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CHAPTER 1

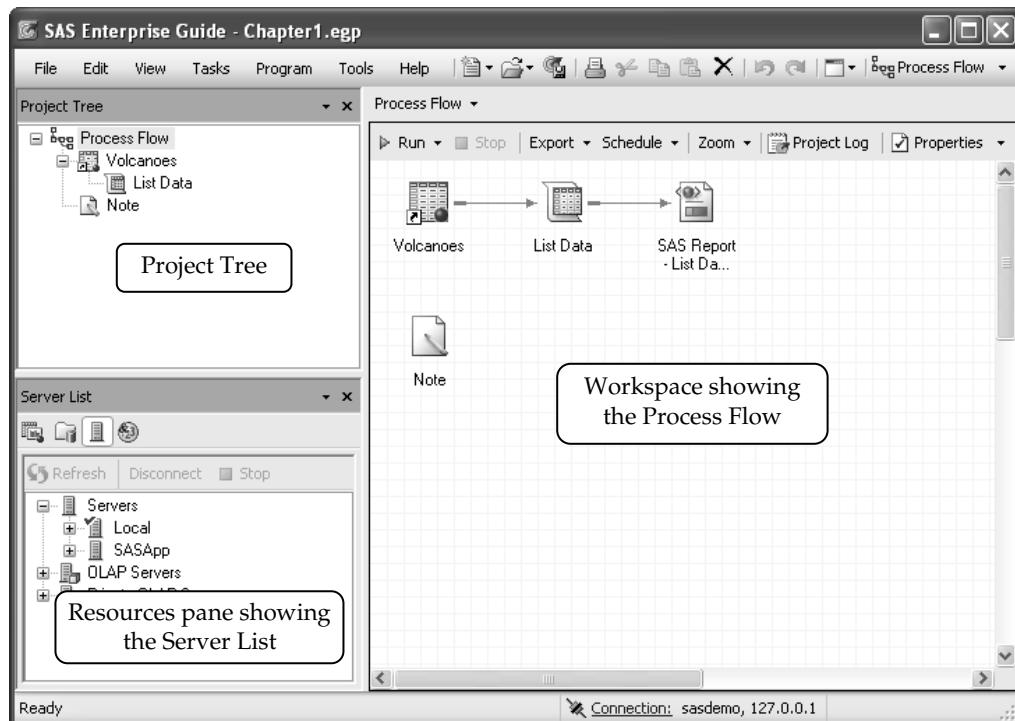
SAS Enterprise Guide Basics

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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 resizing them all—until it looks just the way you want. Then SAS Enterprise Guide will remember those settings 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.



Some windows are open by default while some are closed or hidden behind other windows. You can open or unhide the major windows using the **View** menu.

Docked windows Some of the windows in SAS Enterprise Guide are docked. Most of the docked windows can appear on the left or right side of the application. To change a window from one side to the other, click the down arrow (▼) in the upper-right corner of the window and select **Dock Left** or **Dock Right** from the pop-up menu. From this menu, you can also select **Auto Hide**. If you hide a window, it will be reduced to a tab along the side. To view a hidden window, position your cursor over the window's tab. When you move the cursor out of the window, it will be reduced to a tab again. To unhide a window, click its tab or select it from the **View** menu. These windows are docked:



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



Server List The Server List window lists available SAS servers, and the files and SAS data libraries on those servers. A SAS server is any computer on which SAS software is installed. The computer on which you run SAS Enterprise Guide may or may not be a SAS server. This window appears in the Resources pane, and is open by default.



Task List The Task List window lists all available tasks and task templates. Using the drop-down list at the top of this window, you can choose to display tasks by category, tasks by name, or task templates. You can open a task by double-clicking its name in this window. This window appears in the Resources pane, and is closed by default. To open this window, click its icon in the Resources pane.



SAS Folders The SAS Folders window lists any folders that have been defined in metadata. This window appears in the Resources pane, and is closed by default. To open this window, click its icon in the Resources pane.



Prompt Manager The Prompt Manager window lists any prompts defined for the current project. This window appears in the Resources pane, and is closed by default. To open this window, click its icon in the Resources pane.



Task Status The Task Status window displays notes about tasks that are currently running. This window is different from other docked windows because it is docked to the bottom of the application, and you cannot move it or reduce it to a tab. This window is closed by default. To open the Task Status window, select it from the **View** menu.

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



Process Flow The Process Flow window displays the items in a project and their relationship using a process flow diagram. You can open only one project at a time, but you can create as many process flows as you wish inside a single project. You can open the Process Flow by selecting it from the **View** menu, by double-clicking its name in the Project Tree, by selecting it from the drop-down list at the top of the workspace, by selecting the **Open Process Flow** drop-down list on the menu bar, or by pressing **F4**.



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

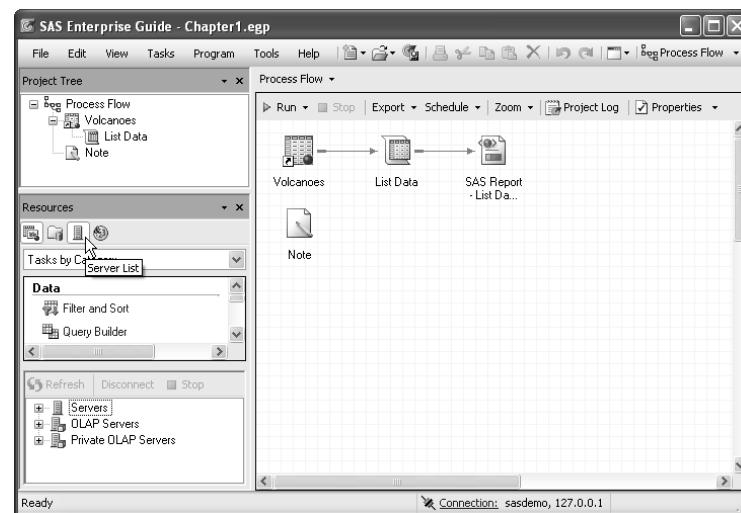
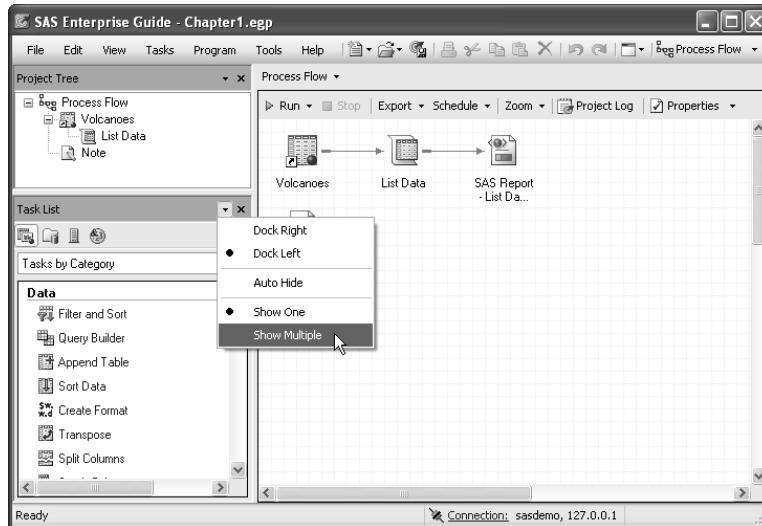
Menus and tools The menus and tools across the top of SAS Enterprise Guide (also called the menu bar) are always the same. However, the menus and tools inside the workspace (also called the workspace toolbar) change. For example, the options above a Process Flow are different from the options above a data table. You can also right-click many objects to open a pop-up menu for that object. So you can see that there are often several ways to do the same thing. This book cannot list all the ways to do every action, but with a little exploration you can find them.

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, select **Tools** ▶ **Options** from the menu bar. Then in the General page of the Options window, click **Restore Window Layout**.

1.2 Splitting the Resources Pane and Workspace

The Resources pane and the workspace are busy places. The Resources pane is home to four windows, while the workspace accommodates even more. By default, you can see only one item at a time, but you can see more if you split the Resources pane or workspace.

Splitting the Resources pane To split the Resources pane, click the down-arrow (▼) at the top of the pane, and select **Show Multiple** from the pull-down list. At first, you will only see one window because only one window is open.



To open other windows, click their icons: Task

List , SAS Folders
Server List ,

or Prompt Manager . You can open all four windows at once in the Resources pane if you wish. In this example, two windows are open, the Task List and the Server List.

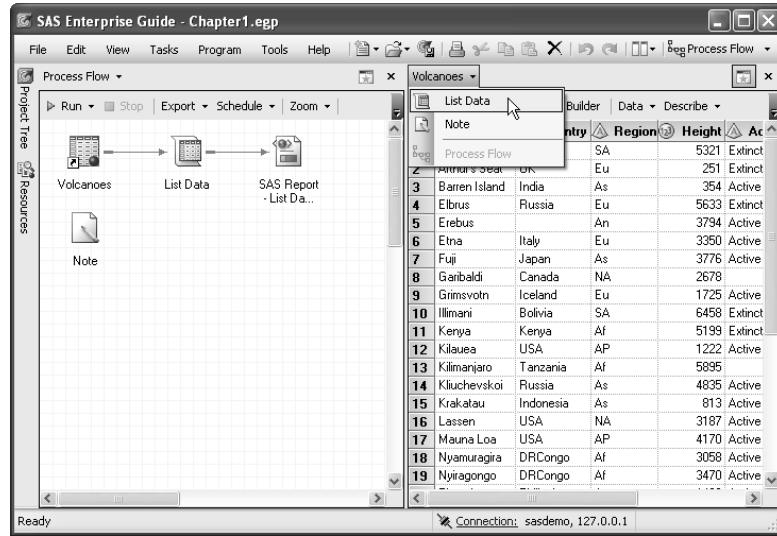
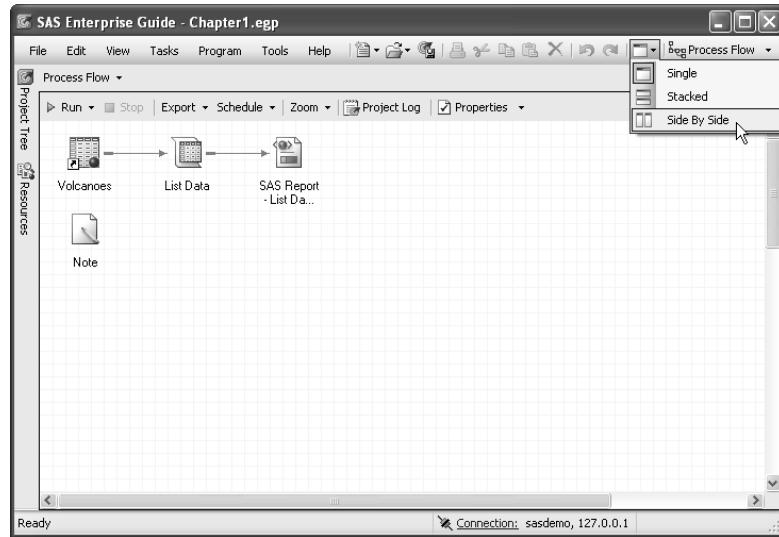
To return the Resources pane to normal, click the down-arrow and select Show One.

Maximizing the workspace It may be helpful to make the workspace as large as possible before you split it. To do this, select **View ▶ Maximize Workspace** from the menu bar. When you maximize the workspace, the Project Tree and Resources pane become tabs pinned to the edge of SAS Enterprise Guide. You can temporarily expand those windows by moving the cursor over a tab. When you move the cursor away, the window will be reduced to a tab again. To return the workspace to its normal size, select **View ▶ Maximize Workspace** again.

Splitting the workspace You can split the workspace into two pieces. First, open any items you wish to view. Then click the Workspace Layout icon on the menu bar



, and select either **Stacked** or **Side By Side** from the pull-down list. You can also do this by selecting **View ▶ Workspace Layout** from the menu bar.



You can click the down-arrow at the top of the workspace to view a drop-down list of all items that are currently open. To display an item, select it from the list.

To unsplit the workspace, click the Workspace Layout icon again, and select **Single** from the pull-down list. You can also click one of the Xs in the upper-right corners to close that section of the workspace.

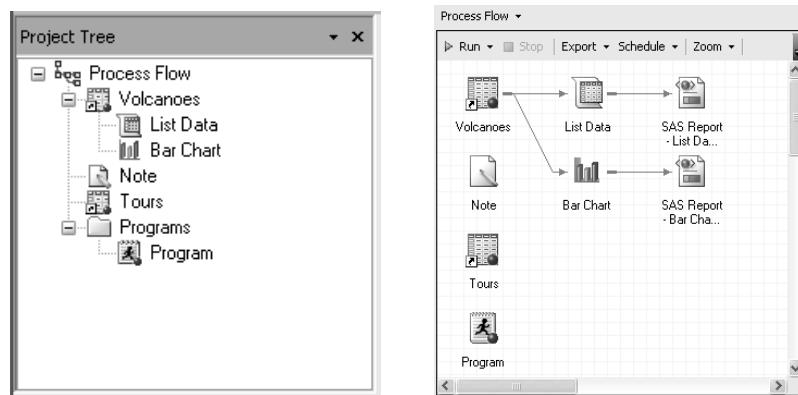
1.3 Projects

In SAS Enterprise Guide, all the work you do is organized into projects. A project is a collection of related data, tasks, results, programs, 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 Tree and Process Flow The Project Tree window displays projects in a hierarchical tree diagram, while the Process Flow window 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 Tree and a Process Flow showing the same project. This project contains several types of items: data, tasks, results, a program, 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 shortcuts to data files, not the actual data. If you delete a project, your data files will still exist. This icon represents a SAS data table.



Tasks Tasks are specific analyses or reports that you run, such as List Data or Bar Chart. Every time you run a task, SAS Enterprise Guide adds an icon representing that task. This icon represents the Bar Chart task.



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

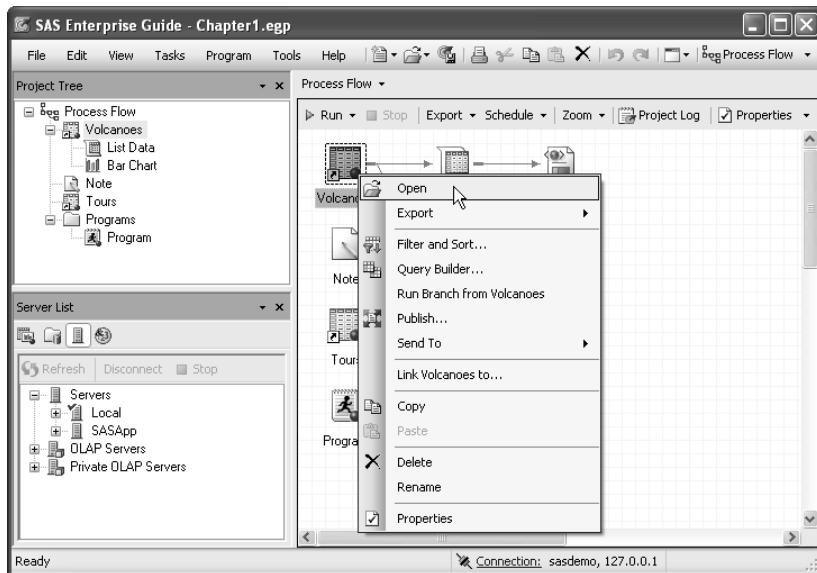


Notes Notes are optional text files you can use to document your work, or record comments or instructions for later use. To create a note, select **File ▶ New ▶ Note** from the menu bar. A text window will open, allowing you to type whatever you wish.



Programs Programs are files that contain SAS code. You can open existing programs in SAS Enterprise Guide, or you can write new programs.

Showing properties and opening items You can display the properties for any item by right-clicking its icon in the Project Tree or Process Flow 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.



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 shortcut 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 data, programs, and results in separate files by right-clicking the icon for that item and selecting **Export** from the pop-up menu.

1.4 Managing Process Flows

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

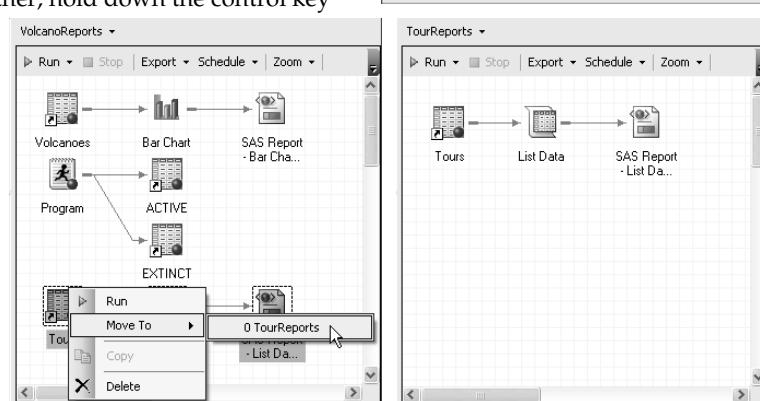
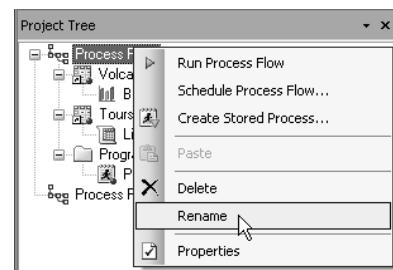
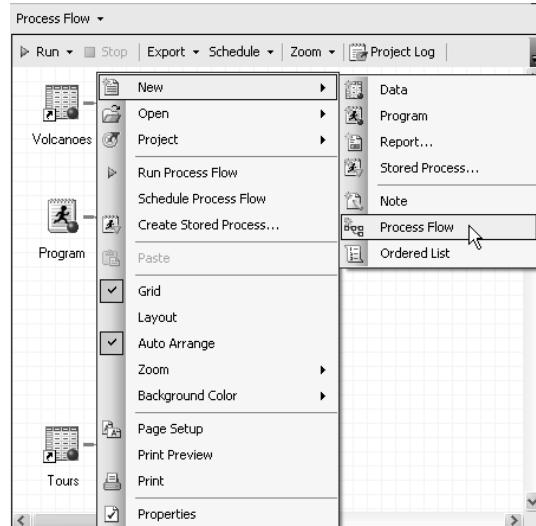
Adding new process flows To add a new process flow to a project, select **File ▶ New ▶ Process Flow** from the menu bar, or right-click the current process flow and select **New ▶ Process Flow** from the pop-up menu. No matter how many process flows you create, the Project Tree will show all of them in a single tree diagram.

When you right-click a process flow, the pop-up menu displays options for customizing the appearance of that process flow. Options include Grid, Layout, Auto Arrange, Zoom, and Background Color.

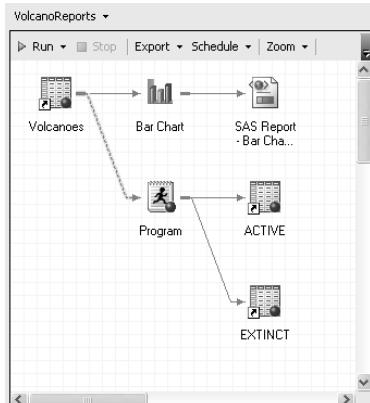
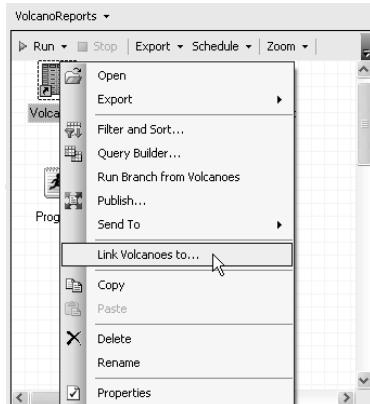
To view a process flow, double-click its name in the Project Tree, or click the down-arrow (▼) above the workspace to open a pull-down list.

When you add a new process flow, it is named Process Flow *n*. To give a process flow a more descriptive name, right-click its name in the Project Tree and select **Rename** from the pop-up menu. To delete a process flow, right-click its name in the Project Tree and select **Delete** from the pop-up menu.

Moving and copying items To move items from one process flow to another, hold down the control key (CTRL), and click all 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 to the process flow named TourReports.



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**.



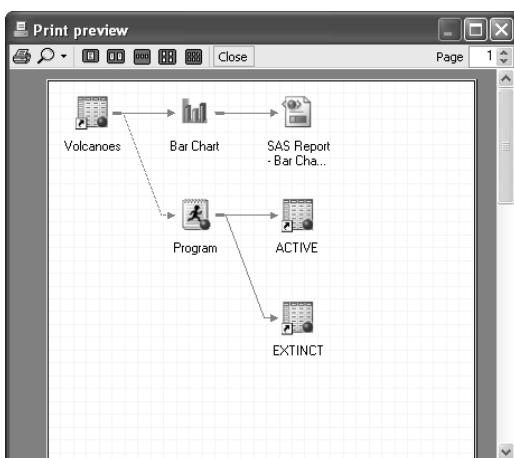
Linking items When you run a process flow, items are executed from top left to bottom right, following the branches created by links between items. You can add links between items to show relationships that may not be clear, or to force items to run in a particular order. For example, if you create a 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 icon has been linked to a program icon to show that this program uses the Volcanoes data table. Notice that when you add links they use a dashed line instead of a solid line.

To delete a link that you previously added, right-click the icon for that link ➔ in the Project Tree and select **Delete** from the pop-up menu.

Printing process flows You can print a copy of your process flow. To control page size and orientation, click the process flow and select **File ▶ Page setup for Process Flow** from the menu bar. To preview a printout, select **File ▶ Print preview for Process Flow**. To print the process flow, select **File ▶ Print Process Flow**. Here is the Print preview window for the VolcanoReports process flow.



1.5 Running and Rerunning Tasks

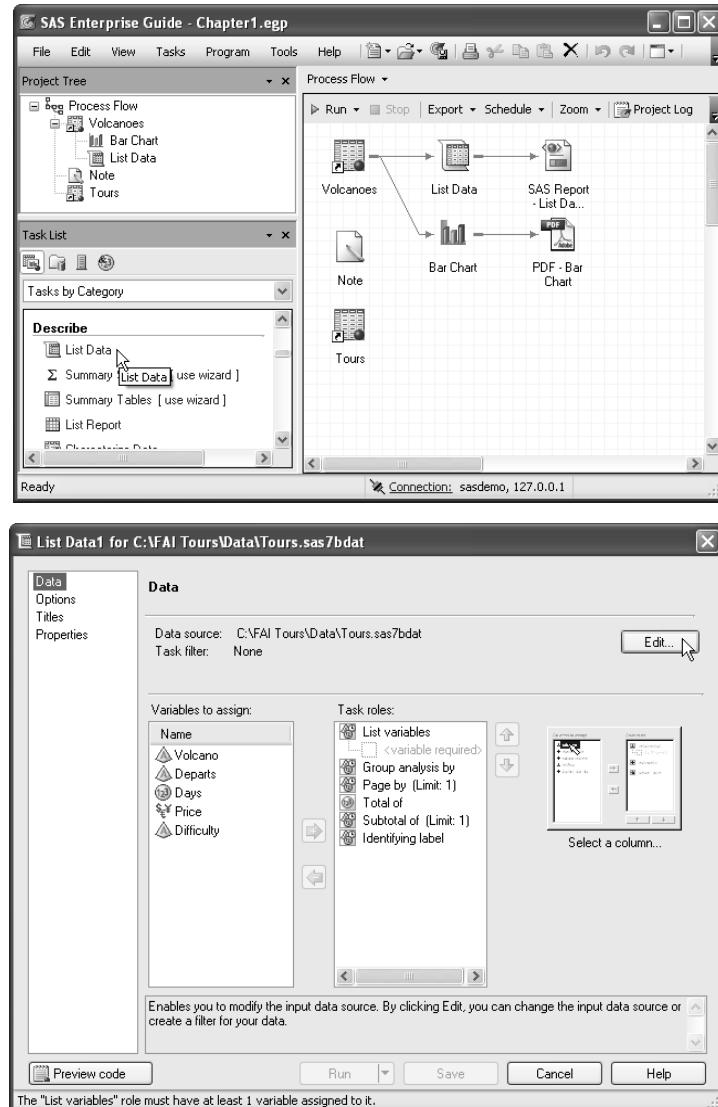
Running tasks is, of course, what SAS Enterprise Guide is all about. Regardless of which task you choose to run, the basic steps are the same: open the task, select the data, and then run the task.

Opening a task To open a task, select it from the **Tasks** menu, or click its name in the Task List window, or open a Data Grid and then select the task from the workspace toolbar. The window for that task will open. In this example, the List Data task is being selected in the Task List window.

Selecting the data

table When you open a task, it will use the data table that is currently active. If a Data Grid is open, then that data table will be active. You can also make a data table active by simply clicking its icon in the Project Tree or Process Flow before you open a task.

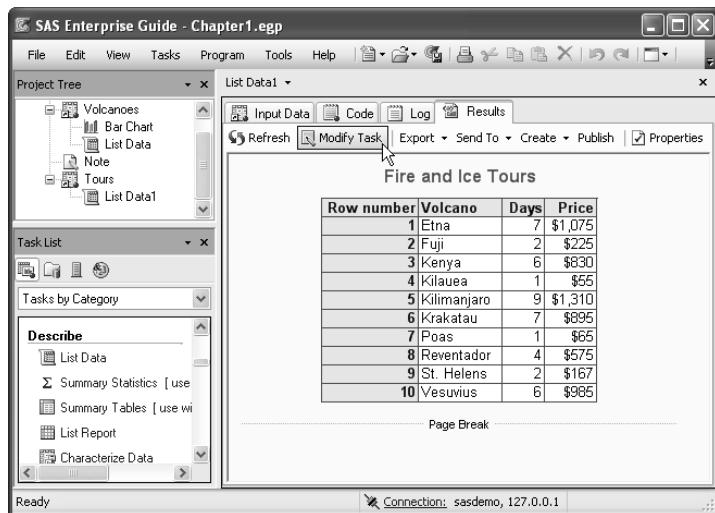
After you open a task, you can change the data table by clicking the **Edit** button in the Data page of the task window. The **Edit Data and Filter** window (not shown) will open where you can choose an alternate data table for the task. See section 5.1 for details about the **Edit Data and Filter** window.



Running a task Every task includes a Data page where you assign variables to task roles. Using the selection pane on the left, you can open other pages. The preceding image shows the List Data task, which has four pages: Data, Options, Titles, and Properties. When you are satisfied with all the settings, click the **Run** button. If you have more than one SAS server, your task will run on the same server where the data table is stored. If you decide you want to stop a task while it's running, select **Program ▶ Stop** from the menu bar, or click the **Stop** button  on the workspace toolbar above the Process Flow. When the task has finished running, the results will be displayed in the workspace.

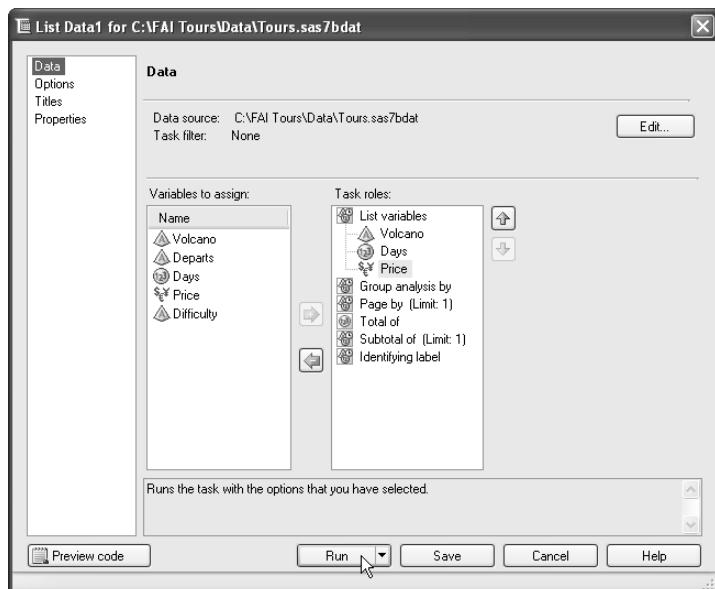
Rerunning a task

To make changes to a task and run it again, first reopen the task window. You can do this by clicking **Modify Task** on the workspace toolbar for the Results tab. You can also reopen a task by right-clicking the task icon in the Project Tree or Process Flow, and selecting **Modify task-name** from the pop-up menu.



Once the task window is open, you can make changes. Then click the **Run** button to rerun the task.

If you just want to rerun a task without reopening the task window, click **Refresh** on the workspace toolbar for the Results tab. You can also right-click the task icon in the Project Tree or Process Flow, and select **Run** from the pop-up menu.

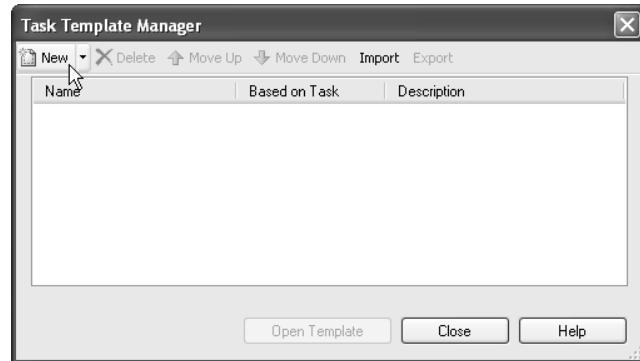
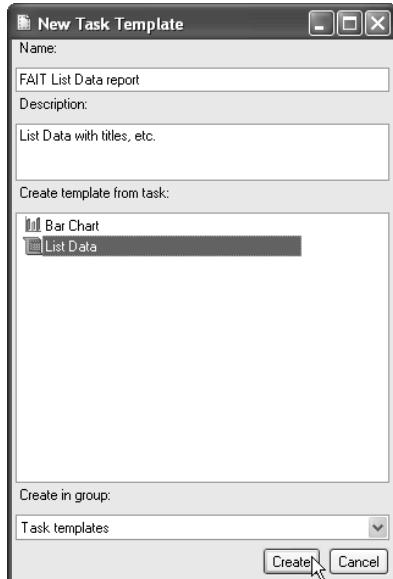


1.6 Creating and Exporting Task Templates

Even with the simplest tasks, there are many ways to customize your results. Once you have spent a lot of time changing titles, choosing options, and specifying a style; you might wish you could save all those settings and use them to create new results. With task templates, you can.

Task templates allow you to save tasks in a form that is independent of data. In other words, task templates save all your settings except the assignment of variables to task roles and certain data-dependent options. Most tasks can create templates, but a few of the more data-driven tasks (including Summary Tables and Append Table) cannot. SAS programmers will be interested to know that task templates are unrelated to the various kinds of templates created by the Output Delivery System.

Creating a task template To create a task template from a task that you have already run, select **Tasks ▶ Task Templates ▶ Task Template Manager** from the menu bar. This opens the Task Template Manager. Click **New** to open the New Task Template window.



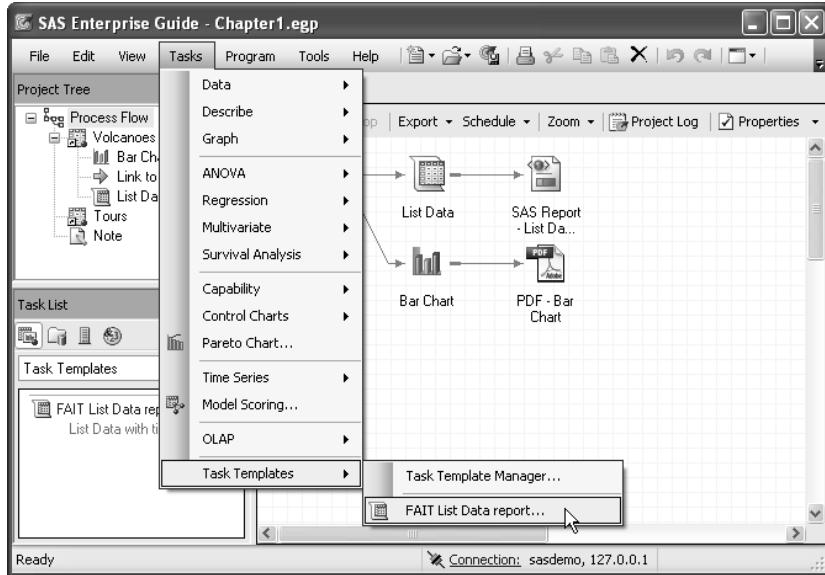
In the New Task Template window, type a name for the new template in the **Name** box. You can type an optional description in the **Description** box if you wish. The area labeled **Create template from task** lists all the tasks currently in the project. Choose a task by clicking its name. Then click **Create**. The new task template will be listed in the Task Template Manager. Click **Close**.

You can also create task templates directly from tasks. If the task window is open, then you can click the down-arrow (▼) on the **Run** button, and select **Create Template** from the pull-down list.

To delete a task template, simply open the Task Template Manager, click the task template name, and click **Delete**.

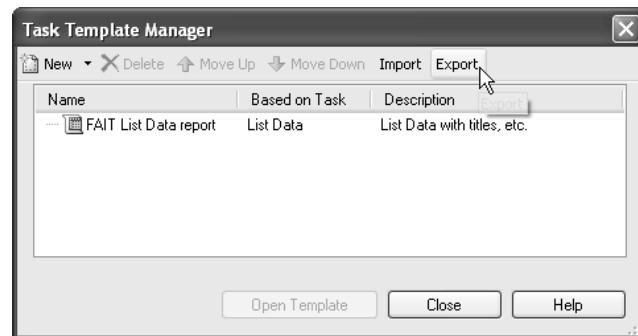
Using a task template Once you create a task template, unless you delete it, it will be available to you every time you open SAS Enterprise Guide. There are two ways to open a task template. You can select **Tasks** ► **Task Templates** ► *task-template-name* from the menu bar, or you can open the Task List window, select **Task Templates** from the drop-down list, and click the name of your task template.

By default, when you open a task template, it uses the active data table. After you open a task template, you can choose a different data table by clicking the **Edit** button in the Data page.



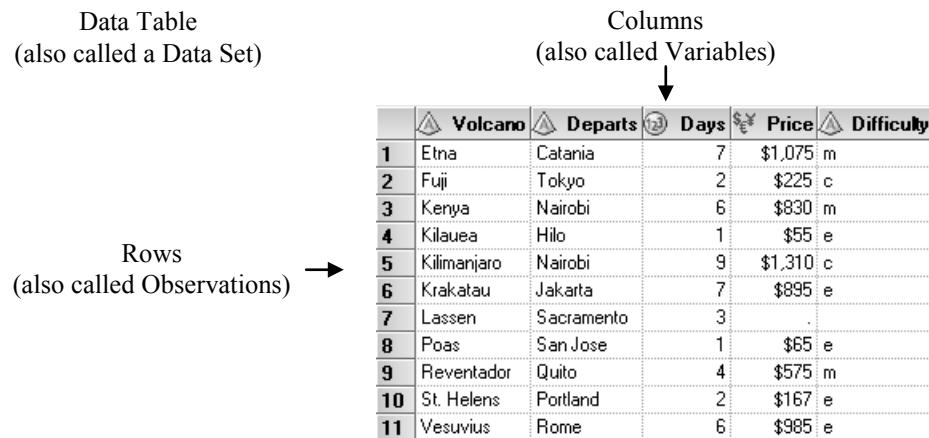
Exporting a task template When you create a task template, it will be saved in a default location. This location is associated with your Windows user account. To share task templates with other people (including anyone who uses the same computer, but a different Windows account), you must export the templates. To do this, open the Task Template Manager, and click **Export**. SAS Enterprise Guide will prompt you to select the templates you wish to export, and to specify a location for saving them.

To import task templates, open the Task Template Manager and click **Import**. Then navigate to the location of the task templates you wish to import.



1.7 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 that was created in Tutorial A. A new tour has been added for the volcano Lassen.



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 use the term columns and others refer 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.



Character data may contain numerals, letters, or special characters (such as \$ and !) 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, 2010	18263	01/01/2010

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 or subtract zip codes. Such values 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.

Moving data between SAS Enterprise Guide and Base SAS Any data created in SAS Enterprise Guide can be used in Base SAS, but the default rules for naming variables are different. Base SAS uses the VALIDVARNAME=V7 SAS 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.

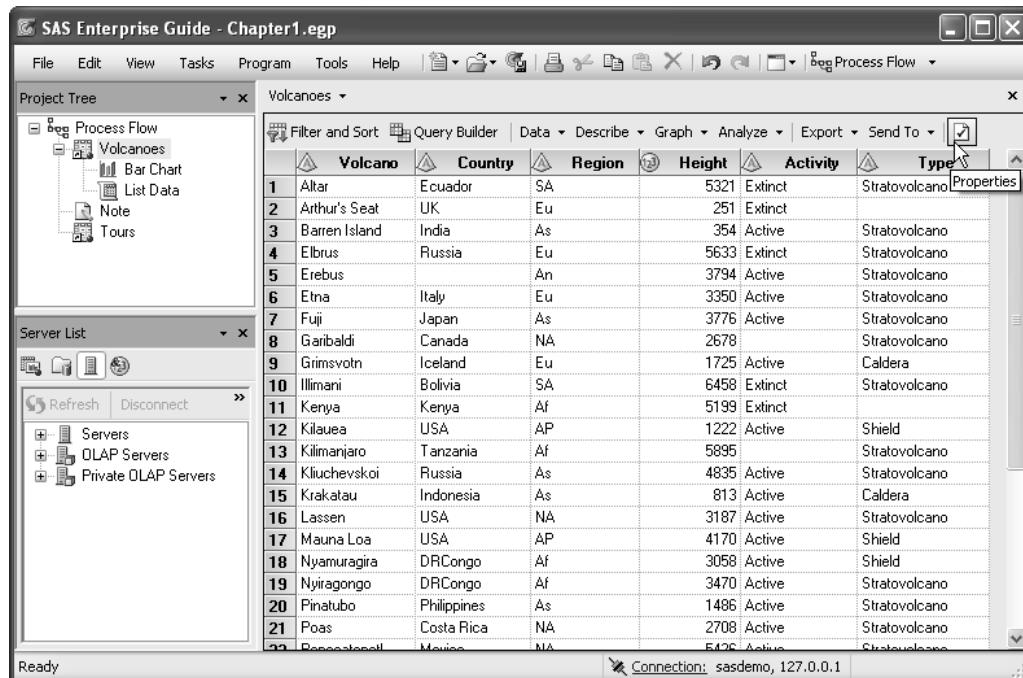
Documentation stored in SAS data tables In addition to your actual data, SAS data tables contain information about the data table, such as its name, the date that you created it, and the version of SAS you used to create it. SAS also stores information about each column in the data table, including its 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. These Properties windows are described in more detail in the next two sections.

1.8 Properties of Data Tables

Someday you may be given a SAS Enterprise Guide project that was created by someone else. If you are unsure what the project does, then it would be a good idea to start by checking the properties of the data tables.

Opening the Properties window To display information about a data table, first open it in a Data Grid by double-clicking the data icon in the Project Tree or Process Flow. Then click the

Properties icon  on the workspace toolbar to open the table Properties window.

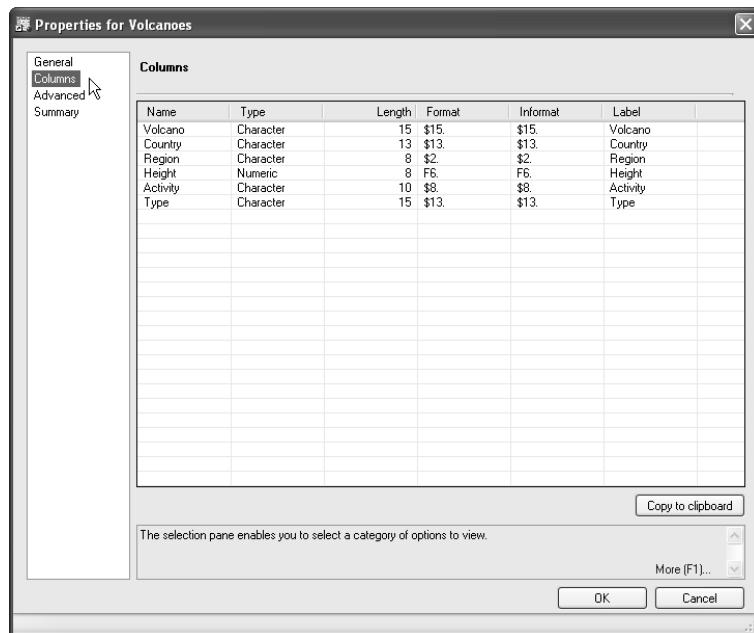
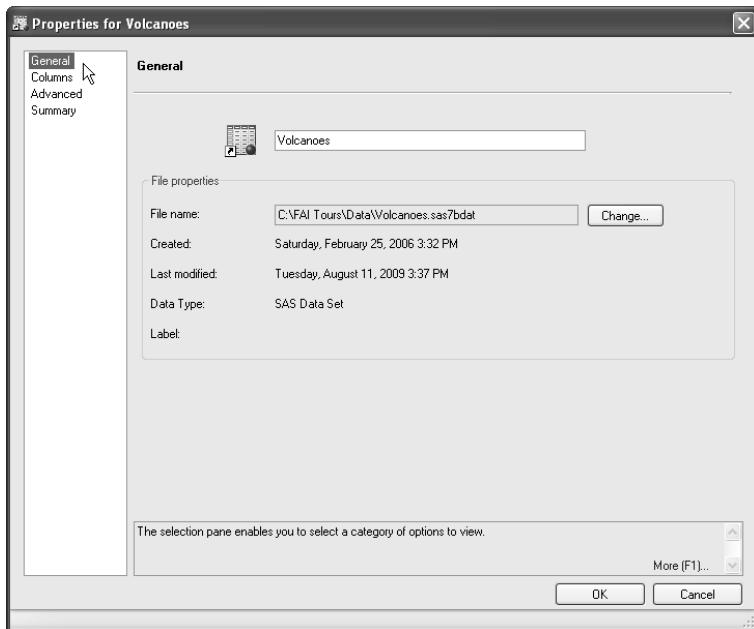


Volcano	Country	Region	Height	Activity	Type
1 Altar	Ecuador	SA	5321	Extinct	Stratovolcano
2 Arthur's Seat	UK	Eu	251	Extinct	Stratovolcano
3 Barren Island	India	As	354	Active	Stratovolcano
4 Elbrus	Russia	Eu	5633	Extinct	Stratovolcano
5 Erebus		An	3794	Active	Stratovolcano
6 Etna	Italy	Eu	3350	Active	Stratovolcano
7 Fuji	Japan	As	3776	Active	Stratovolcano
8 Garibaldi	Canada	NA	2678		Stratovolcano
9 Grimsvotn	Iceland	Eu	1725	Active	Caldera
10 Illimani	Bolivia	SA	6458	Extinct	Stratovolcano
11 Kenya	Kenya	Af	5199	Extinct	
12 Kilaua	USA	AP	1222	Active	Shield
13 Kilimanjaro	Tanzania	Af	5895		Stratovolcano
14 Kluchevskoi	Russia	As	4835	Active	Stratovolcano
15 Krakatau	Indonesia	As	813	Active	Caldera
16 Lassen	USA	NA	3187	Active	Stratovolcano
17 Mauna Loa	USA	AP	4170	Active	Shield
18 Nyamuragira	DRCongo	Af	3058	Active	
19 Nyiragongo	DRCongo	Af	3470	Active	Stratovolcano
20 Pinatubo	Philippines	As	1486	Active	Stratovolcano
21 Poas	Costa Rica	NA	2708	Active	Stratovolcano
22 Rincon de la Vieja	Costa Rica	NA	5426	Active	Stratovolcano

You can also right-click a data icon in the Project Tree or Process Flow, and select Properties from the pop-up menu.

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, and whether it is a SAS data table or some other type of file.



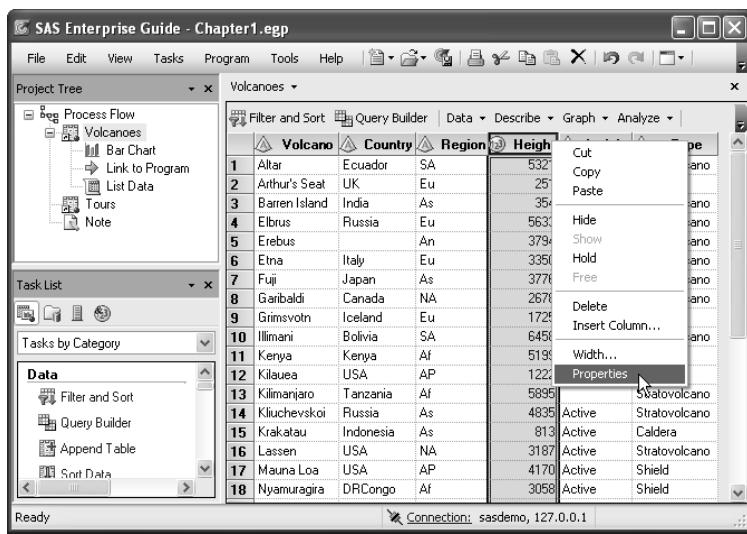
Columns page If you click **Columns** in the selection pane on the left, the Columns page will open. Here, SAS Enterprise Guide displays information about each column: its name, type, length, format, informat, and label. You cannot change the properties of columns in the Properties window for a data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

1.9 Properties of Columns

The column Properties window displays properties for an individual column. You can use this window inside a task to change labels and display formats, but those changes will apply only to the results of that task rather than the original data table. However, if you open the column Properties window inside a Data Grid, then any changes you make will be saved with the data table.

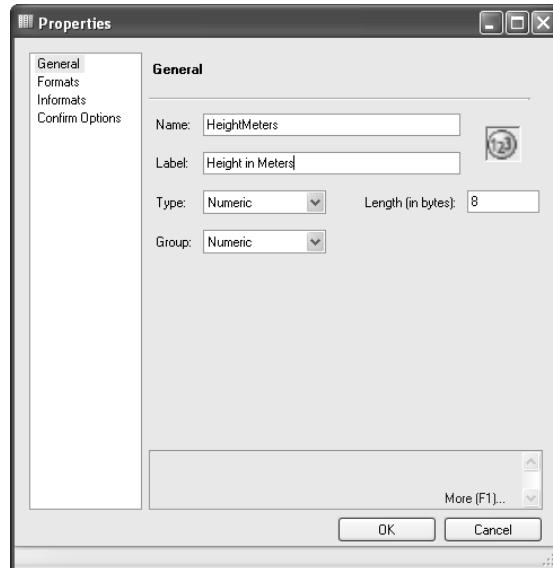
Setting the update mode The Data Grid opens in read-only mode. In this mode you cannot edit the data, and you cannot change column properties. To switch to update mode, select **Edit ▶ Protect Data** from the menu bar. This toggles the data table from read-only to update mode. To return to read-only mode, select **Edit ▶ Protect Data** again.

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 this Data Grid, Properties is being selected for the column Height.



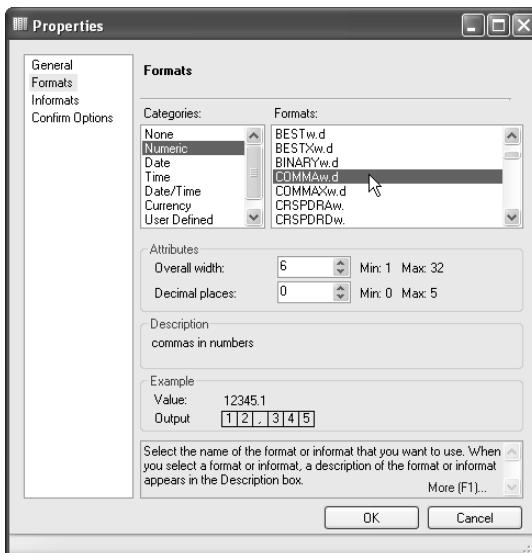
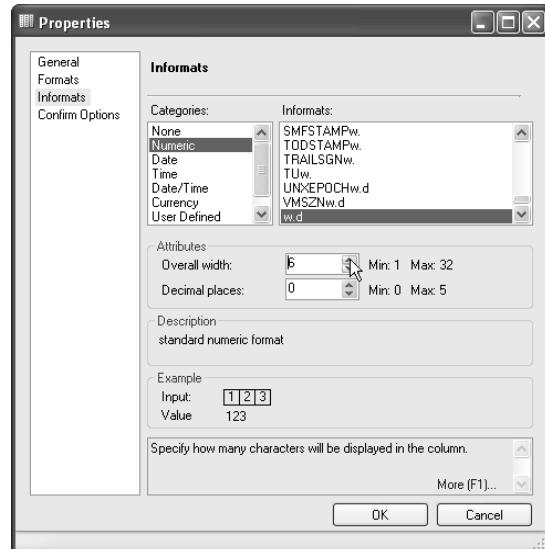
General page The Properties window has several pages. If there is no selection pane on the left, then the data table is in read-only mode and you need to switch to update mode.

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. 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 6 and no decimal places. This informat can be written as 6.0. See the next section for a table of commonly used informats.

In SAS Enterprise Guide 4.2, you can use informats when you import data files, and when you write SAS programs. However, informats are not used when you type data values into a Data Grid. Instead, the Data Grid uses the data type and data group that you specify to determine how to interpret any data values you enter.



	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	Erebus		An	3,794	Active	Stratovolcano
6	Ftna	Italy	Fri	3,350	Active	Stratovolcano

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 1.11 for a table of commonly used formats.

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

1.10 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 when you import data, in a SAS program, or in a Data Grid. However, in SAS Enterprise Guide 4.2, informats are not used to interpret data that you type into a Data Grid. Here are a few of the many informats available in SAS Enterprise Guide.

Informat	Definition	Width range	Default width
Character			
\$ <i>w</i> .	Reads character data—trims leading blanks	1–32,767	none
\$UPCASE <i>w</i> .	Converts character data to uppercase	1–32,767	8
Date, Time, and Datetime¹			
ANYDTDTE <i>w</i> .	Reads dates in any form—when dates are ambiguous, uses the DATESTYLE system option to determine	5–32	9
DATE <i>w</i> .	Reads dates in the form: <i>ddmonyy</i> or <i>ddmonyyymm</i>	7–32	7
DATETIME <i>w</i> .	Reads datetime values in the form: <i>ddmonyy hh:mm:ss.ss</i>	13–40	18
DDMMYY <i>w</i> .	Reads dates in the form: <i>ddmmyy</i> or <i>ddmmyyyy</i>	6–32	6
JULIAN <i>w</i> .	Reads Julian dates in the form: <i>yyddd</i> or <i>yyyyddd</i>	5–32	5
MMDDYY <i>w</i> .	Reads dates in the form: <i>mmddyy</i> or <i>mmdyyyyy</i>	6–32	6
TIME <i>w</i> .	Reads time in the form: <i>hh:mm:ss.ss</i> (hours:minutes:seconds—24-hour clock)	5–32	8
Numeric			
<i>w.d</i>	Reads standard numeric data	1–32	none
COMMA <i>w.d</i>	Removes embedded commas and \$, converts left parentheses to minus sign	1–32	1
PERCENT <i>w</i> .	Converts percentages to proportions	1–32	6

¹ 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 information about assigning display formats.

Informat	Input data	Results	Input data	Results
Character				
\$10.	Lassen	Lassen	St. Helens	St. Helens
\$UPCASE10.	Lassen	LASSEN	St. Helens	ST. HELENS
Date, Time, and Datetime				
ANYDTDTE10.	01jan1961 1961001	366 366	31.01.1961 01/31/61	396 396
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
Numeric				
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

1.11 Selected Standard Formats

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

Format	Definition	Width range	Default width
Character			
\$UPCASE <i>w.</i> \$ <i>w.</i>	Converts character data to uppercase Writes standard character data—default for character data	1–32767 1–32767	Length of variable or 8 Length of variable or 1
Date, Time, andDatetime¹			
DATE <i>w.</i>	Writes SAS date values in form <i>ddmonyy</i> or <i>ddmonyyyy</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>ddmonyy</i> or <i>ddmonyyyy</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
Numeric			
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
	Writes standard numeric data	1–32	none

¹SAS 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
Character				
\$UPCASE10. \$6.	Lassen Lassen	LASSEN Lassen	St. Helens St. Helens	ST. HELENS St. He
Date, Time, and Datetime				
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
Numeric				
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

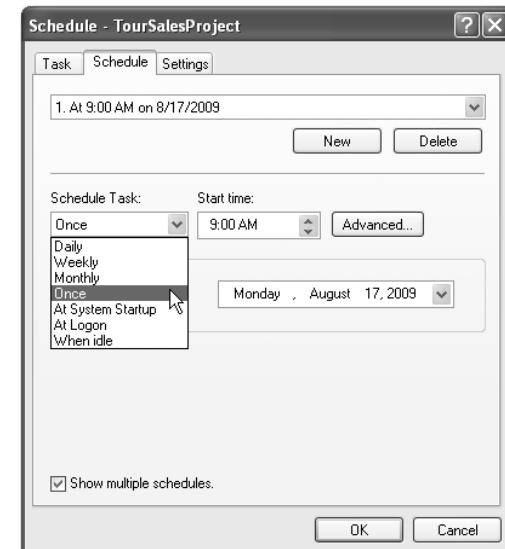
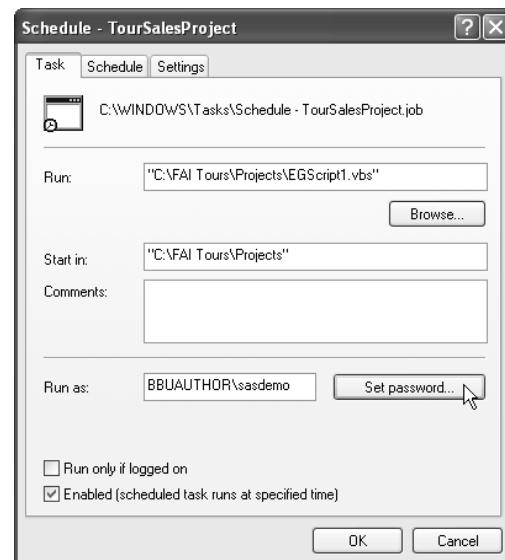
1.12 Scheduling Projects to Run at Specific Times

Sometimes you may want to create a project now, but run it later. For example, if you have data files 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.

Opening the Schedule window You can schedule a complete project or just a process flow. To schedule a project, select **File ► Schedule project-name** from the menu bar.

Schedule project-name from the menu bar. To schedule a process flow, right-click the name of the process flow in the Project Tree and select **Schedule process-flow-name** from the pop-up menu. This opens the Microsoft Windows Task Scheduler with the Task tab on top. 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. 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.

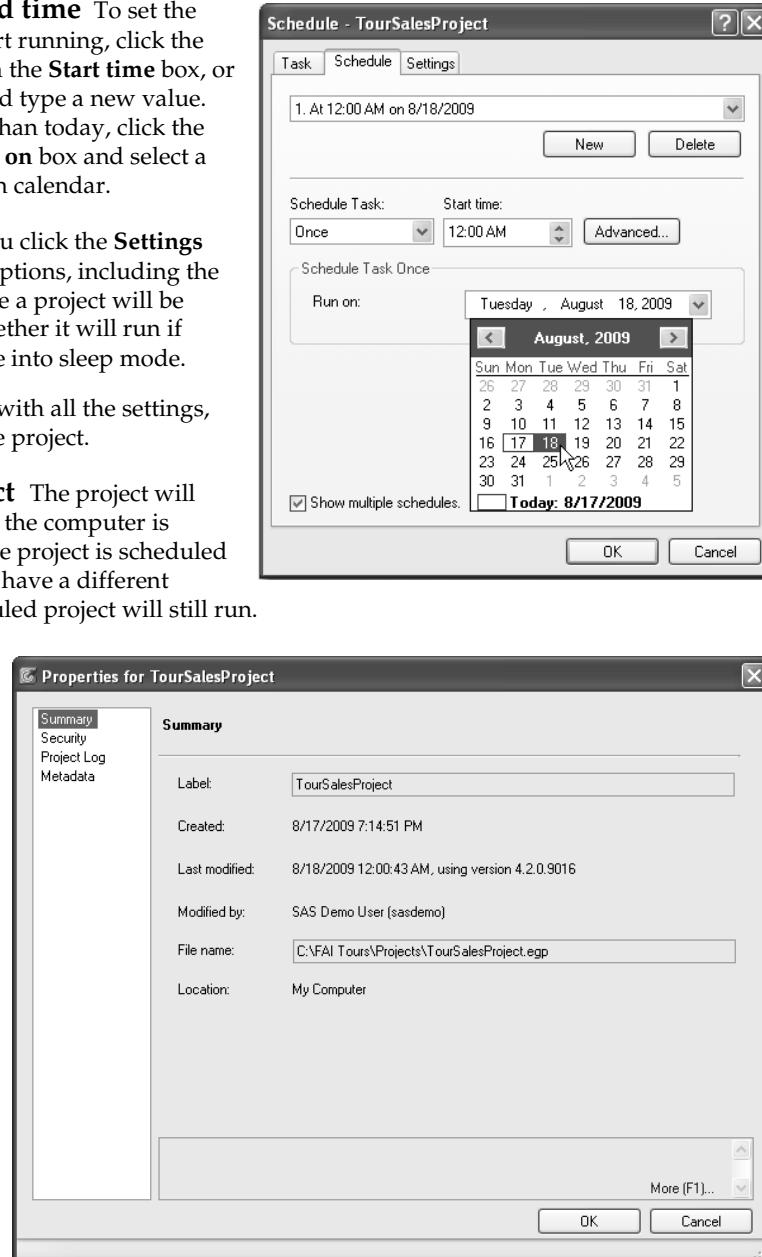
Setting the date and time To set the time the project will start running, click the up and down arrows on the **Start time** box, or simply click the time and type a new value. To choose a date other than today, click the down-arrow in the **Run on** box and select a date from the pull-down calendar.

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 ▶ Project Properties** from the menu bar. The **Last modified** field shows the date and time that the project last ran.

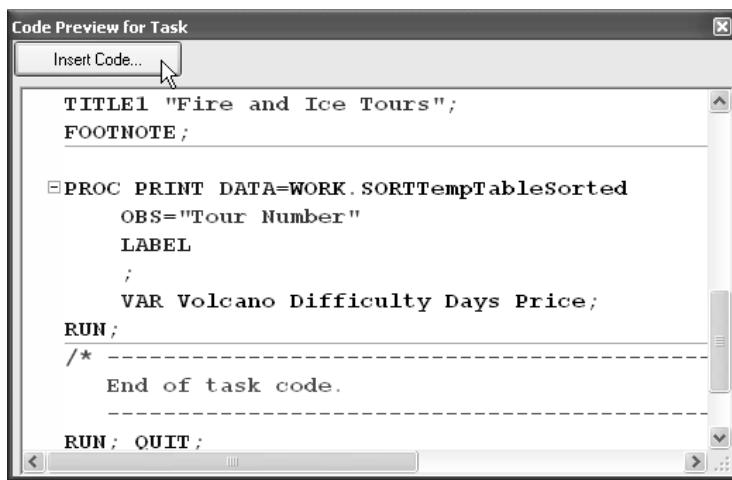
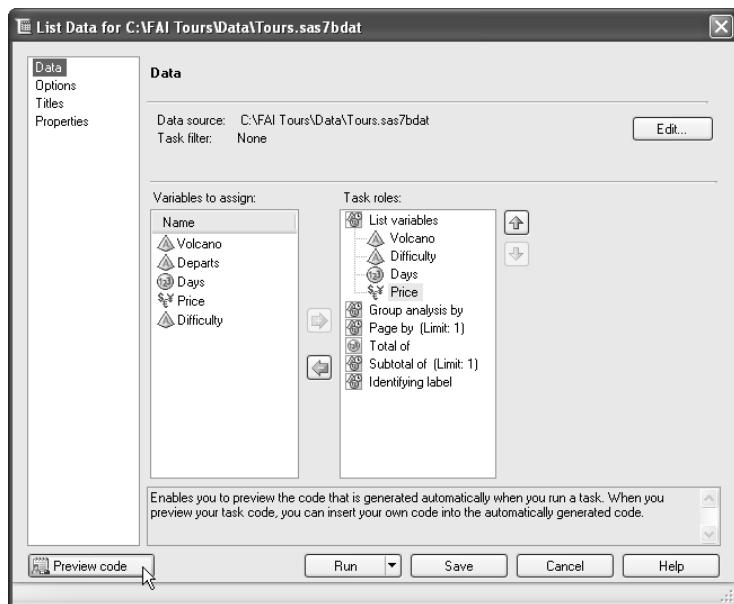


1.13 Editing SAS Programs Generated by a Task

If you are a SAS programmer, you may want to make a few changes to the programs generated by SAS Enterprise Guide. There is more than one way to do this. You can insert your own SAS code into the program associated with a task, or you can save the code generated by a task in a separate file which you can then edit and run.

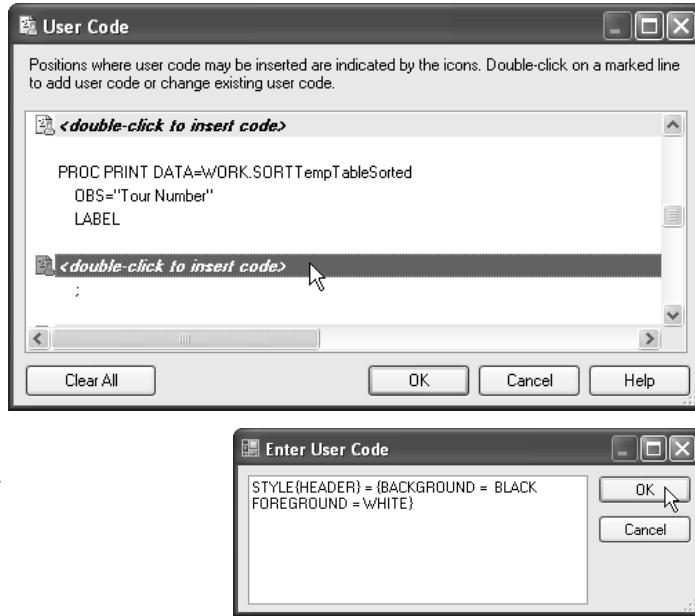
Previewing code generated by a task

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 along with the code generated by the task.



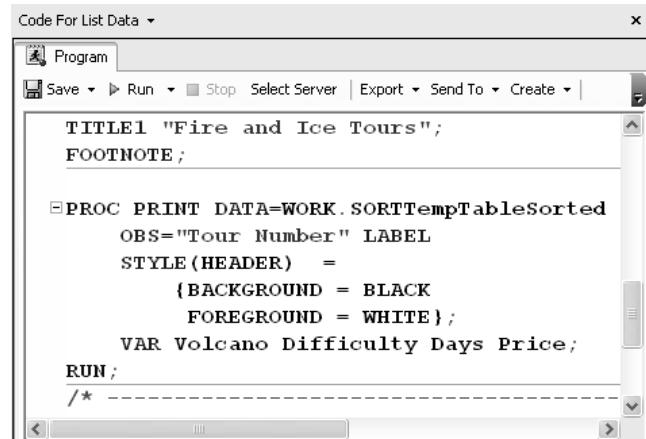
Editing code generated by a task If you want to be able to edit the entire program generated by a task, or code from tasks that do not have a Preview code button, you can make a copy of the program, and then edit it. To do this, run the task, and then right-click the task icon in the Project Tree or Process Flow, and select **Add As Code Template**. SAS Enterprise Guide will open a Program window 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 and are ready to run the program, click **Run** on the workspace toolbar for the Program window. Your program will run on the server that has been set as your default. To choose a different server, click

Select Server. If you decide you want to stop a program while it's running, click the Stop button  on the workspace toolbar for the Program window. You can also use the Program menu on the menu bar to control execution of your program.

Programs created in this way are embedded in your project, and are not saved as separate files. For more information on embedding programs, see the next section.



1.14 Writing and Running Custom SAS Programs

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 run a SAS program that was written outside SAS Enterprise Guide, or you can write a new one.

Writing a new SAS program

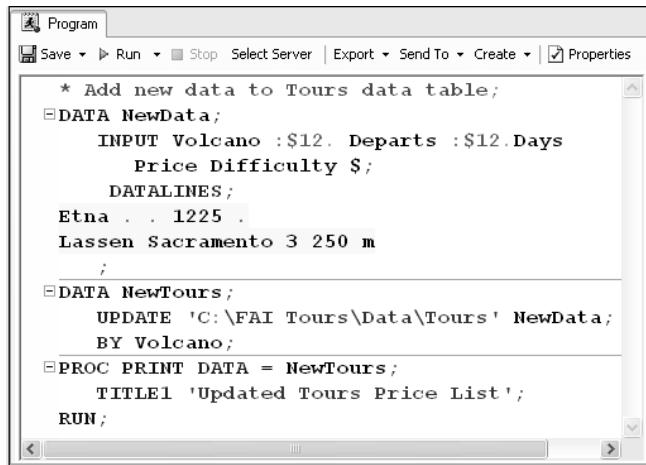
To create a new SAS program To create a new SAS program, open an empty Program window by selecting **File ▶ New ▶ Program** from the menu bar. A Program window will open in the workspace. The program editor in SAS Enterprise Guide is syntax-sensitive, which means that SAS keywords are displayed in blue,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

Opening an existing SAS program

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

Saving a program in a file

Any new programs you write 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 of the project. To save a SAS program outside its project, click **Save** on the workspace toolbar for the Program window, or right-click the program icon in the Project Tree or Process Flow and select **Save program-name As** from the pop-up menu. You can also save a program from the Properties for *program-name* window. To view the properties of a program, click **Properties** on the workspace toolbar for the Program window, or right-click the program icon in the Project Tree or Process Flow and select **Properties** from the pop-up menu. Then in the General page, click **Save As**. If you save the

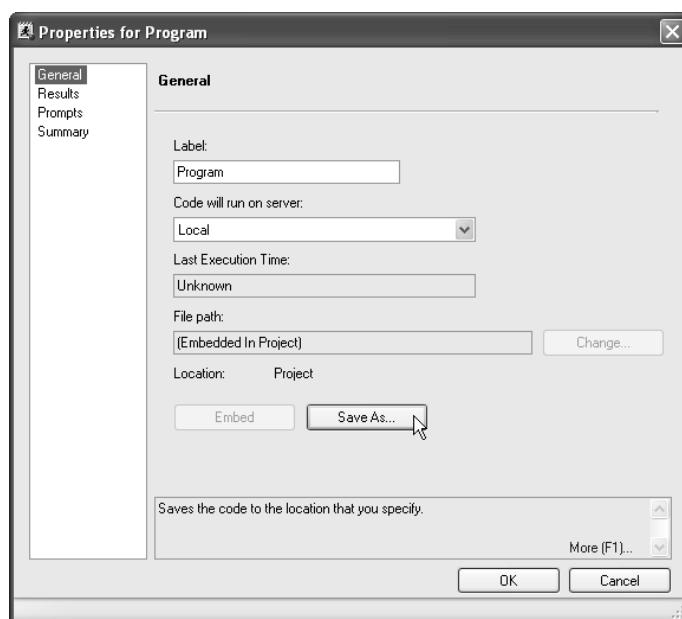


```

* Add new data to Tours data table;
DATA NewData;
  INPUT Volcano :$12. Departs :$12. Days
    Price Difficulty $;
  DATALINES;
  Etna . . 1225 .
  Lassen Sacramento 3 250 m
;

DATA NewTours;
  UPDATE 'C:\FAI Tours\Data\Tours' NewData
  BY Volcano;
  PROC PRINT DATA = NewTours;
    TITLE1 'Updated Tours Price List';
  RUN;

```



program in a file, then it is not embedded, and any changes you make to it in SAS Enterprise Guide will be saved in the file rather than as part of your project. The icon for a program saved in a file includes a little arrow indicating that the project contains a shortcut to the program rather than

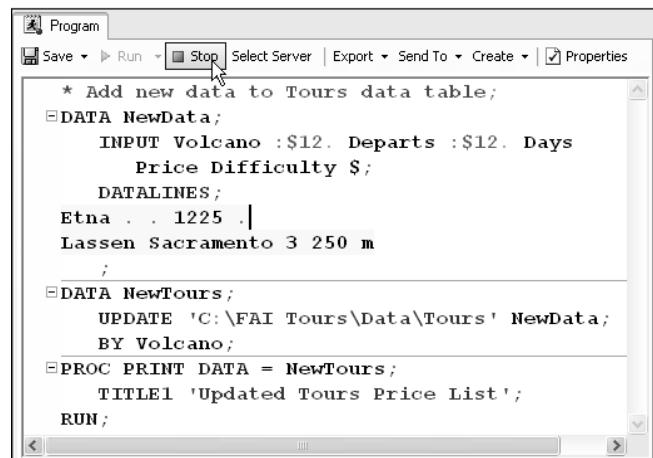
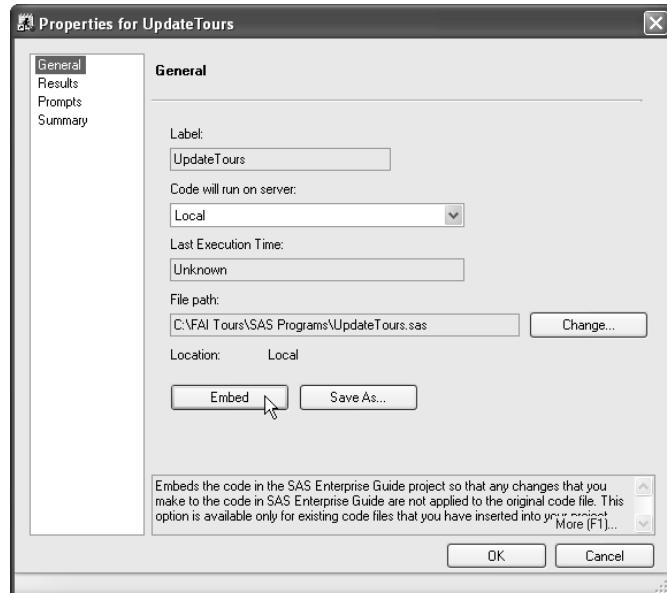
the actual program .

Embedding a program 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 program and click **Embed**. After you embed the program, any changes you make to it in SAS Enterprise Guide will be saved as part of your project rather than in the separate file. The icon for embedded code looks like

this .

Running your program

When you are ready to run your program, click **Run** on the workspace toolbar for the Program window. Your program will run on the server that has been set as your default. To choose a different server, click **Select Server**. If you decide you want to stop a program while it's running, click the **Stop** button  on the workspace toolbar for the Program window. You can also use the Program menu on the main menu bar to control your program.



1.15 Viewing Program and Project Logs

A SAS log is a record of what SAS did. Just about everything you do in SAS Enterprise Guide generates a SAS log. Logs contain the actual code that SAS ran, plus any error messages, warnings, or notes.

Different types of logs A program log is the log that is generated when you run a SAS program. Tasks generate logs too, but when you run tasks, you have little need to view the task log. That is because tasks rarely produce errors or warnings. Every time you rerun a program or task, the old log is replaced with a new one.

The Project Log, on the other hand, is a single cumulative record of everything that has been run in a particular project. By default, the Project Log is turned off. Once you turn the Project Log on, nothing disappears from it unless you clear the log.

Viewing a program log After a program runs, the results are displayed in the workspace. To open the program log, click the tab labeled **Log**. Here is a portion of the program log generated by the SAS program in the preceding section.

```

23      DATA NewTours;
24      UPDATE 'C:\FAI Tours\Data\Tours' NewData;
25      BY Volcano;

NOTE: There were 10 observations read from the data set C:\FAI Tours\Data\Tours.
NOTE: There were 2 observations read from the data set WORK.NEWDATA.
NOTE: The data set WORK.NEWTOURS has 11 observations and 5 variables.
NOTE: DATA statement used (Total process time):
      real time          0.14 seconds
      cpu time          0.04 seconds

26      PROC PRINT DATA = NewTours;

```

One of the first things you will notice when you look at a log is that it contains more lines of SAS code than were in your original program. That is because SAS Enterprise Guide adds housekeeping statements to the beginning and end of your program to make sure that it runs properly when it is passed to your SAS server.

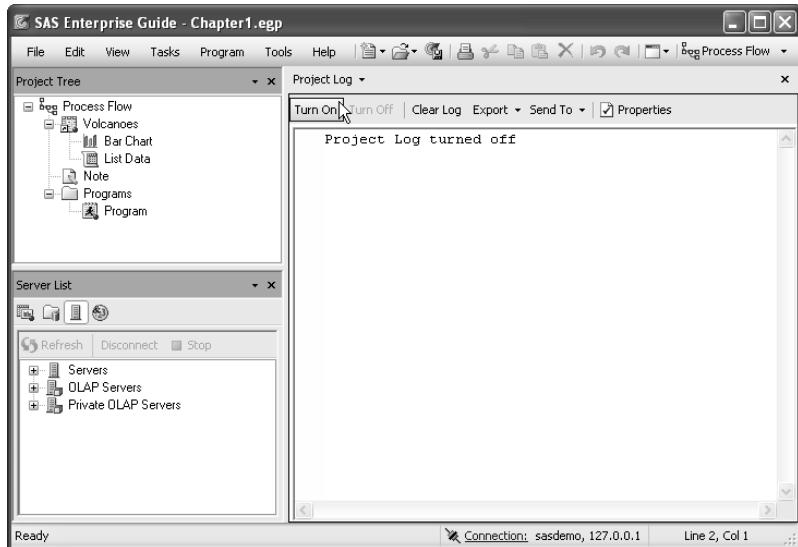


If your program contains any errors, its icon will include a red X. Programs that contain

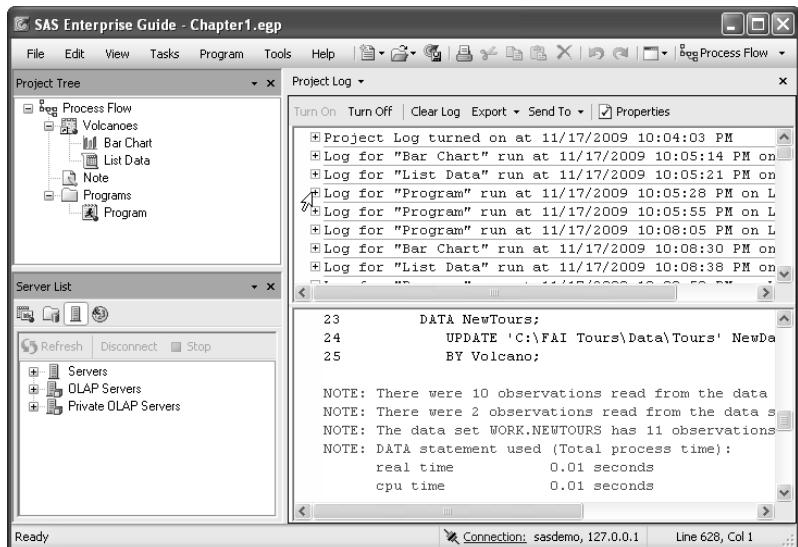


warnings (but no errors) have icons with yellow triangles. Even if there are no errors or warnings, it is a good habit to check the program log when you write your own SAS programs. Just because a program runs without errors or warnings does not mean that it produced the correct results.

Viewing the Project Log To turn on the Project Log, first open it by clicking **Project Log** on the workspace toolbar for the Process Flow or selecting **View ▶ Project Log** from the menu bar. Then on the workspace toolbar for the Project Log, click **Turn On**. Once the Project Log is turned on, it will keep a continuous history of everything that runs in that project.



The Project Log includes the date and time when each action occurred. Click the plus sign (+) to expand a section, or the minus sign (-) to collapse it. You can also split the Project Log into two pieces by clicking and dragging the top border (the line just below the workspace toolbar) of the Project Log window.

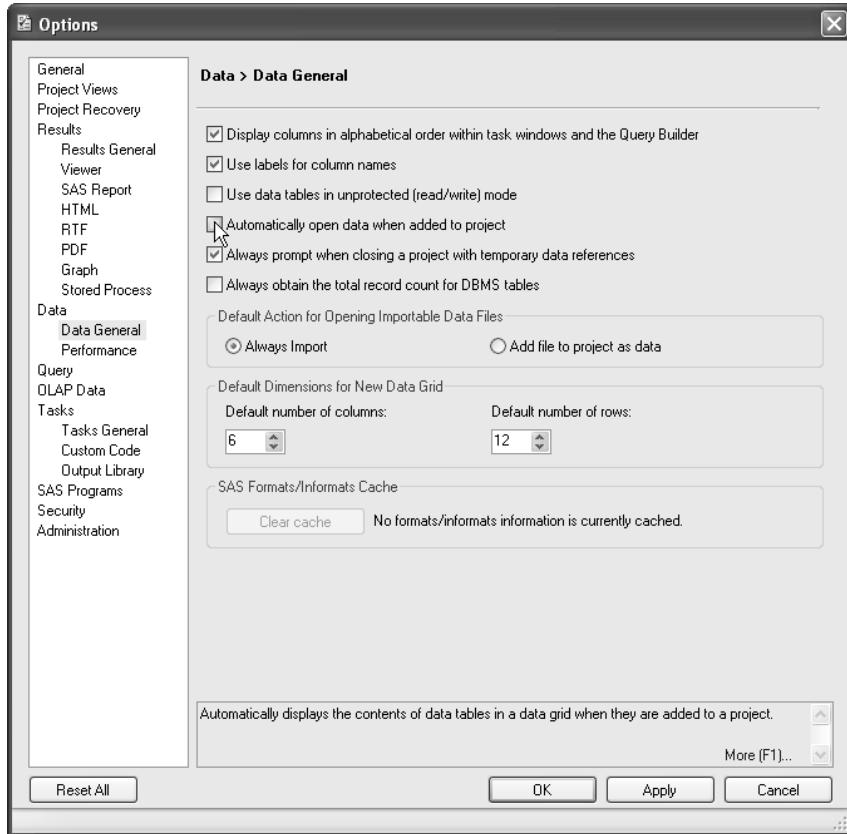


To clear the Project Log, click **Clear Log** on the workspace toolbar for the Project Log. To turn it off, click **Turn Off**.

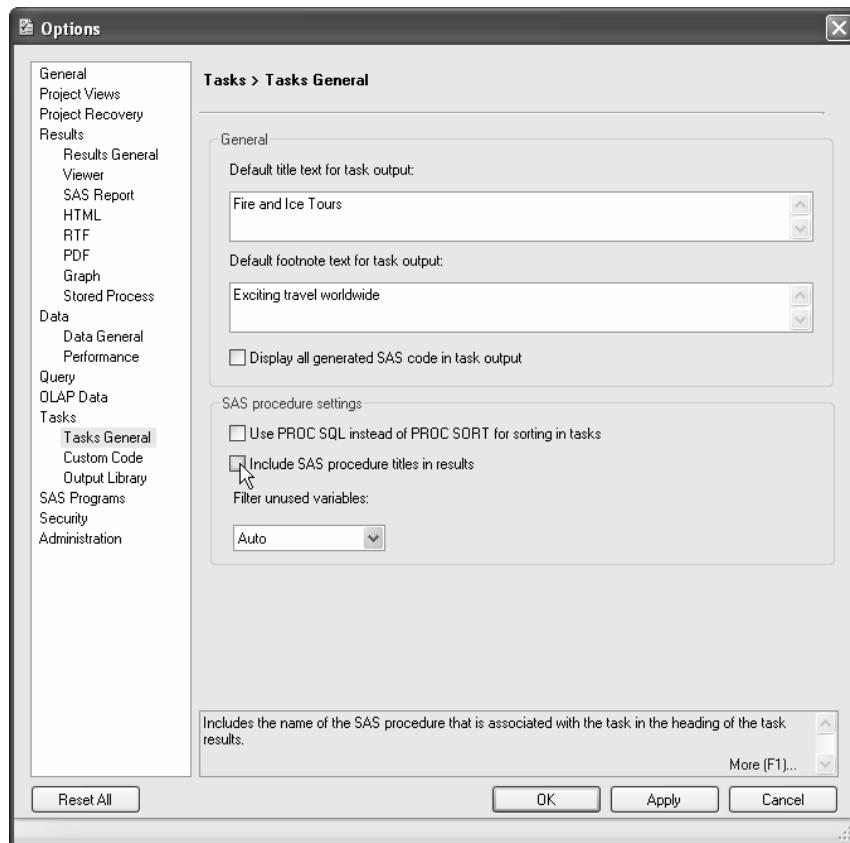
1.16 Using the Options Window

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.

Changing the way data are handled To see options for data, 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**.



Changing the default titles and footnotes To change the default titles and footnotes, click **Tasks General** in the selection pane on the left. In this page, you can specify new default titles and footnotes, or set them to blank. Some tasks 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 labeled **Include SAS procedure titles in results**.



Changing the default result format and style To change the default format for results, click **Results General** in the selection pane on the left to open the Results General page (not shown). Then check all the formats you want to use: **SAS Report**, **HTML**, **PDF**, **RTF**, or **text output**. To change the default style for results, click the name of the format (such as **PDF**) in the selection pane on the left to open a page for that format (not shown), and then select a style. See Tutorial B or Chapter 11 for more about changing result formats and styles.

Running code automatically If you have SAS code that you would like to run automatically, click **SAS Programs** in the selection pane on the left to open the SAS Programs page (not shown). Select an option under the heading **Additional SAS code**. Then click **Edit**, type your code in the Edit window, and click **Save**. The option **Submit SAS code when server is connected** is particularly useful for submitting LIBNAME statements. You can also click **Custom Code** in the selection pane on the left, and specify code to be run before or after tasks.

Restoring the window layout To restore windows to their default layout, click **General** in the selection pane on the left to open the General page (not shown). Then click the **Restore Window Layout** button.

Saving and resetting options To close the Options window and save the changes you have made, click **OK**. 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.

