required Arguments**

*source*

specifies a character expression that contains the characters to be removed. When only *source* is specified, KCOMPRESS returns this expression with all of the single and double-byte blanks removed.

*characters-to-remove*

specifies the character or characters that KCOMPRESS removes from the character. If characters-to-remove is omitted, KCOMPRESS removes all blanks.expression.

**Tip**
Enclose a literal string of characters in quotation marks.

**Example**

The following example uses Japanese characters.
KCOUNT Function

Returns the number of double-byte characters in an expression.

**Categories:**
- DBCS
- CAS

**Restriction:**
This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:**
This function supports the varchar type.

**Syntax**

```
KCOUNT(source)
```

**Required Argument**

`source`

specifies the character expression to count.

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

**Example**

The following example uses Japanese characters.

```
data _null_; 
  result=kcompress('漢字のテスト','');
  put result=;
run;
```
KCVT Function

Converts data from one type of encoding data to another type of encoding data.

**Category:** Character

**Restriction:** This function is assigned an I18N Level 1 status. If possible, avoid I18N Level 1 functions if you are using a non-English language. Under certain circumstances, the I18N Level 1 functions might not work correctly with Double-Byte Character Set (DBCS) or Multi-Byte Character Set (MBCS) encodings. For more information, see Internationalization Compatibility on page 279.

**Syntax**

\[
\text{KCVT}(\text{text, intype, outtype, <options,...> })
\]

**Required Arguments**

- **text** specifies the character variable to be converted.
- **intype** specifies the encoding of the data. The encoding of the text must match the input data's encoding. For valid values, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.
  
ASCIIANY and EBCIDICANY are invalid encoding values.
- **outtype** specifies the encoding to be converted into character data. For valid values, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.
  
ASCIIANY and EBCIDICANY are invalid encoding values.
- **options** specifies character data options. Here are the available options:
  
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOSOSI</td>
<td>No shift code or Hankaku characters.</td>
</tr>
<tr>
<td>NOSHIFT</td>
<td>Replaces character data by conversion. The INPLACE option is specified to secure the same location between different hosts whose lengths of character data are not identical. For example, the INPLACE option converts data from the host that requires Shift-Codes into the other host,</td>
</tr>
<tr>
<td>INPLACE</td>
<td></td>
</tr>
</tbody>
</table>

```plaintext
data _null_;
    text='abcあいう';
    result=kcount(text);
    put result=;
run;
```
which does not require Shift Codes. Truncation occurs when the length of the character data that is converted into outtype for Shift-Codes is longer than the length that is specified in intype.

KANA
Includes Hankaku katakana characters in columns of character data.

UPCASE
Converts a 2-byte alphabet to uppercase characters.

LOWCASE
Converts a 2-byte alphabet to lowercase characters.

KATA2HIRA
Converts katakana data to hiragana.

HIRA2KATA
Converts hiragana data to katakana.

Details
See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KCVT function converts SBCS, DBCS, and MBCS character strings into encoding data. For example, the KCVT function can convert the following: ASCII code data to UCS2 encoding data, Greek code data to UTF-8, and Japanese SJIS code data to another Japanese code data. You can specify the following types for the INTYPE and OUTTYPE options: UCS2, UCS2L, UCS2B, and UTF8. To enable the DBCS mode, specify the DBCS option in the configuration file or from the command line.

If the KCVT function returns a value to a variable that has not yet been assigned a length, by default the variable is assigned a length of 200.

Example
The following code converts IBM PC codes into DEC codes for the external text file specified as my-input-file and writes the results in OUTDD.

```sas
data _null_;
  infile 'my-input-file';
  file outdd noprint;
  input @1 text $char80.;
  text = kcvt(text, 'pcibm', 'dec');
  put @1 text $char80.;
run;
```

KINDEX Function
Searches a character expression for a string of characters.

Categories: DBCS
CAS

Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Note: This function supports the varchar type.

Tip: Non-DBCS equivalent function is INDEX in SAS Viya Functions and CALL Routines: Reference
Syntax

KINDEX(source, excerpt)

Required Arguments

source
   specifies the character expression to search.

excerpt
   specifies the string of characters to search for in the character expression.

Tip  Enclose a literal string of characters in quotation marks.

Details

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KINDEX function searches source, from left to right, for the first occurrence of the string that is specified in excerpt, and returns the position in source of the string's first character. If the string is not found in source, KINDEX returns a value of 0. If there are multiple occurrences of the string, KINDEX returns only the position of the first occurrence.

Example

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td></td>
</tr>
<tr>
<td>text='漢字文字列の検索';</td>
<td>result=7</td>
</tr>
<tr>
<td>result=kindex(text,'検索');</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td>result=0</td>
</tr>
<tr>
<td>text2='探す';</td>
<td></td>
</tr>
<tr>
<td>result=kindex(text,text2);</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Functions:

- “KINDEXC Function” on page 329

KINDEXB Function

Searches a character expression for a string of characters.
Syntax

KINDEXB(source, excerpt)

Required Arguments

source
  specifies the character expression to search for.

excerpt
  specifies the string of characters to search for in the character expression.

TIP  Enclose a literal string of characters in quotation marks.

Details

The KINDEXB function searches source, from left to right, for the first occurrence of the string that is specified in excerpt and returns the string’s first character position in source. If the string is not found in source, KINDEXB returns a value of 0. If there are multiple occurrences of the string, KINDEXB returns only the position of the first occurrence.

Comparisons

KINDEXB returns byte-based values. KINDEX returns character-based values. Most Latin characters are 2 bytes wide and CJK characters are 3 bytes wide, that makes these functions return different results.

The KINDEXCB function searches for the first occurrence of any individual character that is present within the character string. The KINDEXB function searches for the first occurrence of the character string as a pattern.

Example

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data null;</td>
<td></td>
</tr>
<tr>
<td>text='漢字文字列の検索'; result=kindexb(text, '検索');</td>
<td>Result=19</td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>text2='探す';</td>
<td>Result=0</td>
</tr>
<tr>
<td>result=kindexb(text, text2);</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>
KINDEXC Function

Searches a character expression for specified characters.

**Categories:**
- DBCS
- CAS

**Restriction:**
This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:**
This function supports the varchar type.

**Tip:**
The Non-DBCS equivalent function is “INDEXC Function” in SAS Viya Functions and CALL Routines: Reference

---

**Syntax**

KINDEXC(source, excerpt-1, ...excerpt-n)

**Required Arguments**

- **source**
  Specifies the character expression to search for.

- **excerpt-1, ...excerpt-n**
  Specifies the characters to search for in the character expression.

**Tips**
If you specify more than one excerpt, separate them with a comma.

Enclose a literal string of characters in quotation marks.

---

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KINDEXC function searches `source`, from left to right, for the first occurrence of any character present in the excerpts and returns the position in `source` of that character. If none of the characters in `excerpt-1` through `excerpt-n` in `source` are found, KINDEXC returns a value of 0.

**Comparisons**

The KINDEXC function searches for the first occurrence of any individual character that is present within the character string, whereas the KINDEX function searches for the first occurrence of the character string as a pattern.

---

**Example**

The following example uses Japanese characters.
KINDEXCB Function

Searches a character expression for specified characters.

**Category:** DBCS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Syntax**

KINDEXCB(source, excerpt-1, ...excerpt-n)

**Required Arguments**

*source*

specifies the character expression to search for.

*excerpt-1, ...excerpt-n*

specifies the characters to search for in the character expression.

**Tips**

If you specify more than one excerpt, separate them with a comma.

Enclose a literal string of characters in quotation marks.

**Details**

The KINDEXCB function searches the data in *source*, from left to right, for the first occurrence of any character in the excerpts’ arguments and returns the position in *source* of that character. If none of the characters in *excerpt-1* through *excerpt-n* in *source* are found, KINDEXCB returns a value of 0.

```plaintext
data _null_;
a=’A B C. def (漢字123456)’;
result=kindexc(a,’1234567890’,’感漠’);
put result=;
run;
```

**See Also**

**Function:**

- “KINDEX Function” on page 326
Comparisons

KINDEXCB returns byte-based values. KINDEXC returns character-based values. Most Latin characters are 2 bytes wide and CJK characters are 3 bytes wide, that makes these functions return different results.

The KINDEXCB function searches for the first occurrence of any individual character that is present within the character string, whereas the KINDEXB function searches for the first occurrence of the character string as a pattern.

Example

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>Result=19</td>
</tr>
<tr>
<td>a=’ＡＢＣ‘;</td>
<td></td>
</tr>
<tr>
<td>def (漢字123456)’;</td>
<td></td>
</tr>
<tr>
<td>result=kindexb(a, ’1234567890’, ’感漢’);</td>
<td></td>
</tr>
<tr>
<td>cut result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

KLEFT Function

Left-aligns a character expression by removing unnecessary leading DBCS blanks and SO/SI.

**Categories:** DBCS  
CAS  

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:** This function supports the varchar type.

**Tip:** Non-DBCS equivalent function is LEFT in SAS Viya Functions and CALL Routines: Reference.

**Syntax**

KLEFT(*argument*)

**Required Argument**

*argument*  
specifies any SAS character expression.

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

KLEFT returns an argument and removes the leading blanks.
Example

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td></td>
</tr>
<tr>
<td>a='漢字のテスト';</td>
<td></td>
</tr>
<tr>
<td>b=kleft(a);</td>
<td>漢字のテスト</td>
</tr>
<tr>
<td>put '-------1-------2-----';</td>
<td></td>
</tr>
<tr>
<td>put a $25.;</td>
<td></td>
</tr>
<tr>
<td>put b $25.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Functions:
- “KCOMPRESS Function” on page 323
- “KRIGHT Function” on page 341
- “KTRIM Function” on page 351

KLENGTH Function

Returns the length of an argument.

Categories: DBCS, CAS

Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Note: This function supports the varchar type.

Tip: Non-DBCS equivalent function is LENGTH in SAS Viya Functions and CALL Routines: Reference.

Syntax

KLENGTH(argument)

Required Argument

argument

specifies any SAS expression.

Details

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.
The KLENGTH function returns an integer that represents the position of the rightmost non-blank character in the argument. If the value of the argument is missing, KLENGTH returns a value of 0. If the argument is an uninitialized numeric variable, KLENGTH returns a value of 12 and prints a note in the SAS log that the numeric values have been converted to character values.

If you are using SBCS EnglishVARCHAR data, performance issues might occur. To improve the performance, use the following code with non-K functions.

This code improves performance and the results reflect the KLENGTH function’s behavior.

```sas
len = LENGTHC(TRIMN(x));
```

This code improves performance and the results reflect the LENGTH function’s behavior.

```sas
len = LENGTHC(TRIMN(x));
   if NOT len then len = 1;
```

**Example**

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>result=6</td>
</tr>
<tr>
<td>text='あはいう';</td>
<td></td>
</tr>
<tr>
<td>result=klength(text);</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**KLOWCASE Function**

Converts all single-width English alphabet letters in an argument to lowercase.

**Categories:** DBCS, CAS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:** This function supports the varchar type.

**Tip:** Non-DBCS equivalent function is LOWCASE in SAS Viya Functions and CALL Routines: Reference.

**Syntax**

KLOWCASE(argument)
**Required Argument**

*argument*

specifies any SAS character expression.

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KLOWCASE function copies a character argument, converts all uppercase single-width English alphabet letters to lowercase letters, and returns the altered value as a result.

**Example**

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>result=abcあいうえお</td>
</tr>
<tr>
<td>result=klowcase('ABCあいうえお');</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

---

**KPROPCLASS Function**

Converts Chinese, Japanese, Korean, Taiwanese (CJKT) characters.

**Category:** DBCS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Syntax**

\[str = \text{KPROPCLASS}(<instr>, (<options>))\]

**Required Arguments**

*str*

data string that has been converted and is in the current SAS session encoding.

*instr*

input data string.

*options*

converts Japanese, Chinese, Korean, and Taiwanese characters based on specified options.
HALF-KATAKANA, FULL-KATAKANA
This option converts half-width katakana to full-width katakana and is used only with Japanese encoding.

Restriction  This option cannot be used at the same time with the full-Katakana, half-Katakana option.

FULL-KATAKANA, HALF-KATAKANA
This option converts full-width katakana to half-width katakana and is used only with Japanese encoding.

Restriction  This option cannot be used at the same time with the half-Katakana, full-Katakana option.

KATAKANA, ROMAJI
This option converts the katakana character string to a romaji character string and is used only with Japanese encoding.

Restriction  This option cannot be used at the same time with the romaji, katakana option.

ROMAJI, KATAKANA
This option converts the romaji character string to a katakana character string and is used only with Japanese encoding.

Restriction  This option cannot be used at the same time with the katakana, romaji option.

FULL-ALPHABET, HALF-ALPHABET
This option converts the Full-Alphabet characters to Half-Alphabet characters and is used only with Japanese, Chinese, Korean, and Taiwanese encoding.

Restriction  This option cannot be used at the same time with the Half-Alphabet, Full-Alphabet option.

HALF-ALPHABET, FULL-ALPHABET
This option converts the Half-Alphabet characters to Full-Alphabet characters and is used only with Japanese, Chinese, Korean, and Taiwanese encoding.

Restriction  This option cannot be used at the same time with the Full-Alphabet, Half-Alphabet option.

LOWERCASE, UPPERCASE
This option converts lowercase alphabet characters to uppercase alphabet characters.

Restriction  This option cannot be used at the same time with the Uppercase, Lowercase option.

UPPERCASE, LOWERCASE
This option converts uppercase alphabet characters to lowercase alphabet characters.

Restriction  This option cannot be used at the same time with the Lowercase, Uppercase option.

PROPER
This option specifies the following default options based on the encoding:
• Japanese encoding
• Half-Katakana, Full-Katakana
• Full-alphabet, Half-alphabet
• Lowercase, Uppercase
• Korean encoding:
  • Full-alphabet, Half-alphabet
• Chinese encoding:
  • Full-alphabet, Half-alphabet
• Taiwanese encoding:
  • Full-alphabet, Half-alphabet

Details
See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

This function converts the input string based on the specified options and default options. The KPROPCASE function supports the Chinese, Japanese, Korean, Taiwanese (CJKT) environment.

Example
The following example demonstrates the functionality of the KPROPCASE function:

```sas
length fullkana halfkana upper lower fullalpha $ 200;
length str1 str2 str3 str4 str5 str7 str8 $ 30 str6 $44;
lower = 'do-naxtutsu';  /* Doughnuts in Japanese Roman word. */
upper = 'DO-NAXTUTSU';  /* Doughnuts in Japanese Roman word. */
fullkana = unicode('\u30C9\u30FC\u30CA\u30C3\u30C4');
halfkana = unicode('\uFF84\uFF9E\uFF70\uFF85\uFF6F\uFF82');
fullalpha = unicode('\uFF24\uFF2F\uFF0D\uFF2E\uFF21\uFF38\uFF34\uFF35\uFF33\uFF35');
str1 = kpropcase(fullkana, 'full-katakana, half-katakana');
if (halfkana EQ trim(str1)) then
  put str1= $hex14.;
str2 = kpropcase(halfkana, 'half-katakana, full-katakana');
if (fullkana EQ trim(str2)) then
  put str2= $hex22.;
str3 = kpropcase(fullkana, 'katakana, romaji');
if (trim(str3) EQ upper) then
  put str3= ;
str4 = kpropcase(upper, 'romaji, katakana');
if (trim(str4) EQ fullkana) then
  put str4= $hex22.;
str5 = kpropcase(fullalpha, 'full-alphabet, half-alphabet');
if (trim(upper) EQ str5) then
  put str5=;
str6 = kpropcase(upper, 'half-alphabet, full-alphabet');
if (trim(str6) EQ fullalpha) then
  put str6= $hex46.;
str7 = kpropcase(lower, 'lowercase, uppercase');
if (trim(str7) EQ upper) then
  put str7=;
```
KPROPCHAR Function

Converts special characters to normal characters.

**Category:** DBCS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Syntax**

```plaintext
str=KPROPCHAR(<instr>)
```

**Required Arguments**

- **str**
  - result string. Special characters are converted to normal characters.

- **instr**
  - input data string.

**Details**

This function converts special characters to normal characters. The KPROPCHAR function converts the characters from the following ranges:

- Enclosed alphanumeric values: \u2460 to \u24FF. See http://www.unicode.org/charts/PDF/U2460.pdf.
- Dingbats: \u2776 to \u2793. See http://www.unicode.org/charts/PDF/U2700.pdf.
- Enclosed CJK letters and months: \u3200 to \u32FF. See http://www.unicode.org/charts/PDF/U3200.pdf.

**Example**

The following example demonstrates the functionality of the KPROPCHAR function. These examples are processed in a UTF8 SAS session:

```plaintext
length ini out1 $30;
```
KPROPDATA Function

Removes or converts unprintable characters.

**Category:** DBCS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Syntax**

\[
str = \text{KPROPDATA}(\text{<instr>}, \text{<options>}, \text{<input encode name>}, \text{<output encode name>})
\]

**Required Arguments**

- **str**
  - data string that has been converted and is in session encoding.

- **instr**
  - input data string.

- **options**
  - specifies instructions on processing unprintable characters:
UESC
   Converts unprintable characters using a Unicode escaped string (for example, \u0000\u1234).

TRIM
   Removes unprintable characters. No replacement character is used.

BLANK or ''
   Replaces each unprintable character with a single-byte blank.

QUESTION or '?'
   Replaces unprintable characters with a single-byte '?'.

HEX
   Replaces unprintable characters with a hexadecimal representation (for example, 0x810x82).

TRUNCATE or TRUNC
   Truncates the data string when the first unprintable character is encountered.

REMOVE
   Removes the data string if any unprintable characters are found.

NCR
   Encodes the unprintable characters using NCR representation if the code is available in Unicode.

input encode name
   specifies the input data's encoding name if necessary. If the input encode name is not specified, then the KPROPDATA function processes the data as the current SAS session encoded string. For information about SAS encoding names, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.

output encode name
   specifies the output data's encoding name. If the encoding name is not specified, the KPROPDATA function recognizes the output as the current SAS session encoding. For information about SAS encoding names, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.

Details
   This function converts the input data string to the current SAS session encoding and removes or replaces unprintable characters based on the options.

Example
   The following example demonstrates the functionality of the KPROPDATA function:

   length instr $12;
   length str1 str2 str3 str4 str5 str6 str7 str8 str9 str10$ 50;
   instr = "534153"x||"ae"x || " System";
   put instr;
   str1 = kpropdata(instr);
   put str1= +2 str1= $hex26.;
   str2 = kpropdata(instr,'UESC');
   put str2= +2 str2= $hex26.;
   str3 = kpropdata(instr, 'UESC','wlatin1');
   put str3= +2 str3= $hex34.;
   str4 = kpropdata(instr,'TRIM','wlatin1');
   put str4= +2 str4= $hex26.;
   str5 = kpropdata(instr,'BLANK', 'wlatin1');
KREVERSE Function

Reverses a character expression.

Categories:  
- DBCS
- CAS

Restriction:  
This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Note:  
This function supports the varchar type.

Tip:  
Non-DBCS equivalent function is REVERSE in SAS Viya Functions and CALL Routines: Reference.

Syntax

KREVERSE(argument)

Required Argument

argument  
specifies any SAS character expression.

Details

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.
Example

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>result=テストの字漢</td>
</tr>
<tr>
<td>result=kreverse('漢字のテスト');</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

KRIGHT Function

Right-aligns a character expression by trimming trailing DBCS blanks and SO/SI.

Categories: DBCS
CAS

Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Note: This function supports the varchar type.

Tip: See “RIGHT Function” in SAS Viya Functions and CALL Routines: Reference.

Syntax

KRIGHT(argument)

Required Argument

argument

specifies any SAS character expression.

Details

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KRIGHT function returns an argument with trailing blanks moved to the start of the value. The argument's length does not change.

Example

The following example uses Japanese characters.
KSCAN Function

Selects a specified word from a character expression.

**Categories:**
- DBCS
- CAS

**Restriction:**
This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:**
This function supports the varchar type.

**Tip:**
Non-DBCS equivalent function is SCAN in SAS Viya Functions and CALL Routines: Reference.

**Syntax**

\[ \text{KSCAN}(\text{argument}, n, \text{delimiters}) \]

**Required Arguments**

- \(\text{argument}\)
  - specifies any character expression.

- \(n\)
  - specifies a numeric expression that produces the number of the word in the character expression that you want KSCAN to select.

**Tip**
If \(n\) is negative, KSCAN selects the word in the character expression starting from the end of the string. If \(|n|\) is greater than the number of words in the character expression, KSCAN returns a blank value.

---

Statements

```plaintext
data null;
  a=’漢字のテスト’;
b=kright(a);
put ’-----|-----|2-----’;
put a $25.;
put b $25.;
run;
```

---

See Also

**Functions:**

- “KCOMPRESS Function” on page 323
- “KLEFT Function” on page 331
- “KTRIM Function” on page 351

---

Chapter 12 • Dictionary of NLS Functions
**delimiters**

specifies a character variable that produces characters that you want KSCAN to use as word separators in the character expression.

**Defaults**

If you omit **delimiters** in an ASCII environment, SAS uses `blank . < ( + & ! $ * ) ; ^ _ / , % |` in ASCII environments without the ^ character, KSCAN uses the ~ character instead.

If you omit **delimiters** on an EBCDIC environment, SAS uses `blank . < ( + | & ! $ * ) ; ¬ _ / , % | ¢`.

**Tip**

If you represent **delimiters** as a constant, enclose **delimiters** in quotation marks.

---

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

Leading delimiters before the first word in the character string do not effect KSCAN. If there are two or more contiguous delimiters, KSCAN treats them as one.

---

**Example**

The following example uses Japanese characters.

```sas
data _null_;
  length x $20 y $20;
  text1='これは漢字関数のテストです。';
  x='norblank';
  i=1;
  do until(x=' ');
    x=kscan(text1,i,'はの');
    put x=;
    i=i+1;
  end;
  y='norblank';
  i=-1;
  do until(y=' ');
    y=kscan(text1,i,'はの');
    put y=;
    i=i-1;
  end;
run;
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x=これ</td>
</tr>
<tr>
<td></td>
<td>x=漢字関数</td>
</tr>
<tr>
<td></td>
<td>x=テストです。</td>
</tr>
<tr>
<td></td>
<td>x=</td>
</tr>
<tr>
<td></td>
<td>y=テストです。</td>
</tr>
<tr>
<td></td>
<td>y=漢字関数</td>
</tr>
<tr>
<td></td>
<td>y=これ</td>
</tr>
<tr>
<td></td>
<td>y=</td>
</tr>
</tbody>
</table>
**KSTRCAT Function**

Concatenates two or more character expressions.

**Categories:** DBCS, CAS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:** This function supports the varchar type.

**Tip:** Non-DBCS equivalent function is CAT in SAS Viya Functions and CALL Routines: Reference.

---

**Syntax**

\[
\text{KSTRCAT} (\text{argument-1}, \text{argument-2}, \ldots, \text{argument-n})
\]

**Required Argument**

\[
\text{argument}
\]

specifies any single-byte or double-byte character expression.

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

If the KSTRCAT function returns a value to a variable that has not yet been assigned a length, by default the variable is assigned a length of 200.

**Example**

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>result = 漢字文字列の連結</td>
</tr>
<tr>
<td>text1 = '漢字';</td>
<td></td>
</tr>
<tr>
<td>text2 = '文字列';</td>
<td></td>
</tr>
<tr>
<td>text3 = '連結';</td>
<td></td>
</tr>
<tr>
<td>result = kstrcat(text1, text2, 'の', text3);</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>
KSTRIP Function

Removes leading and trailing blanks from a character string.

**Categories:** Character

**CAS**

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:** This function supports the varchar type.

---

**Syntax**

KSTRIP(*string*)

**Required Argument**

*string* specifies a character constant, variable, or expression.

**Details**

The KSTRIP function returns the argument with all leading and trailing SBCS blanks removed. If the argument is blank, KSTRIP returns a string with a length of zero.

Assigning the results of KSTRIP to a variable does not affect the length of the receiving variable. If the value that is trimmed is shorter than the length of the receiving variable, SAS pads the value with new trailing blanks.

In a DATA step, if the KSTRIP function returns a value to a variable that has not previously been assigned a length, then that variable is given the length of the argument.

**Comparisons**

The KSTRIP and STRIP functions return a string with a length of zero, for strings that are blank, and the TRIM function returns a single blank.

The KSTRIP and STRIP functions truncate the output if the receiving variable length is less than the input string. The STRIP function processes only SBCS string truncation. The KSTRIP function processes SBCS and DBCS data.

KSTRIP and STRIP functions are used for data normalization purposes. The KSTRIP function should be used in a DBCS environment. The KSTRIP and STRIP functions have similar performance actions.

**Example**

The following example shows how the KSTRIP function deletes leading and trailing blanks, and how the DBCS character is truncated. This example uses the Japanese Shift_JIS encoding,
### KSUBSTR Function

Extracts a substring from an argument.

**Categories:**
- DBCS
- CAS

**Restriction:**
This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see [Internationalization Compatibility on page 279](#).

**Note:**
This function supports the varchar type.

**Tip:**
See “SUBSTR (left of =) Function” in *SAS Viya Functions and CALL Routines: Reference*.

**Syntax**

\[
\text{KSUBSTR}(\text{argument}, \text{position}<\text{n}>)
\]

**Required Arguments**

- **argument**
  - specifies any SAS character expression.

- **position**
  - specifies a numeric expression that is the beginning character position.

- **n**
  - specifies a numeric expression that is the length of the substring to extract.

---

### See Also

**Function**

- “STRIP Function” in *SAS Viya Functions and CALL Routines: Reference*
Interaction

If \( n \) is larger than the length of the expression that remains in `argument` after `position`, SAS extracts the remainder of the expression.

Tip

If you omit \( n \), SAS extracts the remainder of the expression.

Details

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KSUBSTR function returns a portion of an expression that you specify in `argument`. The portion begins with the character specified by `position` and is the number of characters specified by \( n \).

A variable that is created by KSUBSTR obtains its length from the length of `argument`.

Example

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>Result=漢字文</td>
</tr>
<tr>
<td>text='漢字文字列の抽出';</td>
<td>Result=字文</td>
</tr>
<tr>
<td>result=ksubstr(text,1,2);</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>result=ksubstr(text,3,4);</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>kstart=7;</td>
<td></td>
</tr>
<tr>
<td>klen=2;</td>
<td></td>
</tr>
<tr>
<td>result=ksubstr(text,kstart,klen);</td>
<td></td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Function:

- “KSUBSTRB Function” on page 349
- “KUPDATE Function” on page 355
- “KUPDATESB Function” on page 357
- “KUPDATES Function” on page 358

KSUBSTRN Function

Returns a substring, allowing a result with a length of zero.

Category: DBCS
Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8).

Note: This function supports the varchar type.

See: “SUBSTRN Function” in SAS Viya Functions and CALL Routines: Reference and “Internationalization Compatibility for SAS String Functions” on page 279 for more information.

Syntax

KSUBSTRN(string, position<,length>)

Required Arguments

string

specifies a character or numeric constant, variable, or expression.

If string is numeric, then it is converted to a character value that uses the BEST32 format. Leading and trailing blanks are removed, and no message is sent to the SAS log.

position

is an integer that specifies the position of the first character in the substring.

Optional Argument

length

is an integer that specifies the length of the substring. If you do not specify length, the KSUBSTRN function returns the substring that extends from the position that you specify to the end of the string.

Details

The functionality of KSUBTRN is similar to SUBSTRN. The difference is that if the first parameter is numeric, SUBSTRN’s output length is 8, and KSUBSTRN's output length is 200.

Example

This example shows the different functionality between the functions KSUBSTR and KSUBSTRN.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td></td>
</tr>
<tr>
<td>ksubstr_result = &quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>put ksubstr_result=;</td>
<td>ksubstr_result=<em>234.56</em></td>
</tr>
<tr>
<td>ksubstrn_result = &quot;&quot;</td>
<td></td>
</tr>
<tr>
<td>put ksubstrn_result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>
KSUBSTRB Function

Extracts a substring from an argument according to the byte position of the substring in the argument.

**Category**: DBCS

**Restriction**: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

### Syntax

\[
\text{KSUBSTRB}(\text{argument, position,<n>})
\]

### Required Arguments

- **argument**: specifies any SAS character expression.
- **position**: specifies the beginning character position in byte units.
- **n**: specifies the length of the substring to extract in byte units.

**Interaction**

If \( n \) is larger than the length (in byte units) of the expression that remains in \( \text{argument} \) after \( \text{position} \), SAS extracts the remainder of the expression.

**Tip**

If you omit \( n \), SAS extracts the remainder of the expression.

### Details

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KSUBSTRB function returns a portion of an expression that you specify in \( \text{argument} \). The portion begins with the byte unit specified by \( \text{position} \) and is the number of byte units specified by \( n \).

A variable that is created by KSUBSTRB obtains its length from the length of \( \text{argument} \).

### Example

The following example uses Japanese characters.
KTRANSLATE Function

Replaces specific characters in a character expression.

Categories: DBCS  
            CAS

Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

z/OS specifics: This function runs only on z/OS.
Uses the EBCDIC code sequence.

Note: This function supports the VARCHAR type.

Tip: Non-DBCS equivalent function is TRANSLATE in SAS Viya Functions and CALL Routines: Reference.

Syntax

KTRANSLATE(source,to-1,from-1<,…,to-n,from-n>)

Required Arguments

*source*  
  specifies the SAS expression that contains the original character value.

*to*  
  specifies the characters that you want KTRANSLATE to use as substitutes.

*from*  
  specifies the characters that you want KTRANSLATE to replace.

See Also

Function:

• “KSUBSTR Function” on page 346
Interaction  Values of to and from correspond on a character-by-character basis; KTRANSLATE changes character one of from to character one of to, and so on. If to has fewer characters than from, KTRANSLATE changes the extra from characters to blanks. If to has more characters than from, KTRANSLATE ignores the extra to characters.

Note  You must have pairs of to and from arguments on some operating environments. On other operating environments, a segment of the collating sequence replaces null from arguments.

Details

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

You can use KTRANSLATE to translate a single-byte character expression to a double-byte character expression, or translate a double-byte character expression to a single-byte character expression.

The maximum number of pairs of to and from arguments that KTRANSLATE accepts depends on which operating environment you use to run SAS. There is no functional difference between using several pairs of short arguments, or fewer pairs of longer arguments.

If the KTRANSLATE function returns a value to a variable that has not yet been assigned a length, by default the variable is assigned a length of 200.

Example

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td></td>
</tr>
<tr>
<td>result=ktranslate(’正課’,’回答’,’二課’);</td>
<td>result=正答</td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>result=ktranslate(’abc’,’アイウ’,’abc’);</td>
<td>result=アイウ</td>
</tr>
<tr>
<td>put result=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

KTRIM Function

Removes trailing DBCS blanks and SO/SI from character expressions.

Categories:  DBCS
CAS

Restriction:  This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Note:  This function supports the varchar type.
Tip: Non-DBCS equivalent function is “TRIM Function” in SAS Viya Functions and CALL Routines: Reference.

**Syntax**

KTRIM(argument)

**Required Argument**

*argument*

specifies any SAS character expression.

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

KTRIM copies a character argument, removes all trailing blanks, and returns the trimmed argument as a result. KTRIM is useful for concatenating because concatenation does not remove trailing blanks.

*Note:* If the argument is blank, KTRIM returns one blank for the char type. If the argument is blank, KTRIM returns an empty blank or 0 value for the varchar type.

The varchar type uses character semantics, and the char type uses byte semantics.

Assigning the results of KTRIM to a variable does not affect the length of the receiving variable. If the trimmed value is shorter than the length of the receiving variable, SAS pads the value with new blanks as it assigns it to the variable.

**Example**

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td></td>
</tr>
<tr>
<td>part1='漢字の';</td>
<td>漢字の テスト</td>
</tr>
<tr>
<td>part2='テスト';</td>
<td>漢字のテスト</td>
</tr>
<tr>
<td>hasblank=part1</td>
<td></td>
</tr>
<tr>
<td>noblank=ktrim(part1)</td>
<td></td>
</tr>
<tr>
<td>put hasblank;</td>
<td></td>
</tr>
<tr>
<td>put noblank;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

- “KCOMPRESS Function” on page 323
- “KLEFT Function” on page 331
- “KRIGHT Function” on page 341
KTRUNCATE Function

Truncates a string to a specified length in byte unit without breaking multibyte characters.

Category: DBCS
Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Syntax

KTRUNCATE(argument, number, length)

Required Arguments

argument specifies any SAS character expression.

number is numeric.

length is an integer.

Details

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KTRUNCATE function truncates a full-length number (stored as a double) to a smaller number of bytes, as specified in length and pads the truncated bytes with 0s. The truncation and subsequent expansion duplicate the effect of storing numbers in less than full length and then reading them.

Example

The following example uses Japanese characters.
KUPCASE Function

Converts all single-width English alphabet letters in an argument to uppercase.

**Categories:** DBCS  
CAS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Note:** This function supports the varchar type.

**Tip:** See “UPCASE Function” in SAS Viya Functions and CALL Routines: Reference.

**Syntax**

KUPCASE(*argument*)

**Required Argument**

*argument*

specifies any SAS character expression.

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KUPCASE function copies a character argument, converts all lowercase single-width English alphabet letters to uppercase letters, and returns the altered value as a result.

**Example**

The following example uses Japanese characters.

```
data _null_
   x1=ktruncate('漢字のテスト',6);
   x2=ktruncate('漢字のテスト',7);
   x3=ktruncate('漢字のテスト',9);
   y1=ktruncate('漢字のテスト',5,9);
   y2=ktruncate('漢字のテスト',6,6);
   y3=ktruncate('漢字のテスト',7,6);
   put x1= / x2= / x3= / y1= / y2= / y3=;
run;
```
KUPDATE Function

Inserts, deletes, and replaces character value contents.

Categories: DBCS
CAS

Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Note: This function supports the varchar type.

Syntax

KUPDATE(argument,position,n<, characters-to-replace> )
KUPDATE(argument, position<n> , characters-to-replace)

Required Arguments

argument
specifies a character variable.

data _null_;
   result=kupcase('abcあいうえお');
   put result=;
run;

position
specifies a numeric expression that is the beginning character position.

n
specifies a numeric expression that is the length of the substring to be replaced.

Restrictions

n cannot be larger than the length of the expression that remains in argument after position.

n is optional, but you cannot omit both n and characters-to-replace from the function.

Tip
If you omit n, SAS uses all of the characters in characters-to-replace to replace the values of argument.

characters-to-replace
specifies a character expression that replaces the contents of argument.

Restriction
characters-to-replace is optional, but you cannot omit both characters-to-replace and n from the function.
Tip
Enclose a literal string of characters in quotation marks.

Details
See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KUPDATE function replaces the value of argument with the expression in characters-to-replace starting at the character that you specify in position.

If the KUPDATE function returns a value to a variable that has not yet been assigned a length, by default the variable is assigned a length of 200.

Examples

Example 1
The following example shows the difference between KUPDATE and KUPDATES.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>x1=1 56</td>
</tr>
<tr>
<td>str='123456';</td>
<td>y1=156</td>
</tr>
<tr>
<td>x1=str; substr(x1,2,3)='';</td>
<td>z1=1 56</td>
</tr>
<tr>
<td>y1=kupdate(str,2,3);</td>
<td>x2=1abc56</td>
</tr>
<tr>
<td>z1=kupdates(str,2,3);</td>
<td>y2=1abc56</td>
</tr>
<tr>
<td>put x1= / y1= / z1=;</td>
<td>z2=1abc56</td>
</tr>
<tr>
<td>x2=str; substr(x2,2,3)=&quot;abcd&quot;;</td>
<td>x3=1lab 56</td>
</tr>
<tr>
<td>y2=kupdate(str,2,3,'abcd');</td>
<td>y3=1lab56</td>
</tr>
<tr>
<td>z2=kupdates(str,2,3,'abcd');</td>
<td>z3=1lab 56</td>
</tr>
<tr>
<td>put x2= / y2= / z2=;</td>
<td></td>
</tr>
<tr>
<td>x3=str; substr(x3,2,3)=&quot;ab&quot;;</td>
<td></td>
</tr>
<tr>
<td>y3=kupdate(str,2,3,'ab');</td>
<td></td>
</tr>
<tr>
<td>z3=kupdates(str,2,3,'ab');</td>
<td></td>
</tr>
<tr>
<td>put x3= / y3= / z3=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

Example 2
The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>x1=漢字のテスト</td>
</tr>
<tr>
<td>x1=kupdate('感じのテスト',1,2,'漢字');</td>
<td>x2=kaのテスト</td>
</tr>
<tr>
<td>x2=kupdate(x1,1,2,'kanji');</td>
<td>x3=テスト</td>
</tr>
<tr>
<td>x3=kupdate(x1,1,3);</td>
<td>x4=漢字かんじ</td>
</tr>
<tr>
<td>x4=kupdate(x1,3,'かんじ');</td>
<td></td>
</tr>
<tr>
<td>put x1= / x2= / x3= / x4=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>
KUPDATEB Function

Inserts, deletes, and replaces the contents of the character value according to the byte position of the character value in the argument.

Category: DBCS

Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Syntax

KUPDATEB(argument, position, n<,characters-to-replace> )
KUPDATEB(argument, position <,n>, characters-to-replace)

Required Arguments

argument
specifies a character variable.

dposition
specifies the beginning character position in byte units.

n
specifies the length of the substring to be replaced in byte units.

Restrictions

n cannot be larger than the length (in bytes) of the expression that remains in argument after position.

n is optional, but you cannot omit both n and characters-to-replace from the function.

Tip
If you omit n, SAS uses all of the characters in characters-to-replace to replace the values of argument.

characters-to-replace
specifies a character expression to replace the contents of argument.

Restriction
characters-to-replace is optional, but you cannot omit both characters-to-replace and n from the function.

Tip
Enclose a literal string of characters in quotation marks.

See Also

Functions:
• “KUPDATES Function” on page 358
• “KUPDATEB Function” on page 357
Details
See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KUPDATEB function replaces the value of argument with the expression in characters-to-replace. KUPDATEB replaces n byte units starting at the byte unit that you specify in position.

If the KUPDATEB function returns a value to a variable that has not yet been assigned a length, by default the variable is assigned a length of 200.

Example
The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td></td>
</tr>
<tr>
<td>x1=kupdateb(’漢字のテスト’,1,9,’漢字’);</td>
<td>x1=漢字 テスト</td>
</tr>
<tr>
<td>x2=kupdateb(x1,1,9,’kanji’);</td>
<td>x2=kanji テスト</td>
</tr>
<tr>
<td>x3=kupdateb(x1,1,9);</td>
<td>x3=テスト</td>
</tr>
<tr>
<td>x4=kupdateb(x1,7,’かんじ’);</td>
<td>x4=漢字 かんじ</td>
</tr>
<tr>
<td>put x1= / x2= / x3= / x4=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

See Also
Function:
• “KUPDATE Function” on page 355

KUPDATES Function
Inserts, deletes, and replaces character value contents.

- **Categories:**  DBCS
  CAS
- **Restriction:**  This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

- **Note:**  This function supports the varchar type.

**Syntax**

\[ \text{KUPDATES}(\text{argument}, \text{position}, n<, \text{characters-to-replace}> ) \]
**KUPDATES**(*argument*, *position*<, *n*> , *characters-to-replace*)

**Required Arguments**

*argument*
- specifies a character variable.

*position*
- specifies a numeric expression that is the beginning character position.

**Optional Arguments**

*n*
- specifies a numeric expression that is the length of the substring to be replaced.

| Restrictions |  
|--------------|---------------------------------------------------|
| *n* cannot be larger than the length of the expression that remains in *argument* after *position*. |

| Tip |  
|-----|---------------------------------------------------|
| *n* is optional, but you cannot omit both *n* and *characters-to-replace* from the function. |
| If you omit *n*, SAS uses all of the characters in *characters-to-replace* to replace the values of *argument*. |

*characters-to-replace*
- specifies a character expression that replaces the contents of *argument*.

| Restriction |  
|-------------|---------------------------------------------------|
| *characters-to-replace* is optional, but you cannot omit both *characters-to-replace* and *n* from the function. |

| Tip |  
|-----|---------------------------------------------------|
| Enclose a literal string of characters in quotation marks. |

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The KUPDATES function replaces the value of *argument* with the expression in *characters-to-replace*. KUPDATES replaces *n* characters starting at the character that you specify in *position*.

If the KUPDATES function returns a value to a variable that has not yet been assigned a length, by default the variable is assigned a length of 200.

**Examples**

**Example 1**
The following example uses Japanese characters.
### Example 2

The following example shows the difference between KUPDATE and KUPDATES.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>x1=1 56</td>
</tr>
<tr>
<td>x1=str; substr(x1,2,3)=&quot;&quot;; y1=156</td>
<td></td>
</tr>
<tr>
<td>y1=kupdate(str,2,3); z1=kupdates(str,2,3);</td>
<td>x2=1abc56 y2=1abcd56</td>
</tr>
<tr>
<td>put x1= / y1= / z1=; z2=labcd56</td>
<td></td>
</tr>
<tr>
<td>x2=str; substr(x2,2,3)=&quot;abcd&quot;; y2=labcd56</td>
<td></td>
</tr>
<tr>
<td>y2=kupdate(str,2,3,'abcd'); z3=lab56</td>
<td></td>
</tr>
<tr>
<td>z2=kupdates(str,2,3,'abcd');</td>
<td></td>
</tr>
<tr>
<td>put x2= / y2= / z2=; z3=lab56</td>
<td></td>
</tr>
<tr>
<td>x3=str; substr(x3,2,3)=&quot;ab&quot;; y3=lab56</td>
<td></td>
</tr>
<tr>
<td>y3=kupdate(str,2,3,'ab'); z3=kupdates(str,2,3,'ab');</td>
<td></td>
</tr>
<tr>
<td>put x3= / y3= / z3=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

### See Also

**Functions:**

- “KUPDATE Function” on page 355

---

**KVERIFY Function**

Returns the position of the first character that is unique to an expression.

**Categories:** DBCS, CAS

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Tip:** See “VERIFY Function” in SAS Viya Functions and CALL Routines: Reference
Syntax

\texttt{KVERIFY(source, excerpt-1, \ldots excerpt-n)}

**Required Arguments**

- \textit{source} specifies any SAS character expression.
- \textit{excerpt-1, \ldots excerpt-n} specifies any SAS character expression.

**Tips**

Enclose a literal string of characters in quotation marks.

If you specify more than one excerpt, separate them with a comma.

**Details**

See “Internationalization Compatibility for SAS String Functions” on page 279 for restrictions and more information.

The \texttt{KVERIFY} function returns the position of the first character in \textit{source} that is not present in any \textit{excerpt}. If \texttt{KVERIFY} finds every character in \textit{source} in at least one \textit{excerpt}, it returns a value of 0.

**Example**

The following example uses Japanese characters.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>invalid grade value: 可</td>
</tr>
<tr>
<td>input grade :$2. @@;</td>
<td></td>
</tr>
<tr>
<td>check='良否';</td>
<td></td>
</tr>
<tr>
<td>x=kverify(grade,check);</td>
<td></td>
</tr>
<tr>
<td>if x gt 0 then put 'Invalid grade value: ' grade;</td>
<td></td>
</tr>
<tr>
<td>cards;</td>
<td></td>
</tr>
<tr>
<td>良 否 良 否 良 否 可</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**KVERIFYB Function**

Returns the position of the first character that is unique to an expression.

- **Category:** DBCS
- **Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.
Syntax

\texttt{KVERIFYB}(\texttt{source, excerpt-1,\ldots,excerpt-n})

Required Arguments

\texttt{source}

specifies any SAS character expression.

\texttt{excerpt}

specifies any SAS character expression.

\textbf{T I P} 
If you specify more than one excerpt, separate them with a comma.

Details

The \texttt{KVERIFYB} function returns the position of the first character in \texttt{source} that is not present in any excerpt. If \texttt{KVERIFYB} finds every character in \texttt{source} in at least one excerpt, it returns a 0.

Comparisons

\texttt{KVERIFYB} returns byte-based value. \texttt{KVERIFY} returns character-based value. When process SBCS (For example, wlat1 encoding) string, they return identical result. But, in a DBCS session (For example, EUC-JP or SHIFT-JIS encoding), most CJK characters are 2-byte width, that makes these functions return different result.

Example

The following example uses Japanese characters.

\begin{verbatim}
data _null_;
  check=‘漢字’;
  text=‘漢字の検索’;
  x1=kverify(text,check);
  put x1=
  x2=kverifyb(text,check);
  put x2=;
run;
\end{verbatim}

\begin{tabular}{|l|l|}
\hline
\textbf{Statements} & \textbf{Results} \\
\hline
\texttt{data _null_;} & \texttt{x1=3} \\
\texttt{check=‘漢字’;} & \texttt{x2=7} \\
\texttt{text=‘漢字の検索’;} & \texttt{;} \\
\texttt{x1=kverify(text,check);} & \texttt{;} \\
\texttt{put x1=;} & \texttt{;} \\
\texttt{x2=kverifyb(text,check);} & \texttt{;} \\
\texttt{put x2=} & \texttt{;} \\
\texttt{run;} & \texttt{;} \\
\hline
\end{tabular}

\textbf{NLDATE Function}

Converts the SAS date value to the date value of the specified locale by using the date format descriptors.

\textbf{Category:} Date and Time

\textbf{Restriction:} This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see \textit{Internationalization Compatibility} on page 279.
Syntax

**NLDATE**(*date,descriptor*)

*Required Arguments*

date

specifies a SAS date value.

descriptor

is a variable or expression that specifies how dates and times are formatted in output. The following descriptors are case sensitive:

#

removes the leading zero from the result.

%%

specifies the % character.

%a

specifies the short-weekday descriptor. The range for the day descriptor is Mon–Sun.

%A

specifies the long-weekday descriptor. The range for the long-weekday descriptor is Monday–Sunday.

%b

specifies the short-month descriptor. The range for the short-month descriptor is Jan–Dec.

%B

specifies the long-month descriptor. The range for the long-month descriptor is January–December.

%C

specifies the long-month descriptor and uses blank padding. The range for the long-month descriptor is January–December.

%d

specifies the day descriptor and uses 0 padding. The range for the day modifier is 01–31.

%e

specifies the day descriptor and uses blank padding. The range for the day descriptor is 01–31.

%F

specifies the long-weekday descriptor and uses blank padding. The range for the day descriptor is Monday–Sunday.

%j

specifies the day-of-year descriptor as a decimal number and uses a leading zero. The range for the day-of-year descriptor is 1–366.

%m

specifies the month descriptor and uses 0 padding. The range for the month descriptor is 01–12.
specifies the month descriptor. The range for the month descriptor is 1–12 with blank padding.

%u
specifies the weekday descriptor as a number in the range 1–7 that represents Monday–Sunday.

%U
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value using the number of week within the year (Sunday is considered the first day of the week). The number-of-the-week value is represented as a decimal number in the range 0–53 and uses a leading zero and a maximum value of 53.

%V
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value. The number-of-week value is represented as a decimal number in the range 01–53 and uses a leading zero and a maximum value of 53. Weeks begin on a Monday and week 1 of the year is the week that includes both January 4 and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year.

%w
specifies the weekday descriptor as a number in the range 0–6 that represents Sunday–Saturday.

%W
specifies the week-number-of-year descriptor by calculating the descriptor value as SAS date value by using the number of week within the year (Monday is considered the first day of the week). The number-of-week value is represented as a decimal number in the range 0–53 and uses a leading zero and a maximum value of 53.

%y
specifies the year (2-digit) modifier. The range for the year descriptor is 00–99.

%Y
specifies the year (4-digit) descriptor. The range for the year descriptor is 1970–2069.

**Details**

The NLDATE function converts the SAS date value to the date value of the specified locale by using the date descriptors.

**Example**

The following example shows a log filename that is created from a SAS date value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_Unitedstates;</td>
<td></td>
</tr>
<tr>
<td>logfile=nldate('24Feb2003'd,'%B-%d.log');</td>
<td>February-24.log</td>
</tr>
<tr>
<td>put logfile;</td>
<td></td>
</tr>
</tbody>
</table>
The following example shows a weekday name that is created from a SAS date value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=German_Germany;</td>
<td>Februar-24.log</td>
</tr>
<tr>
<td>logfile=nldate('24Feb2003'd,'%B-%d.log');</td>
<td></td>
</tr>
<tr>
<td>put logfile;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_unitedstates;</td>
<td>Monday</td>
</tr>
<tr>
<td>weekname=nldate('24Feb2003'd,'%A');</td>
<td></td>
</tr>
<tr>
<td>put weekname;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=German_Germany;</td>
<td>Montag</td>
</tr>
<tr>
<td>weekname=nldate('24Feb2003'd,'%A');</td>
<td></td>
</tr>
<tr>
<td>put weekname;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLDATE Format” on page 106

NLDATM Function

Converts the SAS datetime value to the time value of the specified locale by using the datetime-format descriptors.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Date and Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction:</td>
<td>This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.</td>
</tr>
</tbody>
</table>

Syntax

\[
\text{NLDATM}(\text{datetime}, \text{descriptor})
\]

Required Arguments

- **datetime**: specifies a SAS datetime value.
- **descriptor**: is a variable or expression that specifies how dates and times are formatted in output.

The following descriptors are case sensitive:
# removes the leading zero from the result.

%% specifies the % character.

%a specifies the short-weekday descriptor. The range for the day descriptor is Mon–Sun.

%A specifies the long-weekday descriptor. The range for the long-weekday descriptor is Monday–Sunday.

%b specifies the short-month descriptor. The range for the short-month descriptor is Jan–Dec.

%B specifies the long-month descriptor. The range for the long-month descriptor is January–December.

%c specifies the long-month descriptor and uses blank padding. The range for the long-month descriptor is January–December.

%d specifies the day descriptor and uses 0 padding. The range for the day descriptor is 01–31.

e specifies the day descriptor and uses blank padding. The range for the day descriptor is 01–31.

%F specifies the long-weekday descriptor and uses blank padding. The range for the day descriptor is Monday–Sunday.

%H specifies the hour descriptor that is based on a 24-hour clock. The range for the hour descriptor is 00–23.

%I specifies the hour descriptor that is based on a 12-hour clock. The range for the hour descriptor is 01–12.

%j specifies the day-of-year descriptor as a decimal number and uses a leading zero. The range for the day-of-year descriptor is 1–366.

%m specifies the month descriptor and uses 0 padding. The range for the month descriptor is 01–12.

%M specifies the minute descriptor. The range for the minute descriptor is 00–59.

%o specifies the month descriptor and uses blank padding. The range for the month descriptor is 1–12.

%p specifies a.m. or p.m. descriptor.
%S
specifies the second descriptor. The range for the second descriptor is 00–59.

%u
specifies the weekday descriptor as a number in the range of 1–7 that represents Monday–Sunday.

%U
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value and uses the number-of-week value within the year (Sunday is considered the first day of the week). The number-of-week value is represented as a decimal number in the range 0–53. A leading zero and a maximum value of 53 is used.

%V
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value. The number-of-week value is represented as a decimal number in the range 01–53. A leading zero and a maximum value of 53 are used.

%W
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value using the number of week within the year (Monday is considered the first day of the week). The number-of-week value is represented as a decimal number in the range 0–53. A leading zero and a maximum value of 53 are used.

%Y
specifies the year (4-digit) descriptor. The range for the year descriptor is 1970–2069.

%y
specifies the year (2-digit) descriptor. The range for the year descriptor is 00–99.

Details
The NLDATM function converts the SAS datetime value to the datetime value of the specified locale by using the datetime descriptors.

Example
The following example shows a time (a.m or p.m.) that is created from a SAS datetime value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLDATM Function</td>
<td>367</td>
</tr>
</tbody>
</table>
### Statements

```sas
options locale=English;

time_ampm=nldatm('24Feb2003:12:39:43'dt,'%I%p');
put time_ampm;

options locale=German;

time_ampm=nldatm('24Feb2003:12:39:43'dt,'%I%p');
put time_ampm;
```

### Results

- 12PM
- 12nachm

### See Also

**Format:**
- “NLDATM Format” on page 127

---

### NLTIME Function

Converts the SAS time or the datetime value to the time value of the specified locale by using the NLTIME descriptors.

**Category:** Date and Time

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

### Syntax

`NLTIME(time|datetime,descriptor,startpos)`

### Required Arguments

**time**
- specifies a SAS time value.

**datetime**
- specifies a SAS datetime value.

**descriptor**
- is a variable, or expression, that specifies the value of a descriptor. You can enter the following descriptors in uppercase or lowercase:
  - `#`
    - removes the leading zero from the result.
  - `%%`
    - specifies the `%` character.
  - `%H`
    - specifies the hour descriptor that is based on a 24-hour clock. The range for the hour descriptor is 00–23.
%I
  specifies the hour descriptor that is based on a 12-hour clock. The range for the hour descriptor is 01–12.

%M
  specifies the minute modifier. The range for the minute descriptor is 00–59.

%P
  specifies the a.m. or p.m. descriptor.

%S
  specifies the second descriptor. The range for the second descriptor is 00–59.

startpos
  is an integer that specifies the position at which the search should start and that specifies the direction of the search.

Details
The NLTIME function converts a SAS time or datetime value to the time value of the specified locale by using the time descriptors.

Example
The following example shows an a.m. or p.m. time that is created from a SAS time.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>options locale=English;</td>
<td></td>
</tr>
<tr>
<td>time_ampm=nltime('12:39:43't,'%i%p');</td>
<td>12 PM</td>
</tr>
<tr>
<td>put time_ampm;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>options locale=German;</td>
<td></td>
</tr>
<tr>
<td>time_ampm=nltime('12:39:43't,'%i%p');</td>
<td>12 nachm</td>
</tr>
<tr>
<td>put time_ampm;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:
- “NLTIME Format” on page 242

SASMSG Function
Specifies a message from a data set. The returned message is based on the current locale and a specified key.

Category: Locale
Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Syntax

SASMSG (BASENAME", "KEY", <<"QUOTE"|"DQUOTE"|"NOQUOTE"> <, "substitution 1", ..., "substitution 7">>)

Required Arguments

BASENAME

the name of the data set where the message is located.

KEY

the message key.

Note: If you specify an invalid key name, then the key name is returned.

QUOTE|DQUOTE|NOQUOTE

specifies the type of quotation marks that are added to the message text and substitution strings.

Default DQUOTE

 substitution

string substitutions. The maximum string substitutions is 7.

Details

The SAS message data set must be a 7-bit ASCII data set. Any character that cannot be represented in the 7-bit ASCII encoding is represented in the Unicode escape format of '\uxxxx', where 'xxxx' is the base 10 numeric representation of the Unicode value of the character.

The data set used by the SASMSG function must have been created specifically for use with this function. The data set must contain the following variables:

<table>
<thead>
<tr>
<th>#</th>
<th>Variable Name</th>
<th>Type</th>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>locale</td>
<td>char</td>
<td>5</td>
<td>language of the message</td>
</tr>
<tr>
<td>2</td>
<td>key</td>
<td>char</td>
<td>60</td>
<td>key to identify the message</td>
</tr>
<tr>
<td>3</td>
<td>lineno</td>
<td>num</td>
<td>5</td>
<td>line # of the message in reverse order</td>
</tr>
<tr>
<td>4</td>
<td>text</td>
<td>text</td>
<td>1,200</td>
<td>text of the message</td>
</tr>
</tbody>
</table>

The data set must be sorted on the following variables: locale, key, and lineno. The variable lineno must be in descending order. A composite index on locale and key must be defined. Here is a sample program to sort and create an indexed data set:

%let basename=MyProduct;
The returned message is based on the LOCALE system option. The LOCALE option is represented by $ll_RR$ where $ll$ represents the two-letter language code and RR represents the two-letter region code. If a match is not found, then the function searches for a match with the language only. If the pair locale and key are still not found, then the function defaults to the English language (en). If the key does not exist for English (en), then the key name is returned.

You can alter formatting. You can use string substitution by using the format code %s. You can change the order of substitution. In some cases, translation of a message to a language other than English might require changing the order of substitutions. You can change the order by placing an argument number specification, #nn, within a format string, where nn is the number of the argument in the substitution list. The following example demonstrates the order:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>msg = sasmsg(&quot;nls.mymsg&quot;,&quot;IN_CD_LOG&quot;, &quot;noquote&quot;,&quot;cat&quot;,&quot;dog&quot;); IN_CD_LOGINFO = My $#1s. Your $#2s</td>
<td>msg= My cat. Your dog.</td>
</tr>
<tr>
<td>IN_CD_LOGINFO = My $#2s. Your $#1s</td>
<td>msg= My dog. Your cat.</td>
</tr>
</tbody>
</table>

The SASMSG function can be used in the open code macro with the %SYSFUNC macro function.

Arguments that are passed to a function called by the %SYSFUNC macro must not be in quotation marks. Arguments passed to the SASMSG function outside of %SYSFUNC must be quoted.

When the SASMSG function is used with the %SYSFUNC macro function, the returned string is wrapped with the %NRBQUOTE function.

### Examples

#### Example 1

The following example demonstrates the formatting feature of SASMSG:

```sas
%macro demo_sasmsg;
  data _null_; 
  msg = sasmsg("nls.mymsg","IN_APW_SAVE_OK","noquote");
  put msg=;
  run;
%mend demo_sasmsg;
```
Example 2
The following example demonstrates the open macro feature:

\[
\%MACRO PRT(loc, tb, key);
  option locale=&loc;
  %PUT %SYSFUNC(SASMSG(&tb, &key));
%MEND PRT;
\]

```
<table>
<thead>
<tr>
<th>SAS Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>%PRT(en_US,&amp;TABLEID,IN_EDIT)</td>
<td>&quot;Edit&quot;</td>
</tr>
<tr>
<td>%PRT(es_ES,&amp;TABLEID,IN_EDIT)</td>
<td>&quot;Editar&quot;</td>
</tr>
<tr>
<td>%PRT(fr_FR,&amp;TABLEID,IN_EDIT)</td>
<td>&quot;Modifier&quot;</td>
</tr>
</tbody>
</table>
```

SASMSGL Function
Specifies a message from a data set. The message is based on a specified locale value and a specified key value.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Locale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction:</td>
<td>This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.</td>
</tr>
</tbody>
</table>

**Syntax**

\[
\text{SASMSGL}("BASENAME", "KEY", "LOCALE", (..., "Q"|"D"|"N"), <"substitution 1", ..., "substitution 6">)}
\]

**Required Arguments**

**BASENAME**
the name of the data set where the message is located.

**KEY**
the message key.

*Note:* If you specify an invalid key name, then the key name is returned.
**LOCALE**
the posix locale value (ll_RR).

**QUOTE|DQUOTE|NOQUOTE**
specifies the type of quotation marks that are added to the message text and substitution strings.

Default DQUOTE

**substitution**
string substitutions. The maximum string substitutions is 6.

**Details**
The SAS message data set must be a 7-bit ASCII data set. Any character that cannot be represented in the 7-bit ASCII encoding is represented in the Unicode escape format of '\uxxxx', where the xxxx is the base 10 numeric representation of the Unicode value of the character.

The data set used by SASMSGL function must have been created specifically for use with this function. The data set must contain the following variables:

<table>
<thead>
<tr>
<th>#</th>
<th>Variable Name</th>
<th>Type</th>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>locale</td>
<td>char</td>
<td>5</td>
<td>language of the message</td>
</tr>
<tr>
<td>2</td>
<td>key</td>
<td>char</td>
<td>60</td>
<td>key to identify the message</td>
</tr>
<tr>
<td>3</td>
<td>lineno</td>
<td>num</td>
<td>5</td>
<td>line number of the message in reverse order</td>
</tr>
<tr>
<td>4</td>
<td>text</td>
<td>text</td>
<td>1200</td>
<td>text of the message</td>
</tr>
</tbody>
</table>

The data set must be sorted on the following variables: locale, key, and lineno. The variable lineno must be in descending order. A composite index on locale and key must be defined. Here is a sample program to sort and create an indexed data set:

```sas
%let basename=MyProduct;

proc sort data=t.&basename;
    by locale key descending lineno;
run;

proc datasets lib=t
    memtype=data;
    modify &basename;
    index create indx=(LOCALE KEY);
run;
quit;
```

The returned message is based on the LOCALE system option. The LOCALE option is represented by ll_RR where ll represents the two-letter language code and RR represents the two-letter region code. If a match is not found, then the function searches for a match with the language only. If the pair locale and key are still not found, then the function
defaults to the English language (en). If the key does not exist for English (en), then the key name is returned.

You can alter formatting. You can use string substitution by using the format code %s. You can change the order of substitution. In some cases, translation of a message to a language other than English might require changing the order of substitutions. You can change the order by placing an argument number specification, #nn, within a format string, where nn is the number of the argument in the substitution list. The following example demonstrates changing the order:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>msg = sasmsgl(&quot;nls.mymsg&quot;,&quot;IN_CD_LOG&quot;,&quot;en_US&quot;,&quot;N&quot;,&quot;cat&quot;,&quot;dog&quot;);</td>
<td></td>
</tr>
<tr>
<td>IN_CD_LOGINFO = My %#1s. Your %#2s</td>
<td></td>
</tr>
<tr>
<td>IN_CD_LOGINFO = My %#2s. Your %#1s</td>
<td></td>
</tr>
</tbody>
</table>

The SASMSGL function can be used in the open code macro with the %SYSFUNC macro function.

Arguments that are passed to a function called by the %SYSFUNC macro must not be in quotation marks. Arguments passed to the SASMSGL function outside of %SYSFUNC must be quoted.

When the SASMSGL function is used with the %SYSFUNC macro function, the returned string is wrapped with the %NRBQUOTE function.

Examples

**Example 1**
The following example demonstrates the formatting feature of SASMSGL:

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>sasmsgl(&quot;nls.mymsg&quot;, &quot;IN_APW_SAVE_OK&quot;, &quot;en_US&quot;, &quot;n&quot;);</td>
<td>The Access Control key was successfully saved.</td>
</tr>
<tr>
<td>sasmsgl(&quot;nls.mymsg&quot;, &quot;IN_APW_SAVE_OK&quot;, &quot;es_ES&quot;, &quot;n&quot;);</td>
<td>La clave de control de acceso se ha guardado.</td>
</tr>
<tr>
<td>sasmsgl(&quot;nls.mymsg&quot;, &quot;IN_APW_SAVE_OK&quot;, &quot;fr&quot;, &quot;n&quot;);</td>
<td>La clé de contrôle d'accès a bien été enregistrée.</td>
</tr>
</tbody>
</table>

**Example 2**
The following example demonstrates the open macro feature:

<table>
<thead>
<tr>
<th>SAS Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>%PUT %SYSFUNC(SASMSGL(NLS.MYDS, IN_ASD_LABEL, &quot;en_US&quot;));</td>
<td></td>
</tr>
<tr>
<td>%PUT %SYSFUNC(SASMSGL(NLS.MYDS, IN_ASD_LABEL, &quot;es_ES&quot;));</td>
<td></td>
</tr>
</tbody>
</table>
SORTKEY Function

Creates a linguistic sort key.

**Category:** Locale

**Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

**Syntax**

```sas
sortKey(string, <locale, strength, case_order, numeric_order,>)
```

**Required Arguments**

- `string` character expression
- `locale` specifies the locale name in the form of a POSIX name (ja_JP). See Table 17.1 on page 603 for a list of locale names and POSIX values.
- `strength` The value of strength is related to the collation level. There are five collation-level values. The following table provides information about the five levels. The default value for strength is related to the locale.

<table>
<thead>
<tr>
<th>Value</th>
<th>Type of Collation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY or P</td>
<td>PRIMARY specifies differences between base characters (for example, &quot;a&quot; &lt; &quot;b&quot;).</td>
<td>It is the strongest difference. For example, dictionaries are divided into different sections by base character.</td>
</tr>
<tr>
<td>SECONDARY or S</td>
<td>Accents in the characters are considered secondary differences (for example, &quot;as&quot; &lt; &quot;äs&quot; &lt; &quot;at&quot;).</td>
<td>Other differences between letters can also be considered secondary differences, depending on the language. A secondary difference is ignored when there is a primary difference anywhere in the strings.</td>
</tr>
</tbody>
</table>
**TERTIARY or T**

Upper and lowercase differences in characters are distinguished at the tertiary level (for example, "ao" < "Ao" < "âö"). An example is the difference between large and small Kana. A tertiary difference is ignored when there is a primary or secondary difference anywhere in the strings.

**QUATERNARY or Q**

When punctuation is ignored at level 1-3, an additional level can be used to distinguish words with and without punctuation (for example, "ab" < "a-b" < "aB"). This difference is ignored when there is a primary, secondary, or tertiary difference. The quaternary level should be used if ignoring punctuation is required or when processing Japanese text.

**IDENTICAL or I**

When all other levels are equal, the identical level is used as a tiebreaker. The Unicode code point values of the NFD form of each string are compared at this level, just in case there is no difference at levels 1-4.

For example, only Hebrew cantillation marks are distinguished at this level. This level should be used sparingly, as only code point values differences between two strings is an extremely rare occurrence.

---

**case order**

sorts uppercase and lowercase letters. This argument is valid for only TERTIARY, QUATERNARY, or IDENTICAL. The following table provides the values and information for the case order argument.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPER or U</td>
<td>Sorts uppercase letters first, then the lowercase letters.</td>
</tr>
<tr>
<td>LOWER or L</td>
<td>Sorts lowercase letters first, then the uppercase letters.</td>
</tr>
</tbody>
</table>

**numeric order**

orders numbers by the numeric value instead of the number's characters.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMERIC or N</td>
<td>Order numbers (integers) by the numeric value. For example, &quot;8 Main St.&quot; would sort before &quot;45 Main St.&quot;.</td>
</tr>
</tbody>
</table>

**collation order**

There are two types of collation values: Phonebook and Traditional. If you do not select a collation value, then the user's locale-default collation is selected. The following table provides more information.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHONEBOOK or P</td>
<td>specifies a phonebook style ordering of characters. Select PHONEBOOK only with the German language.</td>
</tr>
</tbody>
</table>
 TRADITIONAL or T specifies a traditional style ordering of characters. Select TRADITIONAL only with the Spanish language.

Details

The SORTKEY function creates a linguistic sort key for data. You must enter at least one argument. If the length of the variable that receives the key is not large enough, the data truncates, and a warning is displayed.

locale
Locale values use the POSIX name (ll_RR). LL represents the two-letter language code, and RR represents the two-letter region code. For example, en_US is the POSIX name for English, United States. en represents the English language, and US represents the United States. If a locale value is not specified, then the session locale is used.

strength
The strength argument determines whether accents or case affect collating or matching text. If no value is specified for strength, then the locale determines the value. The following values can be specified for strength.

- PRIMARY
  This value includes base letters. An example is the letters, A, a, and Å are all processed the same.

- SECONDARY
  This value processes data the same as PRIMARY, and accents are processed. The letters A and a are processed equally, and Å is processed as an accented character.

- TERTIARY
  This value processes data the same as SECONDARY, and the character's case is processed. For example, A, a, and Å are all processed differently.

- QUATERNARY
  This value processes data the same as TERTIARY, and punctuation is processed.

- IDENTICAL
  This value process data the same as QUATERNARY, and code point is processed.

case order
specifies to sort data using uppercase or lowercase letter. The following table shows examples of specifying the UPPER value or the LOWER value.

<table>
<thead>
<tr>
<th>UPPER</th>
<th>LOWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aztec</td>
<td>aztec</td>
</tr>
<tr>
<td>aztec</td>
<td>Aztec</td>
</tr>
<tr>
<td>Mars</td>
<td>mars</td>
</tr>
<tr>
<td>mars</td>
<td>Mars</td>
</tr>
</tbody>
</table>
collation order

The collation order value PHONEBOOK is ignored unless the locale is a German language.

The collation order value TRADITIONAL is ignored unless the locale is a Spanish language.

A warning message is displayed for other locales.

**SETLOCALE Function**

Specifies the locale keys for the current SAS locale.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Locale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction:</td>
<td>This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.</td>
</tr>
</tbody>
</table>

**Syntax**

Setting SAS Locale

```
SETLOCALE (sas_locale)
```

Customize single locale elements

```
SETLOCALE (key,value)
```

Customize single locale elements

```
SETLOCALE (category_name, sas_locale)
```

**Required Arguments**

`sas_locale`

specifies a SAS locale name by using the SAS name or the posix name. You can also specify the locale alias.

`key`

specifies a SAS locale element key. See the list of element keys in the Details section.

`value`

specifies a value for the locale element.

`category_name`

specifies the category name:

- LC_TIME
- LC_MONETARY
- LC_NUMERIC
- LC_ALL

**Details**

You can modify the following locale elements. The value of `key` must be less than the value of `max length`. You can specify the following values for `type`: 
0  String.
1  Unsigned integer. You must use double quotation marks.

<table>
<thead>
<tr>
<th>Locale Element Key</th>
<th>Max Length</th>
<th>Type</th>
<th>Category</th>
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</tbody>
</table>
### Examples

#### Example 1
In the following locale example, the SETLOCALE function specifies the locale Japanese (ja_JP). The SETLOCALE function returns the previous locale. In this example, the previous locale was English_United States.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>; x=setlocale('ja_JP'); put x=; run;</td>
<td>x=English_UnitedStates</td>
</tr>
</tbody>
</table>

#### Example 2
In the following example, the SETLOCALE function returns the locale name where the element values are being changed:
Statements | Results
---|---
data _null_; | x=Japanese_Japan
x = setlocale("LC_MONETARY", 'zh_CN'); put x=; run;

**Example 3**
In the following example, the SETLOCALE function changes the value of the specified key, DATE_YEAR_FORMAT:

Statements | Results
---|---
data _null_; | x=%Y¥
x=setlocale('DATE_YEAR_FORMAT', '¥¥Y'); put x=; run;

---

**TZONEID Function**

Returns the current time zone ID.

**Category:** Date and Time  
**Alias:** TZID  
**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.  
This function is not valid in the CAS server.

**Syntax**

TZONEID<time-zone-id>

**Optional Argument**

*time-zone-id*

specifies a region or area value that is defined by SAS. When you specify a zone ID, the time zone that SAS uses is determined by the time zone name and daylight savings time rules.

**Details**

The TZONEID function returns a blank value if the TIMEZONE= option is blank or a user-defined time zone is specified.

The TZONEID function validates the timezone ID. If you specify the timezone ID, the function returns the timezone ID if it is valid or returns a blank value if the ID is invalid.
Example

In the first example, the TIMEZONE option is set to JST. In the second example, TIMEZONE is set to a blank value. In the third example TIMEZONE is set to user-specified time zone. In the fourth example a valid timezoneid and an invalid timezoneid is displayed.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options timezone=jst; data <em>null</em>; tzid=tzoneid(); put tzid=; run;</td>
<td>tzid=ASIA/TOKYO</td>
</tr>
<tr>
<td>options timezone=''; data <em>null</em>; tzid=tzoneid(); put tzid=; run;</td>
<td>tzid=</td>
</tr>
<tr>
<td>options timezone='xxx-12'; /* user defined timezone */ data <em>null</em>; tzid=tzoneid(); put tzid=; run;</td>
<td>tzid=</td>
</tr>
<tr>
<td>data null; name_valid=tzoneid('asia/tokyo'); name_invalid=tzoneid('Milky Way'); put name_valid =; put name_invalid=; run;</td>
<td>name_valid=ASIA/TOKYO name_invalid=</td>
</tr>
</tbody>
</table>

TZONENAME Function

Returns the current standard or daylight savings time, time zone name.

**Category:** Date and Time

**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

This function is not valid in the CAS server.

**Syntax**

TZONENAME()

TZONENAME<time-zone-id,datetime>
Optional Arguments

time-zone-id
  specifies a region/area value that is defined by SAS. When you specify a zone ID, the time zone that SAS uses is determined by time zone name and daylight savings time rules.

  See For a list of the time zone IDs, see Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629.

datetime
  specifies a SAS datetime value.

Details

The TZONENAME function returns a blank value if the TIMEZONE= option is blank.

The TZONENAME function returns the timezone name based on the specified timezone and datetime. If the SAS datetime is not specified, then the current date is used. If TZID is not specified, then the timezone ID that is specified with the TIMEZONE= option is used.

Example

In the first example, the TIMEZONE option is set to a blank value. In the second example, TIMEZONE is set to timezone name, JST. In the third example, TIMEZONE is set to a user-specified time zone. In the fourth example, TIMEZONE is set to a time zone ID.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
| options tz='';
data _null_;
  tzone=tzonename() ;
  put tzone =;
run; | tzname= |
| options tz='jst';
data _null_;
  tzone=tzonename() ;
  put tzone =;
run; | tzname=JST |
| options tz='xxx-12';
data _null_;
  tzone=tzonename() ;
  put tzone =;
run; | tzname=XXX |
| options tz='American/Chicago';
data_null;
  tzone=tzonename('01SEP2014:01:01:01'dt);
  put tzone =;
run; | tzname=CDT |
**TZONOFF Function**

Returns the user time zone offset.

**Category:** Date and Time

**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

This function is not valid in the CAS server.

---

**Syntax**

TZONOFF()

TZONOFF(<time-zone-id, datetime>)

---

**Optional Arguments**

**time-zone-id**

specifies a region/area value that is defined by SAS. When you specify a time zone ID, the time zone that SAS uses is determined by time zone name and daylight savings time rules.

See For a list of time zone IDs, see Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629.

**datetime**

specifies a SAS datetime value.

---

**Details**

If no arguments are specified, the TZONEOFF function returns the time zone offset for the specified TIMEZONE option. The TZONEOFF (time-zone-id) function with the time zone ID argument returns the time zone offset for the specified time zone ID. The TZONEOFF function with the time zone ID argument returns the time zone offset for the specified time zone name. If the time zone name is not valid for the current locale, you receive an error. We recommend that you use the time zone ID, since it is not locale dependent.

If SASDTM is not provided, TZONEOFF returns the current timezone offset. If SASDTM is provided, it returns the offset to get the local time for specified time value.

---

**Example**

The first example has no argument, so the TZONEOFF function returns an offset for the current SAS session. The second example returns an offset based on a specific time zone ID. The third example returns an offset based on a specific time zone ID and a specific date and time. The fourth example returns an offset based on the Time Zone option and a specific date.

If the SAS datetime is not specified, then the TZONEOFF function returns the current timezone offset. If the SAS datetime is specified, then the function returns the offset to provide the local time for the specified time value.
Statements | Results
---|---
```
option TIMEZONE='AUSTRALIA/MELBOURNE';
%PUT %SYSFUNC(TZONEOFF());
```
39600
```
option TIMEZONE='AUSTRALIA/MELBOURNE';
%PUT %SYSFUNC(TZONEOFF('EUROPE/ROME'));
```
3600
```
data _null_;  
dt1='05DEC2012:08:17:52'dt  ;  
dt2='05JUN2012:08:17:52'dt  ;  
offset1= TZONEOFF('EUROPE/MOSCOW', dt1) ;  
offset2= TZONEOFF('EUROPE/MOSCOW', dt2) ;  
put offset1= / offset2= ;  
run ;
offset1=10800  
offset2=14400
```
```
data _null_;  
dt1='05DEC2012:08:17:52'dt  ;  
dt2='05JUN2012:08:17:52'dt  ;  
offset1= TZONEOFF(dt1) ;  
offset2= TZONEOFF(dt2) ;  
put offset1= / offset2= ;  
run ;
offset1=10800  
offset2=14400
```

**TZONES2U Function**

Converts a SAS date time value to a UTC date time value.

**Category:** Date and Time

**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see [Internationalization Compatibility on page 279](#).

This function is not valid in the CAS server.

**Syntax**

```
TZONES2U <datetime, time-zone-id>
```

**Optional Arguments**

- `datetime`
  - specifies a SAS datetime value.

- `time-zone-id`
  - specifies a region or area value that is defined by SAS. When you specify a time zone ID, the time zone that SAS uses is determined by time zone name and daylight savings time rules.

**See** For a list of time zone IDs, see [Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629](#).
Details
The TZONES2U() function returns UTC-based time for the specified TIMEZONE. The TZONES2U(time-zone-id) function with the time zone ID argument returns UTC-based time for the specified time zone ID. If the time zone name is not valid for the current locale, you receive an error.

Example
The following example converts a SAS date time into UTC time.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>option locale=ja_JP TZ='JST' ;</td>
<td>dt=1667722672</td>
</tr>
<tr>
<td>data <em>null</em> ;</td>
<td></td>
</tr>
<tr>
<td>dt='05Nov2012:08:17:52'dt  ;</td>
<td>utc1=2012-11-04T23:17:52+00:00</td>
</tr>
<tr>
<td>utc1 = tzones2u(dt) ;</td>
<td></td>
</tr>
<tr>
<td>utc2 = tzones2u(dt,'ASIA/TOKYO') ;</td>
<td>dt=1667722672</td>
</tr>
<tr>
<td>utc3 = tzones2u(dt,'JST') ;</td>
<td>utc2=2012-11-04T23:17:52+00:00</td>
</tr>
<tr>
<td>put dt= /utc1= is8601dz. // ;</td>
<td></td>
</tr>
<tr>
<td>put dt= /utc2= is8601dz. // ;</td>
<td></td>
</tr>
<tr>
<td>put dt= /utc3= is8601dz. // ;</td>
<td>dt=1667722672</td>
</tr>
<tr>
<td>run ;</td>
<td>utc3=2012-11-04T23:17:52+00:00</td>
</tr>
</tbody>
</table>

TZONEDSTNAME Function
Returns a daylight savings time name.

Category: Date and Time
Restrictions: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.
This function is not valid in the CAS server.

Syntax
TZONEDSTNAME()
TZONEDSTNAME<time-zone-id>

Optional Argument
time-zone-id
specifies a region or area value that is defined by SAS. When you specify a time zone ID, the time zone that SAS uses is determined by the time zone name and daylight savings time rules.

Details
If the TZID is not specified, then the TIMEZONE ID that is specified by the TIMEZONE= option is used. If the daylight savings time is not specified, then the function returns a blank name.
Example

The following example specifies the America/Chicago time zone.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options timezone='America/Chicago';</td>
<td>dstname=CDT</td>
</tr>
<tr>
<td>data null;</td>
<td></td>
</tr>
<tr>
<td>dstname=tzonedstname();</td>
<td></td>
</tr>
<tr>
<td>put dstname;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

TZONEDSTOFF Function

Returns the time zone offset value for the specified daylight savings time.

**Category:** Date and Time

**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279. This function is not valid in the CAS server.

**Syntax**

TZONEDSTOFF()

TZONEDSTOFF<time-zone id>

**Optional Argument**

*time zone id*

specifies a region or area value that is defined by SAS. When you specify a time zone ID, the time zone that SAS uses is determined by the time zone name and daylight savings time rules.

**Details**

If the TZID is not specified, then the TIMEZONE ID that is specified by the TIMEZONE= option is used. If the daylight savings time is not specified, then the function returns a blank name.

**Example**

The following example specifies the America/Chicago time zone.
Statements | Results
--- | ---
options timezone='America/Chicago'; | dstoff=18000
data null;
  dstoff=tzonedstoff();
  put dstoff;
run;
dstoff=18000

TZONESTTNAME Function

Returns a standard time zone name.

**Category:** Date and Time

**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279. This function is not valid in the CAS server.

**Syntax**

TZONESTTNAME()
TZONESTTNAME<time-zone id>

**Optional Argument**

`time-zone-id`

specifies a region or area value that is defined by SAS. When you specify a time zone ID, the time zone that SAS uses is determined by the time zone name and daylight savings time rules.

**Details**

If the TZID is not specified, then the TIMEZONE ID that is specified by the TIMEZONE= option is used.

**Example**

The following example specifies the Asia/Osaka time zone.

Statements | Results
--- | ---
options timezone='Asia/Osaka'; | JST
data null;
  name=tzonestttname();
  put name;
run;
**TZONESTTOFF Function**

Returns the time zone offset value for the specified standard time.

**Category:** Date and Time  
**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279. This function is not valid in the CAS server.

### Syntax

TZONESTTOFF()  
TZONESTTOFF<time-zone id>

### Optional Argument

**time-zone-id**  
Specifies a region or area value that is defined by SAS. When you specify a time zone ID, the time zone that SAS uses is determined by the time zone name and daylight savings time rules.

### Details

If the TZID is not specified, then the TIMEZONE ID that is specified by the TIMEZONE= option is used. If standard time is not specified, then the function returns a blank name.

### Example

The following example specifies the Asia/Osaka time zone.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
| options timezone='Asia/Osaka';  
data null;  
    name=tzonesttoff();  
    put name;  
run; | 32400 |

---

**TZONEU2S Function**

Converts a UTC date time value to a SAS date time value.

**Category:** Date and Time  
**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.
This function is not valid in the CAS server.

**Syntax**

TZONEU2S <UTC date time value, time-zone id>

**Optional Arguments**

- **UTC date time value**
  - specifies a Coordinated Universal Time (UTC) datetime value
- **time-zone id**
  - specifies a region or area value that is defined by SAS. When you specify a zone ID, the time zone that SAS uses is determined by the time zone name and daylight savings time rules.

**Details**

The TZONEU2S(datetime) function returns the SAS datetime for a UTC time for the specified TIMEZONE option. The TZONEU2S(datetime, time-zone-id) function with the time zone ID argument, returns the SAS datetime for the UTC time for the specified time zone ID. If the time zone name is not valid for the current locale, you receive an error.

**Example**

The following example converts a UTC date time to three specific SAS date time values.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>option locale=fr_FR TZ='AMERICA/DENVER';</td>
<td>sdt1=01SEP12:20:34:56</td>
</tr>
<tr>
<td>data <em>null</em>;</td>
<td>sdt2=02SEP12:03:34:56</td>
</tr>
<tr>
<td>utc_date = '2012-09-02T02:34:56+00:00';</td>
<td>sdt3=02SEP12:03:34:56</td>
</tr>
<tr>
<td>udt = input(utc_date,is8601dz.);</td>
<td></td>
</tr>
<tr>
<td>sdt1 = tzoneu2s(udt);</td>
<td></td>
</tr>
<tr>
<td>sdt2 = tzoneu2s(udt,'EUROPE/AMSTERDAM');</td>
<td></td>
</tr>
<tr>
<td>sdt3 = tzoneu2s(udt,'CET');</td>
<td></td>
</tr>
<tr>
<td>put sdt1= datetime. / sdt2= datetime. /</td>
<td></td>
</tr>
<tr>
<td>sdt3= datetime.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

---

**TRANTAB Function**

Transcodes data by using the specified translation table.

- **Category:** Character
- **Restriction:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.
Syntax

\texttt{TRANTAB(string, trantab\_name)}

\textbf{Required Arguments}

\textit{string}
\begin{itemize}
  \item input data that is transcoded.
\end{itemize}

\textit{trantab\_name}
\begin{itemize}
  \item translation table.
\end{itemize}

\textbf{Details}

The TRANTAB function transcodes a data string by using a translation table to remap the characters from one internal representation to another. The encoding of the data in the input string must match the encoding of table 1 in the translation table. The TRANTAB function remaps the data from the encoding using table 1.

Translation tables were introduced in SAS 6 to support the requirements of national languages. SAS 8.2 introduced the \texttt{LOCALE=} and \texttt{ENCODING=} system options as an improvement on direct use of translation tables. In SAS 9 translation tables are used only for transcoding external files. There is direct transcoding in SAS files, between the session encodings. SAS 9.2 supports the TRANTAB function for backward compatibility.

The \texttt{LOCALE=} system option is preferred in later SAS releases.

\textbf{CAUTION:}

Only experienced SAS users should use the TRANTAB function.

\textbf{Example}

The following example uses a translation table that transcodes data that is encoded in Latin2 to an uppercase Latin2 encoding:

\begin{center}
\begin{tabular}{|l|l|}
\hline
\textbf{Statements} & \textbf{Result} \\
\hline
teststrg=trantab('testing','lat2_ucs'); & TESTING \\
put teststrg; & \\
\hline
\end{tabular}
\end{center}

\textbf{UNICODE Function}

Converts Unicode characters to the current SAS session encoding.

\textbf{Category:} Character

\textbf{Restrictions:} This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

UTF-8 is the only SAS session encoding supported by SAS Viya.
Syntax

\[
\text{STR} = \text{UNICODE}(<\text{instr}>,(\text{<Unicode type> }))
\]

Required Arguments

\textit{str}
Data string that has been converted to the current SAS session encoding.

\textit{instr}
input data string.

\textit{Unicode type}
Unicode character formats

- \texttt{ESC} Unicode Escape (for example, '\u0042'). ESC is the default format.
- \texttt{NCR} Numeric Character Representation (for example, &#22823 or &\#177;)
- \texttt{PAREN} Unicode Parenthesis Escape (for example, &lt;u0061&gt;)
- \texttt{UTF8} UTF8 encoding.
- \texttt{UTF16} UTF16 encoding with big endian. UCS2 is an alias.
- \texttt{UTF16B} UTF16 encoding with big endian. UCS2B is an alias.
- \texttt{UTF16L} UTF16 encoding with little endian. UCS2L is an alias.
- \texttt{UTF32} UTF32 encoding with big endian. UCS4 is an alias.
- \texttt{UTF32B} UTF32 encoding with big endian. UCS4B is an alias.
- \texttt{UTF32L} UTF32 encoding with little endian. UCS4L is an alias.

Details

This function reads Unicode characters and converts them to the current SAS session encoding.

The \texttt{UNICODE} function supports the Unicode supplementary characters.

Example

The following example demonstrates the functionality of the \texttt{UNICODE} function:

```sas
/* Run this program using any CJK LOCALIZE */
data _null_;
str1=unicode("\u0041\u0042\u0043");put str1=; /* default */
str2=unicode("\u0041\u0042\u0043", "esc");put str2=; /* ESC - Unicode Escape */
str3=unicode("\#177","ncr");put str3=; /* NCR - Numeric Character Representation */
str4=unicode("\#22823", "ncr");put str4=; /* NCR - Numeric Character Representation */
str5=unicode('<u0061><u0062>', 'paren');put str5=; /* PAREN - Unicode Parenthesis Escape */
str6=unicode('2759'x, 'ucs2');put str6=; /* UCS2 - UCS2 encoding */
str7=unicode('5927'x, 'ucs2b');put str7=; /* UCS2B - UCS2 encoding with big endian */
str8=unicode('2759'x, 'ucs2l');put str8=; /* UCS2L - UCS2 encoding with little endian */
str9=unicode('27590000'x, 'ucs4');put str9=; /* UCS4 - UCS4 encoding */
str10=unicode('0005927'x, 'ucs4b');put str10=; /* UCS4B - UCS4 encoding with big endian */
str11=unicode('27590000'x, 'ucs4l');put str11=; /* UCS4L - UCS4 encoding with little endian */
str12=unicode('E5A4A7'x, 'utf8');put str12=; /* UTF8 - UTF8 encoding */
str13=unicode('2759'x, 'utf16');put str13=; /* UTF16 - UTF16 encoding */
```

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str14=unicode('5927'x,'utf16b');put str14=;            /* UTF16B - UTF16 encoding with big endian */
str15=unicode('2759'x,'utf16l');put str15=;            /* UTF16L - UTF16 encoding with little endian */
str16=unicode("\u00020bb7", "esc");put str16=;         /* ESC - Unicode Escape for Supplementary Character */
str17=unicode("&\#134071;", "ncr");put str17=;          /* NCR - Numeric Character Representation for Supplementary Character */
str18=unicode('<u00020BB7>','paren');put str18=;       /* PAREN - Unicode Parenthesis Escape for Supplementary Character*/
run;

Here are the results from the UNICODE function example:

<table>
<thead>
<tr>
<th>str1=ABC</th>
<th>str2=ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>str3=±</td>
<td>str4=</td>
</tr>
<tr>
<td>大</td>
<td>大</td>
</tr>
<tr>
<td>str5=ab</td>
<td>大</td>
</tr>
<tr>
<td>str6=大</td>
<td>大</td>
</tr>
<tr>
<td>str7=大</td>
<td>大</td>
</tr>
<tr>
<td>str8=大</td>
<td>大</td>
</tr>
<tr>
<td>str9=大</td>
<td>大</td>
</tr>
<tr>
<td>str10=大</td>
<td>大</td>
</tr>
<tr>
<td>str11=大</td>
<td>大</td>
</tr>
<tr>
<td>str12=大</td>
<td>大</td>
</tr>
<tr>
<td>str13=大</td>
<td>大</td>
</tr>
<tr>
<td>str14=大</td>
<td>大</td>
</tr>
<tr>
<td>str15=大</td>
<td>大</td>
</tr>
</tbody>
</table>

**UNICODEC Function**

Converts characters in the current SAS session encoding to Unicode characters.

**Category:** Character

**Restrictions:** This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see [Internationalization Compatibility on page 279](#).

UTF-8 is the only SAS session encoding supported by SAS Viya.

**Syntax**

STR=UNICODEC(<instr>,<Unicode type>))

**Required Arguments**

*str*  
data string that has been converted to Unicode encoding.

*instr*  
input data string.

*Unicode type*  
Unicode character formats

- **ESC**  
  Unicode Escape (for example, \u0042 ) ESC is the default format.

- **NCR**  
  Numeric Character Representation (for example, &#22823 or &\#177 ; )
PAREN Unicode Parenthesis Escape (for example, <u0061>)
UTF8 UTF8 encoding.
UTF16 UTF16 encoding with big endian. UCS2 is an alias.
UTF16B UTF16 encoding with big endian. UCS2B is an alias.
UTF16L UTF16 encoding with little endian. UCS2L is an alias.
UTF32 UTF32 encoding with big endian. UCS4 is an alias.
UTF32B UTF32 encoding with big endian. UCS4B is an alias.
UTF32L UTF32L encoding with big endian. UCS4L is an alias.

Details
This function reads characters that are in the current SAS session encoding and converts them to Unicode encoding.

Example
The following example demonstrates the functionality of the UNICODEC function:

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>data <em>null</em>;</td>
<td>str1=41 2D 32 20 20 20</td>
</tr>
<tr>
<td></td>
<td>str2=41 2D 32 20 92</td>
</tr>
<tr>
<td>str1=unicodec(&quot;ABC&quot;, 'utf8');</td>
<td></td>
</tr>
<tr>
<td>put str1= $hex12.;</td>
<td></td>
</tr>
<tr>
<td>str2=unicodec(&quot;ABCé&quot;, 'utf8');</td>
<td></td>
</tr>
<tr>
<td>put str2= $hex12.;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

UNICODELEN Function
Specifies the length of the character unit for the Unicode data.

Category: Character
Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Syntax
UNICODELEN()

Details
The UNICODELEN function specifies the length of the character unit for the UNICODE data.
Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>len1=unicodelen(&quot;abc ✽ &quot;);</code></td>
<td>len1=4</td>
</tr>
<tr>
<td><code>len2=unicodelen(&quot;\u0041\u0042\u0043\u5927&quot;,&quot;esc&quot;);</code></td>
<td>len2=4</td>
</tr>
<tr>
<td><code>len3=unicodelen(&quot;&amp;#22823;', 'ncr&quot;);</code></td>
<td>len3=1</td>
</tr>
<tr>
<td><code>len4=unicodelen(&quot;&lt;u0061&gt;&lt;u0062&gt;&quot;,&quot;paren&quot;);</code></td>
<td>len4=2</td>
</tr>
</tbody>
</table>

See Also

Functions:
- “UNICODEWIDTH Function” on page 399

UNICODEWIDTH Function

Specifies the length of a display unit for the Unicode data.

Category: Character

Restriction: This function is assigned an I18N Level 2 status and designed for use with SBCS, DBCS, and MBCS (UTF8). For more information, see Internationalization Compatibility on page 279.

Syntax

`UNICODEWIDTH()`

Details

The UNICODEWIDTH function specifies the length of a display unit for the Unicode data. The display unit displays the width of a character when the character is displayed with fixed width font.

The characters in CJK Symbols, CJK Unified Ideographs, Full width Alphabets and Punctuation, Full width currency symbols, CJK Unified Ideograph Extension B-D and CJK Compatibility Ideographs Supplement have the value of a display unit 2. Other characters are display unit 1.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
len1=unicodewidth("abc"); len1=5
len2=unicodewidth("\u0041\u0042\u0043\u5927",'esc'); len2=5
len3=unicodewidth("&\#22823; ",'ncr'); len3=2
len4=unicodewidth("<u0061><u0062>",'paren'); len4=2

See Also

Functions:
- “UNICODELEN Function” on page 398

VARTRANSCODE Function

Returns the transcode attribute of a SAS data set variable.

**Category:** Variable Information

**Syntax**

VARTRANSCODE(*data-set-id*, *var-num*)

**Required Arguments**

- **data-set-id**
  - specifies the data set identifier that the OPEN function returns.

- **var-num**
  - specifies the position of the variable in the SAS data set.

  **Tip**  The VARNUM function returns this value.

**Details**

Transcoding is the process of converting data from one encoding to another. The VARTRANSCODE function returns 0 if the *var-num* variable does not transcode its value, or 1 if the *var-num* variable transcodes its value.


**Example**

The following example shows how to determine whether a character variable is transoded:

data a;
attrib x length=$3. transcode=no;
attrib y length=$3. transcode=yes;
x='abc';
y='xyz';
run;
data _null_;  
  dsid=open('work.a','i');
  nobs=attrn(dsid,"nobs");
  nvars=attrn(dsid,"nvars");
  do i=1 to nobs;
    xrc=fetch(dsid,i);
    do j=1 to nvars;
      transcode = vartranscode(dsid,j);
      put transcode=;
    end;
  end;
run;

SAS writes the following output to the log:
transcode=0
transcode=1

See Also

Functions:

- “ATTRN Function” in SAS Viya Functions and CALL Routines: Reference
- “OPEN Function” in SAS Viya Functions and CALL Routines: Reference
- “VARNUM Function” in SAS Viya Functions and CALL Routines: Reference
- “VTRANSCODE Function” on page 401
- “VTRANSCODEX Function” on page 402

VTRANSCODE Function

Returns a value that indicates whether transcoding is enabled for the specified character variable.

**Categories:** Variable Information
CAS

**Note:** This function supports the varchar type.

**Syntax**

\[ \text{VTRANSCODE (var)} \]

**Required Argument**

\( \text{var} \)

specifies a character variable that is expressed as a scalar or as an array reference.

**Restriction**

You cannot use an expression as an argument.
Details

The VTRANSCODE function returns 0 if transcoding is off, and 1 if transcoding is on.

By default, all character variables in the DATA step are transcoded. You can use the `TRANSCODE=` attribute of the ATTRIB statement to turn transcoding off.

Comparisons

- The VTRANSCODE function returns a value that indicates whether transcoding is enabled for the specified variable. The VTRANSCODEX function, however, evaluates the argument to determine the variable name. The function then returns the transcoding status (on or off) that is associated with that variable name.

- The VTRANSCODE function does not accept an expression as an argument. The VTRANSCODEX function accepts expressions, but the value of the specified expression cannot denote an array reference.

- Related functions return the value of other variable attributes, such as the variable name, type, format, and length. For a list of the variable attributes, see the “Variable Information” functions in SAS Viya Functions and CALL Routines: Reference.

Example

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-------</td>
</tr>
<tr>
<td>attrib x transcode = yes;</td>
<td>rc1=0</td>
</tr>
<tr>
<td>attrib y transcode = no;</td>
<td></td>
</tr>
<tr>
<td>rcl = vtranscode(y);</td>
<td></td>
</tr>
<tr>
<td>put rcl=;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Functions:

- “VTRANSCODEX Function” on page 402

Statements:

- ATTRIB in

VTRANSCODEX Function

Returns a value that indicates whether transcoding is enabled for the specified argument.

Categories: Variable Information

CAS

Note: This function supports the varchar type.
Syntax

VTRANSCODEX (var)

Required Argument

var

specifies any SAS character expression that evaluates to a character variable name.

Restriction

The value of the specified expression cannot denote an array reference.

Details

The VTRANSCODEX function returns 0 if transcoding is off, and 1 if transcoding is on.

By default, all character variables in the DATA step are transcoded. You can use the TRANSCODE= attribute of the ATTRIB statement to turn transcoding off.

Comparisons

• The VTRANSCODE function returns a value that indicates whether transcoding is enabled for the specified variable. The VTRANSCODEX function, however, evaluates the argument to determine the variable name. The function then returns the transcoding status (on or off) that is associated with that variable name.

• The VTRANSCODE function does not accept an expression as an argument. The VTRANSCODEX function accepts expressions, but the value of the specified expression cannot denote an array reference.

• Related functions return the value of other variable attributes, such as the variable name, type, format, and length. For a list of the variable attributes, see the “Variable Information” functions in SAS Viya Functions and CALL Routines: Reference.

Example

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>attrib x transcode = yes; attr b transcode = no;</td>
<td></td>
</tr>
<tr>
<td>rcl = vtranscodex('y')</td>
<td></td>
</tr>
<tr>
<td>put rcl=;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Functions:

• “VTRANSCODE Function” on page 401

Statements:

• ATTRIB
Part 6

Informats for NLS

Chapter 13

Dictionary of Informats for NLS ........................................... 407
# Chapter 13

## Dictionary of Informats for NLS

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<td>NLMNINZD Informat</td>
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<tr>
<td>NLTIME</td>
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<tr>
<td>$UCS2B</td>
<td>Informat</td>
</tr>
<tr>
<td>$UCS2BE</td>
<td>Informat</td>
</tr>
<tr>
<td>NLMNUM</td>
<td>Informat</td>
</tr>
</tbody>
</table>
There are six categories of SAS informats that support NLS:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIDI Text Handling</td>
<td>Instructs SAS to read bidirectional data values from data variables.</td>
</tr>
<tr>
<td>Character</td>
<td>Instructs SAS to read character data values into character variables.</td>
</tr>
<tr>
<td>DBCS</td>
<td>Instructs SAS to manage various Asian languages.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>Instructs SAS to read data values into variables that represent dates, times, and datetimes.</td>
</tr>
<tr>
<td>Hebrew Text Handling</td>
<td>Instructs SAS to read Hebrew data from data variables.</td>
</tr>
<tr>
<td>Numeric</td>
<td>Instructs SAS to read numeric data values into numeric variables.</td>
</tr>
</tbody>
</table>

The following table provides brief descriptions of the SAS informats. For more detailed descriptions, see the NLS entry for each informat.

<table>
<thead>
<tr>
<th>Category</th>
<th>Language Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character</td>
<td>$UCS2B Informat (p. 513)</td>
<td>Reads a character string that is encoded in big-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------</td>
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</tr>
<tr>
<td>$UCS2BE Informat (p. 514)</td>
<td>Reads a character string that is in the encoding of the current SAS session and then converts the character string to big-endian, 16-bit, UCS2, Unicode encoding.</td>
<td></td>
</tr>
<tr>
<td>$UCS2L Informat (p. 515)</td>
<td>Reads a character string that is encoded in little-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td>$UCS2LE Informat (p. 516)</td>
<td>Reads a character string that is in the encoding of the current SAS session and then converts the character string to little-endian, 16-bit, UCS2, Unicode encoding.</td>
<td></td>
</tr>
<tr>
<td>$UCS2X Informat (p. 517)</td>
<td>Reads a character string that is encoded in 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td>$UCS2XE Informat (p. 518)</td>
<td>Reads a character string that is in the encoding of the current SAS session and then converts the character string to 16-bit, UCS2, Unicode encoding.</td>
<td></td>
</tr>
<tr>
<td>$UCS4B Informat (p. 519)</td>
<td>Reads a character string that is encoded in big-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td>$UCS4L Informat (p. 520)</td>
<td>Reads a character string that is encoded in little-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td>$UCS4X Informat (p. 521)</td>
<td>Reads a character string that is encoded in 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td>$UCS4XE Informat (p. 523)</td>
<td>Reads a character string that is in the encoding of the current SAS session, and then converts the character string to 32-bit, UCS4, Unicode encoding.</td>
<td></td>
</tr>
<tr>
<td>$UESC Informat (p. 524)</td>
<td>Reads a character string that is encoded in UESC representation, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td>$UESCE Informat (p. 525)</td>
<td>Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UESC representation.</td>
<td></td>
</tr>
<tr>
<td>$UNCR Informat (p. 526)</td>
<td>Reads an NCR character string, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td>$UNCRE Informat (p. 527)</td>
<td>Reads a character string in the encoding of the current SAS session, and then converts the character string to NCR.</td>
<td></td>
</tr>
<tr>
<td>$UPAREN Informat (p. 528)</td>
<td>Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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</tr>
<tr>
<td><strong>SUPARENE Informat (p. 529)</strong></td>
<td>Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UPAREN representation.</td>
<td></td>
</tr>
<tr>
<td><strong>SUPARENP Informat (p. 530)</strong></td>
<td>Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session, with national characters that remain in the encoding of the UPAREN representation.</td>
<td></td>
</tr>
<tr>
<td><strong>SUTF8X Informat (p. 532)</strong></td>
<td>Reads a character string that is encoded in UTF-8, and then converts the character string to the encoding of the current SAS session.</td>
<td></td>
</tr>
<tr>
<td><strong>MINGUO Informat (p. 421)</strong></td>
<td>Reads dates in Taiwanese format.</td>
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<tr>
<td><strong>NENGO Informat (p. 423)</strong></td>
<td>Reads Japanese date values in the form eyymmdd.</td>
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<tr>
<td><strong>NLDATE Informat (p. 424)</strong></td>
<td>Reads the date value in the specified locale, and then converts the date value to the local SAS date value.</td>
<td></td>
</tr>
<tr>
<td><strong>NLDATM Informat (p. 425)</strong></td>
<td>Reads the date value in the specified locale and then converts the date value to the local SAS date and the day of the week.</td>
<td></td>
</tr>
<tr>
<td><strong>NLDATAM Informat (p. 426)</strong></td>
<td>Reads the datetime value of the specified locale, and then converts the datetime value to the local SAS datetime value.</td>
<td></td>
</tr>
<tr>
<td><strong>NLDATMAP Informat (p. 427)</strong></td>
<td>Reads the date value in the specified locale, and then converts the date value to the local SAS datetime with either a.m. or p.m.</td>
<td></td>
</tr>
<tr>
<td><strong>NLDATMW Informat (p. 428)</strong></td>
<td>Reads the date value in the specified locale and then converts the date value to the local SAS day of the week and the datetime.</td>
<td></td>
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<tr>
<td><strong>NLTIMAP Informat (p. 511)</strong></td>
<td>Reads the time value and uses a.m. and p.m. in the specified locale, and then converts the time value to the local SAS time value.</td>
<td></td>
</tr>
<tr>
<td><strong>NLTIME Informat (p. 512)</strong></td>
<td>Reads the time value in the specified locale, and then converts the time value to the local SAS time value.</td>
<td></td>
</tr>
<tr>
<td><strong>CPTDW Informat (p. 416)</strong></td>
<td>Reads a character string that is in Hebrew DOS (cp862) encoding, and then converts the character string to Windows (cp1255) encoding.</td>
<td></td>
</tr>
<tr>
<td><strong>CPTWD Informat (p. 417)</strong></td>
<td>Reads a character string that is in Windows (cp1255) encoding, and then converts the character string to Hebrew DOS (cp862) encoding.</td>
<td></td>
</tr>
<tr>
<td><strong>EURO Informat (p. 418)</strong></td>
<td>Reads numeric values, removes embedded characters in European currency, and reverses the comma and decimal point.</td>
<td></td>
</tr>
<tr>
<td><strong>EUROX Informat (p. 420)</strong></td>
<td>Reads numeric values and removes embedded characters in European currency.</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
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<tr>
<td></td>
<td>NLMNIAED Informat (p. 429)</td>
<td>Reads the monetary format of the international expression for the United Arab Emirates.</td>
</tr>
<tr>
<td></td>
<td>NLMNIAUD Informat (p. 430)</td>
<td>Reads the monetary format of the international expression for Australia.</td>
</tr>
<tr>
<td></td>
<td>NLMNIBGN Informat (p. 431)</td>
<td>Reads the monetary format of the international expression for Bulgaria.</td>
</tr>
<tr>
<td></td>
<td>NLMNIBRL Informat (p. 432)</td>
<td>Reads the monetary format of the international expression for Brazil.</td>
</tr>
<tr>
<td></td>
<td>NLMNICAD Informat (p. 433)</td>
<td>Reads the monetary format of the international expression for Canada.</td>
</tr>
<tr>
<td></td>
<td>NLMNICCHF Informat (p. 434)</td>
<td>Reads the monetary format of the international expression for Liechtenstein and Switzerland.</td>
</tr>
<tr>
<td></td>
<td>NLMNICNY Informat (p. 435)</td>
<td>Reads the monetary format of the international expression for China.</td>
</tr>
<tr>
<td></td>
<td>NLMNICZK Informat (p. 436)</td>
<td>Reads the monetary format of the international expression for the Czech Republic.</td>
</tr>
<tr>
<td></td>
<td>NLMNIDKK Informat (p. 437)</td>
<td>Reads the monetary format of the international expression for Denmark, Faroe Island, and Greenland.</td>
</tr>
<tr>
<td></td>
<td>NLMNIEEEK Informat (p. 438)</td>
<td>Reads the monetary format of the international expression for Estonia.</td>
</tr>
<tr>
<td></td>
<td>NLMNIEGP Informat (p. 439)</td>
<td>Reads the monetary format of the international expression for Egypt.</td>
</tr>
<tr>
<td></td>
<td>NLMNIEUR Informat (p. 440)</td>
<td>Reads the monetary format of the international expression for Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.</td>
</tr>
<tr>
<td></td>
<td>NLMNIGBP Informat (p. 441)</td>
<td>Reads the monetary format of the international expression for the United Kingdom.</td>
</tr>
<tr>
<td></td>
<td>NLMNIHKD Informat (p. 442)</td>
<td>Reads the monetary format of the international expression for Hong Kong.</td>
</tr>
<tr>
<td></td>
<td>NLMNIHRK Informat (p. 443)</td>
<td>Reads the monetary format of the international expression for Croatia.</td>
</tr>
<tr>
<td></td>
<td>NLMNIHUF Informat (p. 444)</td>
<td>Reads the monetary format of the international expression for Hungary.</td>
</tr>
<tr>
<td></td>
<td>NLMNIIDR Informat (p. 445)</td>
<td>Reads the monetary format of the international expression for Indonesia.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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</tr>
<tr>
<td>NLMNIILS Informat (p. 446)</td>
<td>Reads the monetary format of the international expression for Israel.</td>
<td></td>
</tr>
<tr>
<td>NLMNIINR Informat (p. 447)</td>
<td>Reads the monetary format of the international expression for India.</td>
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</tr>
<tr>
<td>NLMNIJPY Informat (p. 448)</td>
<td>Reads the monetary format of the international expression for Japan.</td>
<td></td>
</tr>
<tr>
<td>NLMNIKRW Informat (p. 449)</td>
<td>Reads the monetary format of the international expression for South Korea.</td>
<td></td>
</tr>
<tr>
<td>NLMNILTL Informat (p. 450)</td>
<td>Reads the monetary format of the international expression for Lithuania.</td>
<td></td>
</tr>
<tr>
<td>NLMNILVL Informat (p. 451)</td>
<td>Reads the monetary format of the international expression for Latvia.</td>
<td></td>
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<tr>
<td>NLMNIMOP Informat (p. 452)</td>
<td>Reads the monetary format of the international expression for Macau.</td>
<td></td>
</tr>
<tr>
<td>NLMNIMXN Informat (p. 453)</td>
<td>Reads the monetary format of the international expression for Mexico.</td>
<td></td>
</tr>
<tr>
<td>NLMNIMYR Informat (p. 454)</td>
<td>Reads the monetary format of the international expression for Malaysia.</td>
<td></td>
</tr>
<tr>
<td>NLMNINOK Informat (p. 455)</td>
<td>Reads the monetary format of the international expression for Norway.</td>
<td></td>
</tr>
<tr>
<td>NLMNINZD Informat (p. 456)</td>
<td>Reads the monetary format of the international expression for New Zealand.</td>
<td></td>
</tr>
<tr>
<td>NLMNIPLN Informat (p. 457)</td>
<td>Reads the monetary format of the international expression for Poland.</td>
<td></td>
</tr>
<tr>
<td>NLMNIRUB Informat (p. 458)</td>
<td>Reads the monetary format of the international expression for Russia.</td>
<td></td>
</tr>
<tr>
<td>NLMNISEK Informat (p. 459)</td>
<td>Reads the monetary format of the international expression for Sweden.</td>
<td></td>
</tr>
<tr>
<td>NLMNISGD Informat (p. 460)</td>
<td>Reads the monetary format of the international expression for Singapore.</td>
<td></td>
</tr>
<tr>
<td>NLMNITHB Informat (p. 461)</td>
<td>Reads the monetary format of the international expression for Thailand.</td>
<td></td>
</tr>
<tr>
<td>NLMNITRY Informat (p. 462)</td>
<td>Reads the monetary format of the international expression for Turkey.</td>
<td></td>
</tr>
<tr>
<td>NLMNITWD Informat (p. 463)</td>
<td>Reads the monetary format of the international expression for Taiwan.</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>NLMNIUSD Informat (p. 464)</td>
<td>Reads the monetary format of the international expression for Puerto Rico and the United States.</td>
<td></td>
</tr>
<tr>
<td>NLMNIZAR Informat (p. 465)</td>
<td>Reads the monetary format of the international expression for South Africa.</td>
<td></td>
</tr>
<tr>
<td>NLMNLAED Informat (p. 466)</td>
<td>Reads the monetary format of the local expression for the United Arab Emirates.</td>
<td></td>
</tr>
<tr>
<td>NLMNLAUD Informat (p. 467)</td>
<td>Reads the monetary format of the local expression for Australia.</td>
<td></td>
</tr>
<tr>
<td>NLMNLBGN Informat (p. 468)</td>
<td>Reads the monetary format of the local expression for Bulgaria.</td>
<td></td>
</tr>
<tr>
<td>NLMNLBRL Informat (p. 469)</td>
<td>Reads the monetary format of the local expression for Brazil.</td>
<td></td>
</tr>
<tr>
<td>NLMNLCAD Informat (p. 470)</td>
<td>Reads the monetary format of the local expression for Canada.</td>
<td></td>
</tr>
<tr>
<td>NLMNLCHF Informat (p. 471)</td>
<td>Reads the monetary format of the local expression for Liechtenstein and Switzerland.</td>
<td></td>
</tr>
<tr>
<td>NLMNLCNY Informat (p. 472)</td>
<td>Reads the monetary format of the local expression for China.</td>
<td></td>
</tr>
<tr>
<td>NLMNLCHF Informat (p. 473)</td>
<td>Reads the monetary format of the local expression for the Czech Republic.</td>
<td></td>
</tr>
<tr>
<td>NLMNLDDKK Informat (p. 474)</td>
<td>Reads the monetary format of the local expression for Denmark, the Faroe Island, and Greenland.</td>
<td></td>
</tr>
<tr>
<td>NLMNLEEK Informat (p. 475)</td>
<td>Reads the monetary format of the local expression for Estonia.</td>
<td></td>
</tr>
<tr>
<td>NLMNLEG Informat (p. 476)</td>
<td>Reads the monetary format of the local expression for Egypt.</td>
<td></td>
</tr>
<tr>
<td>NLMNLEUR Informat (p. 477)</td>
<td>Reads the monetary format of the local expression for Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.</td>
<td></td>
</tr>
<tr>
<td>NLMNLGBP Informat (p. 478)</td>
<td>Reads the monetary format of the local expression for the United Kingdom.</td>
<td></td>
</tr>
<tr>
<td>NLMNLHKD Informat (p. 479)</td>
<td>Reads the monetary format of the local expression for Hong Kong.</td>
<td></td>
</tr>
<tr>
<td>NLMNLHRK Informat (p. 480)</td>
<td>Reads the monetary format of the local expression for Croatia.</td>
<td></td>
</tr>
<tr>
<td>NLMNLMUF Informat (p. 481)</td>
<td>Reads the monetary format of the local expression for Hungary.</td>
<td></td>
</tr>
<tr>
<td>NLMNLDGBP Informat (p. 482)</td>
<td>Reads the monetary format of the local expression for Indonesia.</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>NLMNLILS Informat (p. 483)</td>
<td>Reads the monetary format of the local expression for Israel.</td>
</tr>
<tr>
<td></td>
<td>NLMNLINR Informat (p. 484)</td>
<td>Reads the monetary format of the local expression for India.</td>
</tr>
<tr>
<td></td>
<td>NLMNLJPY Informat (p. 485)</td>
<td>Reads the monetary format of the local expression for Japan.</td>
</tr>
<tr>
<td></td>
<td>NLMNLKRW Informat (p. 486)</td>
<td>Reads the monetary format of the local expression for South Korea.</td>
</tr>
<tr>
<td></td>
<td>NLMNLLTL Informat (p. 487)</td>
<td>Reads the monetary format of the local expression for Lithuania.</td>
</tr>
<tr>
<td></td>
<td>NLMNLLVL Informat (p. 488)</td>
<td>Reads the monetary format of the local expression for Latvia.</td>
</tr>
<tr>
<td></td>
<td>NLMNLMOP Informat (p. 489)</td>
<td>Reads the monetary format of the local expression for Macau.</td>
</tr>
<tr>
<td></td>
<td>NLMNLMXN Informat (p. 490)</td>
<td>Reads the monetary format of the local expression for Mexico.</td>
</tr>
<tr>
<td></td>
<td>NLMNLMYR Informat (p. 491)</td>
<td>Reads the monetary format of the local expression for Malaysia.</td>
</tr>
<tr>
<td></td>
<td>NLMNLNOK Informat (p. 492)</td>
<td>Reads the monetary format of the local expression for Norway.</td>
</tr>
<tr>
<td></td>
<td>NLMNLNZD Informat (p. 493)</td>
<td>Reads the monetary format of the local expression for New Zealand.</td>
</tr>
<tr>
<td></td>
<td>NLMNPLPLN Informat (p. 494)</td>
<td>Reads the monetary format of the local expression for Poland.</td>
</tr>
<tr>
<td></td>
<td>NLMNLRUB Informat (p. 495)</td>
<td>Reads the monetary format of the local expression for Russia.</td>
</tr>
<tr>
<td></td>
<td>NLMNLSEK Informat (p. 496)</td>
<td>Reads the monetary format of the local expression for Sweden.</td>
</tr>
<tr>
<td></td>
<td>NLMNLSGD Informat (p. 497)</td>
<td>Reads the monetary format of the local expression for Singapore.</td>
</tr>
<tr>
<td></td>
<td>NLMNLTTHB Informat (p. 498)</td>
<td>Reads the monetary format of the local expression for Thailand.</td>
</tr>
<tr>
<td></td>
<td>NLMNLTRTRY Informat (p. 499)</td>
<td>Reads the monetary format of the local expression for Turkey.</td>
</tr>
<tr>
<td></td>
<td>NLMNLTWD Informat (p. 500)</td>
<td>Reads the monetary format of the local expression for Taiwan.</td>
</tr>
<tr>
<td></td>
<td>NLMNLUUSD Informat (p. 501)</td>
<td>Reads the monetary format of the local expression for Puerto Rico, and the United States.</td>
</tr>
<tr>
<td></td>
<td>NLMNLZAR Informat (p. 502)</td>
<td>Reads the monetary format of the local expression for South Africa.</td>
</tr>
<tr>
<td></td>
<td>NLMNY Informat (p. 503)</td>
<td>Reads monetary data in the specified locale for the local expression, and then converts the data to a numeric value.</td>
</tr>
</tbody>
</table>
### Dictionary

#### $\text{CPTDW}$ Informat

Reads a character string that is in Hebrew DOS (cp862) encoding, and then converts the character string to Windows (cp1255) encoding.

**Category:** Hebrew Text Handling

**Syntax**

$\text{CPTDW}_w$

**Syntax Description**

$w$

specifies the width of the input field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>1–32767</td>
</tr>
</tbody>
</table>

**Comparisons**

The $\text{CPTDW}_w$ informat performs processing that is opposite of the $\text{CPTWD}_w$ informat.

**Example**

The following example uses the input value of 808182.
$CPTWD Informat

Reads a character string that is in Windows (cp1255) encoding, and then converts the character string to Hebrew DOS (cp862) encoding.

Category: Hebrew Text Handling

Syntax

$CPTWD \texttt{w}.

Syntax Description

\texttt{w}

specifies the width of the input field.

Default 200

Range 1–32767

Comparisons

The $CPTWD \texttt{w}.$ informat performs processing that is opposite of the $CPTDW \texttt{w}.$ informat.

Example

The following example uses the input value of \texttt{דב}. 

\[ x = \text{input}('808182',\texttt{cptdw6}); \]
\[ \text{put } x; \]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ x = \text{input}('808182',\texttt{cptdw6}); ] \text{put } x; ]</td>
<td>דב</td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$CPTDW Format” on page 88
- “$CPTWD Format” on page 89

Informat:
- “$CPTWD Informat” on page 417
### Statements

```plaintext
x=input ('€',cptwd6.);
put x;
```

### See Also

**Formats:**
- "$CPTWD Format" on page 89
- "$CPTDW Format" on page 88

**Informat:**
- "$CPTDW Informat" on page 416

---

**EURO Informat**

Reads numeric values, removes embedded characters in European currency, and reverses the comma and decimal point.

**Category:** Numeric

---

**Syntax**

`EUROw.d`

**Syntax Description**

- `w` specifies the width of the input field.
  - Default: 6
  - Range: 1–32
- `d` specifies the power of 10 by which to divide the value. If the data contains decimal points, the `d` value is ignored.
  - Default: 0
  - Range: 0–31

**Details**

The `EUROw.d` informat reads numeric values and removes embedded euro symbols (€), commas, blanks, percent signs, hyphens, and close parentheses from the input data. A decimal point is assumed to be a separator between the whole number and the decimal portion. The `EUROw.d` informat converts an open parenthesis at the beginning of a field to a minus sign.
Comparisons

• The EURO\textit{w.d} informat is similar to the EUROX\textit{w.d} informat, but EUROX\textit{w.d} reverses the roles of the decimal point and the comma. This convention is common in European countries.

• If no commas or periods appear in the input, then the EURO\textit{w.d} and the EUROX\textit{w.d} informats are interchangeable.

Example

The following table shows input values for currency in euros, the SAS statements that are applied, and the results.

```sas
data _null_
   input x euro10.;
   put x=
   datalines;
E1
E1.23
  1.23
1,234.56
;
run;
SAS Log:
x=1
x=1.23
x=1.23
x=1234.56
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>input x euro10.; put x;</td>
<td>1</td>
</tr>
<tr>
<td>E1.23</td>
<td>input x euro10.; put x;</td>
<td>1.23</td>
</tr>
<tr>
<td>1.23</td>
<td>input x euro10.; put x;</td>
<td>1.23</td>
</tr>
<tr>
<td>1,234.56</td>
<td>input x euro10.; put x;</td>
<td>1234.56</td>
</tr>
</tbody>
</table>

See Also

Formats:

• “EURO Format” on page 96
• “EUROX Format” on page 99
Informat:

- “EUROX Informat” on page 420

**EUROX Informat**

Reads numeric values and removes embedded characters in European currency.

**Category:** Numeric

**Syntax**

EUROX\(w.d\)

**Syntax Description**

\(w\)

specifies the width of the input field.

- Default: 6
- Range: 1–32

\(d\)

specifies the power of 10 by which to divide the value. If the data contains a comma, which represents a decimal point, the \(d\) value is ignored.

- Default: 0
- Range: 0–31

**Details**

The EUROX\(w.d\) informat reads numeric values and removes embedded euro symbols (E), periods, blanks, percent signs, hyphens, and close parentheses from the input data. A comma is assumed to be a separator between the whole number and the decimal portion. The EUROX\(w.d\) informat converts an open parenthesis at the beginning of a field to a minus sign.

**Comparisons**

- The EUROX\(w.d\) informat is similar to the EURO\(w.d\) informat, but EURO\(w.d\) reverses the roles of the comma and the decimal point. This convention is common in English-speaking countries.
- If no commas or periods appear in the input, the EUROX\(w.d\) and the EURO\(w.d\) informats are interchangeable.

**Example**

The following table shows input values for currency in euros, the SAS statements that are applied, and the results.

data _null_
   input x eurox10.;
```
put x=;
datalines;
E1
E1.23
1.23
1,234.56
; run;
SAS Log:
7 input x eurox10.;
8 put x=;
9 datalines;
x=1
x=123
x=123
x=1.23456
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>input x eurox10.; put x;</td>
<td>1</td>
</tr>
<tr>
<td>E1.23</td>
<td>input x eurox10.; put x;</td>
<td>123</td>
</tr>
<tr>
<td>1.23</td>
<td>input x eurox10.; put x;</td>
<td>123</td>
</tr>
<tr>
<td>1,234.56</td>
<td>input x eurox10.; put x;</td>
<td>1.23456</td>
</tr>
</tbody>
</table>

**See Also**

**Formats:**
- “EURO Format” on page 96
- “EUROX Format” on page 99

**Informat:**
- “EURO Informat” on page 418

**MINGUO Informat**

Reads dates in Taiwanese format.

**Category:** Date and Time
Syntax
MINGUOW.

Syntax Description

\( w \)

specifies the width of the input field.

**Default**  6

**Range**  6–10

Details

The general form of a Taiwanese date is \( yyyyymmdd \):

- \( yyyy \)
  - is an integer that represents the year.

- \( mm \)
  - is an integer from 01 through 12 that represents the month.

- \( dd \)
  - is an integer from 01 through 31 that represents the day of the month.

The Taiwanese calendar uses 1912 as the base year (01/01/01 is January 1, 1912). Dates before 1912 are not valid. Year values do not roll over after 100 years. Instead, they continue to increase.

You can separate the year, month, and day values with any delimiters, such as blanks, slashes, or hyphens, that are permitted by the YYMDDW. informat. If delimiters are used, place them between all the values. If you omit delimiters, be sure to use a leading zero for days or months that have a value less than 10.

Example

The following examples use different dates for input values.

```plaintext
input date minguo10.;
put date date9.;
data _null_;
  input date minguo10.;
  put date date9.;
datalines;
49/01/01
891215
03-01-01
;
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>49/01/01</td>
<td>01JAN1960</td>
</tr>
<tr>
<td>891215</td>
<td>15DEC2000</td>
</tr>
</tbody>
</table>
See Also

Format:
- “MINGUO Format” on page 101

Informat:
- “YYMMDD Informat” in SAS Viya Formats and Informats: Reference

NENGO Informat

Reads Japanese date values in the form eyymmdd.

Category: Date and Time

Syntax

NENGOw:

Syntax Description

$w$

specifies the width of the input field.

Default 10

Range 7–32

Details

The general form of a Japanese date is eyymmdd:

$e$

is the first letter of the name of the imperial era (Meiji, Taisho, Showa, or Heisei).

$yy$

is an integer that represents the year.

$mm$

is an integer from 01 through 12 that represents the month.

$dd$

is an integer from 01 through 31 that represents the day of the month.

The $e$ value can be separated from the integers by a period. If you omit $e$, SAS uses the current imperial era. You can separate the year, month, and day values by blanks or any nonnumeric character. However, if delimiters are used, place them between all the values. If you omit delimiters, be sure to use a leading zero for days or months that are values less than 10.
Example

The following examples use different input values.

```sas
input nengo_date nengo8.;
put nengo_date date9.;
data _null_;  
   input nengo_date nengo8.;
   put nengo_date date9.;
   put nengo_date= ;
datalines;
h11108
h.11108
11/10/08
;
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>h11108</td>
<td>08OCT1999</td>
</tr>
<tr>
<td>h.11108</td>
<td>08OCT1999</td>
</tr>
<tr>
<td>11/10/08</td>
<td>08OCT1999</td>
</tr>
</tbody>
</table>

See Also

Formats:
- “NENGO Format” on page 102

NLDATE Informat

Reads the date value in the specified locale, and then converts the date value to the local SAS date value.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Date and Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alias:</td>
<td>NLDATEW</td>
</tr>
</tbody>
</table>

Syntax

NLDATEw.

Syntax Description

w specifies the width of the input field.

Default 10
Example

The following examples use the input February 24, 2003.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>15760</td>
</tr>
<tr>
<td>dy='February 24, 2003';</td>
<td></td>
</tr>
<tr>
<td>y=input('dy,nldate200.);</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>15760</td>
</tr>
<tr>
<td>dy='24. Februar 2003';</td>
<td></td>
</tr>
<tr>
<td>y=input('dy,nldate16.);</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLDATE Format” on page 106

NLDATEW Informat

Reads the date value in the specified locale and then converts the date value to the local SAS date and the day of the week.

Category: Date and Time

Alignment: Left

Syntax

NLDATEWw.

Syntax Description

w specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

Default 20

Range 16–200
Example

The following examples use the input February 24, 2014.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates; data;</td>
<td>19778</td>
</tr>
<tr>
<td>dy='Monday, February 24, 2014';</td>
<td></td>
</tr>
<tr>
<td>y=input(dy,nldatew200.);</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>19778</td>
</tr>
<tr>
<td>dy='Mo. 24.Februar 2014';</td>
<td></td>
</tr>
<tr>
<td>y=input(dy,nldatew16.);</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>

NLDATM Informat

Reads the datetime value of the specified locale, and then converts the datetime value to the local SAS datetime value.

**Category:** Date and Time  
**Alias:** NLDATMW, NLDATMAP  

**Syntax**

NLDATMw.

**Syntax Description**

w

specifies the width of the input field.

Default 19  
Range 19–200  

Example

The following examples use the input value of February 24, 2003 12:39:43.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates; data;</td>
<td>426</td>
</tr>
<tr>
<td>dy='Monday, February 24, 2014';</td>
<td></td>
</tr>
<tr>
<td>y=input(dy,nldatew200.);</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td></td>
</tr>
<tr>
<td>dy='Mo. 24.Februar 2014';</td>
<td></td>
</tr>
<tr>
<td>y=input(dy,nldatew16.);</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
<tr>
<td>run;</td>
<td></td>
</tr>
</tbody>
</table>
Statements | Results
---|---
```plaintext
options locale=English_UnitedStates;
y=input('24.Feb03:12:39:43', nldatm.);
put y=;
```

```plaintext
1361709583
```

```plaintext
options locale=German_Germany;
y=input('24.Februar 2003 12.39 Uhr', nldatm.);
put y=;
```

```plaintext
1330171200
```

See Also

Format:
- “NLDATM Format” on page 127

NLDATMAP Informat

Reads the date value in the specified locale, and then converts the date value to the local SAS datetime with either a.m. or p.m.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Date and Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment:</td>
<td>Left</td>
</tr>
</tbody>
</table>

Syntax

NLDATMAP_w:

**Syntax Description**

w

specifies the width of the output field. If necessary, SAS abbreviates the datetime value to fit the format width.

| Default | 32 |
| Range   | 17–200 |

Example

These examples use the input value of 12:39:43 p.m. on February 24, 2014.

Statements | Results
---|---
```plaintext
---+---+---+---+---
```
### NLDATMW Informat

Reads the date value in the specified locale and then converts the date value to the local SAS day of the week and the datetime.

**Category:** Date and Time  
**Alignment:** Left

#### Syntax

\[ \text{NLDATMWw} \]

#### Syntax Description

- \( w \)
  - specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.

  **Default:** 40  
  **Range:** 34–200

#### Example

The following examples use the input Mon, Feb 24, 2014 12:39:43 PM.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
| options locale=English_UnitedStates; data;  
  dy='February 24, 2014 12:39:43 PM';  
  y=input(dy,nldatmap200.);  
  put y=;  
  run; | 1708864783 |

| options locale=Spanish_Mexico; data;  
  dy='24/02/2003 12:39:43 PM';  
  y=input(dy,nldatmap200.);  
  put y=;  
  run; | 1708864783 |
Statements          Results

options locale=English_UnitedStates;
data;
   dy='Mon, Feb 24, 2014 12:39:43 PM';
   y=input(dy,nldatmw200.);
   put y=;
run;

1708864783

options locale=German_Germany;
dy='Mo, 24. Feb 2014 12.39 Uhr';
y=input(dy,nldatmw16.);
put y=;
run;

1708864783

NLMNIAED Informat
Reads the monetary format of the international expression for the United Arab Emirates.

Category: Numeric
Alignment: Left

Syntax

NLMNIAEDw.d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the d value is ignored.

Default 3
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=input('($12,345.67)',nlmniaed32.2);
y=input('($12,345.67)',dollar32.2);
Statements | Results
---|---
| -12345.67 |
| -12345.67 |

**See Also**

**Informat:**
- “NLMNLAED Informat” on page 466

---

**NLMNIAUD Informat**

Reads the monetary format of the international expression for Australia.

**Syntax**

NLMNIAUDw.d

**Syntax Description**

* w
  - specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

* d
  - specifies to divide the number by $10^d$. If the data contains decimal points, the d value is ignored.
  - **Default:** 2
  - **Range:** 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmniaud32.2);
y=input('($12,345.67)',dollar32.2);
```
Statements | Results
----+----+----
| put x=; | -12345.67 |
| put y=; | -12345.67 |

See Also

Informat:
- “NLMNLAUD Informat” on page 467

NLMNIBGN Informat

Reads the monetary format of the international expression for Bulgaria.

Category: Numeric
Alignment: Left

Syntax

NLMNIBGNgw.d

Syntax Description

w
- specifies the width of the output field.
  - Default: 12
  - Range: 8–32

d
- specifies to divide the number by 10^d. If the data contains decimal points, the d value is ignored.
  - Default: 2
  - Range: 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=put('(-1234.56789)',nlmnibgn32.2);
y=put('(-1234.56789)',dollar32.2);
```
### Statements Result

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

### See Also

**Informat:**
- “NLMNLBGN Informat” on page 468

---

**NLMNIBRL Informat**

Reads the monetary format of the international expression for Brazil.

**Category:** Numeric  
**Alignment:** Left

### Syntax

`NLMNIBRLw.d`

### Syntax Description

**w**
- Specifies the width of the output field.  
  - **Default:** 12  
  - **Range:** 8–32

**d**
- Specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.  
  - **Default:** 2  
  - **Range:** 0–28

### Example

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```
x=input('($12,345.67)',nlmnibr132.2);
y=input('($12,345.67)',dollar32.2);
```
### Statements

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

---

### See Also

**Informat:**

- “NLMNLBRL Informat” on page 469

---

### NLMNICAD Informat

Reads the monetary format of the international expression for Canada.

**Category:** Numeric  
**Alignment:** Left

---

### Syntax

NLMNICADw.d

### Syntax Description

**w**

- specifies the width of the output field.  
  - **Default:** 12  
  - **Range:** 8–32

**d**

- specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.  
  - **Default:** 2  
  - **Range:** 0–28

---

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnicad32.2);
y=input'($12,345.67)',dollar32.2);
```
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:

- “NLMNICAD Format” on page 156

NLMNICHF Informat

Reads the monetary format of the international expression for Liechtenstein and Switzerland.

Category: Numeric
Alignment: Left

Syntax

NLMNICHFw.d

Syntax Description

- **w**
  - specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d**
  - specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - Default: 2
  - Range: 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input'($12,345.67)',nlmnichf32.2);
y=input'($12,345.67)'dollar32.2);
```
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “NLMNICHF Format” on page 157

**NLMNICNY Informat**

Reads the monetary format of the international expression for China.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

NLMNICNY\(w.d\)

**Syntax Description**

\(w\)

- specifies the width of the output field.
  - Default: 12
  - Range: 8–32

\(d\)

- specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input'($12,345.67)',nlmnicny32.2);
y=input'($12,345.67)"dollar32.2";
```
### NLMNICZK Informat

Reads the monetary format of the international expression for the Czech Republic.

**Category:** Numeric  
**Alignment:** Left

### Syntax

\[ \text{NLMNICZK} w.d \]

### Syntax Description

- **w**  
  - Specifies the width of the output field.  
  - Default: 12  
  - Range: 8–32

- **d**  
  - Specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.  
  - Default: 4  
  - Range: 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
x=\text{input}'(\$12,345.67)',\text{nlmniczk32.2}氺;
\]

\[
y=\text{input}'(\$12,345.67)',\text{dollar32.2}氺;
\]
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-------------------------</td>
</tr>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

### See Also

**Informat:**

- “NLMNLCKZ Informat” on page 473

---

**NLMNIDKK Informat**

Reads the monetary format of the international expression for Denmark, Faroe Island, and Greenland.

**Category:** Numeric

**Alignment:** Left

### Syntax

\[
\text{NLMNIDKK} \quad w.d
\]

### Syntax Description

- **w**
  - Specifies the width of the output field.
  - **Default:** 912
  - **Range:** 8–32

- **d**
  - Specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
  - **Default:** 2
  - **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
x=\text{input}(\text{'(}$12,345.67\text{'},\text{nlmnidkk32.2})\);
y=\text{input}(\text{'(}$12,345.67\text{'},\text{dollar32.2})\);
\]
See Also

Format:

- “NLMNIDKK Format” on page 160

NLMNIEEK Informat

Reads the monetary format of the international expression for Estonia.

**Category:** Numeric  
**Alignment:** Left

**Syntax**

NLMNIEEK\(w,d\)

**Syntax Description**

\(w\)

- Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

\(d\)

- Specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
  - Default: 4
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmniek32.2);
y=input('($12,345.67')',dollar32.2);
```
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Informat:
- “NLMNLEEK Informat” on page 475

NLMNIEGP Informat
Reads the monetary format of the international expression for Egypt.

Category: Numeric
Alignment: Left

Syntax

NLMNIEGPw.d

Syntax Description

w
specifies the width of the output field.
Default 12
Range 8–32

d
specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
Default 3
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```r
x=input('($12,345.67)',nlmniegp32.2);
y=input('($12,345.67)',dollar32.2);
```
## Results

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

### See Also

**Informat:**
- “NLMNLEGP Informat” on page 476

### NLMNIEUR Informat

Reads the monetary format of the international expression for Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

**Category:** Numeric

**Alignment:** Left

### Syntax

```
NLMNIEURw.d
```

### Syntax Description

**w**

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

**d**

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

- **Default:** 2
- **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnieur32.2);  
y=input'($12,345.67)"dollar32.2);  
```
See Also

Format:

- “NLMNIEUR Format” on page 163

NLMNIGBP Informat

Reads the monetary format of the international expression for the United Kingdom.

Category: Numeric
Alignment: Left

Syntax

NLMNIGBPw.d

Syntax Description

w
specifies the width of the output field.
Default 12
Range 8–32

d
specifies to divide the number by $10^d$. If the data contains decimal points, the d value is ignored.
Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input'($12,345.67)',nlmnigbp32.2);
y=input'($12,345.67')dollar32.2);
```
Statements | Results
---|---
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:

- “NLMNIGBP Format” on page 164

**NLMNIHKD Informat**

Reads the monetary format of the international expression for Hong Kong.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

\( \text{NLMNIHKD}w.d \)

**Syntax Description**

- **\( w \)** specifies the width of the output field.
  - Default 12
  - Range 8–32
- **\( d \)** specifies to divide the number by \(10^d\). If the data contains decimal points, the \( d \) value is ignored.
  - Default 2
  - Range 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnihkd32.2);
y=input'($12,345.67)'dollar32.2);
```
Statements | Results
---|--
puts x=; | -12345.67
puts y=; | -12345.67

See Also

Format:

- “NLMNIH KD Format” on page 165

NLMNIHRK Informat
Reads the monetary format of the international expression for Croatia.

Category: Numeric
Alignment: Left

Syntax

NLMNIHRKw.d

Syntax Description

w
specifies the width of the output field.

Default 12
Range 8–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the d value is ignored.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=input('($12,345.67)',nlmnihrk32.2);
y=input('($12,345.67)',dollar32.2);
### NLMNIHUF Informat

Reads the monetary format of the international expression for Hungary.

**Category:** Numeric  
**Alignment:** Left

### Syntax

\[ \text{NLMNIHUF} w.d \]

### Syntax Description

- **\( w \)** specifies the width of the output field.
  - Default: 12  
  - Range: 8–32
- **\( d \)** specifies to divide the number by \( 10^d \). If the data contains decimal points, the \( d \) value is ignored.
  - Default: 2  
  - Range: 0–28

### Example

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```plaintext
x=input('($12,345.67)',nlmnihuf32.2);
y=input('($12,345.67)',dollar32.2);
```
NLMNIIDR Informat

Reads the monetary format of the international expression for Indonesia.

**Category:** Numeric

**Alignment:** Left

### Syntax

\[ \text{NLMNIIDR}_w.d \]

### Syntax Description

- **w** specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d** specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
  - Default: 2
  - Range: 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmniidr32.2);
y=input('($12,345.67)',dollar32.2);
```

---

See Also

Informat:

- “NLMNLHUF Informat” on page 481
### Statements

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

#### See Also

**Informats:**

- “NLMNLIDR Informat” on page 482

### NLMNIILS Informat

Reads the monetary format of the international expression for Israel.

**Category:** Numeric  
**Alignment:** Left

#### Syntax

\[ \text{NLMNIILS} w.d \]

#### Syntax Description

- **w**  
  specifies the width of the output field.  
  
  - Default: 12  
  - Range: 8–32

- **d**  
  specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.  
  
  - Default: 4  
  - Range: 0–28

#### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input'($12,345.67)',nlmniils32.2);
y=input'($12,345.67)'dollar32.2);
```
See Also

Format:

• “NLMNIILS Format” on page 169

NLMNIINR Informat
Reads the monetary format of the international expression for India.

Category: Numeric
Alignment: Left

Syntax

NLMNIINRw.d

Syntax Description

w

specifies the width of the output field.

Default 12
Range 8–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the d value is ignored.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=input('($12,345.67)',nlmniinr32.2);
y=input('($12,345.67)',dollar32.2);

Statements | Results
--- | ---
| put x=; | -12345.67 |
| put y=; | -12345.67 |
### Statements ## Results

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

### See Also

**Informat:**

- “NLMNLINR Informat” on page 484

---

**NLMNIJPY Informat**

Reads the monetary format of the international expression for Japan.

**Category:** Numeric

**Alignment:** Left

### Syntax

$\text{NLMNIJPY}_{w,d}$

### Syntax Description

- $w$
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- $d$
  - Specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - Default: 0
  - Range: 0–28

### Example

In the following example, the `LOCALE=` system option is set to English_UnitedStates.

```plaintext
x=input'($12,345.67)',nlmnijpy32.2);
y=input'($12,345.67)'dollar32.2);
```
### NLMNIKRW Informat

Reads the monetary format of the international expression for South Korea.

**Category:** Numeric  
**Alignment:** Left

#### Syntax

\[
\text{NLMNIKRW}^w.d
\]

#### Syntax Description

**\(w\)**  
Specifies the width of the output field.  
- **Default**: 12  
- **Range**: 8–32

**\(d\)**  
Specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.  
- **Default**: 0  
- **Range**: 0–28

#### Example

In the following example, the `LOCALE=` system option is set to English_UnitedStates.

\[
x = \text{input}'($12,345.67)' , \text{nlnmikrw32.2}); \\
y = \text{input}'($12,345.67)' , \text{dollar32.2});
\]
Statements | Results
---+----+----+
| put x=; | -12345.67 |
| put y=; | -12345.67 |

See Also

Informat:
• “NLMNLKRW Informat” on page 486

NLMNILTL Informat
Reads the monetary format of the international expression for Lithuania.

Category: Numeric
Alignment: Left

Syntax
NLMNILTLw.d

Syntax Description

\( w \)

specifies the width of the output field.

Default 12
Range 8–32

\( d \)

specifies to divide the number by \(10^{d} \). If the data contains decimal points, the \( d \) value is ignored.

Default 4
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmniltl32.2);
y=input('($12,345.67)',dollar32.2);
```
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

**Informat:**
- “NLMNLLTL Informat” on page 487

---

**NLMNIVL Informat**

Reads the monetary format of the international expression for Latvia.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

NLMNIVL\(w.d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- Default: 12
- Range: 8–32

\(d\)

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

- Default: 4
- Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnilvl32.2);
y=input('($12,345.67)',dollar32.2);
```
### NLMNIMOP Informat

Reads the monetary format of the international expression for Macau.

**Category:** Numeric  
**Alignment:** Left

#### Syntax

\[ \text{NLMNIMOP} w.d \]

#### Syntax Description

**\( w \)**  
Specifies the width of the output field.  
- Default: 12  
- Range: 8–32

**\( d \)**  
Specifies to divide the number by \(10^d\). If the data contains decimal points, the \( d \) value is ignored.  
- Default: 2  
- Range: 0–28

#### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlnmimop32.2);
y=input('($12,345.67)',dollar32.2);
```

---

### See Also

**Informat:**  
- “NLMNLLVL Informat” on page 488
Statements | Results
---+----1----+
         | ----+
put x=;  | -12345.67
put y=;  | -12345.67

See Also

Informat:

• “NLMNLMP Informat” on page 489

NLMNIMXN Informat

Reads the monetary format of the international expression for Mexico.

Category: Numeric
Alignment: Left

Syntax

NLMNIMXNw.d

Syntax Description

w

specifies the width of the output field.

Default 12
Range 8–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the d value is ignored.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=input('($12,345.67)',nlmnimx32.2);
y=input('($12,345.67)',dollar32.2);
See Also

Informat:
• “NLMNLMXN Informat” on page 490

NLMNIMYR Informat
Reads the monetary format of the international expression for Malaysia.

Category: Numeric
Alignment: Left

Syntax
NLMNIMYRw.d

Syntax Description

\( w \)
 specifies the width of the output field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>8–32</td>
</tr>
</tbody>
</table>

\( d \)
 specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0–28</td>
</tr>
</tbody>
</table>

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnimyr32.2);
y=input('($12,345.67)',dollar32.2);
```
Statements | Results
---|---
---+----1----+
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:

- “NLMNIMYR Format” on page 177

NLMNINOK Informat

Reads the monetary format of the international expression for Norway.

Category: Numeric
Alignment: Left

Syntax

\texttt{NLMNINOK}w.d

Syntax Description

- \texttt{w}
  - specifies the width of the output field.
  - Default: 12
  - Range: 8–32
- \texttt{d}
  - specifies to divide the number by $10^d$. If the data contains decimal points, the \texttt{d} value is ignored.
  - Default: 2
  - Range: 0–28

Example

In the following example, the \texttt{LOCALE=} system option is set to English\_UnitedStates.

\begin{verbatim}
x=input'($12,345.67)',nlmninok32.2);
y=input'($12,345.67)'dollar32.2);
\end{verbatim}
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:

- “NLMNINOK Format” on page 178

**NLMNINZD Informat**

Reads the monetary format of the international expression for New Zealand.

**Category:** Numeric

**Alignment:** Left

**Syntax**

NLMNINZD\(w.d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

Default 12

Range 8–32

\(d\)

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

Default 2

Range 0–28

**Example**

In the following example, the LOCATE= system option is set to English_UnitedStates.

\[x=\text{input}('($12,345.67')',\text{nlninzd32.2});\]
\[y=\text{input}('($12,345.67')',\text{dollart32.2});\]
NLMNIPLN Informat

Reads the monetary format of the international expression for Poland.

**Category:** Numeric

**Alignment:** Left

## Syntax

NLMNIPLN\(w.d\)

### Syntax Description

\(w\)

- specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

\(d\)

- specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
  - **Default:** 2
  - **Range:** 0–28

## Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input'($12,345.67)',nlmnipln32.2);
y=input'($12,345.67)'dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**
- “NLMNINZD Format” on page 179
NLMNIRUB Informat
Reads the monetary format of the international expression for Russia.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Numeric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment:</td>
<td>Left</td>
</tr>
</tbody>
</table>

Syntax

\[ \text{NLMNIRUB}_w.d \]

Syntax Description

\( w \)
- specifies the width of the output field.
  - Default: 12
  - Range: 8–32

\( d \)
- specifies to divide the number by \(10^d\). If the data contains decimal points, the \( d \) value is ignored.
  - Default: 2
  - Range: 0–28

Example

In the following example, the \texttt{LOCALE=} system option is set to 
\texttt{English UnitedStates}.

\begin{verbatim}
x=input'($12,345.67)',nlmnirub32.2);
y=input'($12,345.67)'dollar32.2);
\end{verbatim}

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{x=}</td>
<td>-12345.67</td>
</tr>
<tr>
<td>\texttt{y=}</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

See Also

Format:

- “NLMNIPLN Format” on page 180
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:
- “NLMNIRUB Format” on page 181

NLMNISEK Informat

Reads the monetary format of the international expression for Sweden.

Category: Numeric
Alignment: Left

Syntax

NLMNISEK\(w,d\)

Syntax Description

\(w\)

specifies the width of the output field.

Default 12
Range 8–32

\(d\)

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input'($12,345.67)',nlmnisek32.2);
y=input'($12,345.67)'dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
See Also

Format:

- “NLMNISEK Format” on page 182

NLMNISGD Informat

Reads the monetary format of the international expression for Singapore.

**Category:** Numeric

**Alignment:** Left

**Syntax**

\[ \text{NLMNISGD}w.d \]

**Syntax Description**

\( w \)

- specifies the width of the output field.

  **Default** 12

  **Range** 8–32

\( d \)

- specifies to divide the number by \( 10^d \). If the data contains decimal points, the \( d \) value is ignored.

  **Default** 2

  **Range** 0–28

**Example**

In the following example, the \text{LOCALE=} system option is set to \text{English\_UnitedStates}.

\[
\begin{align*}
x & = \text{input}'($12,345.67)',\text{nlmnisd}32.2); \\
y & = \text{input}'($12,345.67)\text{dollar}32.2);
\end{align*}
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put ( x=; )</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put ( y=; )</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
See Also

Format:
- “NLMNISGD Format” on page 183

NLMNITHB Informat

Reads the monetary format of the international expression for Thailand.

Category: Numeric
Alignment: Left

Syntax

NLMNITHBw.d

Syntax Description

w
    specifies the width of the output field.
    Default 12
    Range  8–32

d
    specifies to divide the number by 10^d. If the data contains decimal points, the d value is ignored.
    Default 2
    Range  0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=input('($12,345.67)',nlmnithb32.2);
y=input('($12,345.67)',dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input('($12,345.67)',nlmnithb32.2);</td>
<td>-12345.67</td>
</tr>
<tr>
<td>y=input('($12,345.67)',dollar32.2);</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
**Statements** | **Results**
---|---
put x=; | -12345.67
put y=; | -12345.67

**See Also**

**Informat:**

- “NLMNLTHB Informat” on page 498

---

**NLMNITRY Informat**

Reads the monetary format of the international expression for Turkey.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

\[ \text{NLMNITRY}^{w.d} \]

**Syntax Description**

\( w \)

- specifies the width of the output field.
- **Default:** 12
- **Range:** 8–32

\( d \)

- specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
- **Default:** 4
- **Range:** 0–28

**Example**

In the following example, the **LOCALE=** system option is set to **English_UnitedStates**.

```plaintext
x=input('($12,345.67)',nlnitry32.2);
```

```plaintext
y=input('($12,345.67)',dollar32.2);
```

**Statements** | **Results**
---|---
- | -12345.67
### NLMNITWD Informat

Reads the monetary format of the international expression for Taiwan.

**Category:** Numeric  
**Alignment:** Left

#### Syntax

\[
\text{NLMNITWD} \ w, \ d
\]

#### Syntax Description

- \( w \)
  - Specifies the width of the output field.  
    - Default: 12  
    - Range: 8–32

- \( d \)
  - Specifies to divide the number by \(10^d\). If the data contains decimal points, the \( d \) value is ignored.  
    - Default: 2  
    - Range: 0–28

#### Example

In the following example, the \texttt{LOCALE=} system option is set to English\_UnitedStates.

```plaintext
x=input'($12,345.67)',nlmnitwd32.2);
y=input'($12,345.67)\'dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put ( x = )</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put ( y = )</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

---

### See Also

**Informat:**
- “NLMNLTRY Informat” on page 499
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:
- “NLMNITWD Format” on page 186

**NLMNIUSD Informat**

Reads the monetary format of the international expression for Puerto Rico and the United States.

**Category:** Numeric  
**Alignment:** Left

### Syntax

```
NLMNIUSDw.d
```

### Syntax Description

**w**
- specifies the width of the output field.
  - Default: 12  
  - Range: 8–32

**d**
- specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - Default: 2  
  - Range: 0–28

### Example

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```
x=input'($12,345.67)',nlmniusd32.2);
y=input'($12,345.67)'dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>----+----1----+</td>
<td>--+--1+--</td>
</tr>
</tbody>
</table>
See Also

Format:

- “NLMNIUSD Format” on page 187

NLMNIZAR Informat

Reads the monetary format of the international expression for South Africa.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

NLMNIZAR<w,d>

**Syntax Description**

- `<w>`
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- `<d>`
  - Specifies to divide the number by 10^<d>. If the data contains decimal points, the `<d>` value is ignored.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```
x=input'($12,345.67)',nlmnizar32.2);
y=input'($12,345.67)'dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
**NLMNLAED Informat**

Reads the monetary format of the local expression for the United Arab Emirates.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

\[ \text{NLMNLAED}_{w,d} \]

**Syntax Description**

- \( w \)
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- \( d \)
  - Specifies to divide the number by \( 10^d \). If the data contains decimal points, the \( d \) value is ignored.
  - **Default:** 3
  - **Range:** 0–28

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```plaintext
x=input('($12,345.67)',nlmnlaed32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

Format:
- “NLMNIZAR Format” on page 188
**Syntax**

\[ \text{NLMNLAUD} \, w.d \]

**Syntax Description**

- \( w \)
  - specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- \( d \)
  - specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```plaintext
x=input('($12,345.67)',nlmnlaud32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

See Also

**Informat:**

- “NLMNIAED Informat” on page 429
### NLMNLBGN Informat

Reads the monetary format of the local expression for Bulgaria.

- **Category:** Numeric
- **Alignment:** Left

#### Syntax

```
NLMNLBGNw.d
```

#### Syntax Description

- **w**
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d**
  - Specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - Default: 2
  - Range: 0–28

#### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input(-12345.67,nlmnlbgn32.2);
y=input(-12345.67,dollar32.2);
```

#### Statements | Results
---|---
```
put x=;
-12345.67
```
```
put y=;
-12345.67
```

---

### See Also

**Format:**
- “NLMNLAUD Format” on page 190
See Also

Informat:
• “NLMNIBGN Informat” on page 431

NLMNLBRL Informat
Reads the monetary format of the local expression for Brazil.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Numeric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment:</td>
<td>Left</td>
</tr>
</tbody>
</table>

Syntax

NLMNLBRLw.d

Syntax Description

w
  specifies the width of the output field.
  
  Default 12
  
  Range 8–32

d
  specifies to divide the number by 10^d. If the data contains decimal points, the d value is ignored.
  
  Default 2
  
  Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',.nlmnlbrl32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-12345.67</td>
</tr>
<tr>
<td></td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
See Also

Informat:
- “NLMNIBRL Informat” on page 432

NLMNLCAD Informat

Reads the monetary format of the local expression for Canada.

**Category:** Numeric

**Alignment:** Left

**Syntax**

NLMNLCAD\_w,d

**Syntax Description**

\_w

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\_d

specifies to divide the number by 10^d. If the data contains decimal points, the \_d value is ignored.

- **Default:** 2
- **Range:** 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlcad32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
### Statements

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>put x=;</code></td>
<td><code>-12345.67</code></td>
</tr>
<tr>
<td><code>put y=;</code></td>
<td><code>-12345.67</code></td>
</tr>
</tbody>
</table>

### See Also

**Format:**
- “NLMNLCAD Format” on page 193

---

**NLMNLCHF Informat**

Reads the monetary format of the local expression for Liechtenstein and Switzerland.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

`NLMNLCHFw,d`

**Syntax Description**

<table>
<thead>
<tr>
<th>Syntax Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>w</code> specifies the width of the output field.</td>
</tr>
<tr>
<td>Default 12</td>
</tr>
<tr>
<td>Range 8–32</td>
</tr>
<tr>
<td><code>d</code> specifies to divide the number by (10^d). If the data contains decimal points, the <code>d</code> value is ignored.</td>
</tr>
<tr>
<td>Default 2</td>
</tr>
<tr>
<td>Range 0–28</td>
</tr>
</tbody>
</table>

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlchf32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>----+----1----+</td>
</tr>
</tbody>
</table>

---
See Also

Format:
- “NLMNLCHF Format” on page 194

NLMNLCHF Informat
Reads the monetary format of the local expression for China.

Category: Numeric
Alignment: Left

Syntax
NLMNLCHF_{w.d}

Syntax Description

\( w \)
specifies the width of the output field.

Default 12
Range 8–32

\( d \)
specifies to divide the number by \( 10^d \). If the data contains decimal points, the \( d \) value is ignored.

Default 2
Range 0–28

Example
In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
x = \text{input}('($12,345.67)', \text{nlmlcny32.2});
y = \text{input}('($12,345.67)', \text{dollar32.2});
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put \text{x} =;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put \text{y} =;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
NLMNLCZK Informat

Reads the monetary format of the local expression for the Czech Republic.

**Category:** Numeric

**Alignment:** Left

### Syntax

```
NLMNLCZKw.d
```

### Syntax Description

- **w**
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **d**
  - Specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
  - **Default:** 4
  - **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('$(12,345.67)',nlmlcze32.2);
y=input('$(12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

---

**See Also**

Format:

- “NLMNLCNY Format” on page 195
**See Also**

**Informat:**
- “NLNICZK Informat” on page 436

---

**NLMNLDKK Informat**

Reads the monetary format of the local expression for Denmark, the Faroe Island, and Greenland.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

\[ \text{NLMNLDKK} w.d \]

**Syntax Description**

- \( w \) specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- \( d \) specifies to divide the number by \( 10^d \). If the data contains decimal points, the \( d \) value is ignored.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```plaintext
x=input('($12,345.67)',nlmnldkk32.2);
y=input('($12,345.67)',dollar32.2);
```

**Statements** | **Results**
---|---
`put x=;` | -12345.67
`put y=;` | -12345.67
### NLMNLEEK Informat

Reads the monetary format of the local expression for Estonia.

- **Category:** Numeric
- **Alignment:** Left

### Syntax

NLMNLEEK<sub>\(w,d\)\right>

### Syntax Description

- **\(w\)** specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **\(d\)** specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
  - Default: 4
  - Range: 0–28

### Example

In the following example, the **LOCALE=** system option is set to **English_UnitedStates**.

```plaintext
x=input('($12,345.67)',nlmnleek32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

### See Also

Format:

- “NMNLDKK Format” on page 197
See Also

Informat:

• “NLMNIEEK Informat” on page 438

NLMNLEG Informat

Reads the monetary format of the local expression for Egypt.

Category: Numeric
Alignment: Left

Syntax

NLMNLEG \text{w.d}

Syntax Description

\text{w}

specifies the width of the output field.

Default 12

Range 8–32

\text{d}

specifies to divide the number by 10^d. If the data contains decimal points, the \text{d} value is ignored.

Default 3

Range 0–28

Example

In the following example, the \texttt{LOCALE=} system option is set to English_UnitedStates.

\texttt{x=input('($12,345.67)$',nlmnllepg32.2);}
\texttt{y=input('($12,345.67)$',dollar32.2);}

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{put x=;}</td>
<td>-12345.67</td>
</tr>
<tr>
<td>\texttt{put y=;}</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
### NLMNLEUR Informat

Reads the monetary format of the local expression for Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

**Category:** Numeric  
**Alignment:** Left

#### Syntax

NLMNLEUR\textit{w.d}

#### Syntax Description

\textit{w}

specifies the width of the output field.

- **Default:** 12  
- **Range:** 8–32

\textit{d}

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

- **Default:** 2  
- **Range:** 0–28

#### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```r
x=input('($12,345.67)',nlmnluer32.2);
y=input('($12,345.67)',dollar32.2);
```
## Statements

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

### See Also

**Format:**

- “NLMNLEUR Format” on page 200

---

## NLMNLGBP Informat

**Reads the monetary format of the local expression for the United Kingdom.**

- **Category:** Numeric
- **Alignment:** Left

### Syntax

`NLMNLGBP w.d`

### Syntax Description

- **w**
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32
- **d**
  - Specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - **Default:** 2
  - **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)', nlmnlgbp32.2);
y=input('($12,345.67)', dollar32.2);
```
NLMNLHKD Informat

Reads the monetary format of the local expression for Hong Kong.

**Category:** Numeric  
**Alignment:** Left

### Syntax

NLMNLHKD<sub>w.d</sub>

#### Syntax Description

**<sub>w</sub>**

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

**<sub>d</sub>**

specifies to divide the number by 10<sup>d</sup>. If the data contains decimal points, the <sub>d</sub> value is ignored.

- **Default:** 2
- **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlhkd32.2);
y=input('($12,345.67)',dollar32.2);
```

**See Also**

**Format:**

- “NLMNLGBP Format” on page 201
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “NLMNLHKD Format” on page 202

---

**NLMNLHRK Informat**

Reads the monetary format of the local expression for Croatia.

**Category:** Numeric

**Alignment:** Left

**Syntax**

NLMNLHRK\textsubscript{\textit{w.d}}

**Syntax Description**

\begin{itemize}
\item \textbf{\textit{w}}
  \begin{itemize}
  \item Default: 12
  \item Range: 8–32
  \end{itemize}
\item \textbf{\textit{d}}
  \begin{itemize}
  \item Default: 2
  \item Range: 0–28
  \end{itemize}
\end{itemize}

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\begin{verbatim}
x=input('($12,345.67)',nlmnlhrk32.2);
y=input('($12,345.67)',dollar32.2);
\end{verbatim}
See Also

Informat:

- “NLMNIHRK Informat” on page 443

NLMNLHUF Informat

Reads the monetary format of the local expression for Hungary.

Category: Numeric

Alignment: Left

Syntax

NLMNLHUFw.d

Syntax Description

\(w\)

specifies the width of the output field.

- Default: 12
- Range: 8–32

\(d\)

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

- Default: 2
- Range: 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[x = \text{input}('($12,345.67)', \texttt{nlmnlhuf32.2});\]
\[y = \text{input}('($12,345.67)', \texttt{dollar32.2});\]
Statements | Results
---|---
| 
```
put x=;  -12345.67
put y=;  -12345.67
```

See Also

Informat:
- “NLMNIHUF Informat” on page 444

NLMNLIDR Informat

Reads the monetary format of the local expression for Indonesia.

**Category:** Numeric
**Alignment:** Left

**Syntax**

NLMNLIDRw.d

**Syntax Description**

- **w**
  - specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d**
  - specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlidr32.2);
y=input('($12,345.67)',dollar32.2);
```
### Statements

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

#### See Also

**Informat:**
- “NLMNIIDR Informat” on page 445

---

### NLMNLILS Informat

Reads the monetary format of the local expression for Israel.

- **Category:** Numeric
- **Alignment:** Left

#### Syntax

```
NLMNLILS w.d
```

#### Syntax Description

- **w**
  - Specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **d**
  - Specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - **Default:** 4
  - **Range:** 0–28

#### Example

In the following example, the LOCALE= system option is set to English.UnitedStates.

```bash
x=input('($12,345.67)',nlmnlils32.2);
y=input('($12,345.67)',dollar32.2);
```
See Also

Format:
- “NLMNLILS Format” on page 206

NLMNLINR Informat

Reads the monetary format of the local expression for India.

Category: Numeric
Alignment: Left

Syntax

NLMNLINRw.d

Syntax Description

\( w \)

specifies the width of the output field.

- Default: 12
- Range: 8–32

\( d \)

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

- Default: 2
- Range: 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlinr32.2);
y=input('($12,345.67)',dollar32.2);
```


<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>---+---1---+</td>
<td></td>
</tr>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

**Informat:**
- “NLMNIINR Informat” on page 447

---

**NLMNLJPY Informat**

Reads the monetary format of the local expression for Japan.

| Category: | Numeric |
| Alignment: | Left |

**Syntax**

\[
\text{NLMNLJPY}w.d
\]

**Syntax Description**

\(?w\) specifies the width of the output field.

- **Default**: 12
- **Range**: 8–32

\(?d\) specifies to divide the number by \(10^{d}\). If the data contains decimal points, the \(d\) value is ignored.

- **Default**: 0
- **Range**: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[
x=\text{input}('$(12,345.67)'\text{,nlmnljpy32.2});
y=\text{input}('$(12,345.67)'\text{,dollar32.2});
\]
### Statements

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>put x=;</code></td>
<td>-12345.67</td>
</tr>
<tr>
<td><code>put y=;</code></td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

### See Also

**Format:**
- “NLMNLJPY Format” on page 208

---

### NLMNLKRW Informat

Reads the monetary format of the local expression for South Korea.

**Category:** Numeric

**Alignment:** Left

### Syntax

`NLMNLKRWw.d`

### Syntax Description

- **w**
  - specifies the width of the output field.
  - Default 12
  - Range 8–32

- **d**
  - specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - Default 0
  - Range 0–28

### Example

In the following example, the `LOCALE=` system option is set to `English_UnitedStates`.

```r
x=input('($12,345.67)',$nmlkrw32.2);
y=input('($12,345.67)',$dollar32.2);
```
Statements | Results
---|---
|  
```
put x=;  -12345.67
put y=;  -12345.67
```  

### See Also

**Informat:**

- “NLMNIKRW Informat” on page 449

---

**NLMNLLTL Informat**

Reads the monetary format of the local expression for Lithuania.

**Category:** Numeric  
**Alignment:** Left

#### Syntax

```
NLMNLLTLw.d
```

#### Syntax Description

**w**  
specifies the width of the output field.

Default: 12  
Range: 8–32

**d**  
specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.

Default: 4  
Range: 0–28

#### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlltl32.2);
y=input('($12,345.67)',dollar32.2);
```
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

**Informat:**
- “NLMNILTL Informat” on page 450

---

**NLMNLLVL Informat**

Reads the monetary format of the local expression for Latvia.

**Category:** Numeric

**Alignment:** Left

**Syntax**

NLMNLLVL\(w.d\)

**Syntax Description**

\(w\)
- specifies the width of the output field.
- **Default:** 12
- **Range:** 8–32

\(d\)
- specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.
- **Default:** 4
- **Range:** 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nmlnlvlv132.2);
y=input('($12,345.67)',dollar32.2);
```
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

See Also

Informat:
- “NLMNILVL Informat” on page 451

NLMNLMP Informat

Reads the monetary format of the local expression for Macau.

Category: Numeric
Alignment: Left

Syntax

NLMNLMPw.d

Syntax Description

*w*

specifies the width of the output field.

Default 12
Range 8–32

d

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\[x=\text{input('($12,345.67)$',nlmnlmp32.2);}\]
\[y=\text{input('($12,345.67)$',dollar32.2);}\]
Statements | Results
---|----
put x=; | -12345.67
put y=; | -12345.67

See Also

Informat:
- “NLMNIMOP Informat” on page 452

NLMNLMXN Informat

Reads the monetary format of the local expression for Mexico.

Category: Numeric
Alignment: Left

Syntax

NLMNLMXNw.d

Syntax Description

w
specifies the width of the output field.
Default 12
Range 8–32
d
specifies to divide the number by 10^d. If the data contains decimal points, the d value is ignored.
Default 2
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

x=input('($12,345.67)',nlmnlmxn32.2);
y=input('($12,345.67)',dollar32.2);
Statements | Results
---+----+---
| put x=; | -12345.67 |
| put y=; | -12345.67 |

See Also

Informat:
- “NLMNIMXN Informat” on page 453

NLMNLMYR Informat

Reads the monetary format of the local expression for Malaysia.

Category: Numeric
Alignment: Left

Syntax

NLMNLMYR\textit{w.d}

\textbf{Syntax Description}

\textit{w}

specifies the width of the output field.

Default 12
Range 8–32

\textit{d}

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

Default 2
Range 0–28

\textbf{Example}

In the following example, the LOCALE= system option is set to English_UnitedStates.

\begin{verbatim}
x=input('($12,345.67)',nlmnlmyr32.2);
y=input('($12,345.67)',dollar32.2);
\end{verbatim}
### Statements

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

#### See Also

**Format:**

- “NLMNLMYR Format” on page 214

### NLMNLNOK Informat

Reads the monetary format of the local expression for Norway.

**Category:** Numeric

**Alignment:** Left

**Syntax**

NLMNLNOK_w.d

**Syntax Description**

- **w**
  - Specifies the width of the output field.
  - Default: 12
  - Range: 8–32

- **d**
  - Specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - Default: 2
  - Range: 0–28

#### Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlnok32.2);
y=input('($12,345.67)',dollar32.2);
```
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

Format:
- “NLMNLNOK Format” on page 215

---

### NLMNLNZD Informat

Reads the monetary format of the local expression for New Zealand.

*Category:* Numeric  
*Alignment:* Left

**Syntax**

NLMNLNZD<sub>W.D</sub>

**Syntax Description**

- **W**
  - Specifies the width of the output field.
  - **Default:** 12  
  - **Range:** 8–32

- **D**
  - Specifies to divide the number by 10<sup>D</sup>. If the data contains decimal points, the D value is ignored.
  - **Default:** 2  
  - **Range:** 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlnlnzd32.2);  
y=input('($12,345.67)',dollar32.2);  
```
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

**See Also**

**Format:**
- “NLMNLNZD Format” on page 216

---

**NLMNLPLN Informat**

Reads the monetary format of the local expression for Poland.

**Category:** Numeric

**Alignment:** Left

**Syntax**

NLMNLPLN

**Syntax Description**

**w**
- specifies the width of the output field.
  - Default: 12
  - Range: 8–32

**d**
- specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
  - Default: 2
  - Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlpln32.2);
y=input('($12,345.67)',dollar32.2);
```

---

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
See Also

Format:

- “NLMNLPLN Format” on page 217

**NLMNLRUB Informat**

Reads the monetary format of the local expression for Russia.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Numeric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment:</td>
<td>Left</td>
</tr>
</tbody>
</table>

**Syntax**

\[ \text{NLMNLRUB}_w.d \]

**Syntax Description**

\[ w \]

specifies the width of the output field.

- Default: 12
- Range: 8–32

\[ d \]

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

- Default: 2
- Range: 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmlrub32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
**NLMNLEK Informat**

Reads the monetary format of the local expression for Sweden.

**Category:** Numeric

**Alignment:** Left

**Syntax**

\[ \text{NLMNLEK}_{w,d} \]

**Syntax Description**

- **\( w \)** specifies the width of the output field.
  - **Default:** 12
  - **Range:** 8–32

- **\( d \)** specifies to divide the number by \(10^d\). If the data contains decimal points, the \( d \) value is ignored.
  - **Default:** 2
  - **Range:** 0–28

**Example**

In the following example, the `LOCALE=` system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlsek32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**
- “NLMNLRUB Format” on page 218
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:
- “NLMNLSEK Format” on page 219

NLMNLSGD Informat

Reads the monetary format of the local expression for Singapore.

**Category:** Numeric

**Alignment:** Left

**Syntax**

NLMNLSGD\_w.d

**Syntax Description**

\_w

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\_d

specifies to divide the number by 10^d. If the data contains decimal points, the \_d value is ignored.

- **Default:** 2
- **Range:** 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlsgd32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>----+----1----+</td>
<td>---+---1----+</td>
</tr>
</tbody>
</table>
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:
- “NLMNLSGD Format” on page 220

NLMNLTHB Informat

Reads the monetary format of the local expression for Thailand.

**Category:** Numeric

**Alignment:** Left

**Syntax**

NLMNLTHB\_w.d

**Syntax Description**

\( w \)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\( d \)

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

- **Default:** 2
- **Range:** 0–28

**Example**

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlthb32.2);
y=input('($12,345.67)',dollar32.2);
```

Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67
See Also

Informat:
• “NLMNITHB Informat” on page 461

NLMNLTRY Informat

Reads the monetary format of the local expression for Turkey.

Category: Numeric
Alignment: Left

Syntax

NLMNLTRYw.d

Syntax Description

w
specifies the width of the output field.
Default 12
Range 8–32

d
specifies to divide the number by $10^d$. If the data contains decimal points, the $d$ value is ignored.
Default 4
Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnltry32.2);
y=input('($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

---
 Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Informat:
- “NLMNITRY Informat” on page 462

NLMNLTWD Informat

Reads the monetary format of the local expression for Taiwan.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Numeric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment:</td>
<td>Left</td>
</tr>
</tbody>
</table>

Syntax

NLMNLTWD\(w.d\)

Syntax Description

\(w\)

specifies the width of the output field.

Default 12

Range 8–32

\(d\)

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

Default 2

Range 0–28

Example

In the following example, the LOCALE= system option is set to English_UnitedStates.

\nx=input('($12,345.67)',nlmnltwd32.2);
y=input('($12,345.67)',dollar32.2);

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=</td>
<td>-12345.67</td>
</tr>
<tr>
<td>y=</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
### Statements

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

### See Also

**Format:**
- “NLMNLTWD Format” on page 223

---

### NLMNLUSD Informat

Reads the monetary format of the local expression for Puerto Rico, and the United States.

**Category:** Numeric

**Alignment:** Left

### Syntax

\[ \text{NLMNLUSD}_{w.d} \]

### Syntax Description

- \( w \)
  - Specifies the width of the output field.
    - **Default:** 12
    - **Range:** 8–32

- \( d \)
  - Specifies to divide the number by \(10^d\). If the data contains decimal points, the \( d \) value is ignored.
    - **Default:** 2
    - **Range:** 0–28

### Example

In the following example, the LOCALE= system option is set to English UnitedStates.

```plaintext
x=input('($12,345.67)',nlmnlusd32.2);
y=input'($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
Statements | Results
---|---
put x=; | -12345.67
put y=; | -12345.67

See Also

Format:
- “NLMNUSD Format” on page 224

**NLMNLZAR Informat**

Reads the monetary format of the local expression for South Africa.

- **Category:** Numeric
- **Alignment:** Left

**Syntax**

NLMNLZAR\(w,d\)

**Syntax Description**

\(w\)

specifies the width of the output field.

- **Default:** 12
- **Range:** 8–32

\(d\)

specifies to divide the number by \(10^d\). If the data contains decimal points, the \(d\) value is ignored.

- **Default:** 2
- **Range:** 0–28

**Example**

In the following example, the LOCATE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlzar32.2);
y=input'($12,345.67)',dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-12345.67</td>
</tr>
</tbody>
</table>
NLMNY Informat

Reads monetary data in the specified locale for the local expression, and then converts the data to a numeric value.

**Category:** Numeric

**Syntax**

\[ \text{NLMNY}_{w.d} \]

**Syntax Description**

- **w**
  - Specifies the width of the input field.
  - Default: 9
  - Range: 1–32

- **d**
  - Specifies whether to divide the number by \(10^d\). If the data contains decimal separators, the \(d\) value is ignored.
  - Default: 0
  - Range: 0–31

**Details**

The NLMNY\(_{w.d}\) informat reads monetary data in the specified locale for the local expression, and then converts the data to a numeric value. It removes any thousands separators, decimal separators, blanks, the currency symbol, and the close parenthesis from the input data.

**Comparisons**

The NLMNY\(_{w.d}\) informat performs processing that is the opposite of the NLMNYI\(_{w.d}\) informat.

The NLMNY\(_{w.d}\) informat is similar to the DOLLAR\(_{w.d}\) informat except that the NLMNY\(_{w.d}\) informat is locale-specific.

---

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put y=;</td>
<td>-12345.67</td>
</tr>
</tbody>
</table>

**See Also**

**Format:**

- “NLMNLZAR Format” on page 225
NLMNY returns an error message if you enclose numerical data with apostrophes. The apostrophes specify that the data is character. The following example produces an error message because the numerical value 1 is enclosed in apostrophes.

```plaintext
data;
x=input('1',NLMNY32.); put x=; run;
```

**Example**

The following examples use the input value of $12,345.67.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>x=input('($12,345.67)',nlmny32.2);</td>
<td>-12345.67</td>
</tr>
<tr>
<td>y=input('($12,345.67)',dollar32.2);</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

**Formats:**
- “NLMNY Format” on page 226
- “NLMNYI Format” on page 227

**Informat:**
- “NLMNYI Informat” on page 504

---

**NLMNYI Informat**

Reads monetary data in the specified locale for the international expression, and then converts the data to a numeric value.

**Category:** Numeric

**Syntax**

`NLMNYI w.d`

**Syntax Description**

`w`

specifies the width of the input field.
Default 9
Range 1–32

d
specifies whether to divide the number by $10^d$. If the data contains decimal separators, the $d$ value is ignored.

Default 0
Range 0–31

Details

The NLMNYIw.d informat reads monetary data in the specified locale for the international expression, and then converts the data to a numeric value. It removes any thousands separators, decimal separators, blanks, the currency symbol, and the close parenthesis from the input data.

Comparisons

The NLMNYIw.d informat performs processing that is the opposite of the NLMNYw.d informat.

Example

The following examples use the input value of 12,345.67.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCATE=English_UnitedStates;</td>
<td>-12345.67</td>
</tr>
<tr>
<td>x=input('(USD12,345.67)',nlmnyi32.2);</td>
<td>-12345.67</td>
</tr>
<tr>
<td>y=input('${-12,345.67}',dollar32.2);</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

- “NLMNY Format” on page 226
- “NLMNYI Format” on page 227

Informat:

- “NLMNY Informat” on page 503
NLNUM Informat
Reads numeric data in the specified locale for local expressions, and then converts the data to a numeric value.

**Category:** Numeric

**Syntax**

\[ \text{NLNUM} \ w \ d \]

**Syntax Description**

- \( w \) specifies the width of the input field.
  - Default: 6
  - Range: 1–32

- \( d \) specifies whether to divide the number by \( 10^d \). If the data contains decimal separators, the \( d \) value is ignored.
  - Default: 0
  - Range: 0–31

**Details**

The NLNUM\( w.d \) informat reads numeric data in the specified locale for local expressions, and then converts the data to a numeric value. It removes any thousands separators, decimal separators, blanks, the currency symbol, and the close parenthesis from the input data.

NLNUM returns an error message if you enclose numerical data with apostrophes. The apostrophes specify that the data is character. The following example produces an error message because the numeric value 1 is enclosed in apostrophes:

```plaintext
data;
  x=input('1',NLNUM32.);
put x=;
run;
```

**Comparisons**

The NLNUM\( w.d \) informat performs processing that is opposite to the NLNUM\( w.d \) informat.

**Example**

The following example uses \(-123456.78\) as the input value.
Statements | Results
----------+----------

```languages=plaintext
options locale=English_UnitedStates;
x=input('−1,234,356.78',nlnum32.2);
put x=;
```

---

See Also

**Formats:**
- “NLNUM Format” on page 228
- “NLMNYI Format” on page 227

**Informat:**
- “NLNUMI Informat” on page 507

---

**NLNUMI Informat**

Reads numeric data in the specified locale for international expressions, and then converts the data to a numeric value.

**Category:** Numeric

**Syntax**

`NLNUMI w.d`

**Syntax Description**

**w**

- Specifies the width of the input field.
  - **Default:** 6
  - **Range:** 1–32

**d**

- Specifies to divide the number by $10^d$. If the data contains decimal separators, the $d$ value is ignored.
  - **Default:** 0
  - **Range:** 0–31

**Details**

The `NLNUMI w.d` informat reads numeric data in the specified locale for international expressions, and then converts the data to a numeric value. It removes any thousands
separators, decimal separators, blanks, the currency symbol, and the close parenthesis from the input data.

**Comparisons**

The NLNUMI\(w.d\) informat performs processing that is opposite of the NLNUM\(w.d\) informat.

**Example**

The following example uses –1,234,356.78 as the input value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>-1234356.78</td>
</tr>
<tr>
<td>x=input('–1,234,356.78', nlnumi32.2);</td>
<td></td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

**Formats:**

- "NLNUM Format" on page 228
- "NLNUMI Format" on page 230
- "NLNUM Informat" on page 506

**NLPCT Informat**

Reads percentage data in the specified locale for local expressions, and then converts the data to a numeric value.

**Category:** Numeric

**Syntax**

\[ \text{NLPCT}w.d \]

**Syntax Description**

\(w\)

specifies the width of the input field.

Default 6

Range 1–32
The NLPCTw.d informat reads percentage data in the specified locale for local expressions, and then converts the data to a numeric value. It divides the value by 100 and removes any thousands separators, decimal separators, blanks, the percent sign, and the close parenthesis from the input data.

Comparisons

The NLPCTw.d informat performs processing that is opposite of the NLPCTIw.d informat. The NLPCTw.d informat is similar to the PERCENTw.d informat except that the NLPCTw.d informat is locale-specific.

NLPCT returns an error message if you enclose numerical data with apostrophes. The apostrophes specify that the data is character. The following example produces an error message because the numerical value 1 is enclosed in apostrophes.

data;
  x=input('"1"',NLPCT32.);
  put x=;
run;

Example

The following example uses –12,345.67% as the input value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates;</td>
<td>-123.4567</td>
</tr>
<tr>
<td>x=input('&quot;-12,345.67%&quot;,nlpct32.2);</td>
<td>-123.4567</td>
</tr>
<tr>
<td>y=input('&quot;(12,345.67%)&quot;,percent32.2);</td>
<td>-123.4567</td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

• “NLPCT Format” on page 231
• “NLPCTI Format” on page 232
• “NLPCTI Informat” on page 510
NLPCTI Informat
Reads percentage data in the specified locale for international expressions, and then converts the data to a numeric value.

**Category:** Numeric

**Syntax**

NLPCTI\(_w.d\)

**Syntax Description**

\(_w\)

specifies the width of the input field.

- **Default:** 6
- **Range:** 1–32

\(_d\)

specifies whether to divide the number by \(10^d\). If the data contains decimal separators, the \(d\) value is ignored.

- **Default:** 0
- **Range:** 0–31

**Details**
The NLPCTI\(_w.d\) informat reads percentage data in the specified locale for international expressions, and then converts the data to a numeric value. It divides the value by 100 and removes any thousands separators, decimal separators, blanks, the percent sign, and the close parentheses from the input data.

**Comparisons**
The NLPCTI\(_w.d\) informat performs processing that is opposite of the NLPCT\(_w.d\) informat.

**Example**
The following example uses -12,345.67% as the input value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>-12,345.67</td>
<td>-123.46</td>
</tr>
</tbody>
</table>
NLTIMAP Informat

Reads the time value and uses a.m. and p.m. in the specified locale, and then converts the time value to the local SAS time value.

**Category:** Date and Time

**Syntax**

\[ \text{NLTIMAP}w. \]

**Syntax Description**

\[ w \]

specifies the width of the input field.

**Default**

10

**Range**

4–200

**Example**

The following example uses 04:24:43 p.m. as the input value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates;</td>
<td>-123.4567</td>
</tr>
<tr>
<td>x=input({'-12,345.67%',nlpct32.2});</td>
<td>-123.4567</td>
</tr>
<tr>
<td>y=input({12,345.67%},percent32.2);</td>
<td></td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---------</td>
</tr>
</tbody>
</table>

See Also

**Formats:**

- “NLPCT Format” on page 231
- “NLPCTI Format” on page 232

**Informat:**

- “NLPCT Informat” on page 508
See Also

Format:

• “NLTIMAP Format” on page 241

NLTIME Informat

Reads the time value in the specified locale, and then converts the time value to the local SAS time value.

Category: Date and Time

Alias: NLTMAP

Syntax

NLTIME

Syntax Description

w

specifies the width of the input field.

Default: 20

Range: 10–200

Example

The following example uses 16:24:43 as the input value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>16:24:43</td>
</tr>
<tr>
<td>y=input('04:24:43 PM',nltime11.);</td>
<td></td>
</tr>
<tr>
<td>put y time.;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>16:24:00</td>
</tr>
<tr>
<td>y=input('16.24 Uhr',nltime11.);</td>
<td></td>
</tr>
<tr>
<td>put y time.;</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>16:24:43</td>
</tr>
<tr>
<td>y=input('16:24:43',nltime.);</td>
<td></td>
</tr>
<tr>
<td>put y time.;</td>
<td></td>
</tr>
</tbody>
</table>
### Statements

options locale='German_Germany';
y=input('16.24 Uhr',nltime.);
put y time.;

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale='German_Germany';</td>
<td>16:24:00</td>
</tr>
<tr>
<td>y=input('16.24 Uhr',nltime.);</td>
<td></td>
</tr>
<tr>
<td>put y time.;</td>
<td></td>
</tr>
</tbody>
</table>

### See Also

**Format:**
- “NLTIME Format” on page 242

### $UCS2B Informat

Reads a character string that is encoded in big-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

- **Category:** Character
- **Restriction:** UTF-8 is the only SAS session encoding supported by SAS Viya.

### Syntax

$UCS2Bw:

### Syntax Description

w

specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

- **Default:** 8
- **Range:** 2–32767

### Comparisons

The $UCS2Bw. informat performs processing that is opposite of the $UCS2BEw. informat. If you are processing data within the same operating environment, then use the $UCS2Xw. informat. If you are processing data from different operating environments, then use the $UCS2Bw. and $UCS2Lw. informats.

### Example

This example uses the UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale='German_Germany';</td>
<td>16:24:00</td>
</tr>
<tr>
<td>y=input('16.24 Uhr',nltime.);</td>
<td></td>
</tr>
<tr>
<td>put y time.;</td>
<td></td>
</tr>
</tbody>
</table>
Statements | Result
---|---
x=input('5927'x,$ucs2b.); x=E5A4A7
put x=$hex6.;

See Also

Formats:
- “$UCS2B Format” on page 243
- “$UCS2L Format” on page 245
- “$UCS2X Format” on page 248
- “$UTF8X Format” on page 264

Informats:
- “$UCS2L Informat” on page 515
- “$UCS2X Informat” on page 517
- “$UTF8X Informat” on page 532

$UCS2BE Informat
Reads a character string that is in the encoding of the current SAS session and then converts the character string to big-endian, 16-bit, UCS2, Unicode encoding.

Category: Character
Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax
$UCS2BEw.

Syntax Description
w
specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default 8
Range 2–32767

Comparisons
The $UCS2BEw. informat performs processing that is opposite of the $UCS2Bw. informat.
Example
This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ucs2str=input (' ', $ucs2be4.);</code></td>
<td><code>puts ucs2str=$hex8.;</code></td>
</tr>
<tr>
<td><code>put ucs2str=$hex8.;</code></td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$UCS2B Format” on page 243
- “$UCS2BE Format” on page 244

Informat:
- “$UCS2B Informat” on page 513

$UCS2L Informat
Reads a character string that is encoded in little-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

**Category:** Character
**Restriction:** UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

$UCS2Lw

**Syntax Description**

w

specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

<table>
<thead>
<tr>
<th>Default</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>2–32767</td>
</tr>
</tbody>
</table>

**Comparisons**
The $UCS2Lw. informat performs processing that is opposite of the $UCS2LEw. informat. If you are processing data within the same operating environment, then use the
$UCS2Xw.informat. If you are processing data from different operating environments, then use the $UCS2Bw. and $UCS2Lw. informats.

**Example**

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input('2759'x,$ucs2l.);</td>
<td>x=E5A4A7</td>
</tr>
<tr>
<td>put x=$hex6.;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

**Formats:**
- “$UCS2B Format” on page 243
- “$UCS2L Format” on page 245
- “$UCS2X Format” on page 248
- “$UTF8X Format” on page 264

**Informats:**
- “$UCS2B Informat” on page 513
- “$UCS2X Informat” on page 517
- “$UTF8X Informat” on page 532

**$UCS2LE Informat**

Reads a character string that is in the encoding of the current SAS session and then converts the character string to little-endian, 16-bit, UCS2, Unicode encoding.

**Category:** Character

**Restriction:** UTF-8 is the only SAS session encoding supported by SAS Viya.

**Syntax**

$UCS2LEw.

**Syntax Description**

w

specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default 8
Range 2–32767

Comparisons
The $UCS2LEw$ informat performs processing that is opposite of the $UCS2Lw$ informat.

Example
This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>ucs2str=input (' krista ', $ucs2le4.);</code></td>
<td><code>ucs2str=2759</code></td>
</tr>
<tr>
<td><code>put ucs2str=$hex4;</code></td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$UCS2L Format” on page 245
- “$UCS2LE Format” on page 247

Informat:
- “$UCS2L Informat” on page 515

$UCS2X Informat
Reads a character string that is encoded in 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character
Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax
$UCS2Xw$

Syntax Description

w specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default 8
Range  2–32767

Comparisons

The $UCS2Xw. informat performs processing that is the opposite of the $UCS2XEw. informat. If you are processing data within the same operating environment, then use the $UCS2Xw. informat. If you are processing data from different operating environments, then use the $UCS2Bw. and $UCS2Lw. informats.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input('5927'x,$ucs2x.);</td>
<td>x=E29D99</td>
</tr>
<tr>
<td>put x=$hex6.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$UCS2B Format” on page 243
- “$UCS2L Format” on page 245
- “$UCS2X Format” on page 248
- “$UTF8X Format” on page 264

Informats:
- “$UCS2B Informat” on page 513
- “$UCS2L Informat” on page 515
- “$UTF8X Informat” on page 532

$UCS2XE Informat

Reads a character string that is in the encoding of the current SAS session and then converts the character string to 16-bit, UCS2, Unicode encoding.

- **Category:** Character
- **Restriction:** UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

$UCS2XEw.
Syntax Description

\( w \)

specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 2–32767

Comparisons

The \$UCS2XE\( w \) informat performs processing that is opposite of the \$UCS2X\( w \) informat.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ucs2str=input ('\xa&quot;, $ucs2xe4.);</td>
<td>ucs2str=20002759</td>
</tr>
<tr>
<td>put ucs2str=$hex8;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
- “\$UCS2X Format” on page 248
- “\$UCS2XE Format” on page 249

Informat:
- “\$UCS2X Informat” on page 517

\$UCS4B Informat

Reads a character string that is encoded in big-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

\$UCS4B\( w \).
Syntax Description

\( w \)

specifies the width of the input field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default 8

Range 4–32767

Comparisons

If you are processing data within the same operating environment, then use the \$UCS4Xw. informat. If you are processing data from different operating environments, then use the \$UCS4Bw. and \$UCS4Lw. informats.

Example

These examples use UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ucs4str=input('ቁ',</td>
<td>ucs4str='0000002000005927</td>
</tr>
<tr>
<td>$ucs4be8.);</td>
<td></td>
</tr>
<tr>
<td>put ucs4str= $hex16.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Format:

- “\$UCS4B Format” on page 250

Informats:

- “\$UCS4L Informat” on page 520
- “\$UCS4X Informat” on page 521

\$UCS4L Informat

Reads a character string that is encoded in little-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

\$UCS4Lw.
Syntax Description

\( \text{w} \)

specifies the width of the input field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 8

Range: 4–32767

Comparisons

If you are processing data within the same operating environment, then use the \$UCS4Xw. informat. If you are processing data from different operating environments, then use the \$UCS4Bw. and \$UCS4Lw. informats.

Example

These examples use UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>z=put('.com',$UCS4L16.); put z $hex32.;</td>
<td>2E000000630000006F0000006D000000</td>
</tr>
</tbody>
</table>

See Also

Format:
- “\$UCS4L Format” on page 252

Informats:
- “\$UCS4B Informat” on page 519
- “\$UCS4X Informat” on page 521

\$UCS4X Informat

Reads a character string that is encoded in 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

\$UCS4Xw.
**Syntax Description**

\( w \)

specifies the width of the input field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

- **Default**: 8
- **Range**: 4–32767

**Comparisons**

The \$UCS4Xw. informat performs processing that is the opposite of the \$UCS4XEw. informat. Use the \$UCS4Xw. informat when you are processing data within the same operating environment. Use the \$UCS4Bw. and \$UCS4Lw. informats when you are processing data from different operating environments.

**Example**

These examples use UTF-8 encoding and little-endian formatting.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>ucs4=put(’91e5’x,$ucs4x.);</td>
<td>ucs4=FDFF0000</td>
</tr>
<tr>
<td>utf8=input(ucs4,$ucs4x.);</td>
<td>utf8=EFBFBD20</td>
</tr>
<tr>
<td>put ucs4=$hex8. utf8=$hex8.; run;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

**Formats:**
- “\$UCS2X Format” on page 248
- “\$UCS2B Format” on page 243
- “\$UCS2L Format” on page 245
- “\$UCS4X Format” on page 255
- “\$UTF8X Format” on page 264

**Informats:**
- “\$UCS2B Informat” on page 513
- “\$UCS2L Informat” on page 515
- “\$UTF8X Informat” on page 532
$UCS4XE Informat

Reads a character string that is in the encoding of the current SAS session, and then converts the character string to 32-bit, UCS4, Unicode encoding.

Category: Character

Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

$UCS4XEw.

Syntax Description

w

specifies the width of the input field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default 8

Range 4–32767

Comparisons

The $UCS4XEw. informat performs processing that is the opposite of the $UCS4Xw. informat.

Example

This example uses UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>$ucs4xe4('ABC', $ucs4xe8.);</td>
<td>ucs4str=20000000027590000</td>
</tr>
<tr>
<td>put ucs4str=$hex16;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

- “$UCS4X Format” on page 255
- “$UCS4XE Format” on page 256

Informat:

- “$UCS4X Informat” on page 521
$UESC Informat

Reads a character string that is encoded in UESC representation, and then converts the character string to the encoding of the current SAS session.

**Category:** Character

**Restriction:** UTF-8 is the only SAS session encoding supported by SAS Viya.

### Syntax

$UESC_w.$

#### Syntax Description

\( w \)

Specifies the width of the output field.

**Default:** 8

**Range:** 1–32767

### Details

If the characters are not available on all operating environments (for example, 0–9, a–z, A–Z) they must be represented in UESC representation. The $UESC_w.$ informat can be nested.

### Comparisons

The $UESC_w.$ informat performs processing that is the opposite of the $UESCE_w.$ informat.

### Example

These examples use the UTF-8 encoding, which is supported under the Linux operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input('\u5927', $uesc10.);</td>
<td>\u5927</td>
</tr>
<tr>
<td>y=input('\uu5927', $uesc10.);</td>
<td>\u5927</td>
</tr>
<tr>
<td>z=input('\uuu5927', $uesc10.);</td>
<td>\u5927</td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>put y;</td>
<td></td>
</tr>
<tr>
<td>put z;</td>
<td></td>
</tr>
</tbody>
</table>
$UESCE Informat

Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UESC representation.

<table>
<thead>
<tr>
<th>Category</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction</td>
<td>UTF-8 is the only SAS session encoding supported by SAS Viya.</td>
</tr>
</tbody>
</table>

Syntax

$UESCE_{w}.$

Syntax Description

\(w\)

specifies the width of the input field.

Default 8

Range 1–32767

Details

The $UESCE_{w}.$ informat can be nested.

Comparisons

The $UESCE_{w}.$ informat performs processing that is opposite of the $UESC_{w}.$ informat.

Example

These examples use the Japanese Shift_JIS encoding, which is supported under the Linux operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x=input('\u{69}', $uescel0.));\n(y=input('\u{5927}', $uescel0.));</td>
<td>\u5927</td>
</tr>
</tbody>
</table>
See Also

Formats:
- “$UESC Format” on page 257
- “$UESCE Format” on page 259

Informat:
- “$UESC Informat” on page 524

$UNCR Informat

Reads an NCR character string, and then converts the character string to the encoding of the current SAS session.

Category: Character
Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax
$UNCRw.

Syntax Description
w
  specifies the width of the input field.

  Default 8
  Range 1–32767

Details
The input string must contain only characters and NCR. Any national characters must be represented in NCR.

Comparisons
The $UNCRw. informat performs processing that is opposite of the $UNCREw. informat.

Example
These examples use UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>---+---+---+1---+</td>
<td></td>
</tr>
</tbody>
</table>
$UNCRE Informat

Reads a character string in the encoding of the current SAS session, and then converts the character string to NCR.

Category: Character
Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

$UNCREw:

Syntax Description

w
specifies the width of the input field.

Default 8
Range 1–32767

Details

The output string converts to plain characters and NCR. Any national characters convert to NCR.

Comparisons

The $UNCREw. informat performs processing that is the opposite of the $UNCRw. informat.

See Also

Formats:
- “$UNCR Format” on page 260
- “$UNCRE Format” on page 261

Informat:
- “$UNCRE Informat” on page 527

Statements | Result
---|---
x=input ('&amp;#22823;', $uncr10.);
y=input ('abc', $uncr10.);
put X;
put Y;
Example

These examples use UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input ('abc', $uncre12.);</td>
<td>$\texttt{abc}$</td>
</tr>
<tr>
<td>put x;</td>
<td>$\texttt{#22823;}$abc</td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$UNCR Format” on page 260
- “$UNCRE Format” on page 261

Informat:
- “$UNCR Informat” on page 526

$UPAREN Informat

Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session.

Category: Character

Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

$\texttt{UPAREN}_w$.

Syntax Description

\( _w \)

specifies the width of the input field.

Default 8

Range 1–32767

Details

If the SAS session encoding does not have a corresponding Unicode expression, the expression remains in encoding of the current SAS session.
Comparisons

The $SUPARENw. informat performs processing that is opposite of the $SUPARENEw. informat.

Example

These examples use UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>v=input('{&lt;u0061&gt;}',$uparen10.);</td>
<td>a</td>
</tr>
<tr>
<td>w=input('{&lt;u0062&gt;}',$uparen10.);</td>
<td>b</td>
</tr>
<tr>
<td>x=input('{&lt;u0063&gt;}',$uparen10.);</td>
<td>c</td>
</tr>
<tr>
<td>y=input('{&lt;u0033&gt;}',$uparen10.);</td>
<td>3</td>
</tr>
<tr>
<td>z=input('{&lt;u5927&gt;}' ,$uparen10.);</td>
<td>❌</td>
</tr>
<tr>
<td>put v;</td>
<td></td>
</tr>
<tr>
<td>put w;</td>
<td></td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>put y;</td>
<td></td>
</tr>
<tr>
<td>put z;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

- “$SUPAREN Format” on page 262
- “$SUPARENE Format” on page 263

Informats:

- “$SUPAREN Informat” on page 529
- “$SUPARENP Informat” on page 530

$SUPARENE Informat

Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UPAREN representation.

- **Category:** Character
- **Restriction:** UTF-8 is the only SAS session encoding supported by SAS Viya.

Syntax

$SUPARENEw.

Syntax Description

w

specifies the width of the input field.
Default 8

Range 1–32767

Comparisons
The $UPARENEw$ informat performs processing that is opposite of the $SUPARENw$ informat.

Example
These examples use UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>v=input('a',$uparene10.);</td>
<td>\textless u0061 \textgreater</td>
</tr>
<tr>
<td>w=input('b',$uparene10.);</td>
<td>\textless u0062 \textgreater</td>
</tr>
<tr>
<td>x=input('c',$uparene10.);</td>
<td>\textless u0063 \textgreater</td>
</tr>
<tr>
<td>y=input('3',$uparene10.);</td>
<td>\textless u0033 \textgreater</td>
</tr>
<tr>
<td>z=input('ł',$uparene10.);</td>
<td>\textless u5927 \textgreater</td>
</tr>
</tbody>
</table>

put v;
put w;
put x;
put y;
put z;

See Also

Formats:
- “SUPAREN Format” on page 262
- “SUPARENE Format” on page 263

Informats:
- “SUPAREN Informat” on page 528
- “SUPARENP Informat” on page 530

$SUPARENP Informat$
Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session, with national characters that remain in the encoding of the UPAREN representation.

Category: Character

Restriction: UTF-8 is the only SAS session encoding supported by SAS Viya.
Syntax

\$UPARENPw.

Syntax Description

\textit{w} specifies the width of the input field.

Default 8

Range \(1–32767\)

Details

If the UPAREN expression contains a national character, whose value is greater than Unicode 0x00ff, the expression remains as a UPAREN expression.

Example

These examples use UTF-8 encoding.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(v=\text{input}{\text{&lt;u0061&gt;},\text{uparenp10.}};)</td>
<td>a</td>
</tr>
<tr>
<td>(w=\text{input}{\text{&lt;u0062&gt;},\text{uparenp10.}};)</td>
<td>b</td>
</tr>
<tr>
<td>(x=\text{input}{\text{&lt;u0063&gt;},\text{uparenp10.}};)</td>
<td>c</td>
</tr>
<tr>
<td>(y=\text{input}{\text{&lt;u0033&gt;},\text{uparenp10.}};)</td>
<td>3</td>
</tr>
<tr>
<td>(z=\text{input}{\text{&lt;u5927&gt;},\text{uparenp10.}};)</td>
<td>\text{&lt;u5927&gt;}</td>
</tr>
<tr>
<td>put v;</td>
<td></td>
</tr>
<tr>
<td>put w;</td>
<td></td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>put y;</td>
<td></td>
</tr>
<tr>
<td>put z;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

- “SUPAREN Format” on page 262
- “SUPARENE Format” on page 263

Informats:

- “SUPAREN Informat” on page 528
- “SUPARENE Informat” on page 529
$UTF8X Informat
Reads a character string that is encoded in UTF-8, and then converts the character string to the encoding of the current SAS session.

**Category:** Character

### Syntax

$UTF8Xw.

### Syntax Description

$w

specifies the width of the input field.

<table>
<thead>
<tr>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1–32767</td>
</tr>
</tbody>
</table>

### Comparisons

This example uses the Japanese UTF-8 encoding, which is supported under the Linux operating environment.

#### Statements

<table>
<thead>
<tr>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>あ</td>
</tr>
</tbody>
</table>

```sas
x=input ('e5a4a7'x, $utf8x3.);
put x;
```

### See Also

#### Formats:

- “$UCS2B Format” on page 243
- “$UCS2L Format” on page 245
- “$UCS2X Format” on page 248
- “$UTF8X Format” on page 264

#### Informats:

- “$UCS2B Informat” on page 513
- “$UCS2L Informat” on page 515
- “$UCS2X Informat” on page 517
Part 7

Macro Functions for NLS

Chapter 14

Dictionary of Macro Functions for NLS

535
Chapter 14
Dictionary of Macro Functions for NLS

Macro Functions by Category

The following table provides brief descriptions of the SAS NLS macro functions. For more information, see the NLS entry for each macro function.

<table>
<thead>
<tr>
<th>Category</th>
<th>Language Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBCS</td>
<td>%KCMPRES and %QKCMPRES Macro Function (p. 536)</td>
<td>Compresses multiple blanks and removes leading and trailing blanks.</td>
</tr>
<tr>
<td></td>
<td>%KINDEX Macro Function (p. 536)</td>
<td>Returns the position of the first character of a string.</td>
</tr>
<tr>
<td></td>
<td>%KLEFT and %QKLEFT Macro Functions (p. 537)</td>
<td>Left-aligns an argument by removing leading blanks.</td>
</tr>
<tr>
<td></td>
<td>%KLENGTH Macro Function (p. 537)</td>
<td>Returns the length of a string.</td>
</tr>
<tr>
<td></td>
<td>%KSCAN and %QKSCAN Functions (p. 538)</td>
<td>Search for a word that is specified by its position in a string.</td>
</tr>
<tr>
<td></td>
<td>%KSUBSTR and %QKSUBSTR Macro Functions (p. 540)</td>
<td>Produce a substring of a character string.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>%KUPCASE and</td>
<td>Convert values to uppercase.</td>
</tr>
<tr>
<td></td>
<td>%QKUPCASE Macro</td>
<td>Functions (p. 542)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Dictionary

### %KCMPRES and %QKCMPRES Macro Function

Compresses multiple blanks and removes leading and trailing blanks.

**Category:** DBCS  
**Type:** NLS macro function

#### Syntax

%%KCMPRES (text | text expression)  
%%QKCMPRES (text | text expression)

#### Details

The %KCMPRES and %QKCMPRES macro functions compress multiple blanks and removes leading and trailing blanks. %KCMPRES returns an unquoted result, even if the argument is quoted. %QKCMPRES returns a quoted result.

%QKCMPRES produces a result with the following special characters and mnemonic operators masked, so the macro processor interprets them as text instead of as elements of the macro language:

& % ' ( ) + - * / < > ^ ~ ; , # blank AND OR NOT EQ NE LE LT GE GT IN

### %KINDEX Macro Function

Returns the position of the first character of a string.

**Category:** DBCS  
**Type:** NLS macro function

#### Syntax

%%KINDEX (source, string)
**Required Arguments**

source

is a character string or text expression.

string

is a character string or text expression.

**Details**

The %KINDEX function searches `source` for the first occurrence of `string` and returns the position of its first character. If `string` is not found, the function returns 0.

**Example: Locating a Character**

The following statements find the first character V in a string:

```sas
%let a=a very long value;
%let b=%kindex(&a,v);
%put V appears at position &b.;
```

When these statements execute, the following line is written to the SAS log:

V appears at position 3.

---

**%KLEFT and %QKLEFT Macro Functions**

Left-aligns an argument by removing leading blanks.

- **Category:** DBCS
- **Requirement:** MAUTOSOURCE system option

**Syntax**

- `%KLEFT` (text | text expression)
- `%QKLEFT` (text | text expression)

**Details**

The %KLEFT and %QKLEFT macro functions left-align arguments by removing leading blanks. If the argument contains a special character or mnemonic operator, listed here, use QKLEFT.

%KLEFT returns an unquoted result, even if the argument is quoted. %QKLEFT produces a result with the following special characters and mnemonic operators masked so that the macro processor interprets them as text instead of as elements of the macro language:

- `& % * ( ) + - / < > = ¬ ^ ~ ; , #` blank
- `AND OR NOT EQ NE LE LT GE GT IN`

---

**%KLENGTH Macro Function**

Returns the length of a string.
%KLENGTH (character string | text expression)

Details
If the argument is a character string, %KLENGTH returns the length of the string. If the argument is a text expression, %KLENGTH returns the length of the resolved value. If the argument has a null value, %KLENGTH returns 0.

Example: Returning String Lengths

The following statements find the lengths of character strings and text expressions:

```sas
%let a=Happy;
%let b=Birthday;
%let c=René;
%put The length of &a is %klength(&a).;
%put The length of &b is %klength(&b).;
%put The length of &c is %klength(&c).;
%put The length of &a &b To &c is %klength(&a &b to &c).;
```

When these statements execute, the following is written to the SAS log:

- The length of Happy is 5.
- The length of Birthday is 8.
- The length of René is 4.
- The length of Happy Birthday To René is 22.

with LENGTH macro %length(&c);

%KSCAN and %QKSCAN Functions

Search for a word that is specified by its position in a string.

Syntax

- `%KSCAN (argument, n<,delimiters >)`
- `%QKSCAN (argument, n<,delimiters >)`
**Required Arguments**

**argument**

is a character string or a text expression. If **argument** contains a special character or mnemonic operator, listed here, use %QKSCAN.

**n**

is an integer or a text expression that yields an integer, which specifies the position of the word to return. If **n** is greater than the number of words in **argument**, the functions return a null string. If **n** is negative, %KSCAN examines the character string and selects the word that starts at the end of the string and searches backward.

**delimiter**

specifies a character variable that produces characters that you want %QKSCAN to use as word separators in the character expression.

**Details**

The %KSCAN and %QKSCAN functions search **argument** and return the **n**th word. A word is one or more characters separated by one or more delimiters.

%-KSCAN does not mask special characters or mnemonic operators in its results, even when the argument was previously masked by a macro quoting function. %QKSCAN masks the following special characters and mnemonic operators in its results:

\& \% ' " ( ) + - * / < > = ¬ ^ ~ ; , # blank

AND OR NOT EQ NE LE LT GE GT IN

In the %KSCAN function, **word** refers to a substring that has all of the following characteristics:

- is bounded on the left by a delimiter or the beginning of the string
- is bounded on the right by a delimiter or the end of the string
- contains no delimiters

A word can have a length of zero if there are delimiters at the beginning or end of the string or if the string contains two or more consecutive delimiters.

If you use the %KSCAN function with only two arguments, then the default delimiters depend on whether your computer uses ASCII or EBCDIC characters:

- If your computer uses ASCII characters, then the default delimiters are as follows:

  blank ! $ % & ( ) * + , - . / ; < ^ |

  In ASCII environments that do not contain the ^ character, the %KSCAN function uses the ~ character instead.

- If your computer uses EBCDIC characters, then the default delimiters are as follows:

  blank ! $ % & ( ) * + , - . / ; < ¬ | ¢§

The %KSCAN function allows character arguments to be null. Null arguments are treated as character strings with a length of zero. Numeric arguments cannot be null.

**Example: Comparing the Actions of %KSCAN and %QKSCAN**

This example illustrates the actions of %KSCAN and %QKSCAN:

```macro a;
   aaaaaa```
%KSUBSTR and %QKSUBSTR Macro Functions

Produce a substring of a character string.

**Category:** DBCS

**Type:** NLS macro function

**Syntax**

%KSUBSTR (argument, position<, length>)

%QKSUBSTR (argument, position<, length>)

**Required Arguments**

*argument*  
is a character string or a text expression. If *argument* contains a special character or mnemonic operator, listed here, use %QKSUBSTR.

*position*  
is an integer or an expression (text, logical, or arithmetic) that yields an integer that specifies the position of the first character in the substring. If *position* is greater than the number of characters in the string, %KSUBSTR and %QKSUBSTR issue a warning message and return a null value.

*length*  
is an optional integer or an expression (text, logical, or arithmetic) that yields an integer that specifies the number of characters in the substring. If *length* is greater than the number of characters following *position* in *argument*, %KSUBSTR and %QKSUBSTR issue a warning message and return a substring containing the characters from *position* to the end of the string. By default, %KSUBSTR and %QKSUBSTR produce a string containing the characters from *position* to the end of the character string.

**Details**

The %KSUBSTR and %QKSUBSTR functions produce a substring of *argument*, which begins at *position* and continues for the number of characters in *length*.
%KSUBSTR does not mask special characters or mnemonic operators in its result. %QKSUBSTR masks the following special characters and mnemonic operators:

& & ' " ( ) + - * / < > = ¬ ^ ~ ; , # blank
AND OR NOT EQ NE LE LT GE GT IN

Examples

**Example 1: Limiting a Fileref to Eight Characters**
The macro MAKEFREF uses %KSUBSTR to assign the first eight characters of a parameter as a fileref, in case a user assigns one that is longer:

```sas
%macro makefref(fileref,file);
  %if %klength(&fileref) gt 8 %then
    %let fileref = %ksubstr(&fileref,1,8);
  filename &fileref "&file";
%mend makefref;
%makefref(humanresource,/dept/humanresource/report96)
```

SAS reads the following statement:

FILENAME HUMANRES "/dept/humanresource/report96";

**Example 2: Storing a Long Macro Variable Value in Segments**
The macro SEPMMSG separates the value of the macro variable MSG into 40-character units and stores each unit in a separate variable:

```sas
%macro sepmmsg(msg);
  %let i=1;
  %let start=1;
  %if %length(&msg)>40 %then
    %do;
      %do %until(%klength(&&msg&i)<40);
        %let msg&i=%qksubstr(&msg,&start,40);
        %put Message &i is: &&msg&i;
        %let i=%eval(&i+1);
        %let start=%eval(&start+40);
        %let msg&i=%qksubstr(&msg,&start);
      %end;
      %put Message &i is: &&msg&i;
    %end;
  %else %put No subdivision was needed.;
%mend sepmmsg;
%sepmmsg(%nrstr(A character operand was found in the %EVAL function or %IF condition where a numeric operand is required.  A character operand was found in the %EVAL function or %IF condition where a numeric operand is required.));
```

When this program executes, these lines are written to the SAS log:

Message 1 is: A character operand was found in the %EV
Message 2 is: AL function or %IF condition where a numeric operand is required. A character operand was found in the %EVAL function or %IF condition where a numeric operand is required.))
Message 3 is: or %IF condition where a numeric operand
Message 4 is: d is required.
%KUPCASE and %QKUPCASE Macro Functions

Convert values to uppercase.

Category: DBCS
Type: NLS macro function

Syntax

%KUPCASE (character string | text expression)
%QKUPCASE (character string | text expression)

Details

The %KUPCASE and %QKUPCASE functions convert lowercase characters in the argument to uppercase. %KUPCASE does not mask special characters or mnemonic operators in its results.

If the argument contains a special character or mnemonic operator, listed here, use %QKUPCASE. %QKUPCASE masks the following special characters and mnemonic operators in its results:

& % ' " ( ) + - * / < > = ¬ ^ ~ ; , # blank
AND OR NOT EQ NE LE LT GE GT IN

%KUPCASE and %QKUPCASE are useful in comparing values because the macro facility does not automatically convert lowercase characters to uppercase before comparing them.

Examples

Example 1: Capitalizing a Value to Be Compared

In this example, the macro RUNREPT compares a value input for the macro variable MONTH to the string DEC. If the uppercase value of the response is DEC, then PROC FSVIEW runs on the data set REPORTS.ENDYEAR. Otherwise, PROC FSVIEW runs on the data set with the name of the month in the REPORTS data library.
%macro runrept(month);
  %if %kupcase(&month)=DEC %then
    %str(proc fsview data=reports.endyear; run;);
  %else %str(proc fsview data=reports.&month; run;);
%mend runrept;

You can invoke the macro in any of these ways to satisfy the %IF condition:

%runrept(DEC)
%runrept(Dec)
%runrept(dec)

**Example 2: Comparing %KUPCASE and %QKUPCASE**

These statements show the results produced by %KUPCASE and %QKUPCASE:

%let a=begin;
%let b=%nrstr(&a);
%put KUPCASE produces: %kupcase(&b);
%put QKUPCASE produces: %qkupcase(&b);

When these statements execute, the following is written to the SAS log:

KUPCASE produces: BEGIN
QKUPCASE produces: &A
## System Option Entries by Category

The language control category of SAS system options is affected by NLS. The following table provides brief descriptions of the SAS system options. For more detailed descriptions, see the dictionary entry for each SAS system option.

<table>
<thead>
<tr>
<th>Category</th>
<th>Language Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>Specifies the language for international date informats and formats.</td>
</tr>
<tr>
<td>Control</td>
<td>ENCODING System Option (p. 551)</td>
<td>Specifies the default character-set encoding for the SAS session.</td>
</tr>
<tr>
<td>LOCALE System Option (p. 552)</td>
<td></td>
<td>Specifies a set of attributes in a SAS session that reflect the language, local conventions, and culture for a geographical region.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>LOCALEDATA System Option (p. 553)</td>
<td>Specifies the source database for the locale information.</td>
<td></td>
</tr>
<tr>
<td>LOGLANGENG System Option (p. 555)</td>
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<td></td>
</tr>
<tr>
<td>MAPEBCDIC2ASCII= System Option (p. 557)</td>
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<td></td>
</tr>
<tr>
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<td></td>
</tr>
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<td></td>
</tr>
<tr>
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<td>Specifies whether to write the byte-order mark (BOM) prefix on Unicode-encoded external files.</td>
<td></td>
</tr>
<tr>
<td>RSASIOTRANSERROR System Option (p. 560)</td>
<td>Displays a transcoding error when invalid data is read from a remote application.</td>
<td></td>
</tr>
<tr>
<td>VALIDMEMNAME= System Option (p. 563)</td>
<td>Specifies the rules for naming SAS data sets, SAS data views, and item stores.</td>
<td></td>
</tr>
<tr>
<td>VALIDVARNAME= System Option (p. 566)</td>
<td>Specifies the rules for valid SAS variable names that can be created and processed during a SAS session.</td>
<td></td>
</tr>
<tr>
<td>LSWLANG System Option (p. 556)</td>
<td>Specifies the language for the language switching feature when the LOGLANGCHG or ODSLANGCHG system option is set at SAS invocation.</td>
<td></td>
</tr>
<tr>
<td>SORTSEQ= System Option (p. 561)</td>
<td>Specifies a language-specific collating sequence for the SORT and SQL procedures to use in the current SAS session.</td>
<td></td>
</tr>
</tbody>
</table>

**Dictionary**

**BOMFILE System Option**

Specifies whether to write the byte-order mark (BOM) prefix on Unicode-encoded external files.

- **Valid in:** configuration file, SAS invocation, OPTIONS statement, SAS System Options window
- **Category:** Files: External Files
- **PROC OPTIONS GROUP=** EXTFILES
Syntax

BOMFILE | NOBOMFILE

Syntax Description

BOMFILE
Specifies to write a byte-order mark (BOM) prefix when a Unicode-encoded file is written to an external file.

NOBOMFILE
Specifies not to write a BOM prefix when a Unicode-encoded file is written to an external file.

Details

The BOMFILE system option does not apply when a Unicode-encoded external file is read.

A BOM is a signature at the beginning of a Unicode data stream. The size of the BOM varies depending on the encoding.

DFLANG= System Option

Specifies the language for international date informats and formats.

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Environment Control: Language Control

PROC OPTIONS
GROUP= LANGUAGECONTROL

Default: English

Syntax

DFLANG='language', locale

Syntax Description

'language'
specifies the language that is used for international date informats and formats.

These languages are valid values for language:

- Afrikaans
- Catalan
- Croatian
- Czech
- Danish
- Dutch
- English
locale
the locale that is specified with the locale system option becomes the active locale.

Details
You can change the value of the DFLANG system option during a SAS session, but you can use only one language at a time. The values for language are not case-sensitive.

When you specify DFLANG=locale, the locale that is specified in the system option of the LOCALE statement becomes the active locale. The locale or language must be supported by the DFLANG system option.

In the following example, the international date informats and formats would be German. The posix name for the German locale is de_DE. The German locale is supported by the DFLANG system option.

```
option locale=de_DE; /* German locale */
option DFLANG=locale;
```

In the following example, the international date informats and formats would be English. Maltese is not supported by DFLANG, so the default locale is English.

```
option locale=mt_MT; /* Maltese locale */
option DFLANG=locale;
```

When you specify DFLANG=locale, the output of the date format is displayed in the locale that is specified with the LOCALE system option. To control the date format in the output, the DFLANG locale uses the value based on the LOCALE system option that has been set at start-up. If DFLANG is set to a valid language, then the date format in the output is English by default. In the following example, the locale is set to French.

```
Sas.exe -locale French
Proc print data=sashelp.class ; run ;
```

mercredi 09 mars 2011 14 h 25
If you set `DFLANG=JAPANESE`, then DFLANG behaves the same way as `DFLANG=LOCALE`.

The value JAPANESE is supported to allow customers running the Japanese image to see the datetime stamp in the SAS Log and the Listing formatted for Japanese. The value LOCALE was added later to give all customers the same feature.

- If DFLANG is not set at start up, the option value is set by the LOCALE option.
- The default format of the datetime stamp of the SAS log is English. If DFLANG is set to LOCALE or JAPANESE, the datetime stamp in the SAS Log is formatted according to the current SAS LOCALE.
- The default format of the datetime stamp of the SAS listing is English. If DFLANG is set to LOCALE or JAPANESE, the datetime stamp in each page of the output sent to the SAS Listing or ODS destinations is formatted according to the SAS LOCALE that was in effect immediately after DFLANG=LOCALE is set.
- Changes to the LOCALE option do not impact how the datetime stamp is formatted unless the DTRESET option is enabled. Then the datetime stamp is formatted according to the current SAS LOCALE.

You can use the value JAPANESE to process the Japanese image to see the datetime stamp in the SAS log and the listing formatted for Japanese.

**See Also**

DTRESET System Option

---

**ENCODING System Option**

Specifies the default character-set encoding for the SAS session.

- **Valid in:** configuration file, SAS invocation
- **Category:** Environment Control: Language Control
- **PROC OPTIONS GROUP=** LANGUAGECONTROL

### Syntax

```
-ENCODING= encoding-value
```

### Required Argument

*encoding-value*

- UTF-8

  *Note:* UTF-8, Unicode encoding is the only supported encoding.

### Details

A character-set encoding is a set of characters that have been mapped to numeric values called code points.

UTF-8 is the only SAS session encoding supported by SAS Viya. The encoding for a SAS session is determined by the values of the ENCODING= option. If ENCODING= is not specified, UTF-8 is set as default.
LOCALE System Option

Specifies a set of attributes in a SAS session that reflect the language, local conventions, and culture for a geographical region.

- **Valid in:** configuration file, SAS invocation, OPTIONS statement, SAS System Options window
- **Category:** Environment Control: Language Control
- **PROC OPTIONS GROUP=** LANGUAGECONTROL
- **Default:** English_UnitedStates
- **Operating environment:** Also valid in SASV9_OPTIONS environment variable

**Syntax**

`-LOCALE locale-name`  
`LOCALE=locale-name`

**Required Argument**

`locale-name`

For a complete list of locale values (SAS names and POSIX names), see “LOCALE= Values for PAPERSIZE and DFLANG Options” on page 603.

**Details**

The LOCALE= system option is used to specify the locale, which reflects the local conventions, language, and culture a geographical region.

If the value of the LOCALE= system option is not compatible with the value of the ENCODING= system option, the character-set encoding is determined by the value of the ENCODING= system option.

When you set a value for LOCALE=, the value of the following system options is modified unless explicit values have been specified:

`DATESTYLE=`  
When LOCALE= is set, the DATESTYLE= system option uses the value that corresponds to the chosen locale.
DFLANG=
When LOCALE= is set, the DFLANG= system option is set to a value that corresponds to the chosen locale.

PAPERSIZE=
When LOCALE= is set, the PAPERSIZE= system option is set to a value that corresponds to the chosen locale and the ODS printer is set to the preferred unit of measurement, inches or centimeters, for that locale.

See Also

Conceptual Information:
- Chapter 2, “Locale for NLS,” on page 5
- “LOCALE= Values for PAPERSIZE and DFLANG Options” on page 603

System Options:
- “ENCODING System Option” on page 551
- “DFLANG= System Option” on page 549

**LOCALEDATA System Option**

Specifies the source database for the locale information.

Valid in: configuration file, SAS invocation
Category: Environment Control: Language Control
PROC OPTIONS GROUP= LANGUAGECONTROL
Default: SASLOCALE

**Syntax**

LOCALEDATA=SASLOCALE | REGISTRY

**Syntax Description**

**SASLOCALE**
- specifies the locale definition from an internal SAS database.

**REGISTRY**
- specifies the locale definition from the SAS registry.

**Details**

The SASLOCALE value system option specifies an internal database as the source of the locale’s definition. This database does not allow customization.

The REGISTRY value specifies an external database where locale definitions are customized by using PROC LOCALEDATA.
**LOGLANGCHG System Option**

Specifies whether the language of the text output to the SAS log can be changed.

- **Valid in:** configuration file, SAS invocation
- **PROC OPTIONS GROUP=** LOGCONTROL
- **Default:** NOLOGLANGCHG

### Syntax

```
LOGLANGCHG | NOLOGLANGCHG
```

### Syntax Description

**LOGLANGCHG**
- specifies that the language of the SAS log messages can be changed after start-up.

**NOLOGLANGCHG**
- specifies that the language of the SAS log message cannot be changed after start-up.

### Details

The following conditions result in these actions:

<table>
<thead>
<tr>
<th>ODSLANGCHG</th>
<th>LOGLANGCHG</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>ON</td>
<td>Language for ODS output and the SAS log can be changed based on LSWLANG= option setting.</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>Language for ODS output and the SAS log cannot be changed.</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>Language for the SAS log can be changed based on LSWLANG= option setting.</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>Language for ODS output can be changed based on LSWLANG= option.</td>
</tr>
</tbody>
</table>

### See Also

- “ODSLANGCHG System Option” on page 559
- “LSWLANG System Option” on page 556
- “LOGLANGENG System Option” on page 555
LOGLANGENG System Option

Specifies using the English language for SAS log message text when the LOCALE option is set after start-up.

Valid in: configuration file, SAS invocation
Category: Environment Control: Language Control
PROC OPTIONS GROUP= LANGUAGECONTROL
Default: NOLOGLANGENG

Syntax

LOGLANGENG | NOLOGLANGENG

Syntax Description

LOGLANGENG
SAS log messages are displayed in English using the LSW feature.

NOLOGLANGENG
The LSW feature is not used to enable English for SAS log messages.

Details

The LOGLANGENG option interacts with the LOGLANGCHG, ODSLANGCHG, and LSWLANG options.

- LOGLANGENG has the same functionality as LSWLANG=EN and NOLOGLANGCHG.
- ODSLANGCHG is valid with LOGLANGENG.
- NOLOGLANGENG has no impact on the SAS session.
- During start-up, the configuration file (!sasroot\nls) and the LOCALE option determine the language for SAS messages. After start-up, if the LOCALE option is set and the LOGLANGENG option is on, the language for the SAS log output is English.
- If LOGLANGENG is enabled at start-up and the value of LOCALE is changed during the session, the SAS log output remains in English.
- If LOGLANGCHG is on, the SAS log is controlled by the LSWLANG= option.
- If ODSLANGCHG is on, the ODS text is controlled by the LSWLANG= option.
- If LOGLANGENG is not enabled at start-up and LOCALE is changed during the session, the SAS log output is displayed in the language that was set at start-up, unless both LOGLANGCHG and LSWLANG= are specified and LSWLANG has a value other than LOCALE.

Example

This example is a French SAS session with LOGLANGENG set to ON.
If LOGLANGENG is set to ON, then LSWLANG=EN and LOGLANGCHG is ON automatically. The SAS session always uses English for the SAS log, but the language of the ODS output is determined by the current SAS configuration.

See Also

- “LSWLANG System Option” on page 556
- “LOGLANGCHG System Option” on page 554
- “ODSLANGCHG System Option” on page 559

LSWLANG System Option

Specifies the language for the language switching feature when the LOGLANGCHG or ODSLANGCHG system option is set at SAS invocation.

- **Valid in:** configuration file, SAS invocation
- **Category:** Language Control
- **PROC OPTIONS GROUP=** LANGUAGECONTROL
- **Default:** LOCALE

**Syntax**

LSWLANG=LOCALE | language

**Required Arguments**

- **LOCALE**
  
  specifying the LOCALE argument preserves the behavior prior to SAS 9.4, where the SAS message text matches the value of the LOCALE= option.

- **language**

  Specifies the language for ODS and the SAS log output. The following values can be specified:

<table>
<thead>
<tr>
<th>Code</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN</td>
<td>English</td>
</tr>
<tr>
<td>FR</td>
<td>French</td>
</tr>
<tr>
<td>IT</td>
<td>Italian</td>
</tr>
<tr>
<td>DE</td>
<td>German</td>
</tr>
<tr>
<td>ES</td>
<td>Spanish</td>
</tr>
<tr>
<td>ZH</td>
<td>Chinese S</td>
</tr>
<tr>
<td>ZT</td>
<td>Chinese T</td>
</tr>
</tbody>
</table>

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MAPEBCDIC2ASCII= System Option

Specifies a translation table that SAS uses to transcode from EBCDIC to ASCII and from ASCII to EBCDIC.

Valid in: configuration file, SAS invocation
Category: Environment Control: Language Control
PROC OPTIONS GROUP=
Alias: MAPE2A
Interaction: The MAPEBCDIC2ASCII= system option specifies a translation table to use for the SAS session. The table specified with MAPEBCDIC2ASCII is used by components such as $EBCDIC and $ASCII formats.

Syntax

MAPEBCDIC2ASCII= TRANTAB catalog-entry

Required Argument

catalog-entry

specifies a SAS catalog TRANTAB entry that contains translation tables. If you specify entry-name.type, SAS first searches SASUSER.PROFILE, then SASHELP.LOCALE, and then SASHELP.HOST for the name specified.

Details

MAPEBCDIC2ASCII= supports the requirements of national languages.

CAUTION:

Do not change a translation table unless you are familiar with its purpose. Translation tables are used internally by SAS to implement NLS. If you are
unfamiliar with translation tables, do not change the specifications without proper technical advice.

**NLDECSEPARATOR System Option**

Specifies whether SAS produces locale sensitive numeric output for the decimal separator or continues to format numbers with US English preferences.

**Valid in:** configuration file, SAS invocation, OPTIONS statement, SAS System Options window

**PROC OPTIONS GROUP=** LANGUAGECONTROL

**Alias:** NLD

**Default:** NONLDECSEPARATOR

**Syntax**

NLDECSEPARATOR | NONLDECSEPARATOR

**Required Arguments**

NLDECSEPARATOR

- Enables locale-sensitive numeric output for the decimal separator.

NONLDECSEPARATOR

- Disables locale-sensitive numeric output for the decimal separator.

**Details**

Use the BESTDOTX format with the NLDECSEPARATOR option to produce a numeric value with a dot as a decimal separator. If you do not use the BESTDOTX format, the result could contain a comma (1,2). SAS does not interpret this output as a numeric value. It would result in an error if the value is used in a later assignment statement.

Some SAS functions, such as CALL SYMPUT, convert numeric values to a character string using the BEST format by default. When NLDECSEPARATOR is enabled, the BEST format uses the separator character that matches the preferences for the current locale. If the locale uses a dot as a separator character, the resulting string can be used later in a SAS statement that evaluates the value as a number. However, if the separator character is a comma or other character, the result causes a syntax error if the SAS code attempts to use it as a number.

To avoid this type of error, use BESTDOTX to format the value before assigning it within the CALL SYMPUT statement. BESTDOTX always uses a dot as a decimal separator in the results that it produces. For example, in the SAS code here, BESTDOTX is used to format the value of the variable X before it is assigned to the macro variable &MACX. The value of &MACX can then be assigned to the SAS variable Y without causing a syntax error.

```
data a;
  x=1.2;
  CALL SYMPUT('macx', put(x, bestdotx.));
run;
```
data b;
  y=&macx
run;

See Also
“BESTDOTX Format” on page 87

ODSLANGCHG System Option
Determines whether the language of the text of the ODS output can be changed

Valid in: configuration file, SAS invocation
Category: Environment Control: Language Control
PROC OPTIONS GROUP= LANGUAGECONTROL
Default: ODSLANGCHG is set to off in all servers except for the UNICODE server
Tip: The language used for the language switching feature is controlled by LSWLANG= option. By default, LSWLANG is set to LOCALE, which specifies that the language of LSW is controlled by the language of LOCALE.

Syntax
ODSLANGCHG | NOODSLANGCHG

Syntax Description
ODSLANGCHG
  Specifies that the language of ODS output can change after start-up.
NOODSLANGCHG
  Specifies that the language of ODS output cannot change after start-up.

Details
The Language Switching feature (LSW) enables you to change the language of SAS messages and ODS templates after start-up. In order to use the LSW for ODS output, you must enable ODSLANGCHG.

During start-up, the configuration file determines the language for SAS messages and ODS templates. If the ODSLANGCHG option is set, the language of ODS output can change to reflect the LSWLANG= setting when the localizations are available.

You can enable ODSLANGCHG but not translate into the language of the locale. For example, if you enable ODSLANGCHG, then start a SAS session in French and set the locale to Greek, NLDATE is displayed in Greek. The output is displayed in French. The output is displayed in French because SAS does not translate into Greek.

Comparisons
If ODSLANGCHG is enabled and LSWLANG=LOCALE is set, the ODS PATH is updated based on the LOCALE setting to include the localized templates and corresponding localized messages are used to generate ODS output.
If ODSLANGCHG is not enabled at start-up, ODS output appears in the language that was specified in the configuration file.

**Example**

Example 1 is a French server with ODSLANGCHG not enabled (NOODSLANGCHG). If a French-client application connects to the server, the output appears in French and dates, formatted by using the NL format, appear in French. If an English-client application connects to the French server, and the locale is changed to English on the server, then output messages appears in French, and dates formatted with NL formats appear in English.

Example 2 is a French server with ODSLANGCHG enabled (ODSLANGCHG) and LSWLANG=LOCALE. If a French-client application connects to the server, the output appears in French and dates formatted by using the NL format, appear in French. If an English-client application connects to the French server, and the locale is changed to English on the server, then output messages appears in English, and dates formatted with NL format appears in English.

Example 3 is a French server with ODSLANGCHG enabled (ODSLANGCHG) and LSWLANG=English. If a French-client application connects to the server, the output appears in English and dates formatted by using the NL format, appear in French. If an English-client application connects to the French server, and the locale is changed to English on the server, then output messages appear in English, and dates formatted with NL format appears in English.

**See Also**

- “LOGLANGENG System Option” on page 555
- “LOGLANGCHG System Option” on page 554
- “LSWLANG System Option” on page 556

---

**RSASIOTRANSERROR System Option**

Displays a transcoding error when invalid data is read from a remote application.

**Valid in:** configuration file, SAS invocation, OPTIONS statement, SAS System Options window

**Category:** Files: SAS Files

**PROC OPTIONS GROUP=** SASFILES

**Default:** RSASIOTRANSERROR

**Syntax**

RSASIOTRANSERROR | NORSASIOTRANSERROR
**Syntax Description**

**RSASIOTRANSERROR**

specifies to display a transcoding error when invalid values are read from a remote application.

**NORSASIOTRANSERROR**

specifies not to display a transcoding error when invalid values are read from a remote application.

**Details**

The RSASIOTRANSERROR system option enables remote users of SASIO, for example, SAS Enterprise Guide and SAS Enterprise Miner, to ignore invalid data values. An invalid data value typically causes a transcoding error when the data is read by a remote application.

---

**SORTSEQ= System Option**

Specifies a language-specific collating sequence for the SORT and SQL procedures to use in the current SAS session.

- **Valid in:** configuration file, SAS invocation, OPTIONS statement, SAS System Options window
- **Category:** Sort: Procedure Options

**PROC OPTIONS GROUP=**

---

**Syntax**

SORTSEQ=| <LINGUISTIC>

**Syntax Description**

**LINGUISTIC**

Sorts characters according to the rules of a specified language. The rules and default collating sequence are based on the language specified in the current locale setting. The implementation is provided by the International Components for Unicode (ICU) library. Refer to “Linguistic Sorting of Data Sets and ICU” in *SAS Viya Data Management and Utility Procedures Guide* for more information.

**Example**

This example demonstrates the functionality of SORTSEQ with PROC SORT and PROC SQL:

```sas
options sortseq=linguistic;
proc sort data=sashelp.class out=foo1;
  by name;
  run;
proc sql;
  create table foo2 as select * from sashelp.class order by name;
  quit;
  run;
```
SAS provides ICU collation when the linguistic option (SORTSEQ=LINGUISTIC) is specified on the Base SAS procedure, PROC SORT. Starting in the third maintenance release of SAS 9.4, linguistic collation can also be specified using the SORTSEQ= option in the SQL Procedure and by specifying system option SORTSEQ=LINGUISTIC.

Note: Only PROC SORT and PROC SQL are affected when the SORTSEQ=LINGUISTIC system option is specified.

When the linguistic option is specified, SAS relies on the ICU libraries as the reference implementation of the Unicode Collation Algorithm (UCA) and as a de facto standard. For in-depth information about the UCA algorithm or the International Components for Unicode (ICU) library implementation, see Download the ICU 4.8 Release and CLDR 2.0 Release Note.

See Also

“Collating Sequence” on page 14

---

**TIMEZONE= System Option**

Specifies the user local time zone.

<table>
<thead>
<tr>
<th>Valid in:</th>
<th>Configuration file, SAS command, OPTIONS statement, SASV9_OPTIONS environment variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category:</td>
<td>Environment Control: Language Control</td>
</tr>
<tr>
<td>PROC OPTIONS GROUP=</td>
<td>LANGUAGECONTROL</td>
</tr>
<tr>
<td>Alias:</td>
<td>TZ=, except in the restricted options configuration file where TIMEZONE= must be used</td>
</tr>
<tr>
<td>Note:</td>
<td>This option can be restricted by a site administrator. For more information, see “Restricted Options” in SAS Viya System Options: Reference.</td>
</tr>
</tbody>
</table>

**Syntax**

TIMEZONE=’time-zone-name’ | ’time-zone-ID’

**Syntax Description**

**time-zone-name**

specifies a three- or four-character time zone name. For example, EST is a time zone name for Eastern Time.

Default: BLANK, indicating that the SAS server time zone and the client time zone are the same

See For a list of time zone names, see Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629.

**time-zone-ID**

specifies a region/area value that is defined by SAS. When you specify a time zone ID, the time zone that SAS uses is determined by time zone name and daylight saving time rules.
Note: Time zone IDs are compatible with Java time zone names.

See: For a list of time zone IDs, see Appendix 1, “Time Zone IDs and Time Zone Names,” on page 629.

Details
You set the TIMEZONE= option to a time zone ID or a time zone name in order for SAS to use a particular time zone. The time zone setting affects the following SAS components:

- times that are recorded by events and logs
- time of data set creation or modification
- DATE( ) function
- DATETIME( ) function
- TIME( ) function
- TODAY( ) function
- time zone functions TZONEOFF( ), TZONENID( ), TZONENAME( ), TZONE2U( ), and TZONEU2S( ),
- time zone formats B8601DXw., E8601DXw., B8601LXw., E8601LXw., B8601TXw., E8601TXw., NLDATMZw., NLDATMTZw., and NLDATMWZw.

You set a time zone by specifying a time zone ID or a time zone name. A time zone ID is a region and an area separated by a forward slash (/). For example, America/New_York and Asia/Osaka are time zone IDs.

A time zone name is a three- or four-character name for a time zone. For example, EST is Eastern Time and JST is Japan Time. SAS determines the time by using time zone rules, including daylight saving time rules, before using a time value.

Some time zones names are valid for different locales. For example, CST is Central Daylight Time, Cuba Daylight Time, and China Daylight Time. SAS uses the value of the LOCALE= system option to determine the region and area to use. If TIMEZONE='CST' and LOCALE='zh_CN', SAS uses the Asia/Beijing time zone. If the time zone name does not exist for the locale, SAS searches all time zones and sets the time zone to the first match that it finds.

When this option is restricted and the value of TIMEZONE= is the default value of BLANK, time zone behavior does not use time zone information.

See Also
“Specifying Time Zones in SAS” on page 25

VALIDMEMNAME= System Option
Specifies the rules for naming SAS data sets, SAS data views, and item stores.

Valid in: Configuration file, SAS command, OPTIONS statement, SASV9_OPTIONS environment variable

Category: Files: SAS Files

PROC OPTIONS GROUP= SASFILES
Default: The shipped default is COMPATIBLE.

Applies to: BASE engine

Restriction: Regardless of the value of VALIDMEMNAME, a member name cannot end in the special character # followed by three digits. This is because it would conflict with the naming conventions for generation data sets. Using such a member name results in an error.

Interaction: SAS Studio sets VALIDMEMNAME=COMPAT before and after each code submission. For more information, see “System Options in SAS Studio” in SAS Viya System Options: Reference.

Note: This option can be restricted by a site administrator. For more information, see “Restricted Options” in SAS Viya System Options: Reference.

Syntax

VALIDMEMNAME=COMPATIBLE | EXTEND

Syntax Description

COMPATIBLE
specifies that a SAS data set name, a SAS data view name, or an item store name must follow these rules:

- The length of the names can be up to 32 characters.
- Names must begin with a letter of the Latin alphabet (A–Z, a–z) or an underscore. Subsequent characters can be letters of the Latin alphabet, numerals, or underscores.
- Names cannot contain blanks or special characters except for the underscore.
- Names can contain mixed-case letters. SAS internally converts the member name to uppercase. Therefore, you cannot use the same member name with a different combination of uppercase and lowercase letters to represent different variables. For example, customer, Customer, and CUSTOMER all represent the same member name. How the name is saved on disk is determined by the operating environment.

Alias COMPAT

EXTEND
specifies that a SAS data set name, a SAS data view name, or an item store name must follow these rules:

- Names can include national characters.
- The name can include special characters, except for the / \ * ? " < > : - characters.
- The name must contain at least one character (letters, numbers, valid special characters, and national characters).
- The length of the name can be up to 32 bytes.
- Null bytes are not allowed.
- Names cannot begin with a blank or a ‘.’ (the period).
- Leading and trailing blanks are deleted when the member is created.
• Names can contain mixed-case letters. SAS internally converts the member name to uppercase. Therefore, you cannot use the same member name with a different combination of uppercase and lowercase letters to represent different variables. For example, customer, Customer, and CUSTOMER all represent the same member name. How the name appears is determined by the operating environment.

Requirement

When VALIDMEMNAME=EXTEND, SAS data set names, SAS data view names, and item store names must be written as a SAS name literal if the name includes blank spaces, special characters, or national characters. If you use either the percent sign (%) or the ampersand (&), then you must use single quotation marks in the name literal in order to avoid interaction with the SAS Macro Facility.

Operating environment

When you reference a SAS file directly by its physical name, the final embedded period is an extension delimiter. If a physical file reference includes a SAS member name that contains a period, you must add the file extension. For example, if you reference the data set name my.member as a physical file, you would add the file extension sas7bdat to the reference, as shown in this SET statement:

```set './saslib/my.member.sas7bdat'.```

Tip

The name is displayed in uppercase letters.

Examples

```data "August Purchases"n;

data 'Años de empleo'n.;;```

CAUTION

Throughout SAS, using the name literal syntax with SAS member names that exceed the 32-byte limit or that have excessive embedded quotation marks might cause unexpected results. The intent of the VALIDMEMNAME=EXTEND system option is to enable compatibility with other DBMS member naming conventions, such as allowing embedded blanks and national characters.

Details

When VALIDMEMNAME= EXTEND, valid characters that are allowed in a SAS data set name, SAS data view name, and an item store name are extended to these characters:

• international characters
• characters supported by third-party databases
• characters that are commonly used in a filename

Only the DATA, VIEW, and ITEMSTOR SAS member types support the extension of characters. The other member types, such as CATALOG and PROGRAM, do not support the extended characters. INDEX and AUDIT types that exist only with the associated DATA member support extended characters.

See Also

System Options:

• “VALIDVARNAME= System Option” on page 566
**VALIDVARNAME= System Option**

Specifies the rules for valid SAS variable names that can be created and processed during a SAS session.

**Valid in:** Configuration file, SAS command, OPTIONS statement, SASV9_OPTIONS environment variable

**Category:** Files: SAS Files

**PROC OPTIONS GROUP=** SASFILES

**Default:** The shipped default is V7.

**Interaction:** SAS Studio sets VALIDVARNAME= to the Preferences setting before each code submission. For more information, see “System Options in SAS Studio” in SAS Viya System Options: Reference.

**Note:** This option can be restricted by a site administrator. For more information, see “Restricted Options” in SAS Viya System Options: Reference.

---

**Syntax**

VALIDVARNAME=V7 | UPCASE | ANY

**Syntax Description**

**V7**

specifies that variable names must follow these rules:

- The length of a SAS variable names can be up to 32 characters.
- The first character must begin with a letter of the Latin alphabet (A–Z, a–z) or the underscore. Subsequent characters can be letters of the Latin alphabet, numerals, or underscores.
- Trailing blanks are ignored. The variable name alignment is left-justified.
- A variable name cannot contain blanks or special characters except for the underscore.
- A variable name can contain mixed-case letters. SAS stores and writes the variable name in the same case that is used in the first reference to the variable. However, when SAS processes a variable name, SAS internally converts it to uppercase. Therefore, you cannot use the same variable name with a different combination of uppercase and lowercase letters to represent different variables. For example, cat, Cat, and CAT all represent the same variable.
- Do not assign variables the names of special SAS automatic variables (such as _N_ and _ERROR_) or variable list names (such as _NUMERIC_, _CHARACTER_, and _ALL_) to variables.

**Examples**

```
season='summer';
percent_of_profit=percent;
```

**UPCASE**

specifies that the variable name follows the same rules as V7, except that the variable name is uppercase, as in earlier versions of SAS.
ANY specifies that SAS variable names must follow these rules:

- The name can begin with or contain any characters, including blanks, national characters, special characters, and multi-byte characters.
- The name can be up to 32 bytes in length
- The name cannot contain any null bytes
- Leading blanks are preserved, but trailing blanks are ignored
- The name must contain at least one character. A name with all blanks is not permitted.
- The name contains mixed-case letters. SAS stores and writes the variable name in the same case that is used in the first reference to the variable. However, when SAS processes a variable name, SAS internally converts it to uppercase. Therefore, you cannot use the same variable name with a different combination of uppercase and lowercase letters to represent different variables. For example, cat, Cat, and CAT all represent the same variable.

See

Examples

`'% of profit'n=percent;`

`'items@warehouse'n=itemnum;`

CAUTION Throughout SAS, using the name literal syntax with SAS member names that exceed the 32-byte limit or have excessive embedded quotation marks might cause unexpected results. The intent of the VALIDVARNAME=ANY system option is to enable compatibility with other DBMS variable (column) naming conventions, such as allowing embedded blanks and national characters.

See Also

System Options:

- “VALIDMEMNAME= System Option” on page 563
Part 9

Options for Commands, Statements, and Procedures for NLS

Chapter 16

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Chapter 16

Dictionary of Command, Statement, and Procedure Option for NLS

Commands, Statements, and Procedures for NLS by Category .................................. 571

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<thead>
<tr>
<th>Category</th>
<th>Language Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Access</td>
<td>CVPBYTES=, CVPENGINE=, and CVPMULTIPLIER= Options</td>
<td>Specifies attributes for character variables that are needed to transcode a SAS file.</td>
</tr>
<tr>
<td></td>
<td>ENCODING= Option</td>
<td>Overrides and transcodes the encoding for input or output processing of external files.</td>
</tr>
<tr>
<td></td>
<td>INENCODING= and OUTENCODING= Options</td>
<td>Overrides and changes the encoding when reading or writing SAS data sets in the SAS library.</td>
</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>ODSCHARSET= Option (p. 591)</td>
<td>Specifies the character set to be generated in the META declaration for the output.</td>
</tr>
<tr>
<td></td>
<td>ODSTRANTAB= Option (p. 592)</td>
<td>Specifies the translation table to use when transcoding an XML document for an output file.</td>
</tr>
<tr>
<td></td>
<td>XMLENCODING= Option (p. 596)</td>
<td>Overrides the encoding of an XML document to import or export an external document.</td>
</tr>
<tr>
<td>Information</td>
<td>TRANSCODE= Option (p. 593)</td>
<td>Specifies an attribute in the ATTRIB statement (which associates a format, informat, label, and length with one or more variables) that indicates whether character variables are to be transcoded.</td>
</tr>
<tr>
<td>ODS: Third-Party Formatted</td>
<td>CHARSET= Option (p. 572)</td>
<td>Specifies the character set to be generated in the META declaration for the output.</td>
</tr>
<tr>
<td></td>
<td>TRANTAB= Option (p. 595)</td>
<td>Specifies the translation table to use when you are transcoding character data.</td>
</tr>
</tbody>
</table>

**Dictionary**

**CHARSET= Option**

Specifies the character set to be generated in the META declaration for the output.

- **Valid in:** LIBNAME statement for the ODS MARKUP and ODS HTML statements
- **Category:** ODS: Third-Party Formatted

**Syntax**

```
CHARSET=character-set ;
```

**Required Argument**

`character-set`

Specifies the character set to use in the META tag for HTML output.

An example of an encoding is UTF-8. Official character sets for use on the Internet are registered by IANA (Internet Assigned Numbers Authority). IANA is the central registry for various Internet protocol parameters, such as port, protocol and enterprise numbers, and options, codes and types. For a complete list of character-set values, see [www.unicode.org/reports/tr22/index.html](http://www.unicode.org/reports/tr22/index.html) and [www.iana.org/assignments/character-sets](http://www.iana.org/assignments/character-sets).

A character set is like an encoding-value in this context. However, character set is the term that is used to identify an encoding that is suitable for use on the Internet.
Example: Generated Output in a META Declaration for an ODS MARKUP Statement

```html
<META http-equiv="Content-Type" content="text/html; charset=utf-8">
```

See Also

Conceptual Information:
- Chapter 3, “Encoding for NLS,” on page 9

Collating Sequence Option

Specifies the collating sequence for PROC SORT.

**Valid in:** PROC SORT statement

**Note:** The PROC SORT statement sorts observations in a SAS data set by one or more characters or numeric variables.

**Syntax**

```
PROC SORT collating-sequence-option <other option(s)> ;
```

**Options**

Options can include one `collating-sequence-option` and multiple `other options`. The order of the two types of options does not matter and both types are not necessary in the same PROC SORT step. Only the explanations for the PROC SORT collating-sequence-options follow.

**DANISH NORWEGIAN**

sorts characters according to the Danish and Norwegian

The Danish and Norwegian collating sequence is shown in Figure 16.1 on page 574.

**POLISH**

sorts characters according to the Polish convention.

**FINNISH SWEDISH**

sorts characters according to the Finnish and Swedish convention. The Finnish and Swedish collating sequence is shown in Figure 16.1 on page 574.

**NORWEGIAN**

See DANISH

**SWEDISH**

See FINNISH

**SORTSEQ=collating-sequence**

specifies the collating sequence. The `collating-sequence` can be a collating-sequence-option, a translation table, an encoding, or the keyword LINGUISTIC. Only one collating sequence can be specified. For more information, see “Collating Sequence” on page 14.

Here are descriptions of the collating sequences:
collating—sequence—option | translation_table

specifies either a translation table, which can be one that SAS provides or any user-defined translation table, or one of the PROC SORT statement Collating-Sequence-Options.

The available translation tables are

- DANISH
- EBCDIC
- FINNISH
- ITALIAN
- NORWEGIAN
- POLISH
- REVERSE
- SPANISH
- SWEDISH

The following figure shows how the alphanumeric characters in each language sorts:

![Figure 16.1 Alphanumeric Characters Sorted for Each Language](image)

Restriction

You can specify only one collating-sequence-option in a PROC SORT step.

Tip

The SORTSEQ= collating sequence options are specified without parenthesis and have no arguments that are associated with them. An example of how to specify a collating sequence follows: proc sort data=mydata SORTSEQ=ASCII;

encoding-value

specifies an encoding value. The result is the same as a binary collation of the character data represented in the specified encoding. See the supported encoding values in “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.

Restriction

PROC SORT is the only procedure or part of the SAS system that recognizes an encoding specified for the SORTSEQ= option.

Tip

When the encoding value contains a character other than an alphanumeric character or underscore, the value needs to be enclosed in quotation marks.
See The list of the encodings that can be specified in “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.

LINGUISTIC<(collating—rules )>
specifies linguistic collation, which sorts characters according to rules of the specified language. The rules and default collating sequence options are based on the language specified in the current locale setting. The implementation is provided by the International Components for Unicode (ICU) library and produces results that are largely compatible with the Unicode Collation Algorithms (UCA).

Alias UCA

Restriction The SORTSEQ=LINGUISTIC option is available on the PROC SORT SORTSEQ= option and PROC SQL.

Notes Linguistic collation can also be specified using the SORTSEQ= option in the SQL Procedure and by specifying system option SORTSEQ=LINGUISTIC. For more information, see “SORTSEQ= System Option” on page 561 and “SORT” in SAS Viya Data Management and Utility Procedures Guide.

Collating rules are supported only for PROC SORT, not for the system option or SORTSEQ= on PROC SQL.

Tips The collating-rules must be enclosed in parentheses. More than one collating rule can be specified.

When BY processing is performed on data sets that are sorted with linguistic collation, the NOBYSORTED system option might need to be specified in order for the data set to be treated properly. BY processing is performed differently than collating sequence processing.

See The “ICU License” in SAS Viya Data Management and Utility Procedures Guide

The “Collating Sequence” on page 14 for detailed information about linguistic collation.


Here are the collation-rules that can be specified for the LINGUISTIC option. These rules modify the linguistic collating sequence:

**ALTERNATE_HANDLING=SHIFTED**
controls the handling of variable characters like spaces, punctuation, and symbols. When this option is not specified (using the default value Non-Ignorable), differences among these variable characters are of the same importance as differences among letters. If the ALTERNATE_HANDLING option is specified, these variable characters are of minor importance.

Default NON_IGNORABLE

Tip The SHIFTED value is often used in combination with STRENGTH= set to Quaternary. In such a case, whitespace characters, punctuation,
and symbols are considered when comparing strings, but only if all other aspects of the strings (base letters, accents, and case) are identical.

**CASE-FIRST**

Specify order of uppercase and lowercase letters. This argument is valid for only TERTIARY, QUATERNARY, or IDENTICAL levels. The following table provides the values and information for the CASE-FIRST argument:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPER</td>
<td>Sorts uppercase letters first, then the lowercase letters.</td>
</tr>
<tr>
<td>LOWER</td>
<td>Sorts lowercase letters first, then the uppercase letters.</td>
</tr>
</tbody>
</table>

**COLLATION**

The following table lists the available COLLATION= values: If you do not select a collation value, then the user's locale-default collation is selected.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIG5HAN</td>
<td>specifies pinyin ordering for Latin and specifies big5 charset ordering for Chinese, Japanese, and Korean characters.</td>
</tr>
<tr>
<td>DIRECT</td>
<td>specifies a Hindi variant.</td>
</tr>
<tr>
<td>GB2312HAN</td>
<td>specifies pinyin ordering for Latin and specifies gb2312han charset ordering for Chinese, Japanese, and Korean characters.</td>
</tr>
<tr>
<td>PHONEBOOK</td>
<td>specifies a telephone-book style for ordering of characters. Select PHONEBOOK only with the German language.</td>
</tr>
<tr>
<td>PINYIN</td>
<td>specifies an ordering for Chinese, Japanese, and Korean characters based on character-by-character transliteration into pinyin. This ordering is typically used with simplified Chinese.</td>
</tr>
<tr>
<td>POSIX</td>
<td>is the Portable Operating System Interface. This option specifies a &quot;C&quot; locale ordering of characters.</td>
</tr>
<tr>
<td>STROKE</td>
<td>specifies a nonalphabetic writing style ordering of characters. Select STROKE with Chinese, Japanese, Korean, or Vietnamese languages. This ordering is typically used with Traditional Chinese.</td>
</tr>
<tr>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>TRADITIONAL</td>
<td>specifies a traditional style for ordering of characters. For example, select TRADITIONAL with the Spanish language.</td>
</tr>
</tbody>
</table>

**LOCALE=locale_name**

specifies the locale name in the form of a POSIX name, for example, ja_JP. See the “LOCALE= Values for PAPERSIZE and DFLANG Options” on page 603 for a list of locale and POSIX values supported by PROC SORT.

**Restriction**
The following locales are not supported by PROC SORT:
- Afrikaans_SouthAfrica, af_ZA
- Cornish_UnitedKingdom, kw_GB

**NUMERIC_COLLATION=**
orders integer values within the text by the numeric value instead of characters used to represent the numbers.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Order numbers by the numeric value. For example, &quot;8 Main St.&quot; would sort before &quot;45 Main St.&quot;.</td>
</tr>
<tr>
<td>OFF</td>
<td>Order numbers by the character value. For example, &quot;45 Main St.&quot; would sort before &quot;8 Main St.&quot;.</td>
</tr>
</tbody>
</table>

**Default**
OFF

**STRENGTH=**
The value of strength is related to the collation level. There are five collation-level values. The following table provides information about the five levels. The default value for strength is related to the locale.

<table>
<thead>
<tr>
<th>Value</th>
<th>Type of Collation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY or 1</td>
<td>PRIMARY specifies differences between base characters (for example, &quot;a&quot; &lt; &quot;b&quot;).</td>
<td>It is the strongest difference. For example, dictionaries are divided into different sections by base character.</td>
</tr>
<tr>
<td>SECONDARY or 2</td>
<td>Accents in the characters are considered secondary differences  (for example, &quot;as&quot; &lt; &quot;as&quot; &lt; &quot;at&quot;).</td>
<td>A secondary difference is ignored when there is a primary difference anywhere in the strings. Other differences between letters can also be considered secondary differences, depending on the language.</td>
</tr>
</tbody>
</table>
### Value | Type of Collation | Description
--- | --- | ---
TERTIARY or 3 | Upper and lowercase differences in characters are distinguished at the tertiary level (for example, "ao" < "Ao" < "aò"). | A tertiary difference is ignored when there is a primary or secondary difference anywhere in the strings. Another example is the difference between large and small Kana.
QUATERNARY or 4 | When punctuation is ignored at level 1-3, an additional level can be used to distinguish words with and without punctuation (for example, "ab" < "a-b" < "aB"). | The quaternary level should be used if ignoring punctuation is required or when processing Japanese text. This difference is ignored when there is a primary, secondary, or tertiary difference.
IDENTICAL or 5 | When all other levels are equal, the identical level is used as a tiebreaker. The Unicode code point values of the Normalization Form D (NFD) form of each string are compared at this level, just in case there is no difference at levels 1-4. | This level should be used sparingly, as only code point values differences between two strings is an extremely rare occurrence. For example, only Hebrew cantillation marks are distinguished at this level.

**Alias** Level=

**CAUTION:**
If you use a host sort utility to sort your data, then specifying a translation table based collating sequence with the SORTSEQ= option might corrupt the character BY variables. For more information, see the PROC SORT documentation for your operating environment.

### Details
The collating sequence option in the PROC SORT statement sorts observations in a SAS data set by one or more characters or numeric variables.

**Table 16.1 Options**

<table>
<thead>
<tr>
<th>Task</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify the collating sequence</td>
<td></td>
</tr>
<tr>
<td>Specify Danish</td>
<td>DANISH on page 573</td>
</tr>
<tr>
<td>Specify Finnish</td>
<td>FINNISH on page 573</td>
</tr>
<tr>
<td>Specify Norwegian</td>
<td>NORWEgIAN on page 573</td>
</tr>
<tr>
<td>Specify Polish</td>
<td>POLISH on page 573</td>
</tr>
<tr>
<td>Specify Swedish</td>
<td>SWEDISH on page 573</td>
</tr>
</tbody>
</table>
Task | Option
--- | ---
Specify a customized sequence | NATIONAL on page 573
Specify any of the collating sequences listed above (ASCII, EBCDIC, DANISH, FINNISH, ITALIAN, NORWEGIAN, POLISH, SPANISH, SWEDISH, or NATIONAL), the name of any other system provided translation table (POLISH, SPANISH), and the name of a user-created translation table. You can specify an encoding. You can also specify either the keyword LINGUISTIC or UCA to achieve a locale-appropriate collating sequence. | SORTSEQ= on page 573

See Also
- “Collating Sequence” on page 14
- “SORT” in SAS Viya Data Management and Utility Procedures Guide

System Options:
- “SORTSEQ= System Option” on page 561

CVPBYTES=, CVPENGINE=, and CVPMULTIPLIER= Options

Specifies attributes for character variables that are needed to transcode a SAS file.

Valid in: LIBNAME statement

Category: Data Access

See: LIBNAME, SAS/ACCESS

Syntax

LIBNAME libref 'SAS data-library'; <CVPBYTES=bytes> <CVPENGINE=engine> <CVPMULTIPLIER=multiplier> <CVPVARCHAR=YES | NO>

Optional Arguments

CVPBYTES=bytes
specifies the number of bytes by which to expand character variable lengths when processing a SAS data file that requires transcoding. The CVP engine expands the lengths so that character data truncation does not occur. The lengths for character variables are increased by adding the specified value to the current length. You can specify a value from 0 to 32766.

For example, the following LIBNAME statement implicitly assigns the CVP engine by specifying the CVPBYTES= option.

libname expand 'SAS data-library' cvpbytes=5;
Character variable lengths are increased by adding 5 bytes. A character variable with a length of 10 is increased to 15, and a character variable with a length of 100 is increased to 105.

**Default**
If you specify CVPBYTES=, SAS automatically uses the CVP engine in order to expand the character variable lengths according to your specification. If you explicitly assign the CVP engine but do not specify either CVPBYTES= or CVPMULTIPLIER=, then SAS uses CVPMULTIPLIER=1.5 to increase the lengths of the character variables.

**Restrictions**
The CVP engine supports SAS data files, no SAS views, catalogs, item stores, and so on.

The CVP engine is available for input (read) processing only.

For library concatenation with mixed engines that include the CVP engine, only SAS data files are processed. For example, if you execute the COPY procedure, only SAS data files are copied.

**Requirement**
The number of bytes that you specify must be large enough to accommodate any expansion. Otherwise, truncation occurs, which results in an error message in the SAS log.

**Interaction**
You cannot specify both CVPBYTES= and CVPMULTIPLIER=. Specify one of these options.

**See**
“Avoiding Character Data Truncation By Using the CVP Engine” on page 23

**CVPENGINE=**
specifies the engine to use in order to process a SAS data file that requires transcoding. The CVP engine expands the character variable lengths to transcoding so that character data truncation does not occur. Then the specified engine does the actual file processing.

**Alias**
CVPENG

**Default**
SAS uses the default SAS engine.

**See**
“Avoiding Character Data Truncation By Using the CVP Engine” on page 23

**CVPMULTIPLIER=**
specifies a multiplier value in order to expand character variable lengths when you are processing a SAS data file that requires transcoding. The CVP engine expands the lengths so that character data truncation does not occur. The lengths for character variables are increased by multiplying the current length by the specified value. You can specify a multiplier value from 1 to 5.

For example, the following LIBNAME statement implicitly assigns the CVP engine by specifying the CVPMULTIPLIER= option.

```sas
libname expand 'SAS data-library' cvpmultiplier=2.5;
```

Character variable lengths are increased by multiplying the lengths by 2.5. A character variable with a length of 10 is increased to 25, and a character variable with a length of 100 is increased to 250.
Alias
CVPMULT

Default
If you specify CVPMULTIPLIER=, SAS automatically uses the CVP engine in order to expand the character variable lengths according to your specification. If you explicitly specify the CVP engine but do not specify either CVPMULTIPLIER= or CVPBYTES=, then SAS uses CVPMULTIPLIER=1.5 to increase the lengths.

Restrictions
The CVP engine supports SAS data files, no SAS views, catalogs, item stores, and so on.

The CVP engine is available for input (read) processing only.

For library concatenation with mixed engines that include the CVP engine, only SAS data files are processed. For example, if you execute the COPY procedure, only SAS data files are copied.

Requirement
The number of bytes that you specify must be large enough to accommodate any expansion. Otherwise, truncation occurs, which results in an error in the SAS log.

Interaction
You cannot specify both CVPMULTIPLIER= and CVPBYTES=. Specify one of these options.

See
“Avoiding Character Data Truncation By Using the CVP Engine” on page 23

CVPVARCHAR=YES | NO
specifies whether to convert fixed-width character variables to variable-width characters during input file processing. The byte length of the new-width character variable is the maximum number of bytes per character from the SAS session encoding multiplied by the specified fixed-width character length.

Default
No

Interaction
If you specify CVPVARCHAR=YES, the CVPMULTIPLIER= and CVPBYTES= options are ignored.

Notes
Trailing blanks are removed from string data that is under CHAR columns.

Fixed-width character variables with a format of TRANSCODE=NO are excluded during conversion.

Details
The character variable padding (CVP) engine converts variables defined with the CHAR to a VARCHAR data type when CVPVARCHAR=YES. Because CVP is available only for input processing, the VARCHAR data type is not automatically saved.

Without saving the data, the conversion to VARCHAR is lost when a SAS session ends. To save the changes, use the SET statement or PROC COPY and an engine that supports VARCHAR. If the data is saved using an engine that does not support VARCHAR, such as the BASE engine, the character columns in the new data set revert to the CHAR data type. The length of the CHAR variables in the new data set is the number of bytes that is needed to store the VARCHAR.
If the data is read by a procedure that does not support VARCHAR, `CVPVARCHAR=YES` is ignored. The CVP engine uses CVPPBYES, CVPMULTIPLIER, or the default multiplier to expand the length of the character columns in the data.

**Example: Using the CVP Engine**

The following example illustrates how to avoid character data truncation by using the CVP engine. The example uses a SAS data set named MYFILES.WLATIN2, which contains some national characters in the Wlatin2 encoding. The data set is created in SAS 9 in an SBCS session. This code sample is run in SAS9.

```sas
libname myfiles 'SAS-Data Library';
data myfiles.wlatin2 (encoding=wlatin2);
  var1='A';
  var2='Š';
  var3='ś';
  var4='ł';
;proc print data=myfiles.wlatin2;
run;
```

<table>
<thead>
<tr>
<th>Obs</th>
<th>var1</th>
<th>var2</th>
<th>var3</th>
<th>var4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>Š</td>
<td>ś</td>
<td>ł</td>
</tr>
</tbody>
</table>

Here is the PROC CONTENTS output for MYFILES.WLATIN2 that was run in SAS 9, which shows that the encoding is Wlatin2 and the length for each character variable is 1 byte:
The following code is executed in SAS Viya. The default session encoding in UTF-8.

```sas
options msglevel=i;
```
libname myfiles 'SAS data-library';
data myfiles.utf8;
  set myfiles.wlatin2;
run;

The DATA step requests a new data set named MYFILES.UTF8. It also requests that the
data be read into the new data set in the UTF-8 encoding, which means that the data
must be transcoded from Wlatin2 to UTF-8. The request results in errors when the
transcoding truncates the character data. The new data set MYFILES.UTF8 is created
but does not contain any data.

Log 16.1  SAS Log with Transcoding Error

INFO: Data file MYFILES.UTF8.DATA is in a format native to another
host or the file encoding does not match the session encoding.
Cross Environment Data Access will be used, which may require additional
CPU resources and reduce performance.
ERROR: Some character data was lost during transcoding in the data set
MYFILES.UTF8.
NOTE: The data step has been abnormally terminated.
NOTE: The SAS System stopped processing this step because of errors.
NOTE: There were 1 observations read from the data set MYFILES.WLATIN2.
WARNING: The data set MYFILES.UTF8 may be incomplete. When this step was
stopped there were 0
  observations and 4 variables.

The following code is executed in SAS Viya and expands the variable lengths:

options msglevel=i;
libname myfiles 'SAS data-library';
libname expand cvp 'SAS data-library' cvpbytes=2;
data myfiles.utf8;
  set expand.wlatin2;
run;

In this example, the CVP engine expands character variable lengths by adding 2 bytes to
each length. The data is read into the new file in UTF-8 encoding by transcoding from
Wlatin2 to UTF-8. There is no data truncation due to the expanded character variable
lengths, and the new data set is successfully created:
Log 16.2  SAS Log Output for MYFILES.UTF8

57     options msglevel=i;
58          libname myfiles 'directory path';
NOTE: Libref MYFILES was successfully assigned as follows:
   Engine:        V9
   Physical Name: /directory path
59          libname expand cvp '/directory path' cvpbytes=2;
WARNING: Libref EXPAND refers to the same physical library as MYFILES.
NOTE: Libref EXPAND was successfully assigned as follows:
   Engine:        CVP
   Physical Name: /directory path
60         data myfiles.utf8;
61         set expand.wlatin2;
INFO: Data file EXPAND.WLATIN2.DATA is in a format that is native to another
   host, or the file encoding does not match the session
   encoding. Cross Environment Data Access will be used, which might require
   additional CPU resources and might reduce performance.
62         run;

NOTE: There were 1 observations read from the data set EXPAND.WLATIN2.
NOTE: The data set MYFILES.UTF8 has 1 observations and 4 variables.
NOTE: DATA statement used (Total process time):
   real time           0.02 seconds
   cpu time            0.01 seconds

Finally, here is PROC CONTENTS output for MYFILES.UTF8 showing that it is in the
UTF-8 encoding and that the length of each character variable is 3:
**ENCODING= Option**

Overrides and transcodes the encoding for input or output processing of external files.

**Valid in:**  
%INCLUDE statement; FILE statement; FILENAME statement; FILENAME statement, EMAIL (SMTP) Access Method; INFILE statement; ODS statements; FILE command; INCLUDE command

**Category:** Data Access

**Syntax**

```
ENCODING= 'encoding-value'
```
Optional Argument

ENCODING= 'encoding-value'
specifies the encoding to use for reading, writing, copying, or saving an external file. The value for ENCODING= indicates that the external file has a different encoding from the current session encoding.

When you read, write, copy, or save data using an external file, SAS transcodes the data from the session encoding to the specified encoding.

For details, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.

Default SAS uses the current session encoding.

Details

The following table provides information about how the ENCODING option is used with the corresponding statement:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%INCLUDE statement:</td>
<td>reads SAS statements and data lines from the specified source file.</td>
</tr>
<tr>
<td>FILE statement:</td>
<td>writes to an external file.</td>
</tr>
<tr>
<td>FILENAME statement:</td>
<td>reads from or writes to an external file.</td>
</tr>
<tr>
<td>FILENAME statement, EMAIL (SMTP) Access Method:</td>
<td>sends electronic mail programmatically.</td>
</tr>
<tr>
<td>INFILE statement:</td>
<td>reads from an external file.</td>
</tr>
<tr>
<td>ODS statements:</td>
<td>controls features of the Output Delivery System that are used to generate, store, or reproduce SAS procedure and DATA step output.</td>
</tr>
<tr>
<td>FILE command:</td>
<td>saves the contents of a window to an external file.</td>
</tr>
<tr>
<td>INCLUDE command:</td>
<td>Copies an external file into the current window.</td>
</tr>
</tbody>
</table>

Examples

Example 1: Using the FILE Statement to Specify an Encoding for Writing to an External File
This example creates an external file from a SAS data set. The current session encoding is UTF-8, but the external file's encoding needs to be LATIN1. By default, SAS writes the external file using the current session encoding.

To specify what encoding to use for writing data to the external file, specify the ENCODING= option:

libname myfiles 'SAS data-library';
Example 2: Using the FILENAME Statement to Specify an Encoding for Reading an External File
This example creates a SAS data set from an external file. The external file is in WLATIN1 character-set encoding, and the current SAS session is in the UTF-8 encoding. By default, SAS assumes that an external file is in the same encoding as the session encoding, which causes the character data to be written to the new SAS data set incorrectly.

To specify which encoding to use when reading the external file, specify the ENCODING= option:

```
libname myfiles 'SAS data-library';
filename extfile 'external-file' encoding="utf-8";
data myfiles.unicode;
  infile extfile;
  input Make $ Model $ Year;
run;
```

When you specify that the external file is in WLATIN1, SAS then transcodes the external file from WLATIN1 to the current session encoding when writing to the new SAS data set. Therefore, the data is written to the new data set correctly in UTF-8.

Example 3: Using the FILENAME Statement to Specify an Encoding for Writing to an External File
This example creates an external file from a SAS data set. By default, SAS writes the external file using the current session encoding. The current session encoding is UTF-8, but the external file's encoding needs to be WLATIN1.

To specify which encoding to use when writing data to the external file, specify the ENCODING= option:

```
libname myfiles 'SAS data-library';
filename outfile 'external-file' encoding="WLATIN1";
data _null_;  
  set myfiles.cars;  
  file outfile;  
  put Make Model Year;  
run;
```

When you specify that the external file is to be in WLATIN1 encoding, SAS then transcodes the data from UTF-8 to the specified encoding, WLATIN1, when writing to the external file.

Example 4: Changing Encoding for Message Body and Attachment
This example illustrates how to change text encoding for the message body as well as for the attachment.

```
filename mymail email 'Joe.Developer@sas.com';
data _null_;  
  file mymail;
```
In the program, the following occurs:

- The ENCODING= email option specifies that the message body is encoded to Greek (ISO) before being sent.
- For the ATTACH= email option, the attachment option ENCODING= specifies the encoding of the attachment that is read into SAS, which is Western (EBCDIC).
- Because SMTP and other email interfaces do not support EBCDIC, the attachment option OUTENCODING= converts the attachment to Western (ISO) before sending it.

**Example 5: Using the INFILE= Statement to Specify an Encoding for Reading from an External File**

This example creates a SAS data set from an external file. The external file's encoding is in WLATIN2, and the current SAS session encoding is UTF-8. By default, SAS assumes that the external file is in the same encoding as the session encoding, which causes the character data to be written to the new SAS data set incorrectly.

To specify which encoding to use when reading the external file, specify the ENCODING= option:

```sas
libname myfiles 'SAS data-library';
filename extfile 'external-file';
data myfiles.unicode;
    infile extfile encoding="utf-8";
    input Make $ Model $ Year;
run;
```

When you specify that the external file is in WLATIN2, SAS then transcodes the external file from WLATIN2 to the current session encoding when writing to the new SAS data set. Therefore, the data is written to the new data set correctly in UTF-8.

**See Also**

Statements:

- “FILE Statement” in *SAS Viya Statements: Reference*
- “FILENAME Statement” in *SAS Viya Statements: Reference*
- “INFILE Statement” in *SAS Viya Statements: Reference*
Syntax

INENCODING= ANY | ASCIIANY | EBCDICANY | encoding-value
OUTENCODING= ANY | ASCIIANY | EBCDICANY | encoding-value

Syntax Description

ANY
specifies no transcoding between ASCII and EBCDIC encodings.

NOTE: ANY is a synonym for binary. Because the data is binary, the actual encoding is irrelevant.

ASCIIANY
specifies that no transcoding occurs, assuming that the mixed encodings are ASCII encodings.

EBCDICANY
specifies that no transcoding occurs, assuming that the mixed encodings are EBCDIC encodings.

encoding-value
specifies an encoding value. For a list of encoding values, see Chapter 18, “Encoding Values in SAS Language Elements,” on page 617.

Details

The INENCODING= option is used to read SAS data sets in the SAS library. The OUTENCODING= option is used to write SAS data sets in the SAS library.

The INENCODING= value or the OUTENCODING= value is written to the SAS log when you use the LIST argument.

INENCODING= and OUTENCODING= are most appropriate when using an existing library that contains mixed encodings. To read a library that contains mixed encodings, you can set INENCODING= to ASCIIANY or EBCDICANY. To write a separate data set, you can use OUTENCODING= to specify a specific encoding, which is applied to the data set when it is created.

Comparisons

• Session encoding is specified using the ENCODING= system option.

• You can specify the encoding for reading data sets in a SAS library by using the LIBNAME statement INENCODING= option for input files. If both the LIBNAME statement option and the ENCODING= data set option are specified, SAS uses the data set option.

• You can specify the encoding for writing data sets to a SAS library by using the LIBNAME statement OUTENCODING= option for output files. If both the LIBNAME statement option and the ENCODING= data set option are specified, SAS uses the data set option.

• For the COPY procedure, the default CLONE option uses the encoding attribute of the input data set instead of the encoding value specified on the OUTENCODING= option.

See Also

• “Overview: Encoding for NLS” on page 9
ODSCHARSET= Option

Specifies the character set to be generated in the META declaration for the output.

Valid in: LIBNAME statement for the XMLV2 engine

Category: Data Access

Syntax

ODSCHARSET=character-set;

Required Argument

character-set

For the LIBNAME statement for the XML engine, specifies the character set to use in the ENCODING= attribute.

An example of an encoding is ISO-8859-1. Official character sets for use on the Internet are registered by IANA (Internet Assigned Numbers Authority). IANA is the central registry for various Internet protocol parameters, such as port, protocol and enterprise numbers, options, codes, and types. For a complete list of character-set values, see [www.unicode.org/reports/tr22/index.html](http://www.unicode.org/reports/tr22/index.html) and [www.iana.org/assignments/character-sets](http://www.iana.org/assignments/character-sets).

A character set is like an encoding-value in this context. However, character set is the term that is used to identify an encoding that is suitable for use on the Internet.

Details

An XML declaration is not required in all XML documents. Such a declaration is required only when the character encoding of the document is other than the default UTF-8 or UTF-16 and no encoding was determined by a higher-level protocol.

The ODSCHARSET option, in the LIBNAME statement for the XML engine, specifies the character set to use for generating an output XML document.

See Also

Conceptual Information:

- Chapter 3, “Encoding for NLS,” on page 9
ODSTRANTAB= Option

Specifies the translation table to use when transcoding an XML document for an output file.

Valid in: the LIBNAME statement for the XMLV2 engine

Category: Data Access

Syntax

TRANTAB = 'translation-table'

Optional Argument

translation-table

specifies the translation table to use for the output file. The translation table is an encoding method that maps characters (letters, logograms, digits, punctuation, symbols, control characters, and so on) in the character set to numeric values. An example of a translation table is one that converts characters from EBCDIC to ASCII-ISO. The table-name can be any translation table that SAS provides, or any user-defined translation table. The value must be the name of a SAS catalog entry in either the SASUSER.PROFILE catalog or the SASHELP.HOST catalog.

Details

The preferred method for specifying an encoding is to use the LOCALE= system option.

See Also

Conceptual Information:

• Conceptual discussion of Chapter 2, “Locale for NLS,” on page 5

System Options:

• “LOCALE System Option” on page 552

Statements:

• SAS Viya XML LIBNAME Engine: User’s Guide

TRANSCODE= Column Modifier on PROC SQL

Specifies whether values can be transcoded for character columns.

Valid in: Column modifier component in the SQL Procedure
Syntax

**TRANSCODE=**YES|NO

*Required Argument*

**TRANSCODE=**YES|NO

for character columns, specifies whether values can be transcoded. Use TRANSCODE=NO to suppress transcoding. Note that when you create a table using the CREATE TABLE AS statement, the transcoding attribute for a particular character column in the created table is the same as it is in the source table unless you change it with the TRANSCODE= column modifier.

**Default**  
YES

**Restriction**  
Suppression of transcoding is not supported for the V6TAPE engine.

**See Also**

- Chapter 4, “Transcoding for NLS,” on page 19
- SAS Viya Data Management and Utility Procedures Guide

**TRANSCODE=** Option

Specifies an attribute in the ATTRIB statement (which associates a format, informat, label, and length with one or more variables) that indicates whether character variables are to be transcoded.

### Valid in:
the ATTRIB statement in a DATA step

### Category:
Information

### Type:
Declarative

### See:

**Syntax**

`ATTRIB variable-list(s) attribute-list(s) ;`

**Required Arguments**

**variable-list**
names the variables that you want to associate with the attributes.

**Tip**  
List the variables in any form that SAS allows.

**attribute-list**

specifies one or more attributes to assign to variable-list. Multiple attributes can be specified in the ATTRIB statement. For a complete list of attributes, see the “ATTRIB Statement” in SAS Viya Statements: Reference.

**TRANSCODE= YES | NO**

Specifies whether to transcode character variables. Use TRANSCODE=NO to suppress transcoding. For more information, see “Overview to Transcoding” on page 19.
<table>
<thead>
<tr>
<th>Default</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction</td>
<td>The TRANSCODE=NO attribute is not supported by some SAS Workspace Server clients. Variables with TRANSCODE=NO are not returned in SAS Viya. Prior to SAS 9.4, variables with TRANSCODE=NO are transcoded. Prior releases of SAS cannot access a SAS 9.4 data set that contains a variable with a TRANSCODE=NO attribute.</td>
</tr>
<tr>
<td>Interactions</td>
<td>You can use the VTRANSCODE and VTRANSCODEX functions to return whether transcoding is on or off for a character variable. If the TRANSCODE= attribute is set to NO for any character variable in a data set, PROC CONTENTS prints a transcode column that contains the TRANSCODE= value for each variable in the data set. If all variables in the data set are set to the default TRANSCODE= value (YES), no transcode column is printed.</td>
</tr>
</tbody>
</table>

**Examples**

**Example 1: Using the TRANSCODE= Option with the SET Statement**

When you use the SET statement to create a data set from several data sets, SAS makes the TRANSCODE= attribute of the variable in the output data set equal to the TRANSCODE= value of the variable in the first data set. In this example, the variable Z's TRANSCODE= attribute in data set A is NO because B is the first data set and Z's TRANSCODE= attribute in data set B is NO.

```sas
data b;
  length z $4;
  z = 'ice';
  attrib z transcode = NO;
data c;
  length z $4;
  z = 'snow';
  attrib z transcode = YES;
data a;
  set b;
  set c;
  /* Check transcode setting for variable Z */
  rc1 = vtranscode(z);
  put rc1=;
run;
```

**Example 2: Using the TRANSCODE= Option with the MERGE Statement**

When you use the MERGE statement to create a data set from several data sets, SAS makes the TRANSCODE= attribute of the variable in the output data set equal to the TRANSCODE= value of the variable in the first data set. In this example, the variable Z's TRANSCODE= attribute in data set A is YES because C is the first data set and Z's TRANSCODE= attribute in data set C is YES.

```sas
data b;
  length z $4;
  z = 'ice';
```
data c;
length z $4;
z = 'snow';
attrib z transcode = YES;
data a;
merge c b;
/* Check transcode setting for variable Z */
rc1 = vtranscode(z);
put rc1=;
run;

Note: The TRANSCODE= attribute is set when the variable is first seen on an input data set or in an ATTRIB TRANSCODE= statement. If a SET or MERGE statement comes before an ATTRIB TRANSCODE= statement and the TRANSCODE= attribute contradicts the SET statement, an error message occurs.

See Also

Functions:
- “VTRANSCODE Function” on page 401
- “VTRANSCODEX Function” on page 402

TRANTAB= Option

Specifies the translation table to use when you are transcoding character data.

Valid in: ODS MARKUP statement and ODS RTF statement
Category: ODS: Third-Party Formatted

Syntax

TRANTAB = (translation-table)

Optional Argument

translation-table

specifies the translation table to use for the output file. The translation table is an encoding method that maps characters (letters, logograms, digits, punctuation, symbols, control characters, and so on) in the character set to numeric values. An example of a translation table is one that converts characters from EBCDIC to ASCII-ISO. The table-name can be any translation table that SAS provides, or any user-defined translation table. The value must be the name of a SAS catalog entry in either the SASUSER.PROFILE catalog or the SASHELP.HOST catalog.

Details

The ENCODING= option is preferred when specifying the encoding.
XMLENCODING= Option

Overrides the encoding of an XML document to import or export an external document.

Valid in: LIBNAME statement for the XML engine
Category: Data Access

Syntax

XMLENCODING= 'encoding-value'

Details

The LIBNAME statement for the XML engine, associates a SAS libref with an XML document to import or export an external document.

Comparisons

Options

encoding-value

specifies the encoding to use when you read, write, copy, or save an external file.

The value for XMLENCODING= indicates that the external file has a different encoding from the current session encoding.

For details, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 617.

The default for encoding-value is the current session encoding.

See Also

Statements:

• SAS Viya XML LIBNAME Engine: User’s Guide

TRANTAB Statement

Specifies the translation table to use when you transcode character data in order to export or transfer a SAS file.

Valid in: CPORT Procedure, UPLOAD procedure, DOWNLOAD procedure
Restriction: You can specify only one translation table per TRANTAB statement. To specify additional translation tables, use additional TRANTAB statements.
Interaction: The TRANTAB statement specifies a customized translation table (for example, to map an EBCDIC character to an ASCII character) to apply to the character set in the SAS file that is being exported or transferred. The TRANTAB= system option specifies a translation table to use for the SAS session, including file transfers.
Syntax

TRANTAB NAME=translation-table-name <TYPE=(etype-list) <OPT=DISP | SRC | (DISP SRC)> > ;

Required Argument

NAME=translation-table-name

specifies the name of the translation table to apply to the SAS catalog that you want to export (PROC CPORT) or transfer (PROC UPLOAD or PROC DOWNLOAD). The translation-table-name that you specify as the name of a catalog entry in either your SASUSERPROFILE catalog or the SASHELPHOST catalog. The SASUSERPROFILE catalog is searched first, and then the SASHELPHOST catalog is searched.

In most cases, the default translation table is the correct one to use, but you might need to apply additional translation tables if, for example, your application requires different national language characters.

You can specify a translation table other than the default in two ways:

- To specify a translation table for an invocation of the procedure, use the TRANTAB statement in the procedure, as appropriate.
- To specify a translation table for your entire SAS session or job (including all file exports or transfers), use the TRANTAB= system option.

Optional Arguments

TYPE=(etype-list)

applies the translation table only to the entries with the type or types that you specify. The etype-list can be one or more entry types. Examples of catalog entry types include DATA and FORMAT. If etype-list is a simple entry type, omit the parentheses.

By default, the UPLOAD, DOWNLOAD, and CPORT procedures apply the translation table to all specified catalog entries.

OPT=DISP | SRC | (DISP SRC)

- OPT=DISP applies the translation table only to the specified catalog entries, which produce window displays.
- OPT=SRC applies the translation table only to the specified catalog entries that are of the type SOURCE.
- OPT=(DISP SRC) applies the translation table only to the specified catalog entries that either produce window displays or are of type SOURCE.

If you do not specify the OPT= option, the UPLOAD or DOWNLOAD procedure applies the translation table to all of the entries in the catalog that you specify.

Default PROC CPORT, PROC UPLOAD, and PROC DOWNLOAD apply the translation table to all entries and data sets in the specified catalog.

Details

Translation tables were introduced in SAS 6 to support the requirements of national languages. SAS 8.2 introduced the LOCALE= system option as an improvement on
direct use of translation tables. SAS 9.3 supports the TRANTAB statement for backward compatibility. However, using the LOCALE= system option is preferred in later SAS releases. For more information, see TS-639, Data Conversion Issues in V6–V8. This technical support note provides information for customers using non-English languages


PROC CPORT is used when you transfer a SAS file across a network. PROC UPLOAD and PROC DOWNLOAD are used when you transfer a SAS file across a network.

You must specify the INCAT= and OUTCAT= options in the PROC UPLOAD or PROC DOWNLOAD statement when using the TRANTAB statement.

Examples

Example 1
The information that follows applies to procedure features:

• PROC CPORT statement option: FILE=
• TRANTAB statement option: TYPE=

This example shows how to apply a customized translation table to the transport file before PROC CPORT exports it. For this example, assume that you have already created a customized translation table called TTABLE1.

Example 2: Program
Assign library references. The LIBNAME and FILENAME statements assign a libref for the source library and a fileref for the transport file, respectively.

libname source 'SAS data-library';
filename tranfile 'transport-file' host-option(s)-for-file-characteristics;

Apply the translation specifics. The TRANTAB statement applies the translation that you specify with the customized translation table TTABLE1. TYPE= limits the translation to FORMAT entries.

proc cport catalog=source.formats file=tranfile;
   trantab name=ttable1 type=(format);
run;

Example 3: SAS Log
See Also

Conceptual Information:

- Chapter 4, “Transcoding for NLS,” on page 19
Part 10

Values for Locale and Transcoding

Chapter 17
  Values for the LOCALE= System Option .......................... 603

Chapter 18
  Encoding Values in SAS Language Elements ...................... 617
Chapter 17
Values for the LOCALE= System Option

LOCALE= Values for PAPERSIZE and DFLANG Options

The following table lists the valid LOCALE= values, specified by using the SAS name or the POSIX name. The alias name is also listed. Some locales do not have an alias.

Table 17.1 Values for the LOCALE= System Option

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<th>SAS Name</th>
<th>POSIX Locale</th>
<th>Aliases</th>
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<td>Afrikaans</td>
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<td>Albanian_Albania</td>
<td>sq_AL</td>
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<tr>
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<td>ar_DZ</td>
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</tr>
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<td></td>
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en       |
| English_SouthAfrica   | en_ZA        |          |
| English_UnitedKingdom | en_GB        |          |
| English_UnitedStates  | en_US        | English  
en       |
<p>| English_Zimbabwe      | en_ZW        |          |
| Estonian_Estonia      | et_EE        | Estonian  et |
| Faroese_FaroeIslands  | fo_FO        | Faroese  fo |
| Finnish_Finland       | fi_FI        | Finnish  fi  |
| French_Belgium        | fr_BE        |          |
| French_Canada         | fr_CA        |          |
| French_France         | fr_FR        | French   fr    |
| French_Luxembourg     | fr_LU        |          |
| French_Switzerland     | fr_CH        |          |
| German_Austria        | de_AT        |          |
| German_Germany        | de_DE        | German   de    |
| German_Liechtenstein  | de_LI        |          |
| German_Luxembourg     | de_LU        |          |
| German_Switzerland     | de_CH        |          |
| Greek_Cyprus          | el_CY        |          |
| Greek_Greece          | el_GR        | Greek    el    |</p>
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<td>Aliases</td>
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### Table 17.2  Default Values for the DFLANG, DATESTYLE, and PAPERSIZE System Options Based on the LOCALE= System Option

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<td>ar_AE</td>
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<td>A4</td>
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<td>DATESTYLE=</td>
<td>PAPERSIZE=</td>
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Overview to SAS Language Elements That Use Encoding Values

When the encoding of the SAS session is different from the encoding of the SAS file or from the data that resides in the SAS file, transcoding must occur. Consider a SAS file that was created in the Western Latin1 encoding, then read into SAS Studio connecting to SAS Viya running the UTF-8 encoding. In order for SAS Viya to successfully access the file, the SAS data file must be transcoded from the Western Latin1 encoding to UTF-8 encoding. For information about transcoding concepts, including SAS language elements that contain options for transcoding, see Chapter 4, “Transcoding for NLS,” on page 19.

SBCS, DBCS, and Unicode Encoding Values for Transcoding Data

The following table presents a list of SBCS, DBCS, and Unicode encoding values for transcoding data for all operating environments. The encoding values are valid for SAS language elements that contain options for transcoding.

Note: If an encoding value contains a hyphen (-), enclose the encoding value in quotation marks.

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* UTF-16BE and UTF-16LE have a fixed length of two bytes per character.
** UTF-32BE and UTF-32LE have a fixed length of four bytes per character.
Part 11

Appendixes

Appendix 1

Time Zone IDs and Time Zone Names ........................................ 629
Appendix 1
Time Zone IDs and Time Zone Names

Area: Africa

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Recommended Reading

Here is the recommended reading list for this title:

- *SAS Viya Data Management and Utility Procedures Guide*
- *SAS Viya Data Set Options: Reference*
- *SAS Viya Formats and Informats: Reference*
- *SAS Viya Functions and CALL Routines: Reference*
- *SAS Viya System Options: Reference*
- *SAS Viya Statements: Reference*
- *SAS Encoding - Understanding the Details*

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**Glossary**

**accented character**
a type of character that is modified by the addition of an accent mark that alters the pronunciation of the character. An example is "ñ", which results from combining the tilde (~) with the character "n".

**American National Standards Institute (ANSI)**
the organization that coordinates the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. ANSI works with the International Organization for Standardization to establish global standards.

**American Standard Code for Information Interchange**
See ASCII.

**ANSI**
See American National Standards Institute.

**ASCII (American Standard Code for Information Interchange)**
a 7-bit encoding standard that provides a basic set of 128 characters, supporting a variety of computer systems. ASCII encodes the uppercase and lowercase letters of the English alphabet, punctuation marks, the digits 0-9, and control characters. This set of 128 characters is also included in most other encodings. See also EBCDIC, encoding.

**bidirectional text**
text in a writing system such as Arabic and Hebrew that generally runs from right to left, except for numbers and embedded text written in other languages that run from left to right.

**BOM**
See byte-order mark.

**byte-order mark (BOM)**
the Unicode character that indicates the byte order of the Unicode text that follows in the text file or stream. The BOM can also indicate which of several Unicode encodings the text stream is encoded as. In UTF-16, the code point of the byte-order mark is U+FEFF (hexadecimal).

**CCS**
See coded character set.
CEDA
See Cross-Environment Data Access.

classifier
the smallest component of a writing system that has a semantic value, such as the letters of an alphabet, digits, or ideographs.

classifier encoding
a mapping of an abstract character repertoire to a set of numeric values. Character encodings are used in computation, data storage, and transmission of textual data. A classifier encoding includes national characters, special characters, the digits 0-9, and control characters.

CJK
the languages of Chinese, Japanese, and Korean, referred to as a collective grouping because all use Chinese characters. The grouping is relevant to translation and information processing. Vietnamese is occasionally included in this grouping (CJKV) because of its use of Chinese characters historically.

code page
the representation of a character set that associates a hexadecimal value with each character. The term code page originated from IBMs EBCDIC-based mainframe systems, but many vendors use this term including Microsoft, SAP, and Oracle Corporation. Vendors often allocate their own code page number to a character encoding, even if it is better known by another name (for example, UTF-8 character encoding has code page numbers 1208 at IBM, 65001 at Microsoft, 4110 at SAP). See also encoding, code page.

coded character set (CCS)
a mapping of an abstract character repertoire to a set of numeric values. The ISO Latin-1 coded character set provides the Western European alphabet and symbols and their numeric representations. For example, the letter "Ä" is represented as C4 (hexadecimal).

collating sequence
a set of rules that determine how textual data is ordered and compared.

control character
a nonprinting character that is represented by a code point in a character set, and that does not itself represent a written symbol.

Cross-Environment Data Access (CEDA)
a feature of SAS software that enables a SAS data file that was created in a directory-based operating environment to be read by a SAS session in another directory-based environment. See also data representation.

data representation
the form in which data is stored in a particular operating environment. Different operating environments use different standards or conventions for storing floating-point numbers (for example, IEEE or IBM 390); for character encoding (ASCII or EBCDIC); for the ordering of bytes in memory (big Endian or little Endian); for word alignment (4-byte boundaries or 8-byte boundaries); and for data-type length (16-bit, 32-bit, or 64-bit).

DBCS
See double-byte character set.
double-byte character set (DBCS)
a character set that requires a variable-width encoding because many characters
occupy two bytes of memory. The term DBCS, as traditionally applied to languages
such as Japanese, Korean, and Chinese, is somewhat misleading because some
DBCS characters actually require only one byte. See also single-byte character set,
multi-byte character set.

EBCDIC (Extended Binary Coded Decimal Interchange Code)
a family of single-byte and multi-byte encodings for the representation of data on
IBM mainframe and mid-range computers. See also ASCII, encoding.

encode
to represent data in a particular character encoding scheme. For example, in ASCII,
the letter "A" is represented as 41 (hexadecimal).

encoding
a mapping of a coded character set to code values.

encoding method
the application of established industry rules to a coded character set to produce an
encoded character scheme. Such rules prescribe the number of bits required for
storing the numeric representation of a specific character and its code position in the
encoding. ISO 2022 and UTF-8 are examples of encoding methods.

EUC
See Extended UNIX Code.

Extended Binary Coded Decimal Interchange Code
See EBCDIC.

Extended UNIX Code (EUC)
a multibyte encoding scheme used primarily to encode Chinese, Japanese, and
Korean writing systems with a maximum of 94 characters in sequences of 7-bit
codes.

graphic character
in ISO standards, an encoded character that is intended to be written, printed, or
otherwise displayed in a form that can be read by humans. Graphic characters are
associated with one or more glyphs.

Hangul
the name for the Korean alphabet, consisting of 24 consonant and vowel letters,
arranged into blocks, one per syllable.

I18N
See internationalization.

ICU (International Components for Unicode)
the open-source project containing C/C++ and Java libraries that provide Unicode
and globalization support for software applications.

input method
a type of character conversion that is designed for interactive data input, generally
from a keyboard. The simplest input method works by mapping ASCII characters
onto another alphabet. Another method is to use composition, converting sequences
of characters into a single letter. Languages like Thai and Korean can use both.
International Components for Unicode

See ICU.

International Organization for Standardization (ISO)

an organization that promotes the development of standards, and sponsors related activities that foster the sharing of products, services, and information among nations.

internationalization (I18N)

the process of designing a software product without making assumptions that are based on a single language or locale, thereby facilitating localization. Internationalization ensures that international conventions (including rules for sorting strings and for formatting dates, times, numbers, and currencies) are supported. It also facilitates a consistent user experience across different language editions of a product. See also national language support.

ISO

See International Organization for Standardization.

ISO 646 family

a group of 7-bit encodings that are defined in the ISO 646 standard. The encoding contains both the 116 invariant ASCII code positions and the 12 variant code positions that can be replaced by national characters. For example, code position 23 (hexadecimal) is reserved for a variant character. This position is occupied by the number sign (#) in the US, and the symbol (£) in the UK. The national variants of ISO 646 are largely obsolete.

ISO 8859 family

a group of 16 8-bit encodings that are defined in the ISO 8859 standard. Each encoding contains both the 128 ASCII characters and the 128 extended characters, which are used in the language or languages that are supported by the encoding. For example, ISO 8859-1, also called Latin-1, is a commonly used encoding in the ISO 8859 family that contains the ASCII characters as well as characters used by Western European languages. See also International Organization for Standardization.

L10N

See localization.

locale

a setting that reflects the language, local conventions, and culture for a geographic region. Local conventions can include specific formatting rules for paper sizes, dates, times, and numbers, and a currency symbol for the country or region. Some examples of locale values are French_Canada, Portuguese_Brazil, and Chinese_Singapore.

localization (L10N)

the process of adapting software for a particular geocultural region (locale). Translation of the user interface, system messages, and documentation is a large part of the localization process. See also internationalization.

logogram

a visual symbol that represents a word or morpheme rather than a speech sound. An example of a logogram in the Chinese language is 山 for the word "mountain".

MBCS

See multi-byte character set.
multi-byte character set (MBCS)
a character set that requires a variable-width encoding because many characters
occupy more than one byte of memory. DBCS and MBCS are sometimes used
interchangeably, but MBCS is more accurate for describing the character sets of
languages such as Japanese, Korean, and Chinese. See also single-byte character set,
double-byte character set.

national character
a character that is specific to a language as it is written in a nation or group of
nations. For example, the letter “ñ” with a tilde (ñ) is a Spanish national character.

national language support (NLS)
the set of features that enable a software product to function properly in every global
market for which the product is targeted.

NLS
See national language support.

SBCS
See single-byte character set.

single-byte character set (SBCS)
a type of encoding for which each character is represented using one byte of
computer memory. An example of a single-byte character set is Latin 1. See also
double-byte character set, multi-byte character set.

special character
a type of character other than alphanumeric characters, the underscore (_), and the
blank. An example is the asterisk (*).

transcoding
the process of converting the contents of a SAS file from one encoding to another
encoding. Transcoding is necessary if the session encoding and the file encoding are
different, such as when transferring data from a Latin 1 encoding under UNIX to a
German EBCDIC encoding on an IBM mainframe. See also encoding, translation
table.

translation table
a SAS catalog entry that is used to map data from one encoding to another encoding.
SAS language elements that control locale values and encoding properties
automatically invoke the appropriate translation table. Translation tables are specific
to the operating environment. An example is a translation table that maps the
Windows Latin 2 encoding to the ISO Latin 2 encoding. See also encoding,
transcoding.

Unicode
a 16-bit encoding that is the industry standard for supporting the interchange,
processing, and display of characters and symbols from most of the world's writing
systems.
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**N**

National Language Support

*See NLS (National Language Support)*

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