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Chapter 1
Using Data Grids in SAS Intelligent Decisioning

Introduction to Data Grids

A data grid is a table. A data grid variable is a variable of type DATAGRID whose value is a table. For example, suppose you have a table that contains the data for all of the insurance policies for all of your customers. This table might look like the table shown in Table 1.1.

Table 1.1  Insurance Policy Table

<table>
<thead>
<tr>
<th>PolicyHolder</th>
<th>PolicyNumber</th>
<th>YearlyPremium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smyth, Joe</td>
<td>453975R398</td>
<td>439.50</td>
</tr>
<tr>
<td>Smyth, Joe</td>
<td>987348P210</td>
<td>132.90</td>
</tr>
<tr>
<td>Dupree, Marcel</td>
<td>983092B228</td>
<td>334.00</td>
</tr>
<tr>
<td>Dupree, Marcel</td>
<td>274933P412</td>
<td>219.25</td>
</tr>
</tbody>
</table>
You can use a data grid to store the policy information as represented in Figure 1.1.

Figure 1.1  Insurance Policy Table Using Data Grids

<table>
<thead>
<tr>
<th>PolicyHolder</th>
<th>Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smyth, Joe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PolicyNumber</td>
</tr>
<tr>
<td></td>
<td>453975R398</td>
</tr>
<tr>
<td></td>
<td>987348P210</td>
</tr>
<tr>
<td>Dupree, Marcel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PolicyNumber</td>
</tr>
<tr>
<td></td>
<td>983092B228</td>
</tr>
<tr>
<td></td>
<td>274933P412</td>
</tr>
</tbody>
</table>

The data grid in the Policies column is represented by JavaScript Object Notation (JSON) strings.

A data grid JSON string has the following basic format:

```json
[{"metadata": ["column-definitions"], "data": ["column-data"]}
```

The column definitions are name-value pairs separated by commas:

```json
{"column1-name":"data-type"}, {"column2-name":"data-type"}, ...
```

The data for each row of the data grid is specified in square brackets with commas between each value:

```json
[column1-data, column2-data...]
```

For example, if the data grids shown in Figure 1.1 are serialized, the insurance policy table appears as shown in Table 1.2.

Table 1.2  Serialized Insurance Policy Table

<table>
<thead>
<tr>
<th>PolicyHolder</th>
<th>Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smyth, Joe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PolicyNumber</td>
</tr>
<tr>
<td></td>
<td>453975R398</td>
</tr>
<tr>
<td></td>
<td>987348P210</td>
</tr>
<tr>
<td>Dupree, Marcel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PolicyNumber</td>
</tr>
<tr>
<td></td>
<td>983092B228</td>
</tr>
<tr>
<td></td>
<td>274933P412</td>
</tr>
</tbody>
</table>

If you are processing the data grid column in the insurance policy table, you could define a variable named Policies of type DATAGRID and use the functions described in Chapter 3, “Data Grid Functions,” on page 15 to process the data. For example:

```javascript
DATAGRID_GET(Policies, 'PolicyNumber', 2)
```
For policy holder Joe Smyth, this function call returns 987348P210. In this case, you define variables for only the PolicyHolder and Policies columns. You do not define variables for the PolicyNumber and YearlyPremium columns within the data grid.

Alternatively, you can process the data grid column in the insurance policy table by using a rule set, model, or decision to iterate through the data grids. To specify that an object iterates through a data grid, you select **Score rows in this data grid**. In this case, you do not use the data grid functions. For more information, see “Ways to Work with Data Grids” on page 4 and “Scoring Rows in a Data Grid” on page 4.

---

**Serialize and Import Data Grids Into a Table**

*Note:* If you write a serialized data grid variable to a table, the maximum size of the JSON string is based on the engine that writes the table. For the Base SAS engine, the limit is 32,767. If you write the serialized data grid variable to a SAS Cloud Analytic Services (CAS) table, the maximum size of the JSON string is determined by the amount of memory that is available. The default size is 10,485,760.

1. Use the `%DCM_SERIALIZEGRID` macro to serialize your data grid into a JavaScript Object Notation (JSON) string. The data grid must be serialized if it is used in a rule set or in a decision that meets either of the following criteria:
   - The rule set or decision is used in a test or in a publishing validation test.
   - The rule set will be deployed to Hadoop, Teradata, or SAS Cloud Analytic Services (CAS).

   *Note:* Data grids that are used in decisions that are deployed to SAS Micro Analytic Service are automatically serialized when a request that uses the data grids is sent to the service. If your job is deployed only to SAS Micro Analytic Service, you do not need to use the `%DCM_SERIALIZEGRID` macro to serialize the data grids.

   *Note:* The names of data grid column are limited to 255 characters.

2. To combine data from multiple tables into one table, use the `%DCM_MERGE_SERIALIZED_GRIDS` macro. This macro merges multiple data grids and scalar data into one table based on the values of key columns in each data grid and in the scalar data table.

3. Import the table that contains the serialized data grids as a data table into SAS Intelligent Decisioning. See “Importing Local Files” in *SAS Data Explorer: User’s Guide* for more information.

---

**Working with Data Grids**

**Data Grids and Publishing Destinations**

You can publish rule sets and decisions that use data grids to any destination. However, it is unlikely that rule sets or decisions that use data grids can be executed successfully on Teradata because of limitations on row sizes.

You must use the `%DCM_SERIALIZEGRID` macro to serialize your data grid if it is used in a rule set or in a decision that will be deployed to Apache Hadoop, Teradata, or
SAS Cloud Analytic Services (CAS). For more information, see “Serialize and Import Data Grids Into a Table” on page 3.

Ways to Work with Data Grids

In a rule set or model, you can work with data grids in two ways:

• use data grid functions. For more information, see “Using Data Grid Functions” on page 6.

• execute the model, rule set, or subdecision against each row in the data grid. “You can specify that the model, rule set, or subdecision execute against the data grid when you map the input and output variables. by selecting **Score rows in this data grid** when you map its input and output variables. For more information, see “Scoring Rows in a Data Grid” on page 4.

In custom code files, you use data grid functions to process the data in a data grid. For more information, see “Processing Data Grids in a Code File” on page 6.

**Note:** You cannot use data grids in condition expressions. If you need to use a value calculated from a data grid in a decision condition expression, calculate the value in a rule set, assign the value to an action variable, and then use the action variable in the decision condition expression.

Defining Data Grid Variables

Data grid variables can be imported, exported, created, edited, and added to rule sets in the same way as other variables. When you are creating or importing data grid variables, the following guidelines apply:

• The columns within a data grid can contain only character or numeric data.

• In the SAS Intelligent Decisioning interface, which variables you define depend on how you are working with the data grid.

  • If you are using data grid functions, you define variables for only the table columns that contain the data grids. When you use a data grid function, the function parameter that specifies the name of the data grid column must be either a literal value or a variable that evaluates to the data grid column name.

  • If you are executing a model, rule set, or subdecision against each row in the data grid, you define variables for the columns within the data grid.

Scoring Rows in a Data Grid

By default, each node in a decision is executed for the first record in the input data table, then for the second input record, and so on, before execution moves to the next node. However, if the node object uses a data grid variable, you can specify that the object is executed against each row of the data grid instead of against each record in the input data.

To execute an object against each row in a data grid, select the **Score rows in this data grid** option when you are mapping decision variables for the object. Then, select the data grid. This option is available on the **Input Variables** and **Output Variables** property panes for rule sets, models, and subdecisions that contain a data grid. When you select this option, the object processes only the data grid. All other output variables are passed through to the next node in the decision.
Important: When the node object is a filtering rule set, and you select Score rows in this data grid, rows that do not meet the criteria defined by the rules are removed from the data grid.

**Mapping Data Grid Variables in a Rule Set, Model, or Decision**

When you add an object to a decision and the object contains a data grid variable, SAS Intelligent Decisioning creates a decision variable for the data grid in the same way that it creates decision variables for object variables of other data types. When you select Score rows in this data grid for an object that uses a data grid, you can choose to map the columns in the object’s data grid variable either to columns in the decision’s data grid variable or to other decision variables. In the lists of variables in the Input Variables property pane, the decision’s scalar variables are identified by the icon, and the decision’s data grid columns are identified by the icon.

For more information, see “Map Object Variables to Decision Variables” in SAS Intelligent Decisioning: User’s Guide.

**Editing Data Grid Variable Metadata**

For existing data grid variables, you can add or delete columns in the data grid variable.

**Add Columns to a Data Grid**

1. On the Variables tab of a rule set or decision, click on the data grid variable that you want to edit. The Edit Variable window appears.
2. Click on columns field to open the Edit Columns window.
3. (Optional) To add new custom columns to the data grid:
   a. Select Add a new column, and enter the name of the new column in the columns field.
   b. Select the data type of the column, and click Add.
4. (Optional) To add columns from a data table:
   a. Select Add columns from a data table, and click Browse. The Choose Data window appears.
   b. Select the data table, and click OK. SAS Intelligent Decisioning closes the Choose Data window, and adds all of the columns in the data table to the columns field in the Edit Columns window.
   c. In the Edit Columns window, click Add. SAS Intelligent Decisioning adds all of the columns in the data table to the table of columns.
   d. (Optional) Click for any columns that you do not want to add to your data grid.
   e. (Optional) For character string values, enter a length if you do not want to use the default length.
5. (Optional) To add columns from another data grid variable in the same decision:
   a. Select Add columns from a data grid, and click Browse. The Edit Columns window appears.
   b. Select the data grid that contains the column that you want to add.
c. In the **Available items** list, select the columns that you want to add, and click ✈️ or 🛠️.

d. Click OK to return to the Edit Columns window.

6. Click OK to add the selected columns to your data grid variable and return to the Edit Variable window.

7. Click OK.

**Delete Columns from a Data Grid**

1. On the **Variables** tab of a decision, click on the data grid variable that you want to edit. The Edit Variable window appears.

2. Click 📊 to open the Edit Columns window.

3. Click ➔ for each column that you want to delete.

4. Click OK.

---

**Using Data Grid Functions**

For objects that iterate over a data grid, you do not need to use data grid functions. For more information, see “Ways to Work with Data Grids” on page 4 and “Scoring Rows in a Data Grid” on page 4.

In all other cases, you must use SAS Intelligent Decisioning data grid functions to process data grid variables. SAS Intelligent Decisioning supplies several functions for use with data grids. These functions are described in Chapter 3, “Data Grid Functions,” on page 15.

**Note:** You can nest function calls. For example:

```
datagrid_count(datagrid_subsetByValue(assets, 'Asset_Type', 'Savings'))
```

---

**Processing Data Grids in a Code File**

You can create custom DS2 code files that process the values in a data grid and include the code file in a decision. For example, the following DS2 code uses the DATAGRID_COUNT function to determine how many rows are in the data grid, then loops through the data grid to process each row. It uses the DATAGRID_GET function to retrieve the values for the data grid variables. The values of the data grid variables are passed to the assessLoanRequest method.

```ds2
/* Use the DATAGRID_COUNT function to determine the */
/* number of rows that are in the data grid. */

"numRows" = DATAGRID_COUNT(loanrequests);
if "numRows" > 0 then do;
    do "loopIndex" = 1 to "numRows";
    /* Use the DATAGRID_GET function to retrieve the values in the data grid. The assessLoanRequest method invokes */
```

/* a published rule set to evaluate each loan request. */

assessLoanRequest(DATAGRID_GET("loanrequests","annualSalary",loopIndex),
    DATAGRID_GET("loanrequests","incomeThreshold",loopIndex));

/* Continue processing the data. */


---

Working with Data Grids in SAS Studio

When you are using data grids in a DS2 custom code file in SAS Intelligent Decisioning, the data grid package and the data grid functions are predefined. However, these packages and functions are not automatically available when you are using SAS Studio to develop and test code. You can use the %DCM_DATAGRID_INTERFACE macro to make data grid functionality available in SAS Studio. For more information, see “%DCM_DATAGRID_INTERFACE” on page 10.

In addition, if your test thread or data program uses any data grid functions, then you need to invoke %DCM_DATAGRID_INTERFACE within the thread or data block, after any global declaration statements. For example:

```
data work.cars;
    set sashelp.cars;
run;
%dcm_serializegrid(gridSourceTable=work.cars,
    classVars=make,
    outputTable=work.carsByMakeGrid,
    gridColName=carsGrid)
proc ds2;
    /* define data grid DS2 packages */
    package *testCustomCode" /inline;
    /* define data grid interface methods */
    %dcm_datagrid_interface()
    method execute(varchar(32) whichColumn,
        in_out double meanValue,
        in_out package datagrid thisGrid;
        meanValue = DataGrid_Mean(thisGrid,whichColumn);
    end;
endpackage;

data work.profileByMake(keep=(rowCount make meanMSRP meanWeight carsGrid))
    / overwrite=yes;
    dcl package testCustomCode myCustomCode();
    dcl double meanMSRP;
    dcl double meanWeight;
    dcl varchar(32767) carsGrid;  /* serialize in and out */
    dcl package datagrid _carsGrid();
    dcl integer rowCount;
    /* define data grid interface methods */
    %dcm_datagrid_interface()
    method run();
```
set work.carsByMakeGrid;
meanMSRP = .;
meanWeight = .;
rowCount = DataGrid_Create(_carsGrid,carsGrid);
myCustomCode.execute('msrp' , meanMSRP , _carsGrid);
myCustomCode.execute('weight', meanWeight , _carsGrid);
carsGrid = DataGrid_toString(_carsGrid);
output work.profileByMake;
end;
enddata;

run;
quit;
Chapter 2

Data Grid Macros

Using the Data Grid Macros

The SAS Intelligent Decisioning macros are for use in SAS Studio only.

Data Grid Macros Available in SAS Intelligent Decisioning

You can prototype and test custom code that uses data grids in SAS Studio before you add your code to a decision. You can use the %DCM_DATAGRID_INTERFACE macro to make data grid functions available in SAS Studio. For more information, see “Working with Data Grids in SAS Studio” on page 7.

Data grids must be serialized into JavaScript Object Notation (JSON) strings before you can use the data in SAS Intelligent Decisioning. You can use the following macros to prepare grid data to be used in rules sets:

%DCM_SERIALIZEGRID
creates a table in which one of the columns contains a JSON string that represents a data grid.

%DCM_MERGE_SERIALIZEGRID.fillStyle
merges tables that contain data grids that have been serialized with the %DCM_SERIALIZEGRID macro with a table that contains scalar data.
Dictionary

%DCM_DATAGRID_INTERFACE

Makes the data grid functions available in SAS Studio.

Syntax

%DCM_DATAGRID_INTERFACE()

Details

Use the %DCM_DATAGRID_INTERFACE macro to make data grid functions available in SAS Studio. You must invoke this macro within the custom code file package, after any global package declaration statements and before any methods in the package that use data grid functions. In addition, if your test thread or data program uses any data grid functions, then you must invoke the %DCM_DATAGRID_INTERFACE macro within the thread or data block, after any global declaration statements. For more information, see “Working with Data Grids in SAS Studio” on page 7.

```sas
proc ds2;
    data _null_
        dcl package datagrid myPackage();
        %dcm_datagrid_interface()
        /* your DS2 code */
    enddata;
run;
quit;
```

%DCM_SERIALIZEGRID

Creates a table in which one of the columns contains a JSON string that represents a data grid.

Requirement: If you are working with SAS Cloud Analytic Services (CAS) tables, all of the tables must be accessed in the same CAS session.

Syntax

%DCM_SERIALIZEGRID (GRIDCOLNAME=data_grid_column_name, GRIDSOURCETABLE=table_name, OUTPUTTABLE=results_table, <CLASSVARS=class_variable1<class_variable2...>,>
Required Arguments

GRIDCOLNAME=data_grid_column_name
specifies the name for the serialized data grid column in the results table.

GRIDSOURCETABLE=table_name
specifies the table that contains the columns that are to be serialized into a data grid.

OUTPUTTABLE=results_table
specifies the name of the results table that contains the data grid column.

Optional Arguments

CLASSVARS=class_variable1 <class_variable2...>
specifies the class variables that control how the data is grouped into data grids. If you specify one class variable, the results table contains one data grid for each value of the class variable. If you specify more than one class variable, a separate data grid is created for each combination of values for the class variables. The class variables are written to the output results table.

GRIDCOLS=column1 <column2...>
specifies the names of the columns that are to be serialized into the data grid. If you do not specify this option, all of the columns in the table are serialized except for the columns specified by the CLASSVARS= option.

GRIDCOLLEN=length
specifies the length for the column specified by the GRIDCOLUMN= option. If the results table is a Base SAS table, the length must be less than or equal to 32,767. If the results table is a SAS Cloud Analytic Services (CAS) table, the length must be less than or equal to 10,485,760.

Default 32,767

PROMOTE=YES | NO
promotes the merged data grid table from session scope to global scope.

Default YES

Restriction This option is valid only if the results table is written to a CAS table.

Example: Serializing the Assets Table

The following example serializes (creates JSON strings) the assets data for each customer in the mylib.assets table. The output table is named assetsGrid, and the data grid column in the output table is named Assets. The data in the mylib.assets table is grouped by the class variable custName, so the output table contains one row for each value of custName.

``` SAS
$dcn_serializeGrid(
    gridSourceTable=mylib.assets,
    gridColName=Assets,
    outputTable=assetsGrid,
)```
%DCM_MERGEGRIDSERIALIZEDGRIDS

Merges tables that contain data grids that have been serialized with the %DCM_SERIALIZEGRIDS macro with a table that contains scalar data.

**Requirement:** If you are working with SAS Cloud Analytic Services (CAS) tables, all of the tables must be accessed in the same CAS session.

**Syntax**

```sas
%DCM_MERGEGRIDSERIALIZEDGRIDS ( 
  MERGETABLE=table_name, 
  MERGEKEY=merged_table_key, 
  OUTPUTTABLE=results_table, 
  GRIDTABLES=data_grid1 <data_grid2>..., 
  GRIDMERGEKEYS=data_grid_key1 <data_grid_key2>..., 
  GRIDCOLUMNS=data_grid_column1 <data_grid_column2>..., 
  <PROMOTE=YES | NO>
)
```

**Required Arguments**

**MERGETABLE=table_name**

specifies the name of the table that contains the scalar data.
MERGEKEY=merge_table_key
specifies the name of the key column in the table specified by the MERGETABLE= argument.

*Note:* You can specify only one merge column key. The %DCM_MERGESERIALIZEDGRIDS macro does not support merges based on multiple key values.

OUTPUTTABLE=results_table
specifies the name of the table that contains the results of the merge.

GRIDTABLES=data_grid1 <data_grid2> ...
specifies the names of the tables that contain the data grid columns that are to be merged into the results table. The data grid columns must contain a serialized data grid produced by the %DCM_SERIALIZEGRID macro.

**Interaction** For each data grid that is to be merged into the results table, the name of the data grid table, merge key, and data grid column must be specified in the same order for each of the GRIDTABLES=, GRIDMERGEKEYS=, and GRIDCOLUMNS= arguments.

GRIDMERGEKEYS=data_grid_key1 <data_grid_key2> ...
specifies the names of the key columns in the tables specified by the GRIDTABLES= argument.

**Interaction** The first key specified must be the key for the first table specified in the GRIDTABLES= argument, the second key must be the key for the second table, and so on.

GRIDCOLUMNS=data_grid_column1 <data_grid_column2> ...
specifies the names of the data grid columns in the tables specified by the GRIDTABLES= argument.

**Interaction** The first column specified must be the name of the data grid column in the first table specified in the GRIDTABLES= argument, the second key must be the name of the data grid column in the second table, and so on.

PROMOTE=YES | NO
promotes the merged data grid table from session scope to global scope.

**Default** YES

**Restriction** This option is valid only if the results table is written to a CAS table.

**Example: Merging Debts and Assets Data Grids with Loan Request Information**

The following example merges the scalar data in the mylib.loanRequests table with the data grid columns in the tables debtsGrid and assetGrid. The key column for the scalar table and the data grid tables is custName. The data grid columns in the resulting output table, mylib.loadRequestData, are named Debts and Assets.

```plaintext
%dcn_mergeSerializedGrids(
   mergeTable=mylib.loanRequests,
   mergekey=Customer,
   outputTable=mylib.loadRequestData,
   gridTables=debtsGrid assetsGrid,
```
gridMergeKeys=custName custName
gridColumns=Debts Assets);

**Table 2.3** *mylib.loanrequests Merge Table*

<table>
<thead>
<tr>
<th>RequestID</th>
<th>RequestedAmt</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME4922Mac01</td>
<td>20000</td>
<td>MacKelly, Sara</td>
</tr>
<tr>
<td>NC2W497Smy03</td>
<td>80495</td>
<td>Smyth, Joe</td>
</tr>
</tbody>
</table>

**Table 2.4** *debtsGrid Data Grid Table*

<table>
<thead>
<tr>
<th>CustName</th>
<th>Debts</th>
</tr>
</thead>
</table>
| MacKelly, Sara   | [{"metadata":{"DEBTTYPE":"string"},"BALANCE":"decimal"},
|                 | "data":{"Mortgage":80053.16,"CreditCard":2143.68}]} |

**Table 2.5** *assetsGrid Data Grid Table*

<table>
<thead>
<tr>
<th>CustName</th>
<th>Assets</th>
</tr>
</thead>
</table>
| MacKelly, Sara   | [{"metadata":{"ASSETTYPE":"string"},"VALUE":"decimal"},
|                 | "data":{"Property, Primary":212000,"Property, Investment":125000}]} |
| Smyth, Joe       | [{"metadata":{"ASSETTYPE":"string"},"VALUE":"decimal"},
|                 | "data":{"Property, Primary":234500}]} |

**Table 2.6** *mylib.loanRequestData Results Table*

<table>
<thead>
<tr>
<th>RequestID</th>
<th>RequestAmt</th>
<th>Customer</th>
<th>Debts</th>
<th>Assets</th>
</tr>
</thead>
</table>
| ME4922Mac01    | 20000      | MacKelly, Sara| [{"metadata":{"DEBTTYPE":"string"},
|                 |            |               | "BALANCE":"decimal"},
|                 |            |               | "data":{"Mortgage":80053.16,"CreditCard":2143.68}]} | [{"metadata":
|                 |            |               | {"ASSETTYPE":"string"},"VALUE":"decimal"},
|                 |            |               | "data":{"Property, Primary":212000,"Property, Investment":125000}]} |
| NC2W497Smy03   | 80495      | Smyth, Joe    | .                                          | [{"metadata":
|                 |            |               | {"ASSETTYPE":"string"},"VALUE":"decimal"},
|                 |            |               | "data":{"Property, Primary":234500}]} |
# Chapter 3
## Data Grid Functions

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| DATAGRID_LEFTJOIN | 34 |
| DATAGRID_MATCHCOUNT | 35 |
| DATAGRID_MAX | 36 |
| DATAGRID_MEAN | 36 |
| DATAGRID_MEDIAN | 37 |
| DATAGRID_MIN | 37 |
| DATAGRID_MULTISORT | 38 |
| DATAGRID_NMISS | 38 |
| DATAGRID_NVALID | 39 |
| DATAGRID_RENAMECOLUMN | 39 |
| DATAGRID_RIGHTJOIN | 40 |
| DATAGRID_SET | 40 |
Comparison Operators

You can use any of the following operators with functions that compare values such as the DATAGRID_FILTEREDGET and DATAGRID_MATCHCOUNT functions.

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQ, =, ==</td>
<td>Equals</td>
</tr>
<tr>
<td>NE, !=, ^=, &lt;&gt;</td>
<td>Not equal to</td>
</tr>
<tr>
<td>GT, &gt;</td>
<td>Greater than</td>
</tr>
<tr>
<td>LT, &lt;</td>
<td>Less than</td>
</tr>
<tr>
<td>LE, &lt;=</td>
<td>Less than or equal to</td>
</tr>
<tr>
<td>GE, &gt;=</td>
<td>Greater than or equal to</td>
</tr>
</tbody>
</table>

Data Grid Functions Available in SAS Intelligent Decisioning

Functions are categorized by the types of values that they return or type of operation they perform. Each function belongs to one of the following categories:

Create, Update, or Delete
Create, copy, update, or clear the data in a data grid.

Information
Return information about an entire data grid or about a column or row in the data grid.

Join or Append
Join or append two data grids.

Rename
Rename columns in a data grid.

Retrieve Values
Retrieve values from a data grid.
 Serialize
 Serializer a data grid into a JSON string.

 Set Values
 Set the value of cells in a data grid.

 Statistical
 Perform statistical calculations on values in the data grid.

 Subset and Sort
 Subset or sort a data grid.

 The following table provides brief descriptions of the data grid functions.

<table>
<thead>
<tr>
<th>Category</th>
<th>Language Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create, Update, or Delete</td>
<td>DATAGRID_ADDCHARACTERCOLUMN (p. 19)</td>
<td>Adds a character column to the specified data grid.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_ADDNUMERICCOLUMN (p. 20)</td>
<td>Adds a numeric column to the specified data grid.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_ADDROW (p. 20)</td>
<td>Appends a new row to the specified data grid.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_CLEAR (p. 22)</td>
<td>Deletes all rows and all column metadata from the specified data grid.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_CLEARDATA (p. 22)</td>
<td>Deletes all rows from the specified data grid but does not remove the column metadata.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_CONFORM (p. 24)</td>
<td>Adds the columns that are exclusive to dataGrid1 to dataGrid2, and adds the columns that are exclusive to dataGrid2 to dataGrid1.</td>
</tr>
<tr>
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<td></td>
<td>DATAGRID_DELETECOLUMN (p. 26)</td>
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<td></td>
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<tr>
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<tr>
<td></td>
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</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>Category</td>
<td>Language Elements</td>
<td>Description</td>
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<tr>
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<tr>
<td><strong>Category</strong></td>
<td><strong>Language Elements</strong></td>
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</tr>
<tr>
<td><strong>Join or Append</strong></td>
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<td>Appends a new row to the specified data grid.</td>
</tr>
<tr>
<td></td>
<td><strong>DATAGRID_APPEND</strong> (p. 21)</td>
<td>Appends dataGrid2 to dataGrid1.</td>
</tr>
<tr>
<td></td>
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</tr>
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</tr>
<tr>
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</tr>
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<tr>
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</tr>
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<td><strong>Set Values</strong></td>
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</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td><strong>DATAGRID_SET</strong> (p. 40)</td>
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</tr>
<tr>
<td></td>
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</tr>
<tr>
<td><strong>Statistical</strong></td>
<td><strong>DATAGRID_CORR</strong> (p. 24)</td>
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</tr>
<tr>
<td></td>
<td><strong>DATAGRID_FREQ</strong> (p. 31)</td>
<td>Returns the number of distinct values for the specified column.</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>DATAGRID_MAX (p. 36)</td>
<td>Returns the maximum value for the specified column.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_MEAN (p. 36)</td>
<td>Returns the mean value for the specified column.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_MEDIAN (p. 37)</td>
<td>Returns the median value for the specified column.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_MIN (p. 37)</td>
<td>Returns the minimum value that appears in the specified column.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_NMISS (p. 38)</td>
<td>Returns the number of missing values for the specified column of the specified data grid.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_STDDEV (p. 42)</td>
<td>Returns the standard deviation of the values in the specified column.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_SUM (p. 44)</td>
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</tr>
<tr>
<td>Subset and Sort</td>
<td>DATAGRID_BOTTOMN (p. 21)</td>
<td>Populates the target data grid with the rows from the source data grid that contain the lowest <em>number</em> values in the specified column.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_MULTISORT (p. 38)</td>
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</tr>
<tr>
<td></td>
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<td>Sorts a data grid based on the values in a single column, and then populates the target data grid with the sorted data.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_SUBSETBYVALUE (p. 43)</td>
<td>Populates the target data grid with the rows from the source data grid for which the specified comparison evaluates to true.</td>
</tr>
<tr>
<td></td>
<td>DATAGRID_TOPN (p. 44)</td>
<td>Populates the target data grid with the rows from the source data grid that contain the highest <em>number</em> values in the specified column.</td>
</tr>
</tbody>
</table>

**Dictionary**

**DATAGRID_ADDCHARACTERCOLUMN**

Adds a character column to the specified data grid.

**Category:** Create, Update, or Delete

**Returned data type:** INTEGER

**Note:** This function returns the number of columns that are in the data grid after the new column has been added.
Syntax

DATAGRID_ADDCHARACTERCOLUMN (dataGrid, column)

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

column
specifies the name of the column that you want to create. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

DATAGRID_ADDCHARACTERCOLUMN

Adds a character column to the specified data grid.

Category: Create, Update, or Delete
Returned data type: INTEGER
Note: This function returns the number of columns that are in the data grid after the new column has been added.

Syntax

DATAGRID_ADDNUMERICCOLUMN (dataGrid, column)

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

column
specifies the name of the column that you want to create. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

DATAGRID_ADDNUMERICCOLUMN

Adds a numeric column to the specified data grid.

Category: Create, Update, or Delete
Returned data type: INTEGER
Note: This function returns the number of columns that are in the data grid after the new column has been added.

Syntax

DATAGRID_ADDROW (dataGrid)

Categories: Create, Update, or Delete
Join or Append
Returned data type: INTEGER
Note: This function returns the number of rows that are in the data grid after the new row has been added.

DATAGRID_ADDROW

Appends a new row to the specified data grid.
Syntax

DATAGRID_ADDROW (dataGrid)

Required Argument

dataGrid

specifies the name of the data grid. This argument must be a variable of type DATAGRID.

DATAGRID_APPEND

Appends dataGrid2 to dataGrid1.

Category: Join or Append

Requirement: The two data grids must contain the same columns. You can use the DATAGRID_CONFORM function to make the two data grids have the same columns.

Returned data type: INTEGER

Note: This function returns the number of rows that are in the data grid after the append.

Syntax

DATAGRID_APPEND (dataGrid1, dataGrid2)

Required Argument

dataGrid1
dataGrid2

specifies the names of the two data grids.

DATAGRID_BOTTOMN

Populates the target data grid with the rows from the source data grid that contain the lowest number values in the specified column.

Category: Subset and Sort

Returned data type: INTEGER

Note: This function returns the number of rows in the target data grid. The target data grid is sorted in ascending order of the specified column.

Syntax

DATAGRID_BOTTOMN (source-dataGrid, column, number, target-dataGrid)
**Required Arguments**

**source-dataGrid**  
specifies the name of the source data grid. This argument must be a variable of type DATAGRID.

**column**  
specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

**number**  
specifies the number of rows to return.

**target-dataGrid**  
specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

---

**DATAGRID_CLEAR**

Deletes all rows and all column metadata from the specified data grid.

**Category:** Create, Update, or Delete

**Returned data type:** INTEGER

**Note:** This function always returns a zero.

**Syntax**

```java
DATAGRID_CLEAR (dataGrid)
```

**Required Argument**

**dataGrid**  
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

---

**DATAGRID_CLEARDATA**

Deletes all rows from the specified data grid but does not remove the column metadata.

**Category:** Create, Update, or Delete

**Returned data type:** INTEGER

**Note:** This function always returns a zero.

**Syntax**

```java
DATAGRID_CLEARDATA (dataGrid)
```
Required Argument

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

DATAGRID_COLUMNCOUNT

Returns the number of columns in the specified data grid.

Category: Information
Returned data type: INTEGER

Syntax

DATAGRID_COLUMNCOUNT (dataGrid)

Required Argument

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

DATAGRID_COLUMNNAME

Returns the name of the column that is in the specified ordinal position in the specified data grid.

Category: Information
Returned data type: CHARACTER

Syntax

DATAGRID_COLUMNNAME (dataGrid, column_number)

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

column_number
specifies the column number in the data grid. The columns in a data grid are numbered beginning with 1.
DATAGRID_CONFORM

Adds the columns that are exclusive to dataGrid1 to dataGrid2, and adds the columns that are exclusive to dataGrid2 to dataGrid1.

**Category:** Create, Update, or Delete

**Returned data type:** INTEGER

**Note:** This function always returns a zero.

**Syntax**

DATAGRID_CONFORM (dataGrid1, dataGrid2)

**Required Argument**

dataGrid1
dataGrid2

specifies the names of the two data grids that you want to contain the same columns.

DATAGRID_COPY

Copies the source data grid into the target data grid.

**Category:** Create, Update, or Delete

**Returned data type:** INTEGER

**Note:** This function returns the number of rows in the target data grid.

**Syntax**

DATAGRID_COPY (source-dataGrid, target-dataGrid)

**Required Arguments**

source-dataGrid

specifies the name of the source data grid. This argument must be a variable of type DATAGRID.

target-dataGrid

specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

DATAGRID_CORR

Returns the Pearson product-moment correlation coefficient for the specified columns in the specified data grid.
Syntax

**DATAGRID_CORR** *(dataGrid, column1, column2)*

**Required Arguments**

- **dataGrid**: specifies the name of the data grid. This argument must be a variable of type DATAGRID.
- **column1**
- **column2**: specifies the numeric data grid columns for which you want to compute the correlation coefficient.

**Details**

The Pearson product-moment correlation is a parametric measure of association for two variables. It measures both the strength and the direction of a linear relationship. If one variable X is an exact linear function of another variable Y, a positive relationship exists if the correlation is 1, and a negative relationship exists if the correlation is –1. If there is no linear predictability between the two variables, the correlation is 0. If the two variables jointly have a normal distribution with a zero correlation, the two variables are independent. However, correlation does not imply causality because, in some cases, an underlying causal relationship might not exist.

The formula for the Pearson product-moment correlation, denoted by \( \rho_{xy} \), is as follows:

\[
\rho_{xy} = \frac{\text{Cov}(x, y)}{\sqrt{\text{Var}(x)\text{Var}(y)}} = \frac{\text{E}((x - \text{E}(x))(y - \text{E}(y)))}{\sqrt{\text{E}((x - \text{E}(x))^2)\text{E}((y - \text{E}(y))^2)}}
\]

**DATAGRID_COUNT**

Returns the number of rows in the specified data grid.

**Syntax**

**DATAGRID_COUNT** *(dataGrid)*

**Required Argument**

- **dataGrid**: specifies the name of the data grid. This argument must be a variable of type DATAGRID.
**DATAGRID_CREATE**

Creates a data grid from the specified JSON string.

**Category:** Create, Update, or Delete

**Returned data type:** DATAGRID

**Note:** This function returns the number of rows that are in the data grid.

**Syntax**

```
DATAGRID_CREATE (dataGrid, JSON_string)
```

**Required Arguments**

- `dataGrid` specifies the name of the data grid. This argument must be a variable of type DATAGRID.

- `JSON_string` specifies a JSON character string that contains the data for the data grid. You can specify a literal value in single quotation marks, or you can specify a variable that evaluates to a JSON character string. You can use the %DCM_SERIALIZEGRID macro to generate the JSON string for a data grid. See “%DCM_SERIALIZEGRID” on page 10 for more information.

The JSON string has the following format:

```
[ { "metadata": { "column1": "data_type" }, ..., { "column2": "data_type" } },
  { "data": [ [row1_data], [row2_data] ] } ]
```

- `column1` specifies the column names of each column in the data grid.

- `row1_data` specifies the data for each row in the data grid. Separate the values for each column in a row with a comma (,). Enclose character values in double quotation marks.

**See**

- “Introduction to Data Grids” on page 1
- “Example: Serializing the Assets Table” on page 11

---

**DATAGRID_DELETECOLUMN**

Deletes the specified column from the specified data grid.

**Category:** Create, Update, or Delete

**Returned data type:** INTEGER
DATAGRID_DELETECOLUMN

Syntax

DATAGRID_DELETECOLUMN (dataGrid, column)

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

column
specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

DATAGRID_DELETEROW

Deletes the specified row from the specified data grid.

Category: Create, Update, or Delete

Returned data type: INTEGER

Note: This function returns the number of rows remaining in the data grid.

Syntax

DATAGRID_DELETEROW (dataGrid, row_number)

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

row_number
specifies the number of the row to delete.

DATAGRID_DISTINCTROWCOUNT

Returns the number of unique rows in the specified data grid.

Category: Information

Returned data type: INTEGER

Syntax

DATAGRID_DISTINCTROWCOUNT (dataGrid)
Required Argument

dataGrid

specifies the name of the data grid. This argument must be a variable of type DATAGRID.

DATAGRID_FILTEREDGET

Returns the value in the first row in the specified column for which the specified comparison evaluates to true.

Category: Retrieve Values

Returned data type: STRING, DOUBLE

Syntax

DATAGRID_FILTEREDGET (dataGrid, columnReturned, filterColumn, operator, variableOrValue)

Required Arguments

dataGrid

specifies the name of the data grid. This argument must be a variable of type DATAGRID.

columnReturned

specifies the name of the column whose value you want to know. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

filterColumn

specifies the name of the column whose value is to be compared to variableOrValue. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

operator

specifies one of the following operators shown in “Comparison Operators” on page 16. You can specify the name of a character variable that evaluates to one of these operators, or you can specify the operator enclosed in single quotation marks.

variableOrValue

specifies the value to compare to the value of filterColumn. You can specify a number, a character string enclosed in single quotation marks, the name of a variable or of an expression. The value that you specify must be or must evaluate to the same data type as filterColumn.

Details

The DATAGRID_FILTEREDGET function compares the value in filterColumn to the specified variableOrValue by using the comparison operator. The comparison is as follows:

filterColumn operator variableOrValue

For the first row for which the comparison evaluates to true, this function returns the value of columnReturned.
Example

The following example determines whether the value of the riskGroup column is equal to `Low`, and if so, returns the value of the approvalStatus column:

```
DATAGRID_FILTEREDGET(DebtEval,'approvalStatus','riskGroup','EQ','Low')
```

**DATAGRID_FILTEREDSET**

Sets the value in the specified row and column to the specified value if the specified comparison evaluates to true.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Set Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned data type:</td>
<td>INTEGER</td>
</tr>
</tbody>
</table>

**Syntax**

```
DATAGRID_FILTEREDSET(dataGrid, columnToAssign, rowNumber, filterColumn, operator, variableOrValue, valueToAssign)
```

**Required Arguments**

- **dataGrid**
  - specifies the name of the data grid. This argument must be a variable of type DATAGRID.

- **columnToAssign**
  - specifies the name of the column to be assigned the specified value. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

- **rowNumber**
  - specifies the row number that contains the cell to be assigned the specified value. You can specify a number or a variable that evaluates to a number.

- **filterColumn**
  - specifies the name of the column whose value is to be compared to `variableOrValue`. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

- **operator**
  - specifies one of the following operators shown in “Comparison Operators” on page 16. You can specify the name of a character variable that evaluates to one of these operators, or you can specify the operator enclosed in single quotation marks.

- **variableOrValue**
  - specifies the value to compare to the value of `filterColumn`. You can specify a number, a character string enclosed in single quotation marks, the name of a variable or of an expression. The value that you specify must be or must evaluate to the same data type as `filterColumn`.

- **valueToAssign**
  - specifies the value to assign to the cell at `rowNumber,columnToAssign`. You can specify a number, a character value enclosed in single quotation marks, or the name of a variable.
Details

The DATAGRID_FILTEREDSET function compares the value of filterColumn to the value of variableOrValue using the comparison operator. The comparison is as follows:

```
filterColumn operator variableOrValue
```

If the comparison evaluates to true, this function sets the value of rowNumber,columnToAssign to the value specified by valueToAssign.

Example

For the data grid row specified by the value of the customer variable, the DATAGRID_FILTEREDSET function sets the column riskGroup to High if the value of the Debts column is greater than the value of assets variable:

```
DATAGRID_FILTEREDSET(DebtEval,'riskGroup',customer,'debts','GT',assets,'High')
```

---

**DATAGRID_FILTEREDSETALL**

Sets the cell in the specified column to the specified value for each row for which the specified comparison evaluates to true.

**Category:** Set Values  
**Returned data type:** INTEGER  
**Note:** This function returns the number of cells that were set to the specified value.

Syntax

```
DATAGRID_FILTEREDSETALL(dataGrid, columnToAssign, filterColumn, operator, variableOrValue, valueToAssign)
```

**Required Arguments**

- **dataGrid**  
  specifies the name of the data grid. This argument must be a variable of type DATAGRID.

- **columnToAssign**  
  specifies the name of the column to be assigned the specified value. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

- **filterColumn**  
  specifies the name of the column whose value is to be compared to variableOrValue. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

- **operator**  
  specifies one of the following operators shown in “Comparison Operators” on page 16. You can specify the name of a character variable that evaluates to one of these operators, or you can specify the operator enclosed in single quotation marks.
variableOrValue
specifies the value to compare to the value of filterColumn. You can specify a number, a character string enclosed in single quotation marks, the name of a variable or of an expression. The value that you specify must be or must evaluate to the same data type as filterColumn.

valueToAssign
specifies the value to assign to the appropriate cells in columnToAssign. You can specify a number, a character value enclosed in single quotation marks, the name of a variable, or an expression. The value that you specify must be or must evaluate to the same data type as columnToAssign.

Details
For each row in the data grid, the DATAGRID_FILTEREDSETALL function compares the value of filterColumn to the value of variableOrValue by using the comparison operator. The comparison is as follows:

filterColumn operator variableOrValue

If the comparison evaluates to true, this function sets the value of the cell in column columnToAssign to the value specified by valueToAssign.

Example
This example sets the value of the cell in column riskGroup to the value of the highGroup variable for all rows in the data grid DebtEval for which the value of the Debts column is greater than the value of the assets variable:

```
DATAGRID_FILTEREDSETALL(DebtEval,'riskGroup','debts','GT',assets,highGroup)
```

DATAGRID_FREQ
Returns the number of distinct values for the specified column.

| Category: | Statistical               |
| Returned data type: | INTEGER          |

Syntax

```
DATAGRID_FREQ(dataGrid, column)
```

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

column
specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.
**DATAGRID_FULLJOIN**

Performs a full join of two data grids and populates the target data grid with the results of the join.

**Category:** Join or Append  
**Returned data type:** INTEGER  
**Note:** This function returns the number of rows in the target data grid.

**Syntax**

`DATAGRID_FULLJOIN(dataGrid1, dataGrid2, keyColumn1, keyColumn2, target-dataGrid)`

**Required Arguments**

- `dataGrid1`  
  specifies the names of the two data grids to be joined.

- `dataGrid2`  
  specifies the name of the key column in `dataGrid1`. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

- `keyColumn1`  
  specifies the name of the key column in `dataGrid2`. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

- `keyColumn2`  
  specifies the name of the key column in `dataGrid2`. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

- `target-dataGrid`  
  specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

**Details**

The DATAGRID_FULLJOIN function performs a full outer join of two data grids for which `dataGrid1.keyColumn1` equals `dataGrid2.keyColumn2` and populates the target data grid with the results of the join. The target data grid includes all rows from both `dataGrid1` and `dataGrid2`. Unmatched rows are preserved.

When the column names in the two data grids are identical, the columns from `dataGrid1` are added to the target data grid.

**DATAGRID_GET**

Returns the value of the cell in the specified row and column.

**Category:** Retrieve Values  
**Returned data type:** STRING, DOUBLE
Syntax

**DATAGRID_GET** (*dataGrid, column, rowNumber*)

**Required Arguments**

*dataGrid*
- specifies the name of the data grid. This argument must be a variable of type DATAGRID.

*column*
- specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

*rowNumber*
- specifies the row number in the data grid. You can specify a number or a variable that evaluates to a number.

**DATAGRID_GRIDMATCHCOUNT**

Returns the number of rows for which the value in the specified column in one data grid matches the value in the specified column in another data grid.

**Category:** Information

**Returned data type:** INTEGER

**Syntax**

**DATAGRID_GRIDMATCHCOUNT** (*dataGrid1, dataGrid2, column1, column2*)

**Required Arguments**

*dataGrid1*
- specifies the names of data grids. These arguments must be variables of type DATAGRID.

*dataGrid2*
- specifies the name of the column in *dataGrid1* that you want to compare to a column in *dataGrid2*. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

*column1*
- specifies the name of the column in *dataGrid2*. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

*column2*
- specifies the name of the column in *dataGrid2*. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

**Details**

The **DATAGRID_GRIDMATCHCOUNT** function returns the number of rows in which the value of *dataGrid1, column1* match the value of *dataGrid2, column2*.
DATAGRID_INNERJOIN
Performs an inner join of two data grids and populates the target data grid with the results of the join.

**Category:** Join or Append  
**Returned data type:** INTEGER  
**Note:** This function returns the number of rows in the target data grid.

**Syntax**

```
DATAGRID_INNERJOIN (dataGrid1, dataGrid2, keyColumn1, keyColumn2, target-dataGrid)
```

**Required Arguments**

- `dataGrid1`  
  Specifies the names of the two data grids to be joined.
- `dataGrid2`  
  Specifies the name of the key column in `dataGrid1`. You can specify a column name in single quotation marks or a variable that evaluates to a column name.
- `keyColumn1`  
  Specifies the name of the key column in `dataGrid2`. You can specify a column name in single quotation marks or a variable that evaluates to a column name.
- `keyColumn2`  
  Specifies the name of the key column in `dataGrid2`. You can specify a column name in single quotation marks or a variable that evaluates to a column name.
- `target-dataGrid`  
  Specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

**Details**

The DATAGRID_INNERJOIN function performs an inner join of two data grids for which `dataGrid1.keyColumn1` equals `dataGrid2.keyColumn2` and populates the target data grid with the results of the join. The target table includes all rows from `dataGrid1` that match rows in `dataGrid2`. Unmatched rows from both data grids are discarded.

When the column names in the two data grids are identical, the columns from the left side of the join are added to the resulting data grid.

DATAGRID_LEFTJOIN
Performs a left join of two data grids, returns the resulting data grid, and populates the target data grid with the results of the join.

**Category:** Join or Append  
**Returned data type:** INTEGER  
**Note:** This function returns the number of rows in the target data grid.
Syntax

DATAGRID_LEFTJOIN (dataGrid1, dataGrid2, keyColumn1, keyColumn2, target-dataGrid)

Required Arguments

dataGrid1
specifies the names of the two data grids to be joined.

dataGrid2

keyColumn1
specifies the name of the key column in dataGrid1. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

keyColumn2
specifies the name of the key column in dataGrid2. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

target-dataGrid
specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

Details

The DATAGRID_LEFTJOIN function performs a left join of two data grids for which dataGrid1.keyColumn1 equals dataGrid2.keyColumn2 and populates the target data grid with the results of the join. The target data grid contains all rows from dataGrid1 plus the matching rows from dataGrid2.

When the column names in the two data grids are identical, the columns from the left side of the join are added to the resulting data grid.

DATAGRID_MATCHCOUNT

Returns the number of rows in the specified column for which the specified comparison evaluates to true.

Category: Information

Returned data type: INTEGER

Syntax

DATAGRID_MATCHCOUNT (dataGrid, filterColumn, operator, variableOrValue)

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

filterColumn
specifies the name of the column whose value is to be compared to variableOrValue. You can specify a column name in single quotation marks or a variable that evaluates to a column name.
operator
specifies one of the following operators shown in “Comparison Operators” on page 16. You can specify the name of a character variable that evaluates to one of these operators, or you can specify the operator enclosed in single quotation marks.

variableOrValue
specifies the value to compare to the value of filterColumn. You can specify a number, a character string enclosed in single quotation marks, the name of a variable or of an expression. The value that you specify must be or must evaluate to the same data type as filterColumn.

**DATAGRID\_MAX**

Returns the maximum value for the specified column.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Statistical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned data type:</td>
<td>DOUBLE</td>
</tr>
</tbody>
</table>

**Syntax**

\[ \text{DATAGRID\_MAX} (\text{dataGrid}, \text{column}) \]

**Required Arguments**

\textit{dataGrid}

specifies the name of the data grid. This argument must be a variable of type DATAGRID.

\textit{column}

specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

**DATAGRID\_MEAN**

Returns the mean value for the specified column.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Statistical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned data type:</td>
<td>DOUBLE</td>
</tr>
</tbody>
</table>

**Syntax**

\[ \text{DATAGRID\_MEAN} (\text{dataGrid}, \text{column}) \]

**Required Arguments**

\textit{dataGrid}

specifies the name of the data grid. This argument must be a variable of type DATAGRID.
column
specifies the name of the column in the data grid. You can specify a column name in
single quotation marks or a variable that evaluates to a column name.

DATAGRID_MEDIAN

Returns the median value for the specified column.

| Category: | Statistical |
| Returned data type: | DOUBLE |

Syntax

DATAGRID_MEDIAN (dataGrid, column)

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type
DATAGRID.

column
specifies the name of the column in the data grid. You can specify a column name in
single quotation marks or a variable that evaluates to a column name.

DATAGRID_MIN

Returns the minimum value that appears in the specified column.

| Category: | Statistical |
| Returned data type: | DOUBLE |

Syntax

DATAGRID_MIN (dataGrid, column)

Required Arguments

dataGrid
specifies the name of the data grid. This argument must be a variable of type
DATAGRID.

column
specifies the name of the column in the data grid. You can specify a column name in
single quotation marks or a variable that evaluates to a column name.
**DATAGRID_MULTISORT**

Sorts a data grid based on the values of one or more columns, and then populates the target data grid with the sorted data.

- **Category:** Subset and Sort
- **Returned data type:** INTEGER
- **Note:** This function returns the number of rows in the target data grid.

**Syntax**

\[
\text{DATAGRID\_MULTISORT} (\text{source-dataGrid}, \text{sort\_column\_1, sort\_order\_1}, \ldots, \text{target-dataGrid})
\]

**Required Arguments**

- **source-dataGrid**
  - specifies the name of the source data grid. This argument must be a variable of type DATAGRID.

- **sort\_column\_n**
  - specifies the column whose values are used to sort the rows in the target data grid.

- **sort\_order\_n**
  - specifies whether the target data grid is sorted in ascending or descending order according to the values in the column specified by \text{sort\_column\_n}. Specify \text{A} for ascending order or \text{D} for descending order. If you specify a variable for the sort order, and the variable value is an empty character string, the function returns a null value.

  You can specify up to six pairs of \text{sort\_column\_n} and \text{sort\_order\_n} parameters.

- **target-dataGrid**
  - specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

**DATAGRID_NMISS**

Returns the number of missing values for the specified column of the specified data grid.

- **Category:** Statistical
- **Returned data type:** INTEGER

**Syntax**

\[
\text{DATAGRID\_NMISS} (\text{dataGrid}, \text{column})
\]
**Required Arguments**

*dataGrid*

specifies the name of the data grid. This argument must be a variable of type DATAGRID.

*column*

specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

---

**DATAGRID_NVALID**

Returns the number of valid nonmissing numeric values in the specified column of the specified data grid.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned data type:</td>
<td>INTEGER</td>
</tr>
</tbody>
</table>

**Syntax**

`DATAGRID_NVALID (dataGrid, column)`

**Required Arguments**

*dataGrid*

specifies the name of the data grid. This argument must be a variable of type DATAGRID.

*column*

specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

---

**DATAGRID_RENAMECOLUMN**

Renames the specified column in the specified data grid.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Rename</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned data type:</td>
<td>INTEGER</td>
</tr>
</tbody>
</table>

**Note:**

This function returns a 1 if the column does not exist and a 0 if the column is renamed.

**Syntax**

`DATAGRID_RENAMECOLUMN (dataGrid, oldName, newName)`

**Required Arguments**

*dataGrid*

specifies the name of the data grid. This argument must be a variable of type DATAGRID.
oldName
    specifies the existing name of the column.

newName
    specifies the new name of the column.

DATAGRID_RIGHTJOIN
Performs a right join of two data grids, returns the resulting data grid, and populates the target data grid with the results of the join.

Category: Join or Append

Returned data type: INTEGER

Note: This function returns the number of rows in the target data grid.

Syntax
DATAGRID_RIGHTJOIN (dataGrid1, dataGrid2, keyColumn1, keyColumn2, target-dataGrid)

Required Arguments

dataGrid1
dataGrid2
    specifies the names of the two data grids to be joined.

keyColumn1
    specifies the name of the key column in dataGrid1. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

keyColumn2
    specifies the name of the key column in dataGrid2. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

target-dataGrid
    specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

Details
The DATAGRID_RIGHTJOIN function performs a right join of two data grids for which dataGrid1.keyColumn1 equals dataGrid2.keyColumn2. It populates the target data grid with the results of the join. The target data grid contains all rows from dataGrid2 plus all matching rows from dataGrid1.

When the column names in the two data grids are identical, the columns from the right side of the join are added to the resulting data grid.

DATAGRID_SET
Assigns the specified value to the specified row and column.

Category: Set Values
**Syntax**

**DATAGRID_SET** (*dataGrid, column, rowNumber, variableOrValue*)

**Required Arguments**

*dataGrid*  
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

*column*  
specifies the name of the column whose value is to be set. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

*rowNumber*  
specifies the number of the row to be set. You can specify a number or a variable that evaluates to a number.

*variableOrValue*  
specifies the value to be assigned to *column*. You can specify a number, a character value enclosed in single quotation marks, the name of a variable, or an expression. The value that you specify must be or must evaluate to the same data type as *column*.

**DATAGRID_SETALL**

Assigns the specified value to all rows in the specified column.

**Category:** Set Values  
**Returned data type:** INTEGER

**Syntax**

**DATAGRID_SETALL** (*dataGrid, column, variableOrValue*)

**Required Arguments**

*dataGrid*  
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

*column*  
specifies the name of the column whose values are to be set.

*variableOrValue*  
specifies the value to be assigned to *column*. You can specify a number, a character value enclosed in single quotation marks, the name of a variable, or an expression. The value that you specify must be or must evaluate to the same data type as *column*. 
**DATAGRID_SORT**

Sorts a data grid based on the values in a single column, and then populates the target data grid with the sorted data.

**Category:** Subset and Sort  
**Returned data type:** INTEGER  
**Note:** This function returns the number of rows in the target data grid.

**Syntax**

DATAGRID_SORT (source-dataGrid, sort_column, sort_order, target-dataGrid)

**Required Arguments**

*source-dataGrid*  
specifies the name of the source data grid. This argument must be a variable of type DATAGRID.

*sort_column*  
specifies the column whose values are used to sort the rows in the target data grid.

*sort_order*  
specifies whether the target data grid is sorted in ascending or descending order. Specify A for ascending order or D for descending order. If you specify a variable for the sort order, and the variable value is an empty character string, the function returns a null value.

*target-dataGrid*  
specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

**DATAGRID_STDDEV**

Returns the standard deviation of the values in the specified column.

**Category:** Statistical  
**Returned data type:** DOUBLE

**Syntax**

DATAGRID_STDDEV (dataGrid, column)

**Required Arguments**

*dataGrid*  
specifies the name of the data grid. This argument must be a variable of type DATAGRID.
column
specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

**DATAGRID_SUBSETBYVALUE**

Populates the target data grid with the rows from the source data grid for which the specified comparison evaluates to true.

<table>
<thead>
<tr>
<th>Category:</th>
<th>Subset and Sort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned data type:</td>
<td>INTEGER</td>
</tr>
<tr>
<td>Note:</td>
<td>This function returns the number of rows in the target data grid.</td>
</tr>
</tbody>
</table>

**Syntax**

`DATAGRID_SUBSETBYVALUE (source-dataGrid, filterColumn, operator, variableOrValue, target-dataGrid)`

**Required Arguments**

*dataGrid*  
specifies the name of the data grid. This argument must be a variable of type DATAGRID.

*filterColumn*  
specifies the name of the column whose value is to be compared to *variableOrValue*. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

*operator*  
specifies one of the following operators shown in “Comparison Operators” on page 16. You can specify the name of a character variable that evaluates to one of these operators, or you can specify the operator enclosed in single quotation marks.

*variableOrValue*  
specifies the value to compare to the value of *filterColumn*. You can specify a number, a character string enclosed in single quotation marks, the name of a variable or of an expression. The value that you specify must be or must evaluate to the same data type as *filterColumn*.

*target-dataGrid*  
specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

**Details**

The DATAGRID_SUBSETBYVALUE function compares the value of *filterColumn* in the source data grid to *variableOrValue* by using the comparison operator. The comparison is as follows:

`filterColumn operator variableOrValue`

This function populates the target data grid with all of the rows for which the comparison evaluates to true.
DATAGRID_SUM
Returns the sum of the values in the specified column.

Category: Statistical
Returned data type: DOUBLE

Syntax
DATAGRID_SUM (dataGrid, column)

Required Arguments

dataGrid
  specifies the name of the data grid. This argument must be a variable of type DATAGRID.

column
  specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

DATAGRID_TOPN
Populates the target data grid with the rows from the source data grid that contain the highest number values in the specified column.

Category: Subset and Sort
Returned data type: INTEGER
Note: This function returns the number of rows in the target data grid. The returned data grid is sorted in descending order of the specified column.

Syntax
DATAGRID_TOPN (source-dataGrid, column, number, target-dataGrid)

Required Arguments

source-dataGrid
  specifies the name of the source data grid. This argument must be a variable of type DATAGRID.

column
  specifies the name of the column in the data grid. You can specify a column name in single quotation marks or a variable that evaluates to a column name.

number
  specifies the number of rows to return.
**target-dataGrid**

specifies the name of the target data grid. This argument must be a variable of type DATAGRID. Any existing data in the target data grid is overwritten.

---

**DATAGRID_TOSTRING**

Returns the JSON string for the specified data grid.

- **Category:** Serialize
- **Returned data type:** CHARACTER
- **See:** "Introduction to Data Grids" on page 1

---

**Syntax**

`DATAGRID_TOSTRING (dataGrid)`

**Required Argument**

- **dataGrid**

  specifies the name of the data grid. This argument must be a variable of type DATAGRID.
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