



# REFERENCE SECTION

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# CHAPTER 1

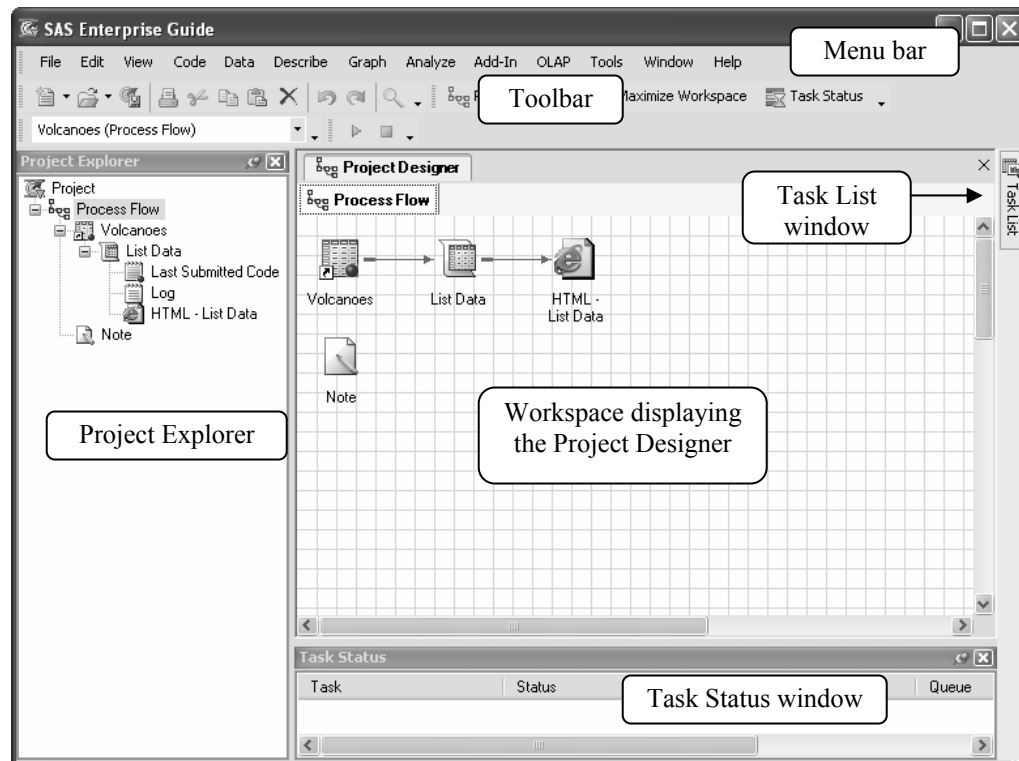
## SAS Enterprise Guide Basics

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## 1.1 SAS Enterprise Guide Windows


SAS Enterprise Guide has many windows. You can customize the appearance of SAS Enterprise Guide—closing some windows, opening others, and rearranging them all—until it looks just the way you want. Then SAS Enterprise Guide will save those changes so the next time you open it, everything will be just where you left it.

Here is SAS Enterprise Guide with its windows in their default positions.



**Docking windows** Some of the windows in SAS Enterprise Guide are docking windows. Docking windows appear around the edges of the application. You can undock a window by clicking its title bar and dragging it. To dock it, drag it to an edge of the application until it changes shape, and then release it. Some docking windows are open by default while others are closed. If a docking window is closed, you can open it using the **View** menu. Here are the basic docking windows:

 **Project Explorer** The Project Explorer displays the items in a project in a hierarchical tree diagram. This window is open by default.

 **Task Status** The Task Status window displays notes about any tasks that are currently running either locally or on a remote server. This window is open by default.



**Task List** The Task List window is also open by default, but it is minimized and appears as a tab on the right side. To expand the Task List window, move your cursor over the Task List tab. This window lists all available tasks. You can view tasks sorted by category or in alphabetical order by clicking the tabs at the top of the window. To open a task, select it from the menu bar, or click its name in the Task List window.



**Server List** The Server List window lists available SAS servers, and the files and SAS data libraries on those servers. This window is closed by default.



**Binder List** The Binder List window lists available binders and their contents, and is closed by default. See section 2.2 for more information about binders.





**SAS Folders** The SAS Folders window lists any stored processes available to you, and is closed by default.



**What is** The What is window displays information describing menus and tools, and is closed by default. See section 1.14 for more information about using the What is window.



**Project Log** The Project Log window displays a single log for your entire project, and is closed by default.

**Pinning windows** You can minimize docking windows by clicking the pushpin icon  in the upper-right corner. SAS Enterprise Guide will reduce that window to a tab along the edge of the SAS Enterprise Guide application. Then, when you move the cursor over the tab, the window will expand. When you move the cursor out of the window, it will be reduced to a tab again. To unpin a window, click the sideways pushpin icon .

**Workspace** The workspace is not itself a window, but it is very important. This is where the Project Designer and document windows appear. The workspace is always there and cannot be closed. However, you can open and close individual items inside the workspace.



**Project Designer** The Project Designer displays the items in a project and their relationship using a process flow diagram. You can display only one project at a time in the Project Designer, but you can create as many process flow diagrams as you wish inside a single project. You can turn the Project Designer into a docking window by right-clicking its tab and selecting **Dockable** from the pop-up menu. To reverse this, right-click the Project Designer's title bar and uncheck **Dockable**.



**Document windows** The document windows display your data, results, code, logs, and notes. There is a different type of icon for every kind of document. This icon represents a SAS data table.

**Restoring windows** Once you have rearranged your windows, you may decide you want them back where they started. To restore them to their original locations, just select **Tools ► Options** from the menu bar. Then, in the General page of the Options window, click **Reset Docking Windows**.

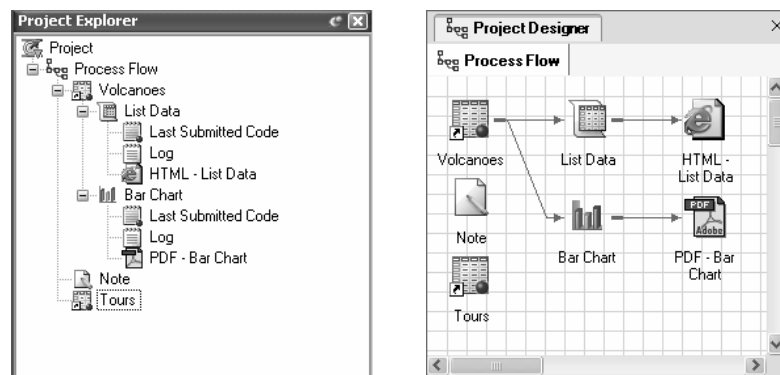
## 1.2 Projects

In SAS Enterprise Guide, all the work you do is organized into projects. A project is a collection of related data, tasks, results, code, logs, and notes. Projects help you by keeping track of everything, even if your data are scattered in many directories or on more than one computer. That way, when you come back to an old project six months or a year later, you won't be left wondering which data sets you used or what reports you ran.

You can have as many projects as you like, and you can use a data set over and over again in different projects, so there is a lot of flexibility. However, you can have only one project open at a time. Also, if you share a project file with someone else, that person must have access to your data files and any other items you reference.

To create a new project, select **File ► New ► Project** from the menu bar. To open an existing project, select **File ► Open ► Project** and navigate to your project.

**Project Explorer and Project Designer** The Project Explorer displays projects in a hierarchical tree diagram, while the Project Designer displays projects using a process flow diagram. In either window, the items in your project are represented by icons, and connected to show the relationship between items. Here are examples of a Project Explorer and a Project Designer showing the same project. This project contains several types of items: data, tasks, results, code, logs, and a note.



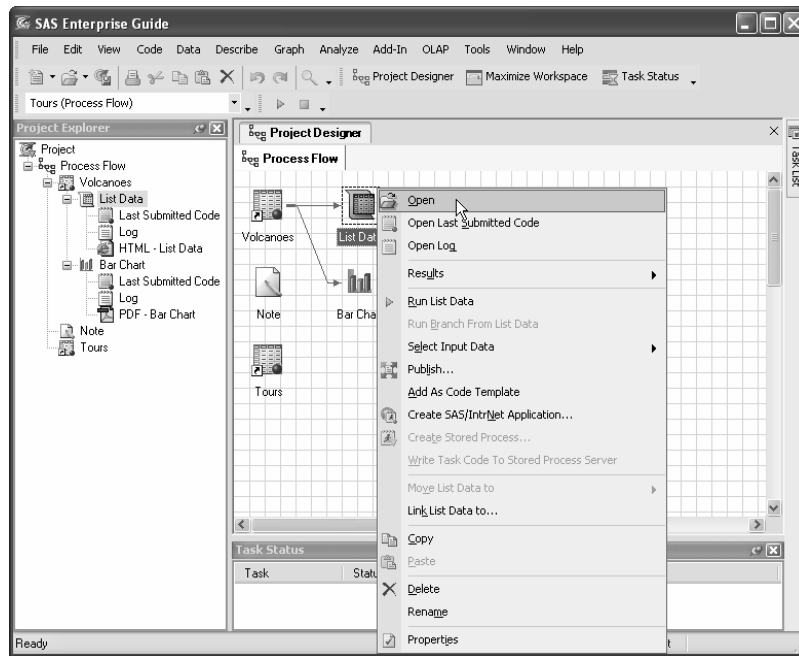
**Data** Data files in a project may be SAS data tables, raw data files, or files from other databases or applications, such as Microsoft Excel spreadsheets. Projects contain pointers to data files, not the actual data. If you delete a project, your data files will still exist.

**Tasks** Tasks are specific analyses or reports that you run, such as Analysis of Variance or Bar Chart. Every time you run a task, SAS Enterprise Guide adds an icon representing that task.

**Results** Results are the reports or graphs produced by tasks you run. Results are represented by icons labeled with the type of output (HTML, PDF, RTF, SAS Report, or text) and the name of the task.

**Notes** Notes are optional text files you can use to document your work, or record comments or instructions for later use. To create a note, select **File ► New ► Note** from the menu bar. A text window will open, allowing you to type whatever you wish.

**Showing properties and opening items** You can display the properties for any item by right-clicking its icon in the Project Explorer or Project Designer and selecting **Properties** from the pop-up menu. You can open any item by double-clicking its icon, or by right-clicking its icon and selecting **Open** from the pop-up menu.



**Code and log files** Code files are SAS programs, either ones that SAS Enterprise Guide writes when you run a task, or ones that you have written. Log files are text files written by SAS that contain details about how a particular task ran. When you run a task, code and log icons are automatically added to the Project Explorer, but not to the Project Designer. To display a code file, double-click the icon for **Last Submitted Code** in the Project Explorer or right-click the icon and select **Open** from the pop-up menu. To display a log file, double-click the log icon in the Project Explorer or right-click the log icon and select **Open** from the pop-up menu. If you want the code and log to appear automatically in the Project Designer, select **Tools ► Options** from the menu bar. In the selection pane on the left, click **Project Views** and then check the boxes next to **Show generated code items** and **Show SAS output log**.

**Renaming and deleting items** You can rename most items by right-clicking the item and selecting **Rename** from the pop-up menu. You can delete an item in a project by right-clicking and selecting **Delete**. Note that if you delete data from a project, only the pointer to that data is deleted, not the actual data file.

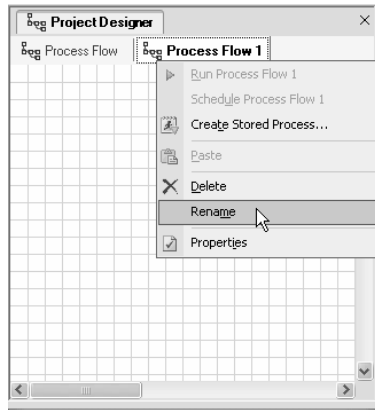
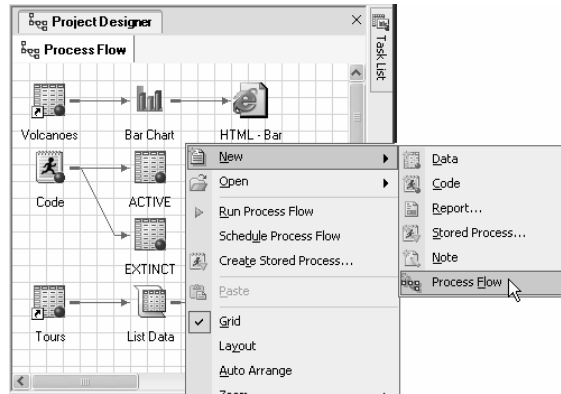
**Saving a project** To save a project, select **File ► Save project-name** or **File ► Save project-name As** from the menu bar. Each project is saved as a single file and has a file extension of .egp. You can save results, code, and logs as separate files by right-clicking and selecting **Export** from the pop-up menu.

### 1.3 Managing Process Flows

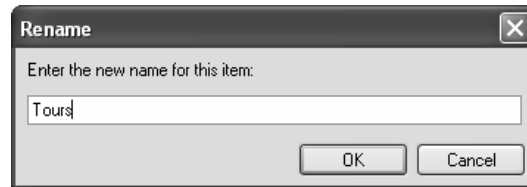
In SAS Enterprise Guide, you can have only one project open at a time. However, you can have multiple process flows within a single project. So, if you have a complex project, you may want to divide it into several process flows.

**Adding new process flows** To add a new process flow to a project, select **File ► New ► Process Flow** from the menu bar, or right-click the current process flow and select **New ► Process Flow** from the pop-up menu.

Note that no matter how many process flows you create in the Project Designer, the Project Explorer always shows your entire project in a single tree diagram.

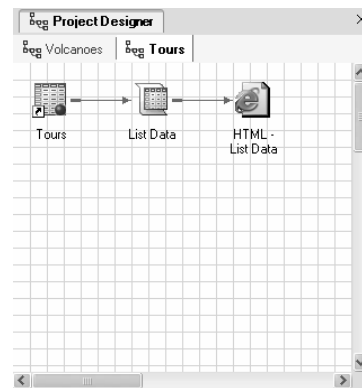
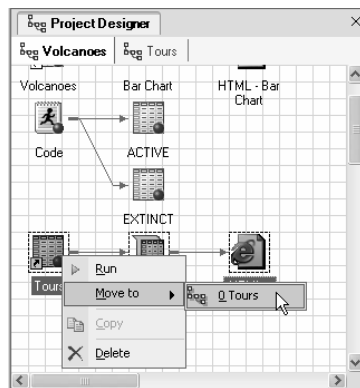


**Renaming process flows** When you open a new process flow, it is named Process Flow *n*. To give your process flows more descriptive names, right-click the tab for each process flow and select **Rename** from the pop-up menu. Then type the new name in the Rename window and click **OK**.



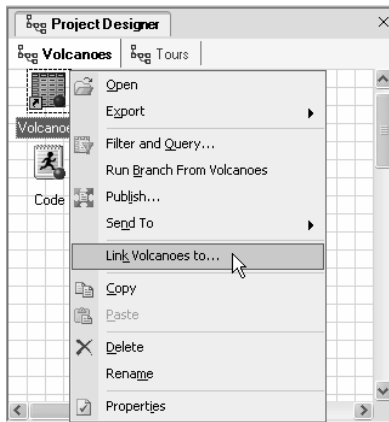
**Moving and copying items** To move items from one process flow to another, hold down the control button, and click the items you want to move. Then right-click, and select **Move to ► process-flow-name** from the pop-up menu. In this example, three items are being moved.

In this example, three items are being moved.

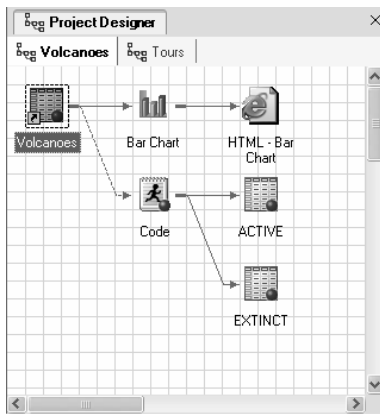
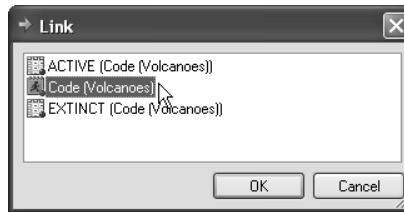




Copying items is similar to moving items except that you cannot copy results. Select the items to be copied using control-click. Then right-click the items and select **Copy** from the pop-up menu, and right-click the target process flow and select **Paste**.

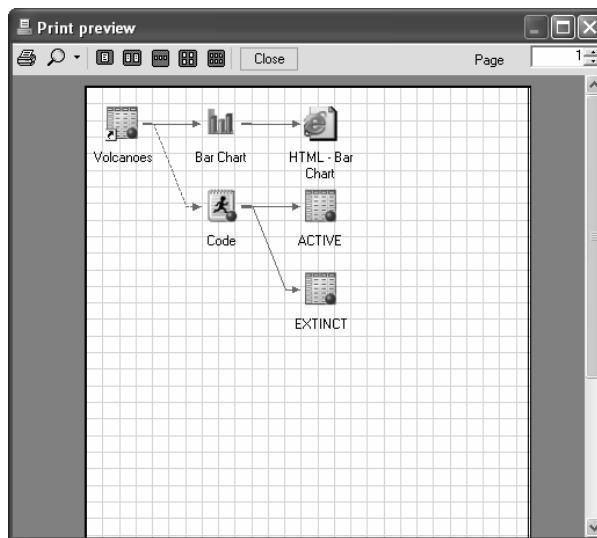


**Linking items** You can add links between items to show relationships that may not be clear, or to force items to run in a particular order. For example, if you create a format that is used by a task, you might want to add a link indicating that the task follows the format. To add a link, right-click the initial item and select **Link item-name to** from the pop-up menu. A Link window will open showing all the other items to which you can link. Select the item to which you want to link, and click **OK**.



In this process flow, the Volcanoes data table has been linked to a code icon to show that this code uses the Volcanoes data table. Notice that links you add use a dashed line instead of a solid line.

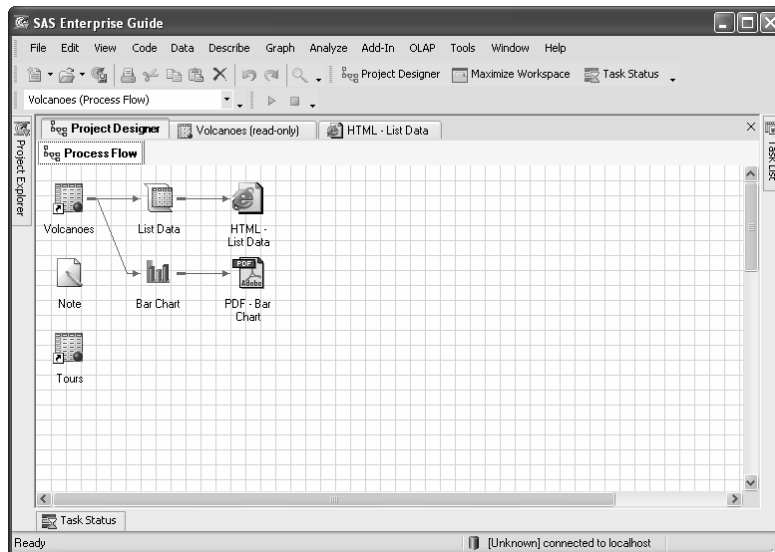
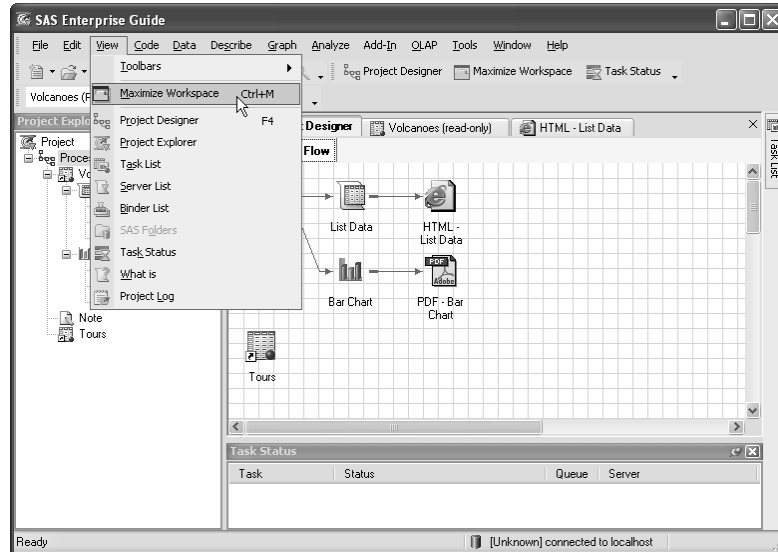
**Printing process flows** You can print a copy of your process flow. To control page size and orientation, right-click the process flow and select **Page setup**. To preview a printout, right-click and select **Print preview**. To print the process flow, right-click and select **Print**. Here is the Print preview window for the Volcanoes process flow.



## 1.4 Maximizing and Splitting the Workspace

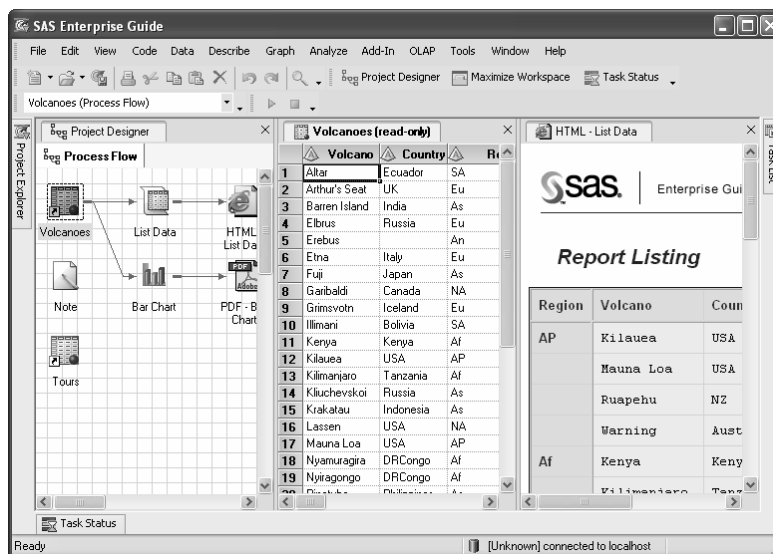
The workspace is where you see the Project Designer and the document windows (data, results, code, logs, and notes). By default, you see these items one at a time, but you can enlarge and divide the workspace so you can see two or more items side by side.

**Maximizing the workspace** To make the workspace as large as possible, select **View ► Maximize Workspace** from the menu bar or click the **Maximize Workspace** button on the toolbar



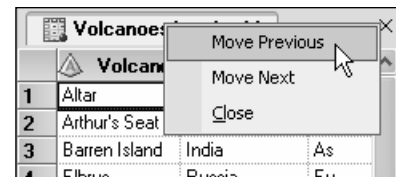
When you maximize the workspace, the Project Explorer and Task Status windows become tabs pinned to the edges of the SAS Enterprise Guide application. You can temporarily expand those windows by moving the cursor over the tab. When you move the cursor away, the window will be reduced to a tab again.

**Splitting the workspace** You can display the Project Designer and document windows side by side or one above the other. First, open all the items you wish to view. Then, in the workspace, right-click the tab for one item and select either **New Horizontal Tab Group** or **New Vertical Tab Group**. This splits the workspace in two. Repeat this until all the documents you wish to see are visible.



This example shows the workspace split into three vertical sections. The first section displays the Project Designer, the second the Volcanoes data set, and the last the result of a List Data task.

**Unsplitting and restoring the workspace** To move documents from one section of the workspace to another, right-click a tab and select **Move Previous** or **Move Next** from the pop-up menu. The item you move will appear on top of the other items in that section. To completely unsplit the workspace simply move the items until they are all in a single section.



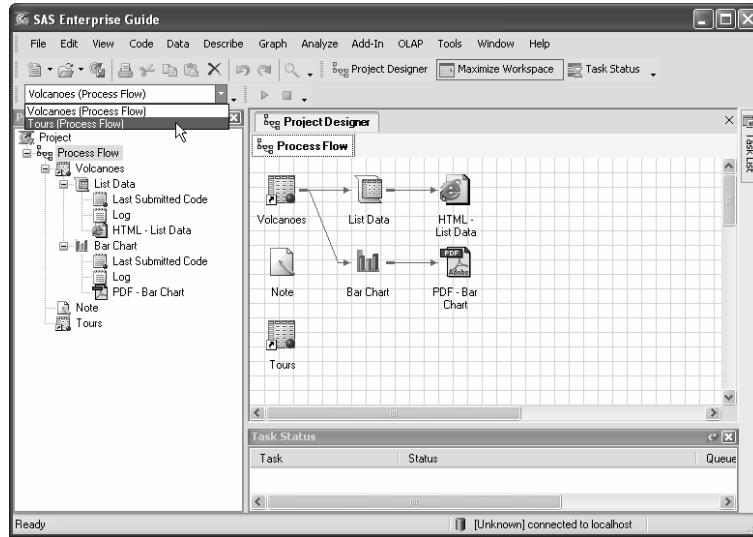
To return the workspace to its normal size, either select **View Maximize ► Workspace** from the menu bar or click the **Maximize Workspace** button on the toolbar. You can unsplit the workspace and restore it to normal size at the same time by selecting **Tools ► Options** from the menu bar and clicking the **Reset Docking Windows** button.

## 1.5 Running and Rerunning Tasks

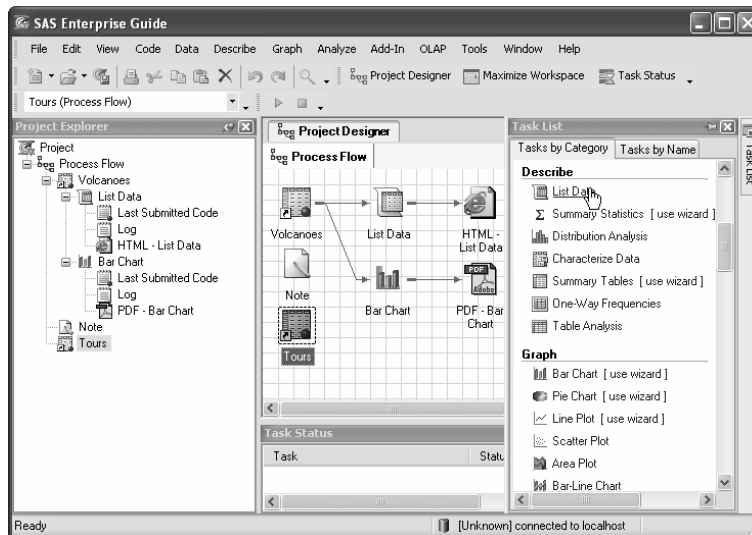
Running tasks is, of course, what SAS Enterprise Guide is all about. Regardless of which task you choose to run, the basic steps are the same: select the data, open the task and select settings, and then run the task.

### Setting the active data table

SAS Enterprise Guide will run a task using the data table that is currently active. The name of the active data table appears in the Active Data box on the left side of the toolbar. To change to one of the other data tables in your project, click the down arrow in the Active Data box and select another data table from the pull-down list, or just click the data table icon in the Project Explorer or Project Designer. This example shows the Tours data table being selected.

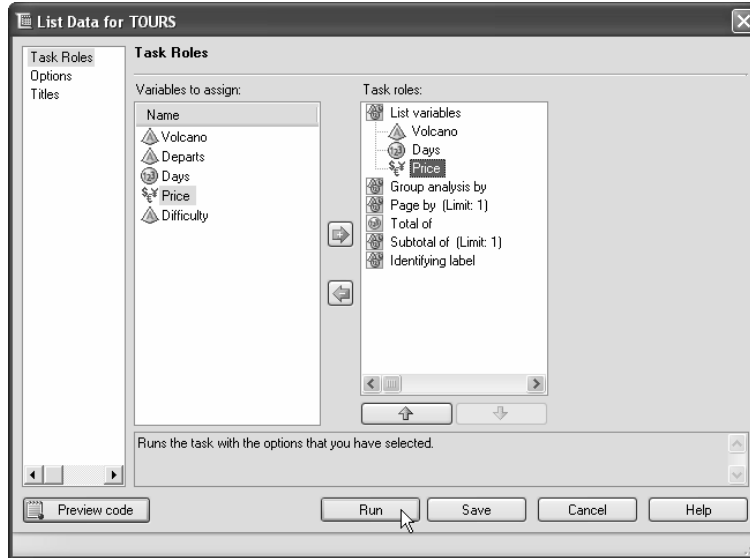


This example shows the Tours data table being selected.




### Opening a task

To open a task, select it using menus or click its name in the Task List window. The window for that task will open. In this case, the List Data task is being selected from the Task List window.



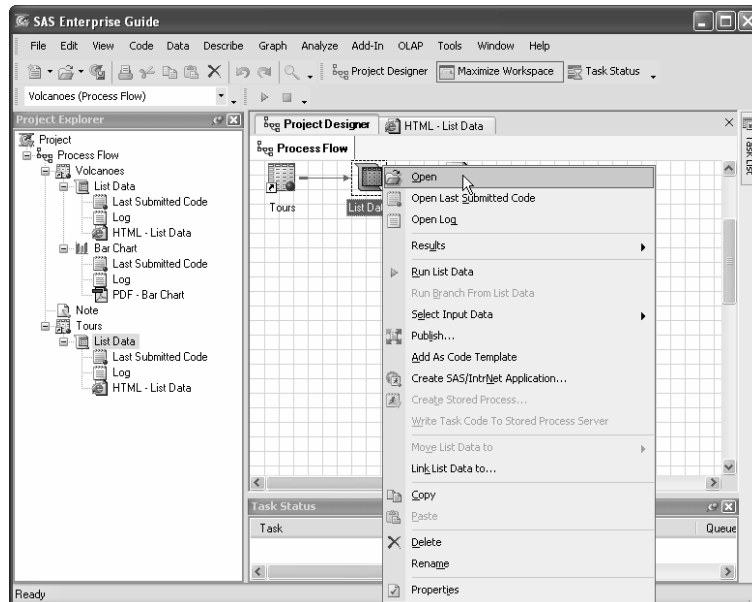
**Running a task** In the task window, you assign variables to task roles and then select options. When you are satisfied with all the settings, click the **Run** button.

If you decide you want to stop a task while it's running, click the **Stop** button  on the bottom line of the toolbar, or select **Code** ► **Stop** from the menu bar.

### Rerunning a task

To make changes to a task and run it again, first reopen the task by right-clicking the task icon in the Project Explorer or Project Designer, and selecting **Open** from the pop-up menu. You can also reopen the task by double-clicking the task icon. Once the task window is open, you can make changes. Then click the **Run** button to rerun the task.

If the data have been updated and you want to rerun a task without making any changes to the task settings, you can right-click the task icon and select **Run task-name** to run just that one task, or select **Run Branch From task-name** to run that task and any items that are downstream in the process flow.








## 1.6 SAS Data Tables

SAS Enterprise Guide can read and write many kinds of data files (see Chapter 2 for more on this topic), but for most purposes, you will want to have your data in a special form called a SAS data table. When you open a SAS data table, it is displayed in the workspace in a Data Grid. The following Data Grid shows the Tours data table. A new tour has been added for Lassen.

Data Table  
(also called a Data Set)

Columns  
(also called Variables)

Rows  
(also called Observations)

	 Volcano	 Departs	 Days	 Price	 Difficulty
1	Etna	Catania	7	\$1,025	m
2	Fuji	Tokyo	2	\$195	c
3	Kenya	Nairobi	6	\$780	m
4	Kilauea	Hilo	1	\$45	e
5	Kilimanjaro	Nairobi	9	\$1,260	c
6	Krakatau	Jakarta	7	\$850	e
7	Lassen	Sacramento	3		
8	Poas	San Jose	1	\$50	e
9	Reventador	Quito	4	\$525	m
10	St. Helens	Portland	2	\$157	e
11	Vesuvius	Rome	6	\$950	e

**Terminology** In SAS Enterprise Guide, rows are also called observations, columns are also called variables, and data tables are also called data sets. SAS Enterprise Guide uses all these terms. Some tasks refer to columns and others to variables, depending on the context.

**Data types and data groups** In SAS Enterprise Guide, there are two basic types of data: numeric and character. Numeric data are divided into four data groups: numeric, currency, time, and date. For each of these, SAS Enterprise Guide has special tools: informats for reading that type of data, functions for manipulating that type of data, and formats for displaying that type of data. SAS Enterprise Guide uses a different icon to identify each kind of data in Data Grids and tasks.



Character data may contain numerals, letters, or special characters (such as \$ or !) and can be up to 32,767 characters long. Character data are represented by a red pyramid with the letter A on it.



Currency data are numeric values for money and are represented by a picture of the dollar, euro, and yen symbols.



Date data are numeric values equal to the number of days since January 1, 1960. The table below lists four dates, and their corresponding SAS date and formatted values:

Date	SAS date value	MMDDYY10. formatted value
January 1, 1959	-365	01/01/1959
January 1, 1960	0	01/01/1960
January 1, 1961	366	01/01/1961
January 1, 2007	17176	01/01/2007

You will rarely see unformatted SAS date values in SAS Enterprise Guide. However, because dates are numeric, you can use them in arithmetic expressions to find, for example, the number of days between two dates. Datetime values are included in this data group, and are the number of seconds since January 1, 1960. Date data are represented by a picture of a calendar.



Time data are numeric values equal to the number of seconds since midnight. Time data are represented by a picture of a clock.



Other numeric data that are not dates, times, or currency are simply called numeric. They may contain numerals, decimal places (.), plus signs (+), minus signs (-), and E for scientific notation. Numeric data are represented by a blue ball with the numbers 1, 2, and 3 on it.

**Numeric versus character** If the values of a column contain letters or special characters, they must be character data. However, if the values contain only numerals, then they may be either numeric or character. You should base your decision on how you will use the data. Sometimes data that consist solely of numerals make more sense as character data than as numeric. Zip codes, for example, are made up of numerals, but it just doesn't make sense to add, subtract, multiply, or divide zip codes. Such numbers work better as character data.

**Column names** Column names in SAS Enterprise Guide may be up to 32 characters in length, and can begin with or contain any character, including blanks.

**Using SAS Enterprise Guide data in Base SAS** Any data created in SAS Enterprise Guide can be used in Base SAS, but the default rules for naming variables are different in Base SAS because Base SAS uses the VALIDVARNAME=V7 system option, while SAS Enterprise Guide uses VALIDVARNAME=ANY. For the sake of compatibility, you may want to follow these rules when naming columns: choose column names that are 32 characters or fewer in length, start with a letter or underscore, and contain only letters, numerals, and underscores.

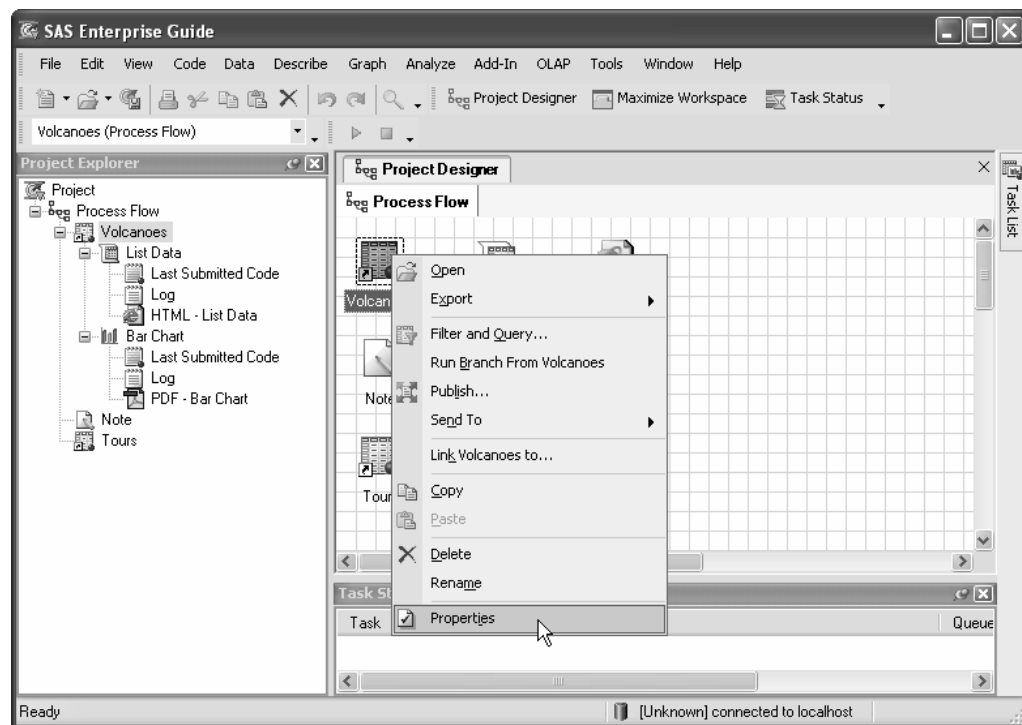
**Missing data** Sometimes despite your best efforts, your data may be incomplete. The value of a particular column may be missing for some rows. In those cases, missing character data are represented by blanks, and missing numeric data are represented by a single period (.). In the preceding Data Grid, the value of Price is missing for the tour of Lassen, and its place is marked by a period. The value of Difficulty is missing for the same tour and is left blank.

**Documentation stored in SAS data tables** In addition to your actual data, SAS data tables contain information about the data table, such as its name, the date that you created it, and the version of SAS you used to create it. SAS also stores information about each column in the data table, including its name, type, and length. This information is sometimes called the descriptor portion of the data table, and it makes SAS data tables self-documenting. This information is what you see in the Properties windows for data tables and columns, which are described in more detail in the next two sections.

## 1.7 Properties of Data Tables

Someday you might be given a SAS Enterprise Guide project that was created by someone else. If you want to figure out what it does, the first thing you would probably do is read any notes. The next thing you would probably do is check the properties of the data tables.

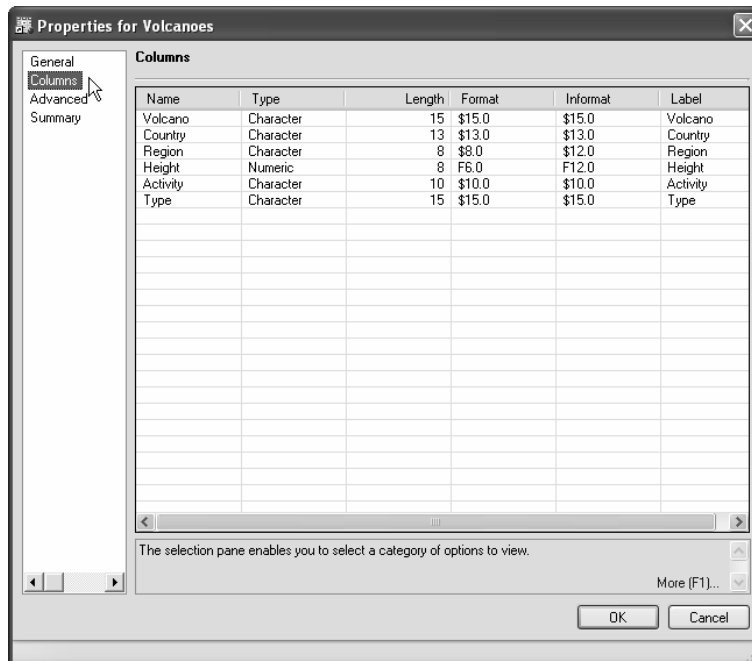
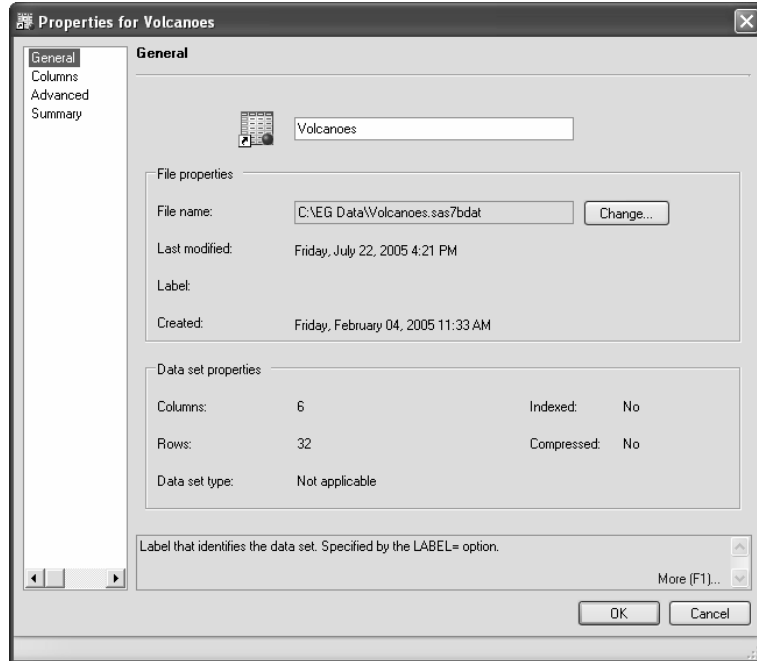
**Opening the Properties window** You can display information about a data table by right-clicking its icon in the Project Explorer or Project Designer and selecting **Properties** from the pop-up menu. In the following window, Properties is being selected for the Volcanoes data table.





## General page

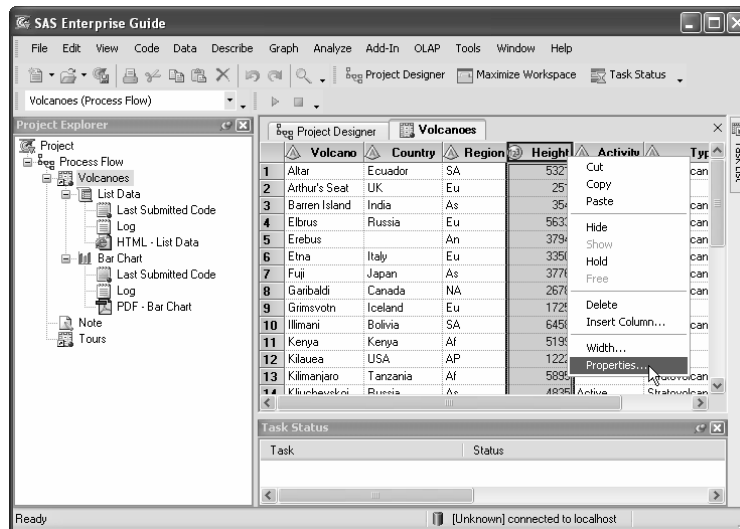
When the table Properties window opens, it displays the General page. The General page lists basic information about the table: its name, when it was created and last modified, the number of rows and columns, and whether it is indexed or compressed.



**Columns page** If you click **Columns** in the selection pane on the left, the Columns page will open. Here, SAS Enterprise Guide displays information about each column: its name, type, length, format, informat, and label. You cannot change the properties of columns in the Properties window for a data table. To make changes, use the Properties window for an individual column as described in the next section.

## 1.8 Properties of Columns

The column Properties window displays properties for an individual column. If you open the column Properties window from a Data Grid, you can make changes to those properties.

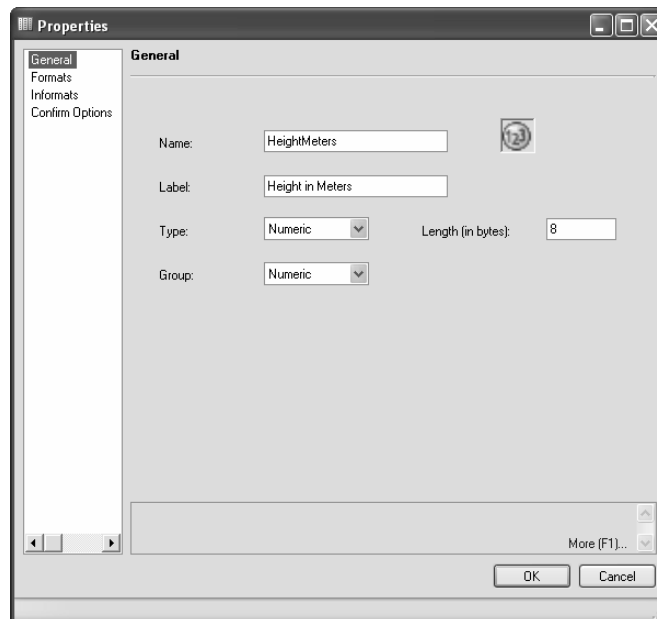


**Setting the update mode** If the words **read-only** appear after the name of the data table at the top of the Data Grid, then the table is in read-only mode and you will not be able to make changes. To switch to update mode, select **Data ► Read-only** from the menu bar. This toggles the data table from read-only to update mode.

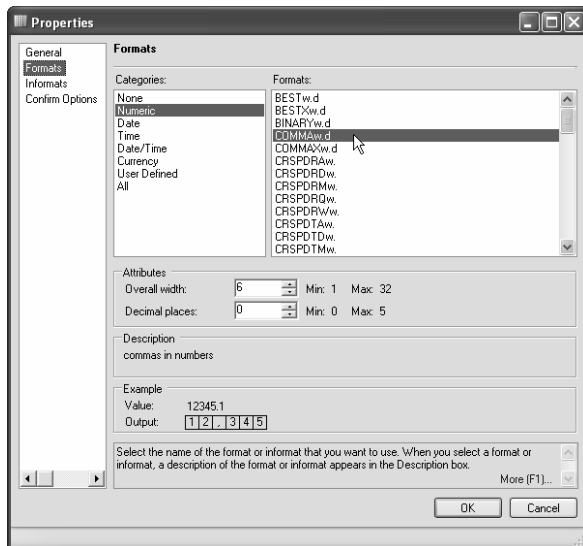
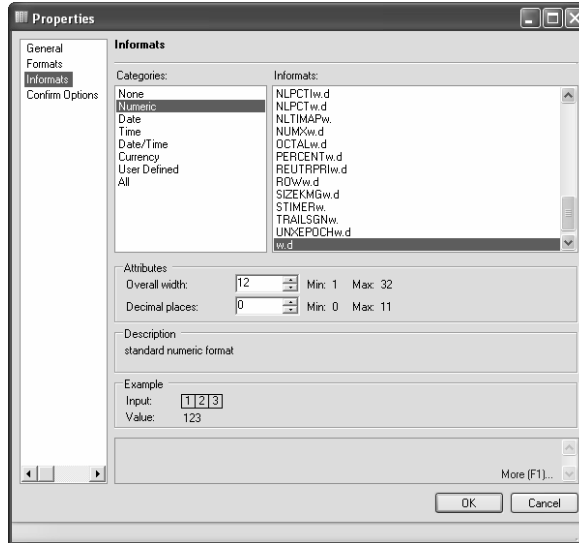
**Opening the Properties window** To open the column Properties window, right-click the header of a column and select **Properties** from the pop-up menu. In the preceding Data Grid, Properties is being selected for the column Height.

**General page** The Properties window has several pages. If there is no selection pane on the left, then the data table is in read-only mode and you need to switch to update mode.

The General page displays basic information for the column: its name, label, type, group, and length. You can change any of these properties. In this example, the column name has been changed to **HeightMeters**, and the label to **Height in Meters**. This column is **numeric** and has a length of **8**.



**Informats page** Click **Informats** in the selection pane on the left to open the Informats page. Informats (also called input formats or read-in formats) tell SAS Enterprise Guide how to interpret input data. If you edit the data table, SAS Enterprise Guide will use informats to interpret any values you type. There are different informats for character, numeric, date, time, and currency data. In this example, the column uses the default numeric informat, *w.d*, with a width of 12 and no decimal places. This informat can be written as 12.0. See the next section for a table of commonly used informats.



**Formats page** Click **Formats** in the selection pane on the left to open the Formats page. Formats (also called display formats) tell SAS Enterprise Guide how data should look in Data Grids or reports. There are different formats for character, numeric, date, time, and currency data. In this example, the format **COMMAw.d** with a width of 6 and no decimal places has been selected. This format can be written as **COMMA6.0**. See section 1.10 for a table of commonly used formats.

	Volcano	Country	Region	HeightMeters	Activity	Type
1	Altar	Ecuador	SA	5,321	Extinct	Stratovolcano
2	Arthur's Seat	UK	Eu	251	Extinct	
3	Barren Island	India	As	354	Active	Stratovolcano
4	Elbrus	Russia	Eu	5,633	Extinct	Stratovolcano
5	Frebuz		An	3,794	Active	Stratovolcano

**Results** Here is the Data Grid showing the new name, HeightMeters, and format with commas.

## 1.9 Selected Informats

SAS informats (also called input formats or read-in formats) tell SAS Enterprise Guide how to interpret input data. You can specify informats in the column Properties window of a Data Grid, or in the Column Options page when reading data. Here are a few of the many informats available in SAS Enterprise Guide.

Informat	Definition	Width range	Default width
<b>Character</b>			
$\$w.$	Reads character data—trims leading blanks	1–32,767	none
$\$UPCASEw.$	Converts character data to uppercase	1–32,767	8
<b>Date, Time, and Datetime<sup>1</sup></b>			
ANYDTDTE $w.$	Reads dates in any form—when dates are ambiguous, uses the DATESTYLE system option to determine	5–32	9
DATE $w.$	Reads dates in the form: <i>ddmonyy</i> or <i>ddmonyyyy</i>	7–32	7
DATETIME $w.$	Reads datetime values in the form: <i>ddmonyy hh:mm:ss.ss</i>	13–40	18
DDMMYY $w.$	Reads dates in the form: <i>ddmmyy</i> or <i>ddmmyyyy</i>	6–32	6
JULIAN $w.$	Reads Julian dates in the form: <i>yyddd</i> or <i>yyyyddd</i>	5–32	5
MMDDYY $w.$	Reads dates in the form: <i>mmdyy</i> or <i>mmdyyyy</i>	6–32	6
TIME $w.$	Reads time in the form: <i>hh:mm:ss.ss</i> (hours:minutes:seconds—24-hour clock)	5–32	8
<b>Numeric</b>			
$w.d$	Reads standard numeric data	1–32	none
COMMA $w.d$	Removes embedded commas and \$, converts left parentheses to minus sign	1–32	1
PERCENT $w.$	Converts percentages to numbers	1–32	6

<sup>1</sup> SAS date values are the number of days since January 1, 1960. Time values are the number of seconds past midnight, and datetime values are the number of seconds past midnight on January 1, 1960.

The examples below show input data and resulting data values for each informat. The results shown are unformatted data values. See sections 3.1 and 3.2 for more information about assigning display formats.

Informat	Input data	Results	Input data	Results
<b>Character</b>				
\$10.	Lassen	Lassen	St. Helens	St. Helens
\$UPCASE10.	Lassen	LASSEN	St. Helens	ST. HELENS
<b>Date, Time, and Datetime</b>				
ANYDTDTE10.	01jan1961	366	31.01.1961	396
	1961001	366	01/31/61	396
DATE9.	1jan1961	366	31 jan 61	396
DATETIME14.	1jan1960 10:30	37800	1jan1961 10:30	31660200
DDMMYY10.	01.01.1961	366	31/01/61	396
JULIAN7.	1961001	366	61031	396
MMDDYY10.	01-01-1961	366	01/31/61	396
TIME8.	10:30	37800	10:30:15	37815
<b>Numeric</b>				
5.1	1234	123.4	-12.3	-12.3
COMMA10.0	\$1,000,001	1000001	(1,234)	-1234
PERCENT5.	5%	0.05	(20%)	-0.2

## 1.10 Selected Standard Formats

SAS formats (also called display formats) tell SAS Enterprise Guide how to display or print data. You can apply formats in the column Properties window of a Data Grid, in the Properties window within a task, or in a query. Here are a few of the many formats available in SAS Enterprise Guide.

Format	Definition	Width range	Default width
<b>Character</b>			
\$UPCASE <i>w.</i>	Converts character data to uppercase	1–32767	Length of variable or 8
\$ <i>w.</i>	Writes standard character data—default for character data	1–32767	Length of variable or 1
<b>Date, Time, and Datetime<sup>1</sup></b>			
DATE <i>w.</i>	Writes SAS date values in form <i>ddmmonyy</i> or <i>ddmmonyyyy</i>	5–9	7
DATETIME <i>w.d</i>	Writes SAS datetime values in form <i>ddmmmyy:hh:mm:ss.ss</i>	7–40	16
DTDATE <i>w.</i>	Writes SAS datetime values in form <i>ddmmonyy</i> or <i>ddmmonyyyy</i>	5–9	7
EURDFDD <i>w.</i>	Writes SAS date values in form <i>dd.mm.yy</i> or <i>dd.mm.yyyy</i>	2–10	8
JULIAN <i>w.</i>	Writes SAS date values in Julian date form <i>yyddd</i> or <i>yyyyddd</i>	5–7	5
MMDDYY <i>w.</i>	Writes SAS date values in form <i>mm/dd/yy</i> or <i>mm/dd/yyyy</i> —default for dates	2–10	8
TIME <i>w.d</i>	Writes SAS time values in form <i>hh:mm:ss.ss</i> —default for times	2–20	8
WEEKDATE <i>w.</i>	Writes SAS date values in form <i>day-of-week, month-name dd, yy</i> or <i>yyyy</i>	3–37	29
WORDDATE <i>w.</i>	Writes SAS date values in form <i>month-name dd, yyyy</i>	3–32	18
<b>Numeric</b>			
BEST <i>w.</i>	SAS System chooses best format—default format for numeric data	1–32	12
COMMA <i>w.d</i>	Writes numbers with commas	2–32	6
DOLLAR <i>w.d</i>	Writes numbers with a leading \$ and commas separating every three digits—default for currency	2–32	6
E <i>w.</i>	Writes numbers in scientific notation	7–32	12
EUROX <i>w.d</i>	Writes numbers with a leading € and periods separating every three digits	2–32	6
PERCENT <i>w.d</i>	Writes numeric data as percentages	4–32	6
<i>w.d</i>	Writes standard numeric data	1–32	none

<sup>1</sup>SAS date values are the number of days since January 1, 1960. Time values are the number of seconds past midnight, and datetime values are the number of seconds past midnight on January 1, 1960.

The examples below show unformatted data values and formatted results for each display format.

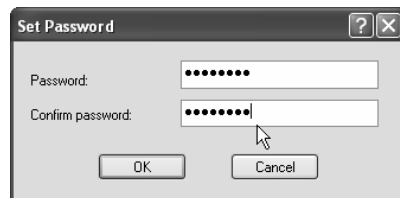
Format	Data value	Results	Data value	Results
<b>Character</b>				
\$UPCASE10.	Lassen	LASSEN	St. Helens	ST. HELENS
\$10.	Lassen	Lassen	St. Helens	St. Helens
<b>Date, Time, and Datetime</b>				
DATE9.	366	01JAN1961	396	31JAN1961
DATETIME16.	37800	01JAN60:10:30	2629800	31JAN60:10:30
DTDATE9.	37800	01JAN1960	2629800	31JAN1960
EURDFDD10.	366	01.01.1961	396	31.01.1961
JULIAN7.	366	1961001	396	1961031
MMDDYY10.	366	01/01/1961	396	01/31/1961
TIME8.	37800	10:30:00	37815	10:30:15
WEEKDATE15.	366	Sun, Jan 1, 61	396	Tue, Jan 31, 61
WORDDATE12.	366	Jan 1, 1961	396	Jan 31, 1961
<b>Numeric</b>				
BEST10.	1000001	1000001	-12.34	-12.34
BEST6.	1000001	1E6	100001	100001
COMMA12.2	1000001	1,000,001.00	-12.34	-12.34
DOLLAR13.2	1000001	\$1,000,001.00	-12.34	\$-12.34
E10.	1000001	1.000E+06	-12.34	-1.234E+01
EUROX13.2	1000001	€1.000.001,00	-12.34	€-12,34
PERCENT9.2	0.05	5.00%	-1.20	(120.00%)
10.2	1000001	1000001.00	-12.34	-12.34

## 1.11 Scheduling Projects to Run at Specific Times

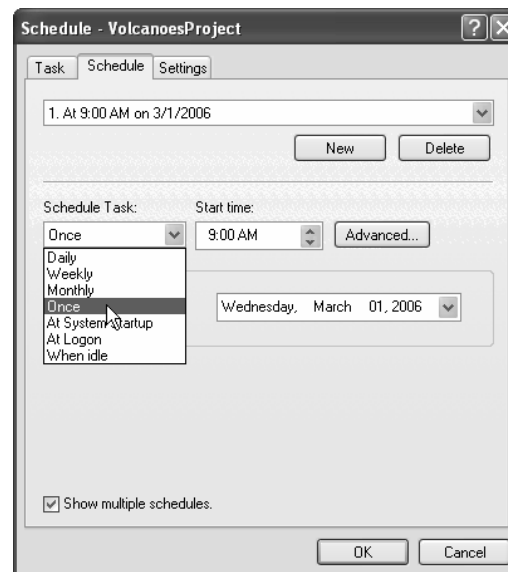
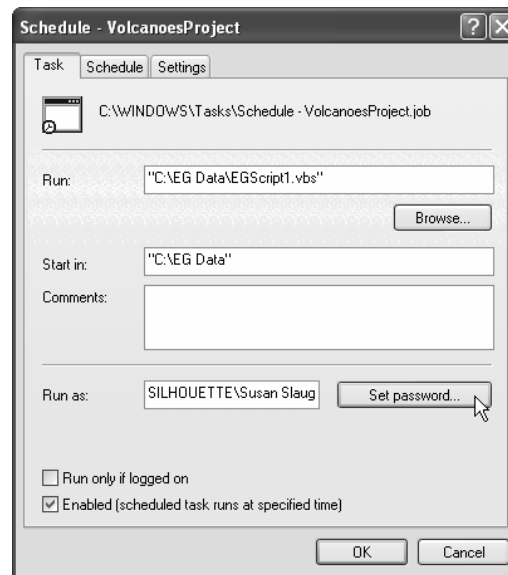
Sometimes you may want to create a project now, but run it later. For example, if you have data that are updated on a regular basis, you might want to automatically rerun the project once a week using the new data. Or, if your data files are very large, you might want to run your projects at night so that SAS Enterprise Guide is not using valuable resources during work hours.

**Scheduling a project** To schedule a project, select **Tools ► Schedule Project** from the menu bar. This opens the Schedule window with the Task page displayed. When you schedule a project, SAS Enterprise Guide creates a script that is saved in a file on your computer. The name and path of this script is displayed in the **Run** box. The **Start in** box displays the folder in which the script will run. Your computer and user name are displayed in the **Run as** box.

If you will not be logged on at the time the project runs, then make sure the box next to **Run only if logged on** is unchecked, and click the **Set password** button to open the Set Password window. Enter the password for your user name (the same password you use when you log on to your computer), and click **OK**.



**Setting the run frequency** To tell SAS Enterprise Guide when to run the project, click the **Schedule** tab of the Schedule window. Click the **New** button. Then select the frequency to run the project from the drop-down list under **Schedule Task**. You can schedule your project to run just once at a specified time as shown here, or you can schedule your project to run on a regular basis.

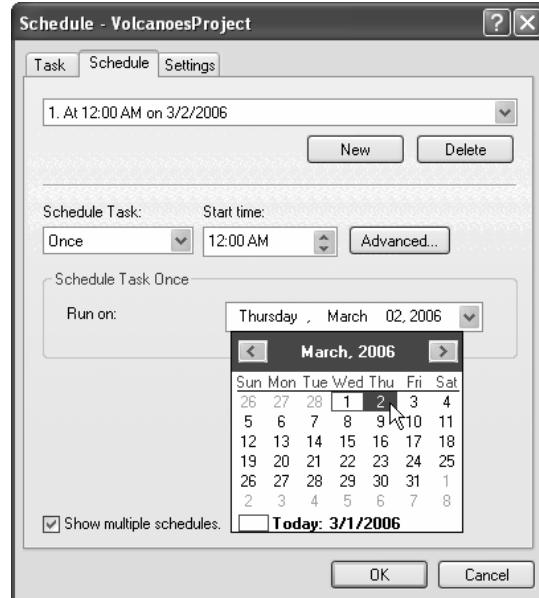




**Setting the date and time** To set the time the project will start running, click the up and down arrows on the **Start time** box, or simply click the time and type a new value. To choose a date other than today, click the down arrow in the **Run on** box and select a date from the pop-up calendar.

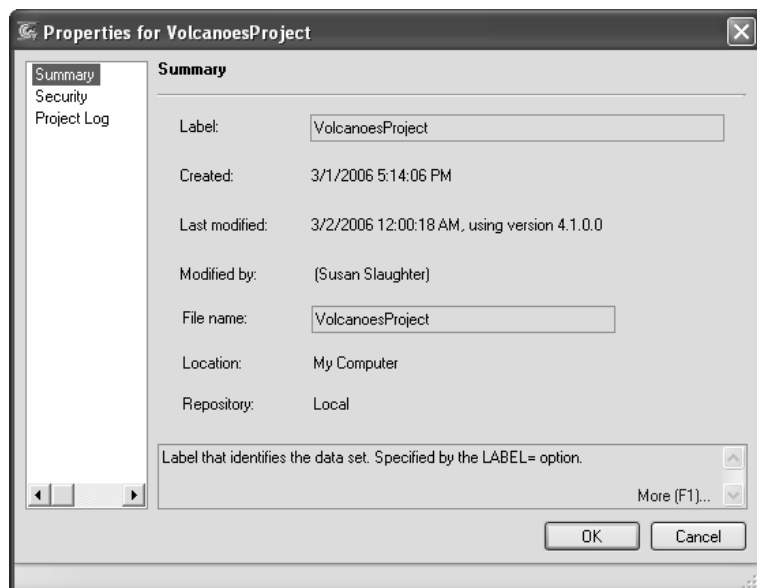
**Other settings** If you click the **Settings** tab, you will see other options, including the maximum length of time a project will be allowed to run and whether it will run if your computer has gone into sleep mode.

When you are satisfied with all the settings, click **OK** to schedule the project.



**Running the project** The project will not run if it is open or if the computer is turned off at the time the project is scheduled to run. However, if you have a different project open, the scheduled project will still run.

**Viewing the results** To see the results of your scheduled run, open the project after it has completed running. If you are not sure whether a project ran, you can confirm this by opening the Properties window for that project. To open the Properties window for a project, select **File ► Properties** from the menu bar. The **Last modified** field shows the date and time that the project last ran.

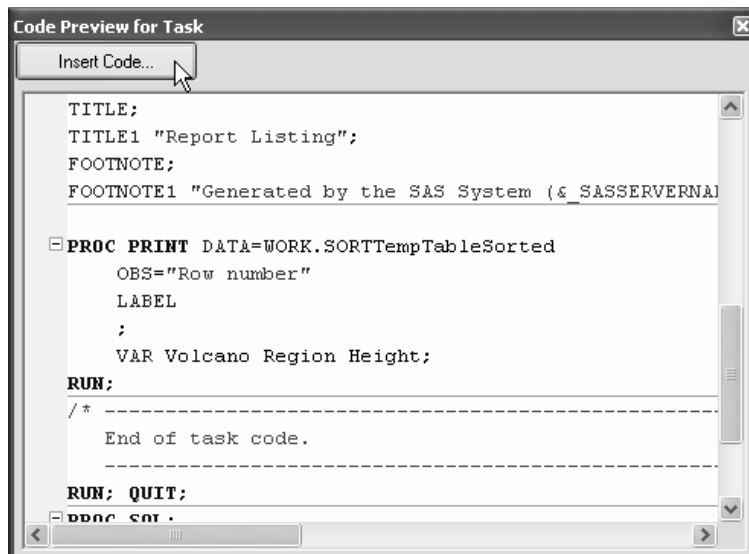
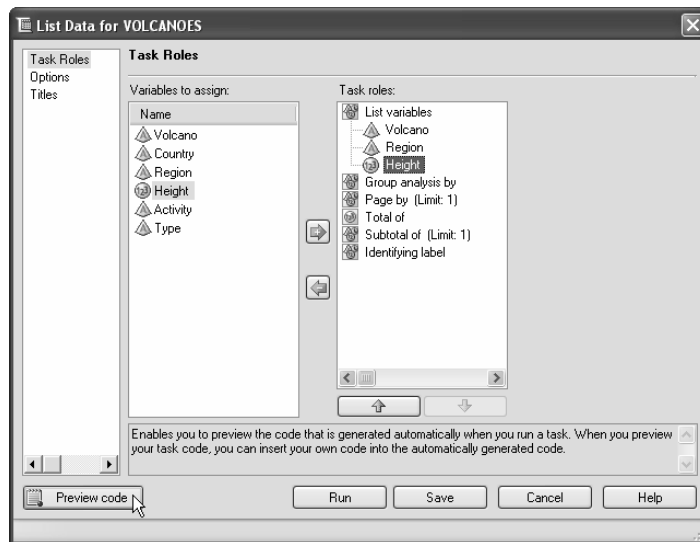


## 1.12 Viewing and Editing SAS Code Generated by a Task

If you are a SAS programmer, you'll probably want to see the SAS code generated by SAS Enterprise Guide. Sometimes, you may also want to edit the SAS code generated by SAS Enterprise Guide. There is more than one way to do this. You can insert your own custom code into the SAS program written by a task, or you can save the code generated by a task in a separate file which allows you to edit any part of the program.

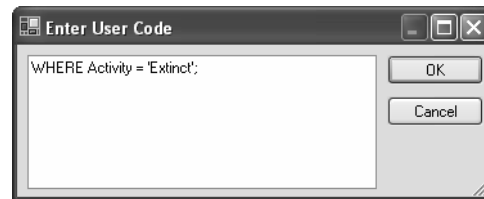
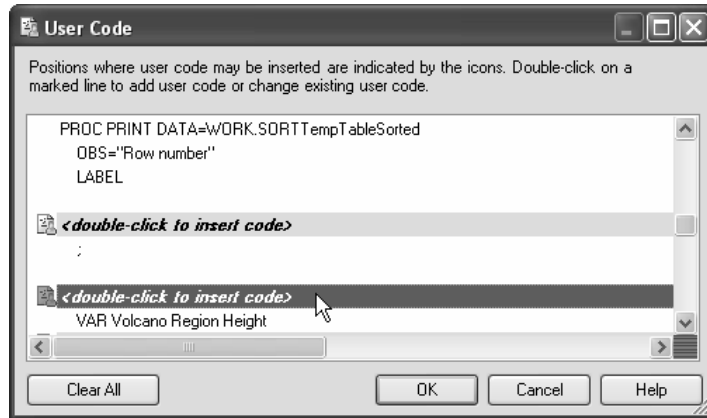
### Viewing code generated by a task

Many task windows have a **Preview code** button in the lower-left corner. If you click this button, SAS Enterprise Guide will open a Code Preview window displaying the code that SAS Enterprise Guide has written for that task.



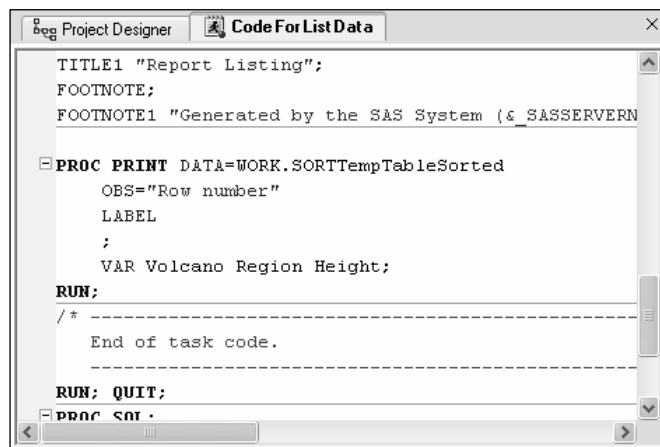
**Inserting code in a task** Here is a Code Preview window for a List Data task. You can see that it uses PROC PRINT. If you want to add code to the task, click the **Insert Code** button. This opens a User Code window.

You cannot edit the existing code generated by a task, but the User Code window allows you to add code at specific points in the program. In the User Code window, double-click **<double-click to insert code>** at the point where you wish to add your own custom code. An Enter User Code window will open. Type the custom code you wish to add. When you are done, click **OK**. Your new code will appear in the User Code window. Click **OK** in the User Code window. When you run the task, SAS Enterprise Guide will run the code you inserted, in addition to the code generated by the task.



**Editing code generated by a task** If you want to be able to edit the entire program generated by a task, or code from tasks that do not have a Preview code button, you can make a copy of the generated code, and then edit it. To do this, run the task, and then right-click the task icon in the Project Explorer or Project Designer, and select **Add As Code Template**. SAS Enterprise Guide will open a code window in the workspace containing the code generated by the task.

You can edit this code in any way you wish. Because this code is a copy of the code generated by the task, any changes you make here will not affect the task, nor will any changes you make to the task be reflected in this code. When you have made all the changes you wish to the code and are ready to run it, select **Code ► Run program-name On server-name** from the menu bar. To choose a different server, select **Code ► Select Server**.



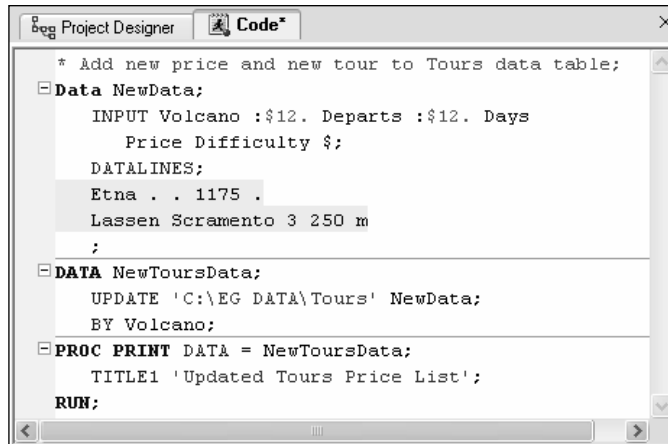
Code created in this way is embedded in your project, and is not saved as a separate file. For more information on embedding code, see the next section.

## 1.13 Writing and Running Custom SAS Code

You can accomplish a lot using tasks in SAS Enterprise Guide, but sometimes you may need to do something for which there is no predefined task. At those times, you can open a SAS program that was written outside SAS Enterprise Guide or you can write a new one.

### Writing a new SAS

**program** To create a new SAS program, open a new Code window by selecting **File ► New ► Code** from the menu bar. An empty Code window will open in the workspace. The code editor in SAS Enterprise Guide is syntax-sensitive, which means that SAS keywords are displayed in blue, comments are green, quoted strings are pink, and so forth.

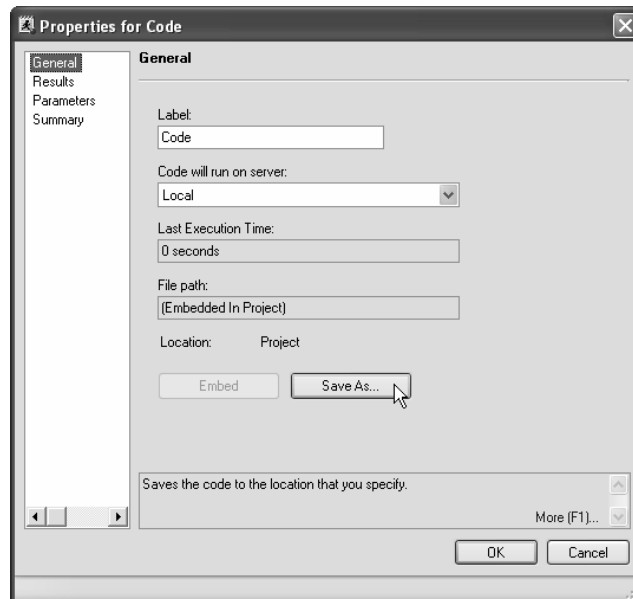


```
* Add new price and new tour to Tours data table;
DATA NewData;
  INPUT Volcano :$12. Departs :$12. Days
        Price Difficulty $;
  DATALINES;
  Etna . . 1175 .
  Lassen Sacramento 3 250 m
  ;
DATA NewToursData;
  UPDATE 'C:\EG DATA\Tours' NewData;
  BY Volcano;
PROC PRINT DATA = NewToursData;
  TITLE1 'Updated Tours Price List';
RUN;
```

### Opening an existing

**SAS program** If you have existing SAS programs that you want to include in your project, you can open them by selecting **File ► Open ► Code** from the menu bar. Navigate to the existing SAS program and click **Open**. This opens a Code window in the workspace, where you can edit the program.

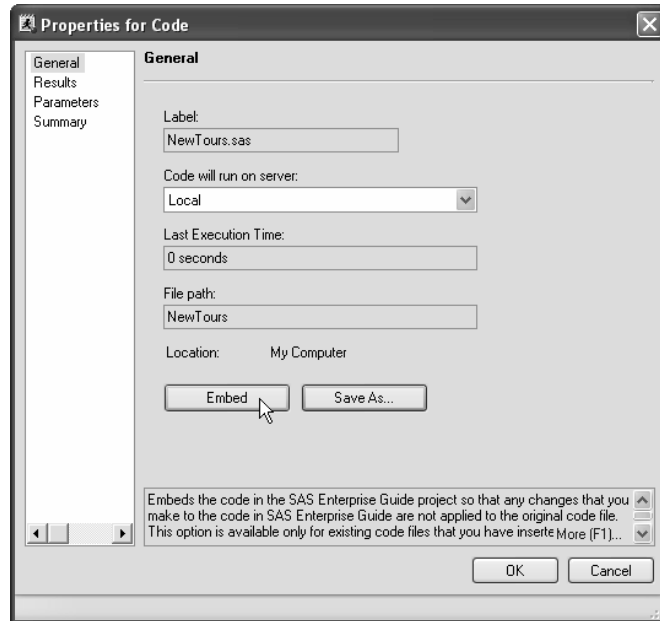
**Saving code in a file** Any new programs you write are automatically embedded in your project. This means that the program's code does not exist in a file outside the project. To save the SAS code outside the project, right-click the code icon in the Project Explorer or Project Designer and select **Save Code As** from the pop-up menu. You can also save code from the Properties window. To view the properties of code, right-click the code icon in the Project Explorer or Project Designer and select **Properties** from the pop-up menu. Then in the General page, click **Save As**. If you save the code in a file, then the program is not embedded, and any changes you make to the code in SAS Enterprise Guide will be saved in the file rather than as part of your project.



The icon for code saved in a file includes a little arrow indicating that the project contains a shortcut to the code rather than the actual code.



**Embedding code in a project** When you open a SAS program that has been saved in a separate file, it is not automatically embedded in your project. If you want to embed the program in your project, then open the Properties window for the code and click the **Embed** button. After you embed the code, any changes you make to the code in SAS Enterprise Guide will be saved as part of your project rather than in the file. The icon for embedded code looks like this.



**Running your code and viewing the SAS log** When you are ready to run your code, select **Code ► Run program-name On server-name**. To choose a different server use **Code ► Select Server**. When you run code in SAS Enterprise Guide, if there is an error, the default action is to open a SAS log window in the workspace. If there are no errors, then the SAS log will not open automatically. To open the SAS log, double-click the icon for the log in the Project Explorer. Here is a portion of the SAS log generated by the SAS program at the beginning of this section.

```

Project Designer  Log [Code (Process Flow)]
22      DATA NewToursData;
23          UPDATE 'C:\EG DATA\Tours' NewData;
24          BY Volcano;

NOTE: There were 10 observations read from the data set C:\EG DATA\Tours.
NOTE: There were 2 observations read from the data set WORK.NEWDATA.
NOTE: The data set WORK.NEWTOURSDATA has 11 observations and 5 variables.
NOTE: DATA statement used (Total process time):
       real time           0.01 seconds
       cpu time            0.01 seconds

25      PROC PRINT DATA = NewToursData;

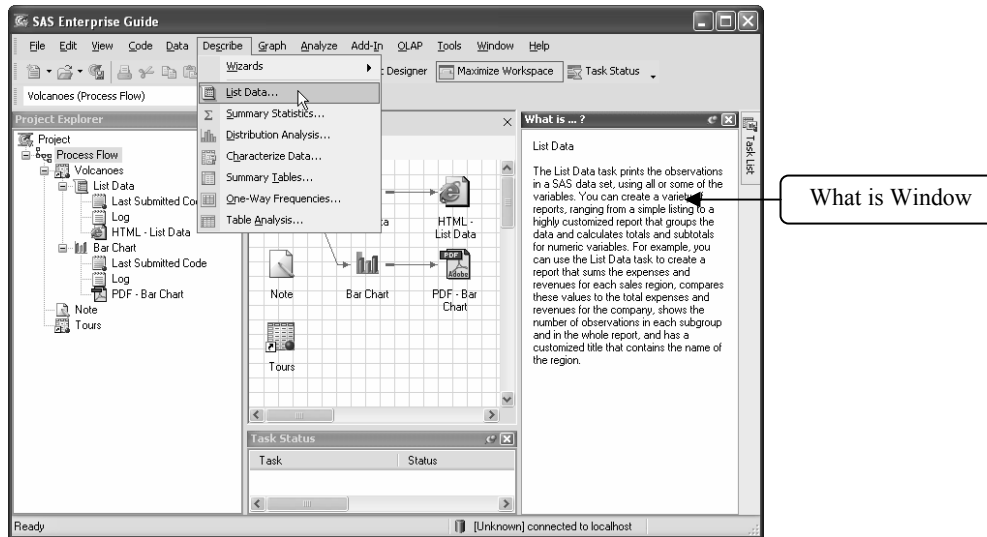
26          TITLE1 'Updated Tours Price List';
27      RUN;

```

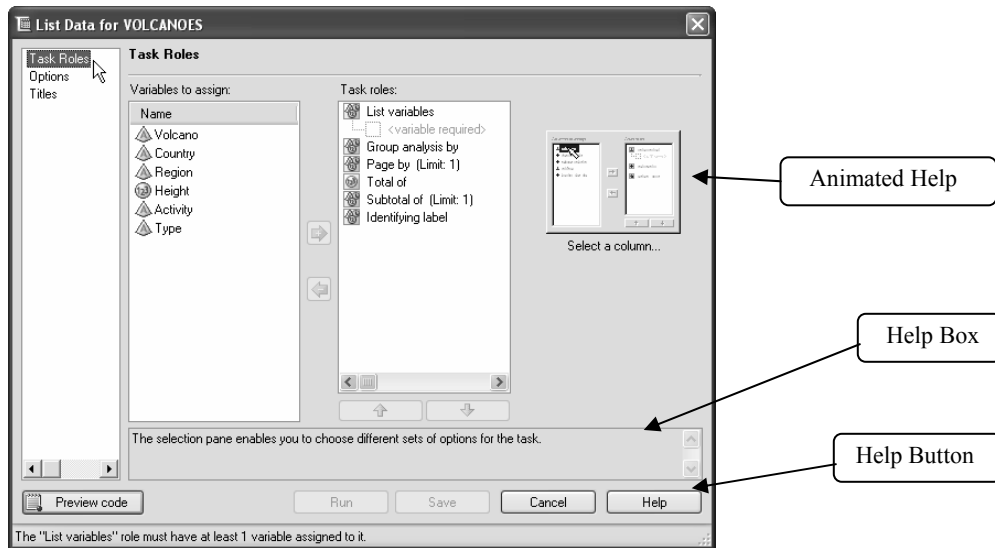
## 1.14 Using SAS Enterprise Guide Help

In SAS Enterprise Guide, help is never far away. You can find help via the Help menu, of course, but you can also find help inside many windows.

**What is window** To open the What is window, select **View ► What is** from the menu bar. Then point the cursor at a menu item or tool, and the What is window will describe that menu item or tool.



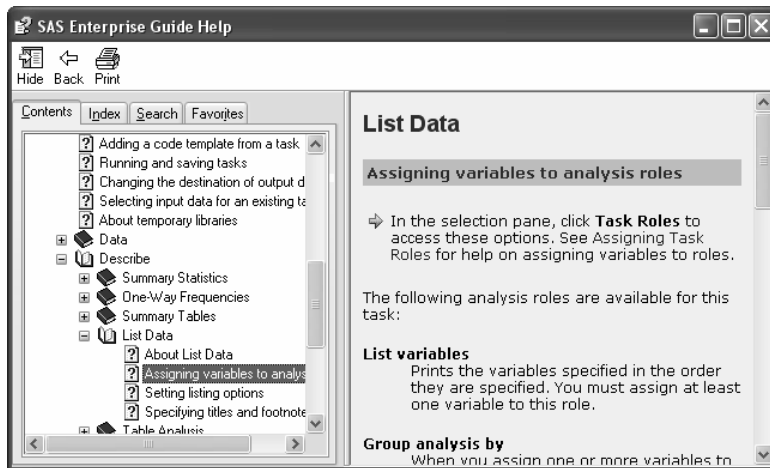
**Context-sensitive help** The List Data window provides a good example of the context-sensitive help provided inside task windows.



There are three main types of context-sensitive help:

- Animated help demonstrates how to assign variables to task roles.
- The Help box near the bottom of the window displays textual help. As you move your cursor around the window, the text automatically changes to describe what the cursor is pointing to.
- The Help button in the right corner gives you more extensive help. When you click it, the SAS Enterprise Guide Help window opens.

**SAS Enterprise Guide Help** If you click the **Help** button in a task window, SAS Enterprise Guide will open the Help window and display information about the current task. You can also open the Help window by selecting **Help ► SAS Enterprise Guide Help** from the menu bar, but then it's up to you to find the right section of help for your needs.



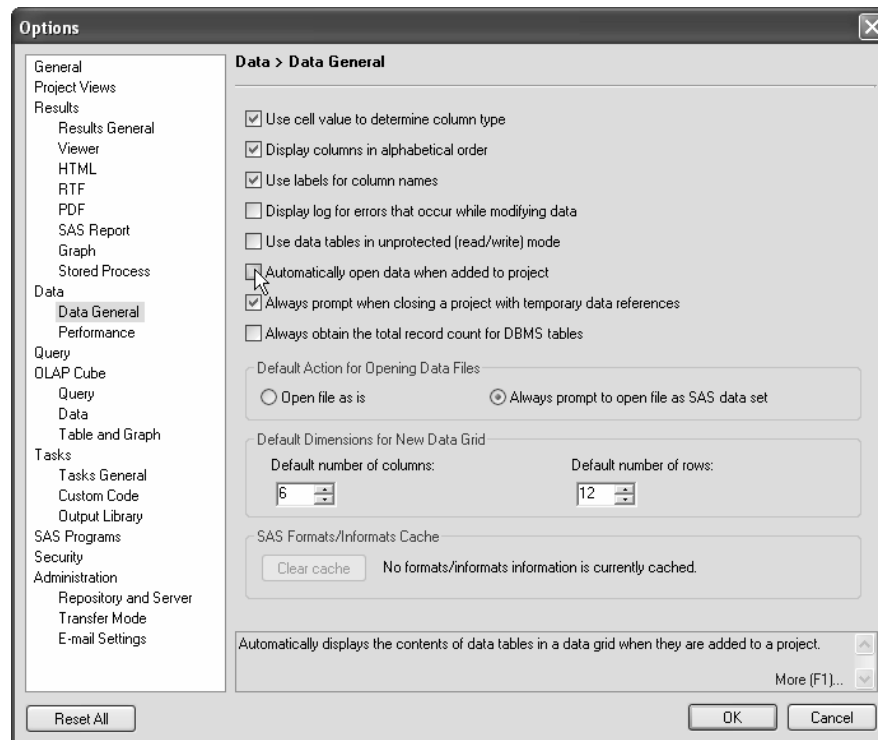
The Help window has two main panes: the Navigation pane on the left, and the Topic pane on the right. In the Navigation pane, you can choose from four tabs.

- The Contents tab shows an expandable table of contents for the SAS Enterprise Guide documentation.
- The Index tab allows you to browse the index for both SAS Enterprise Guide and SAS syntax help. If you type a keyword or part of a keyword, you will jump to that part of the index.
- The Search tab finds every occurrence of the words you type, in both the SAS Enterprise Guide and SAS syntax help.
- The Favorites tab allows you to make a list of your favorite help topics so that you can find them more easily in the future.

## 1.15 Using the Options Window

The Options window allows you to change many default behaviors in SAS Enterprise Guide. To open the Options window, select **Tools ► Options** from the menu bar.

**Data General options** To open the Data > Data General page, click **Data General** in the selection pane on the left.



If you have large data tables, columns might be easier to find if they are arranged in alphabetical order. To list columns alphabetically in task windows, check the box in front of **Display columns in alphabetical order**.

By default, the Data Grid uses column names, not labels, for column headers. To change this, check the box in front of **Use labels for column names**.

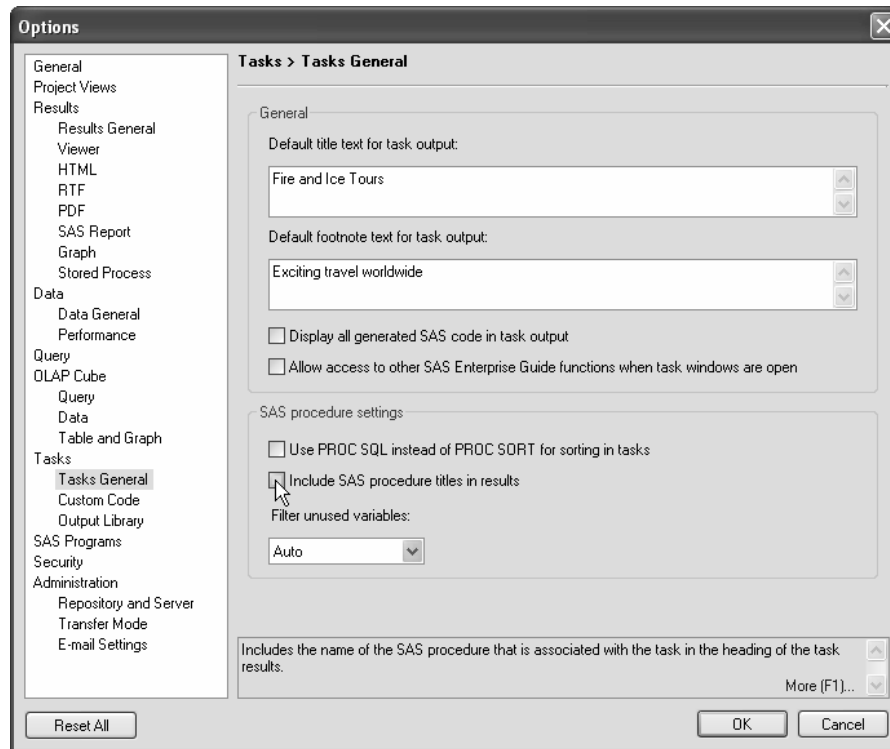
If you have large data tables on remote servers, you may be able to improve performance by unchecking **Automatically open data when added to project**.

**Tasks General options** To open the Tasks > Tasks General page, click **Tasks General** in the selection pane on the left.

At the top of this page, you can type a new default title and footnote, or set them to blank.



Near the bottom of the page is another useful option. Some tasks in SAS Enterprise Guide include in the results the name of the SAS procedure used by that task. In these results, you will see titles like “The FREQ Procedure,” or “The ANOVA Procedure.” You can eliminate these titles by unchecking the box for **Include SAS procedure titles in results**.



**Restoring the default windows** To restore windows to their default layout, click **General** in the selection pane on the left. Then click the **Reset Docking Windows** button.

**Changing the default output type or style** To change the default output type, click **Results General** in the selection pane on the left, and check the type of output you want. To change the default output style, click **HTML**, **RTF**, **PDF**, or **SAS Report** in the selection pane on the left. Then select the output style you want. See Tutorial C or section 10.2 for more information about changing output styles. Section 4.13 discusses changing the output type for queries, and section 9.6 discusses changing the output type for graphs.

**Saving and resetting options** Click **OK** to close the Options window and save the changes you have made. Once you set options, they stay in effect for future SAS Enterprise Guide sessions. If at a later time, you decide you want to restore everything in the Options window to the default settings, simply click the **Reset All** button in the lower left corner.

