

The Little SAS[®] Enterprise Guide[®] Book

Point-and-Click
Access to the
Power of SAS[®]

Susan J. Slaughter and Lora D. Delwiche

sas

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The Little SAS® Enterprise Guide® Book

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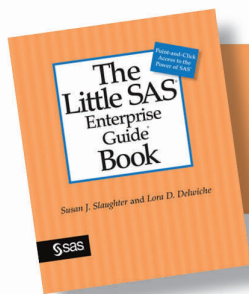
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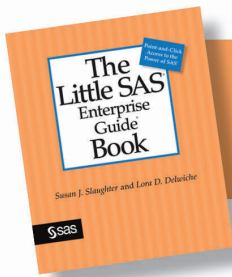
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A

Getting Started with SAS Enterprise Guide

This first tutorial will give you a basic understanding of how SAS Enterprise Guide works and how quickly tasks can be accomplished. The following topics will be covered:

- Starting SAS Enterprise Guide
- A quick tour of SAS Enterprise Guide windows
- Data types
- Entering data into the Data Grid
- Using SAS Enterprise Guide tasks
- Making changes to tasks

The data for this tutorial come from Fire and Ice Tours, a fictional company that arranges tours of volcanoes around the world. For each tour, the company keeps track of the name of the volcano, the city from which the tour departs, the number of days of the tour, and the price. Because the tours can require some physical exertion, the company gives each tour a difficulty rating: easy, moderate, or challenging.

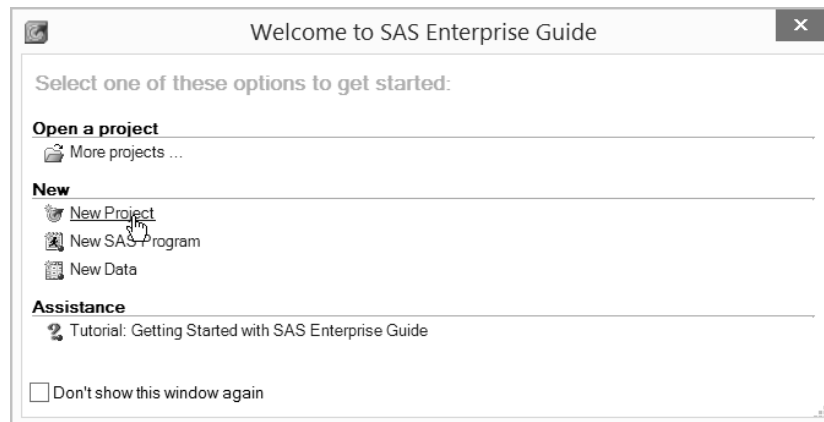


Starting SAS Enterprise Guide

Start SAS Enterprise Guide by either double-clicking the **SAS Enterprise Guide** icon on your desktop, or selecting **SAS Enterprise Guide** from the Windows **Start** menu. Starting SAS Enterprise Guide brings up the SAS Enterprise Guide window in the background, with the Welcome window in the foreground. The Welcome window allows you to choose between opening an existing project or starting a new project. Click **New Project**.

SAS Enterprise Guide Projects

SAS Enterprise Guide organizes all your work into projects. You can work on only one project at a time, and each project is stored in a single file. A project will contain all the reports that you produce, plus shortcuts to all the data files that you use.



SAS Enterprise Guide window When you first start SAS Enterprise Guide, your screen should look something like the following. There are several parts to the SAS Enterprise Guide window: some are visible, while others may be hidden or temporarily closed.

Resetting SAS Enterprise Guide Options

There are many options in SAS Enterprise Guide that affect how it works. For example, you can turn off the Welcome window, or change the default format and appearance of results. If someone has already used SAS Enterprise Guide on your computer, they may have made some changes to the initial settings. To reset all options to their original settings, select **Tools ► Options** from the menu bar. Then click **Reset All**.








Basic elements of SAS Enterprise Guide

Project Tree: This window displays your project in a hierarchical tree diagram.

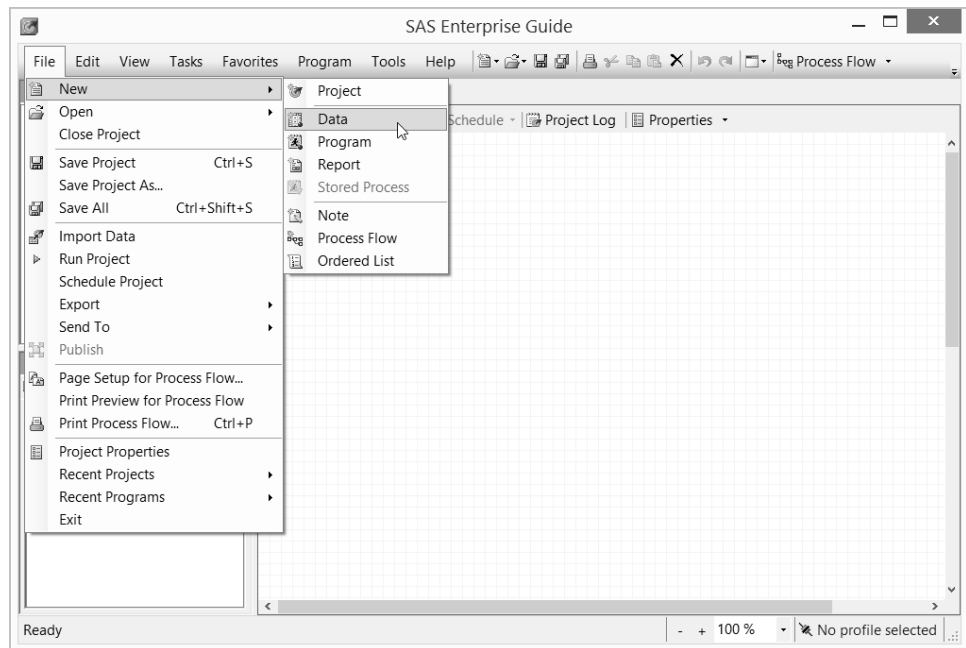
Workspace: This is a container for the Process Flow, results from tasks that you run, Data Grids, SAS code, SAS logs, and Notes.

Process Flow: This window displays a graphical representation of your project.

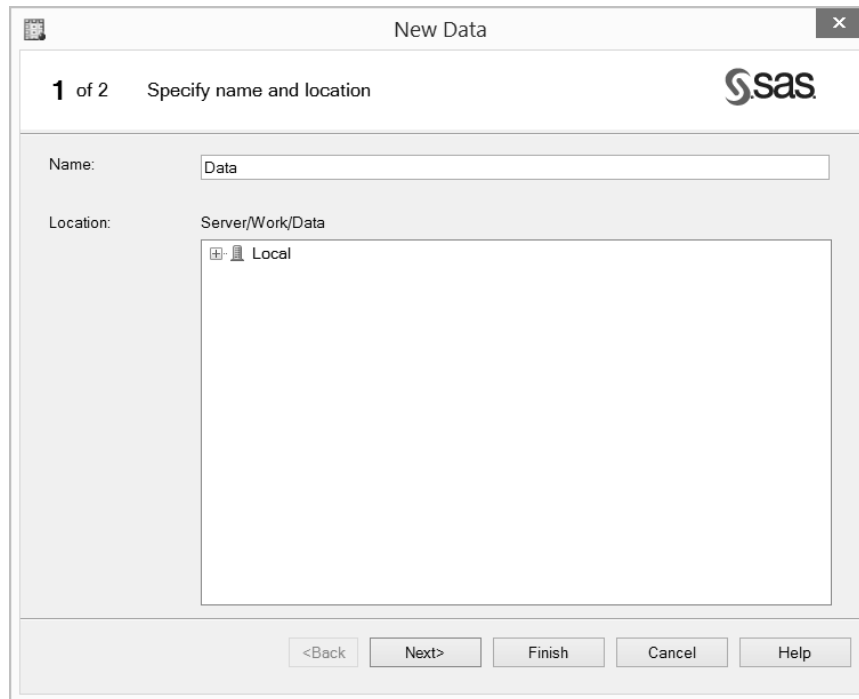
Resources pane: This pane shows either the Servers, Tasks, SAS Folders, Prompt Manager, or Data Exploration History windows. The Servers window displays all the SAS servers that you can access during your SAS Enterprise Guide session. A SAS server is any computer on which SAS software is installed. The Tasks window displays all available tasks. The SAS Folders contain links to your stored processes, information maps, and projects. The Prompt Manager displays all available prompts. The Data Exploration History provides links to any data exploration done in the project. To switch between the windows, click their icons at the top of the pane:  for Servers,  for Tasks,  for SAS Folders,  for the Prompt Manager, or  for Data Exploration History.

Task Status (not shown): When you are running a task, messages about the progress of the task appear in the Task Status window. To open the Task Status window, select **View ► Task Status** from the menu bar.

Entering data There are many ways to get data into SAS Enterprise Guide, and SAS Enterprise Guide can use data from a variety of sources including SAS data sets, Microsoft Excel files, and plain text files. For this example, you are simply going to type the data directly into SAS Enterprise Guide. To bring up the Data Grid so you can enter the data, select **File ► New ► Data** from the menu bar.



This opens the New Data wizard. In the first window of the wizard, SAS Enterprise Guide asks what you want to name the data table and where you want to save the data. The name for the data table is initially set to Data.



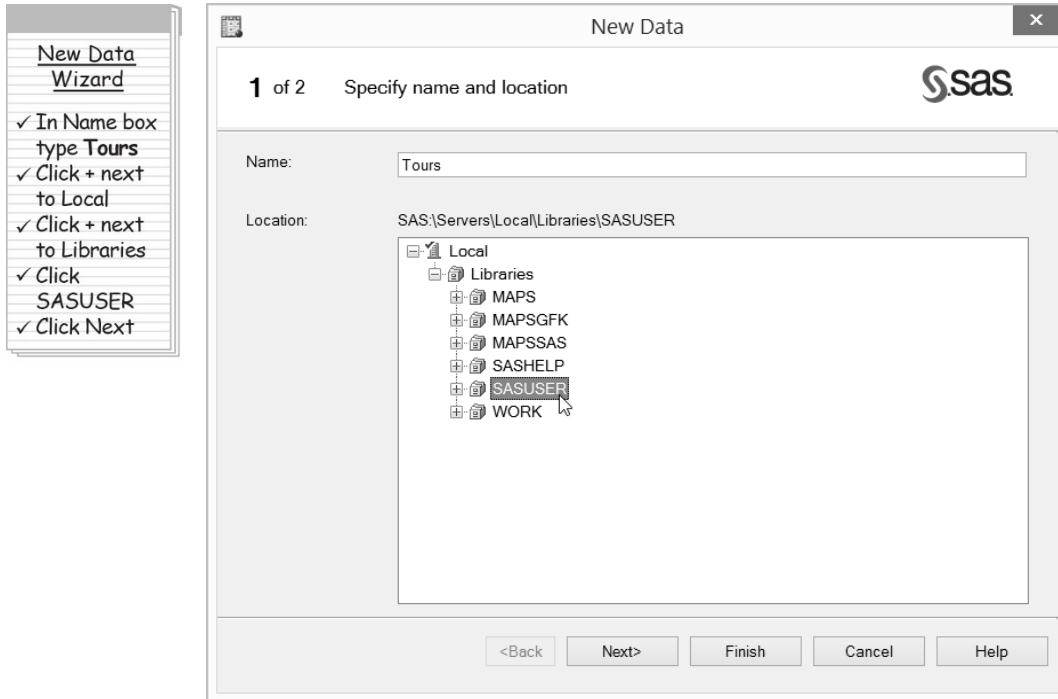
SAS Data Sets or SAS Data Tables?

A SAS data set and a SAS data table are the same thing. The two terms are used interchangeably, and you will see both terms used in this book.

Data Table Member Names

You can give your data tables almost any names you want, but the names must be 32 characters or fewer in length and not start with a period or a space. While it is possible to have special characters (including spaces) in your names, you may want to stick with just letters, numerals, and underscores. These characters are all that are allowed under the default naming rules for SAS programs. In addition, names must start with a letter or underscore. Using these rules will make it easier if you ever want to refer to your data in SAS programs that you or someone else writes.

Give the new data table the name **Tours** by typing **Tours** in the **Name** box. To see all the SAS libraries (storage locations) available to you, click the plus signs next to the words **Local** and then **Libraries**. For this example, save the data in the **SASUSER** library. Click **SASUSER** to select the **SASUSER** library. The SAS Enterprise Guide administrator at your site may have set up the **SASUSER** library so that you cannot save files there. If this is the case for you, choose an alternate library that is available to you (but do not choose **WORK** since that is a temporary storage location).

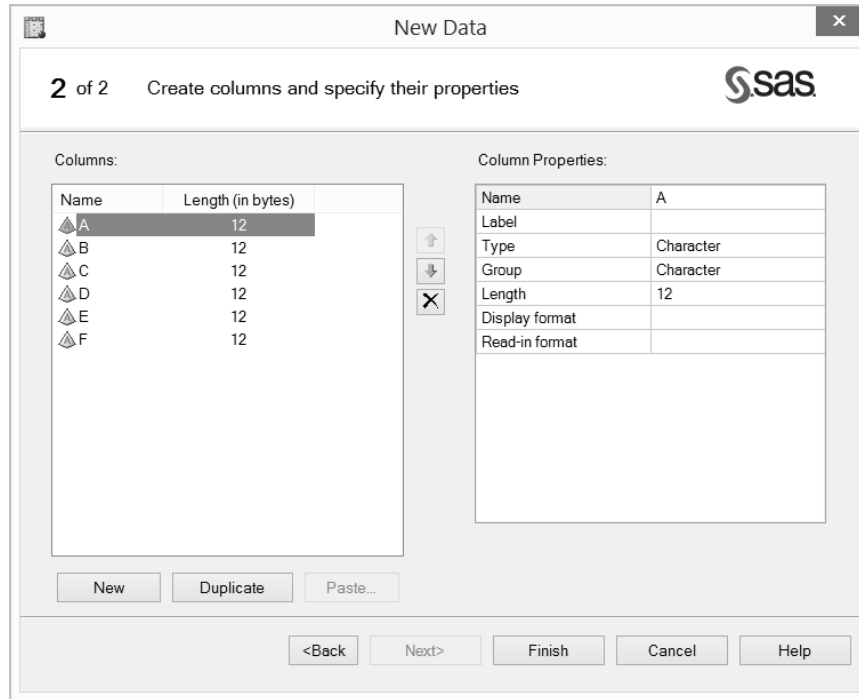


Click **Next** to open the second window of the New Data wizard.

Libraries

SAS Enterprise Guide and SAS organize SAS data tables into libraries. Libraries are locations, or folders, where data tables are stored. Instead of referring to the folders by their full path, SAS Enterprise Guide gives the folders short nicknames, called librefs. The **WORK** library points to a temporary storage location that is automatically erased when you exit SAS Enterprise Guide. The **SASUSER** library is a permanent storage location. If the **EGTASK** library is defined for your site, then data tables produced by tasks will be stored in the **EGTASK** library. If the **EGTASK** library is not defined, then data tables produced by tasks will be stored in the **SASUSER** library. Libraries can be created using the Assign Project Library wizard available from the Tools menu.

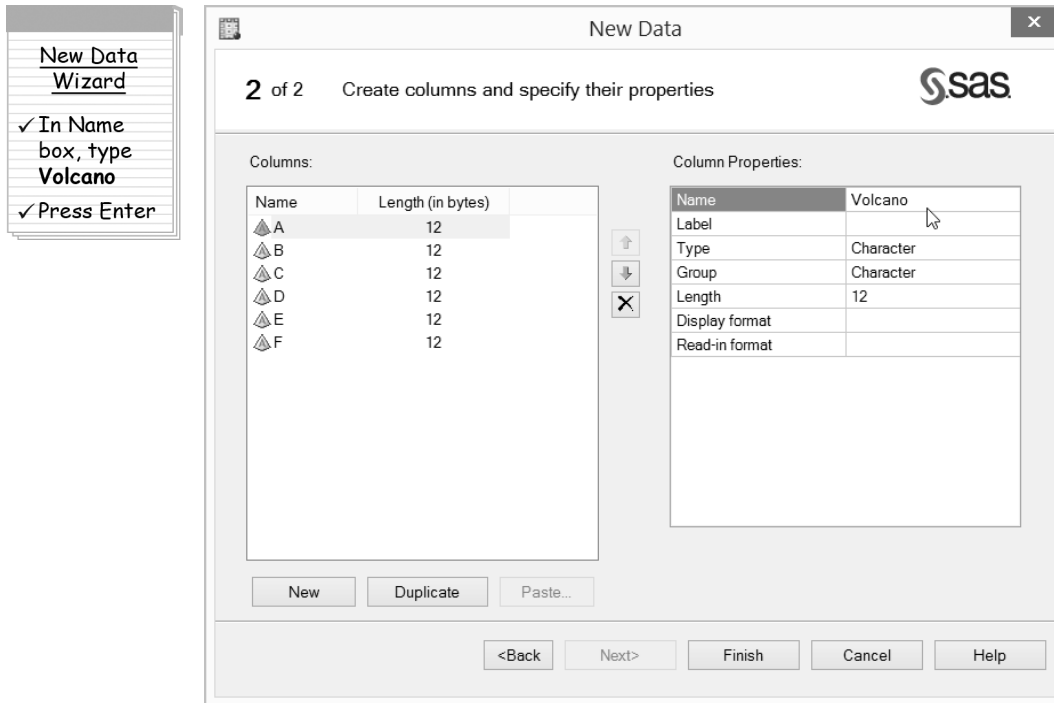
The second window of the New Data wizard is where you assign names and properties to the columns in your data table. As a starting point, the New Data wizard sets up six columns with one-letter names from A to F. All these initial columns have the same properties.



Column Names

You can give your columns almost any names you want, but the names must be 32 characters or fewer in length. While it is possible to have special characters (including spaces) in your names, you may want to stick with just letters, numerals, and underscores. These characters are all that are allowed under the default naming rules for SAS programs. In addition, names must start with a letter or underscore. Using these rules will make it easier if you ever want to refer to your data in SAS programs that you or someone else writes.

In the Column Properties box, you can assign each column a name, label, type, group, length, display format, and read-in format. The first column will contain the names of the volcanoes, so type **Volcano** in the box next to **Name**.

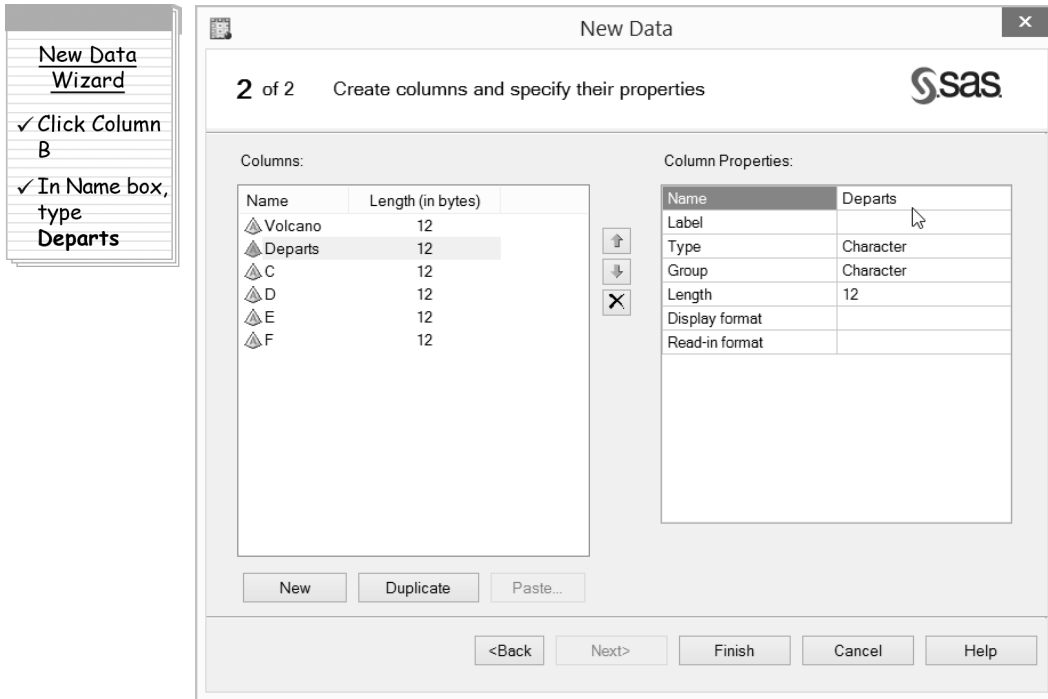


When you press **Enter**, the name you typed in the Name box will replace the name, in this case A, in the Columns box on the left. Because the names of the volcanoes contain characters, as opposed to numbers, leave the **Type** and **Group** properties as **Character**, and because none of the volcano names are longer than 12 characters, leave the **Length** set to **12**.

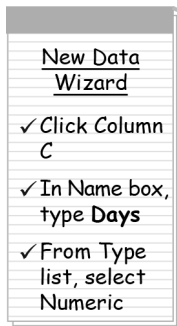
Lengths of Character Columns

The New Data wizard in SAS Enterprise Guide gives character columns a length of 12. If your character data are longer than 12 characters, you need to change the length of the column to be at least as long as the longest data value. If all your data values are shorter than 12 characters, you can shorten the length for the column. Using shorter lengths for character data decreases the storage space needed for the data table.


Now click the column named **B** in the **Columns** box on the left. This column will contain the name of the departure city for the tour, so type the word **Departs** next to **Name** in the **Column Properties** box on the right. Leave the other settings as they are.



The third column contains the number of days the tour lasts. Give it the name **Days**, and because the values in this column are numbers, use the pull-down list to select **Numeric** for the **Type** property.



New Data ✕

2 of 2 Create columns and specify their properties 

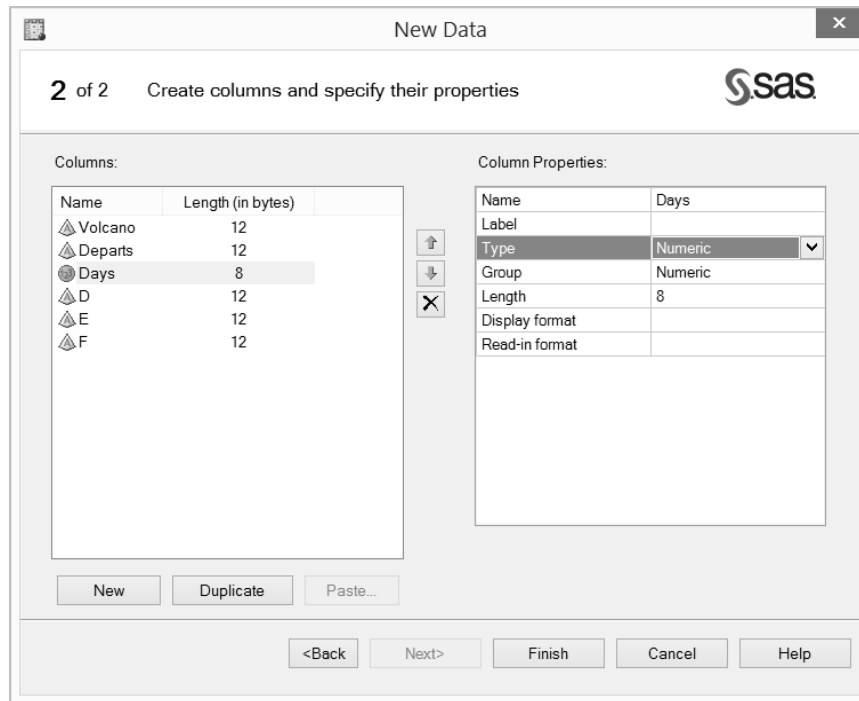
Columns:

Name	Length (in bytes)
▲ Volcano	12
▲ Departs	12
▲ Days	12
▲ D	12
▲ E	12
▲ F	12

Column Properties:

Name	Days
Label	
Type	Character ▼
Group	Numeric
Length	12
Display format	
Read-in format	

Notice that when you set the column type to numeric, the icon next to the column name changes from the red pyramid (character) to the blue ball (numeric). The length of 8 is the default for all numeric columns and means that the numbers will be stored with maximum precision. Generally, there is no need to change the length of numeric columns.




Character versus Numeric

How do you decide if a column should be character or numeric? If the values for the column have letters or special characters in them, then the column must be character. If the column contains only numerals, then it could be either character or numeric. Generally, if it does not make sense to add or subtract the values, then the column should be character.

Name the fourth column **Price** and give it the type **Numeric**. When you choose the numeric type, you have several options for **Group**: numeric, date, time, and currency. Because Price will contain currency values, select the group **Currency**.

- New Data Wizard
- ✓ Click Column D
 - ✓ In Name box, type **Price**
 - ✓ From Type list, select **Numeric**
 - ✓ From Group list, select **Currency**

New Data x

2 of 2 Create columns and specify their properties 

Columns:


Name	Length (in bytes)
▲ Volcano	12
▲ Departs	12
⌚ Days	8
● Price	8
▲ E	12
▲ F	12

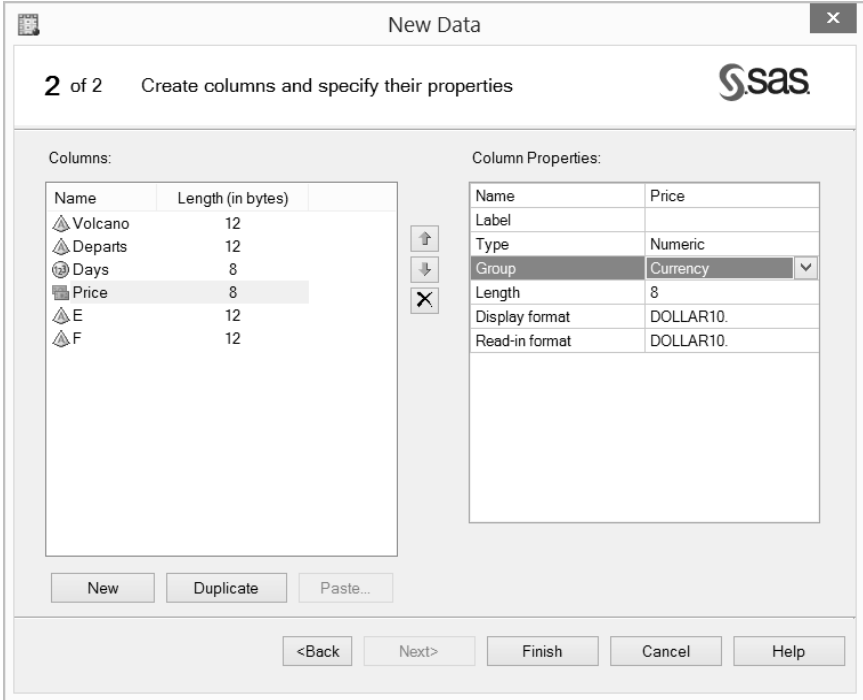
Column Properties:

Name	Price
Label	
Type	Numeric
Group	Numeric ▼
Length	Numeric
Display format	Date
Read-in format	Time
	Currency

Numeric Groups

By choosing a group for your numeric column, what you are doing is assigning a format to your column. A format is a way of displaying the values in the column. If you choose currency, then when you type a number like 1200, SAS Enterprise Guide will automatically display the number as \$1,200. SAS Enterprise Guide has made it easy for you to assign some of the frequently used formats to your columns.


Notice that when you do this, the icon changes from the blue ball to the currency icon .



The final column will contain the difficulty ratings of each tour. The most challenging tours have values of **c**, the moderately challenging tours have values of **m**, while the easiest tours have values of **e**. Give the column the name **Difficulty** and because the values for the column are single characters, change the length to **1**. You could leave the column as length 12, but then the column would take more storage space than it really needs.

- New Data Wizard
- ✓ Click Column E
 - ✓ In Name box, type **Difficulty**
 - ✓ In Length box, type 1
 - ✓ Press Enter

New Data ×

2 of 2 Create columns and specify their properties 

Columns:


Name	Length (in bytes)
▲ Volcano	12
▲ Departs	12
▲ Days	8
▲ Price	8
▲ Difficulty	1
▲ F	12

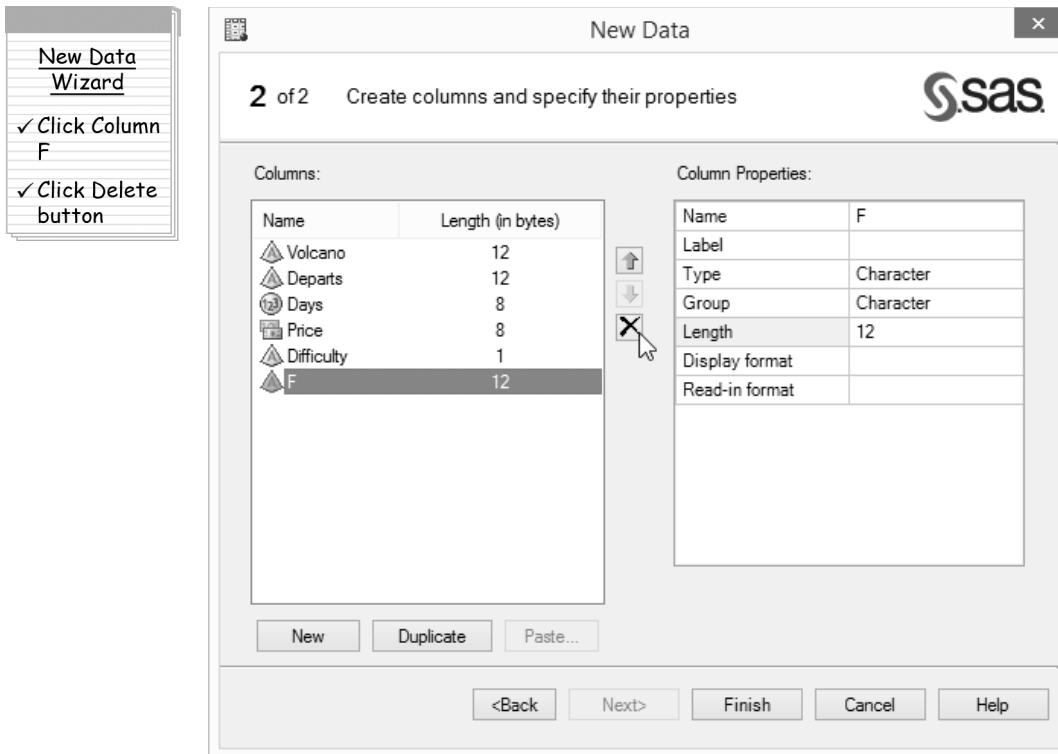
Column Properties:

Name	Difficulty
Label	
Type	Character
Group	Character
Length	1
Display format	
Read-in format	

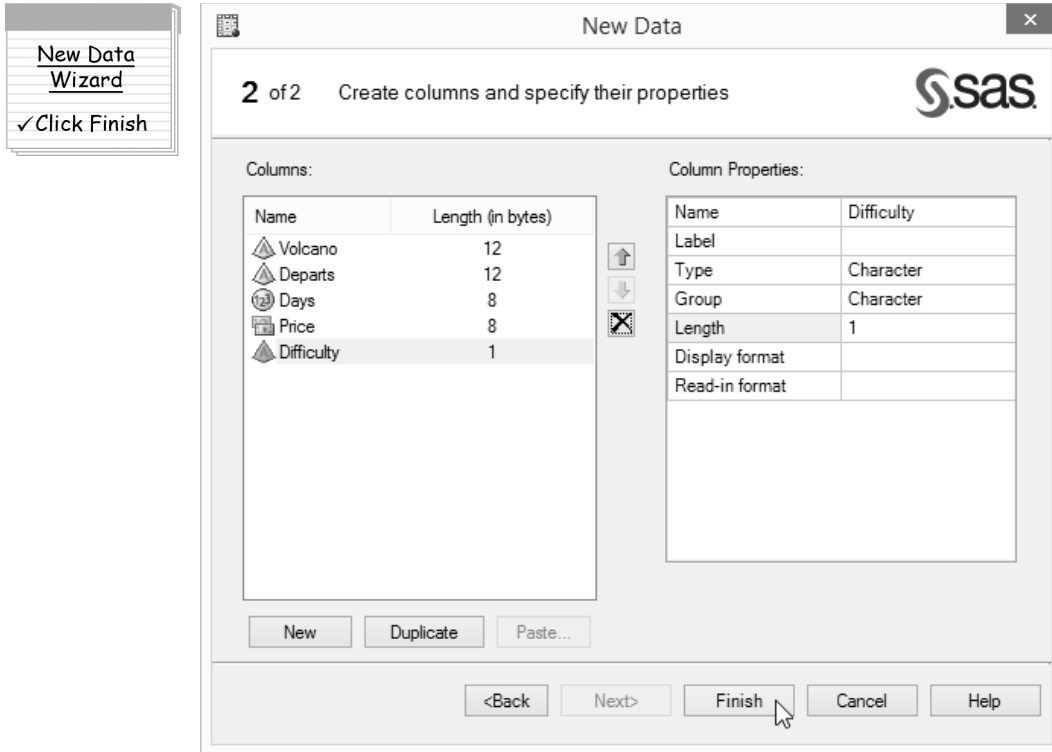
New Duplicate Paste...

<Back Next> Finish Cancel Help

Now the properties for all the columns have been set. However, there is one extra column: column F. Delete the unnecessary column by clicking it in the **Columns** box and then clicking the delete button  to the right of the **Columns** box.

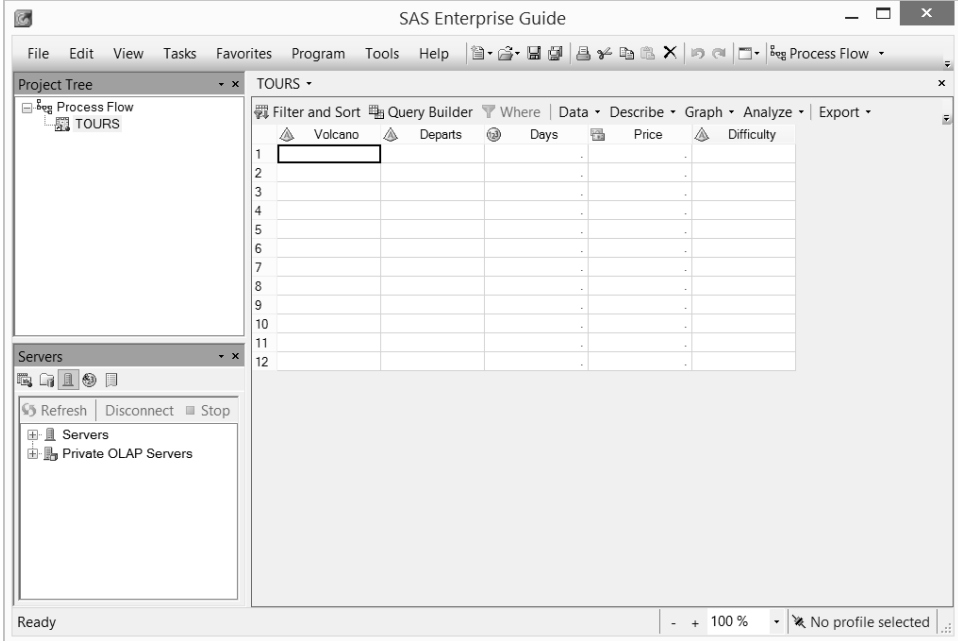


Now all the columns have been given names and properties, and there are no extra columns.



Click **Finish** to create the new data table. The Tours data table appears in a Data Grid in the workspace with all the columns that you just defined. There is also an icon for the Tours data table in the Project Tree under the words Process Flow.

Notice that the numeric columns, Days and Price, have periods in the data cells. This is because in SAS Enterprise Guide missing numeric values are represented by a single period, whereas missing character values are represented by blanks. Because no data have been entered into the Data Grid, all the values are missing.



The screenshot displays the SAS Enterprise Guide interface. The main window is titled "SAS Enterprise Guide" and contains a menu bar (File, Edit, View, Tasks, Favorites, Program, Tools, Help) and a toolbar. On the left, there is a "Project Tree" showing a "Process Flow" with a "TOURS" object. Below it is a "Servers" panel with "Refresh", "Disconnect", and "Stop" buttons, and a tree view showing "Servers" and "Private OLAP Servers". The central area is a "Data Grid" for the "TOURS" object. The grid has columns for "Volcano", "Departs", "Days", "Price", and "Difficulty". The rows are numbered 1 through 12. All cells in the grid are empty, indicating missing data. The status bar at the bottom shows "Ready", a zoom level of "100%", and "No profile selected".

	Volcano	Departs	Days	Price	Difficulty
1			.	.	.
2			.	.	.
3			.	.	.
4			.	.	.
5			.	.	.
6			.	.	.
7			.	.	.
8			.	.	.
9			.	.	.
10			.	.	.
11			.	.	.
12			.	.	.

You can now start entering the data into the Data Grid. To enter data into the Data Grid, simply click a cell and start typing the data. Click the first cell in the **Volcano** column and type the volcano name **Etna**.

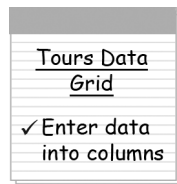


TOURS ▾

Filter and Sort Query Builder Where Data Describe Graph Analyze Exp

	Volcano	Departs	Days	Price	Difficulty
1	Etna				
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

To move over to the next column, press the **Tab** key. To move down to the cell below, press the **Enter** key. You can also use the arrow keys to move around in the Data Grid, or you can simply click the cell where you want to type. Enter all the data for the volcano tours so that your Data Grid looks like the following. Notice that when you enter the data for the Price column, you do not need to enter the dollar signs and commas. Simply enter the numerals that make up the number, and then when you move on to another cell, SAS Enterprise Guide will give your number the proper formatting.



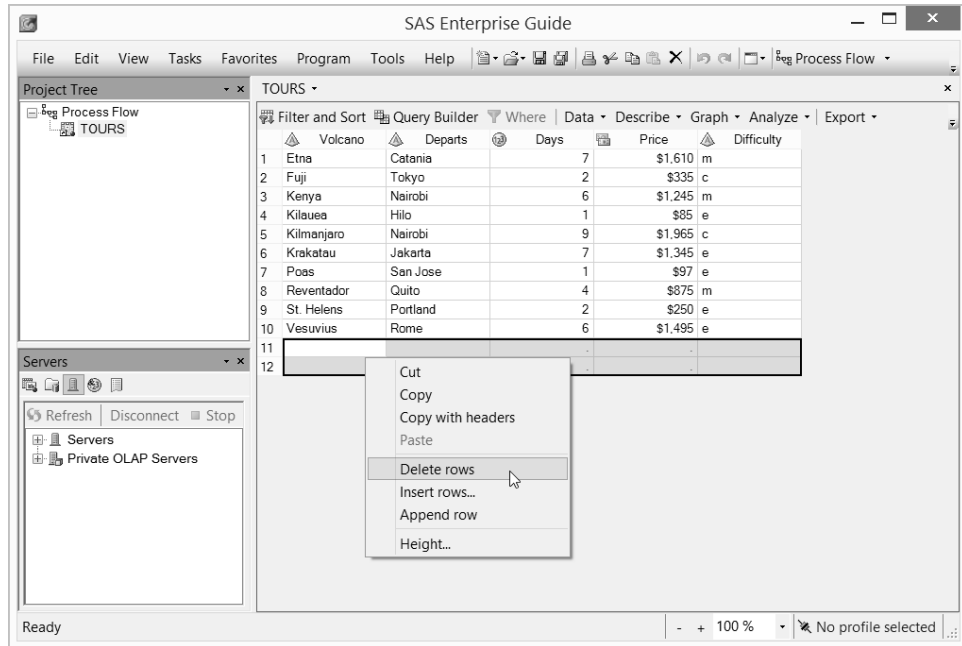
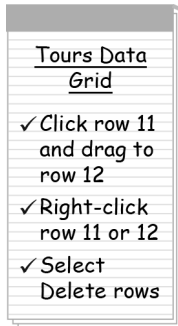
TOURS ▾

Filter and Sort Query Builder Where Data Describe Graph Analyze Exp

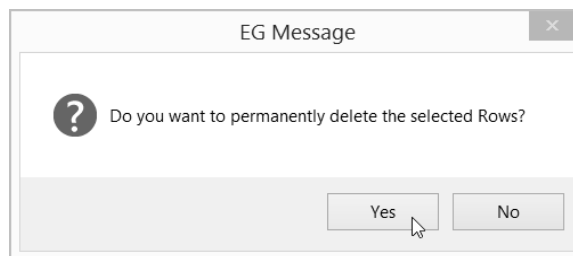
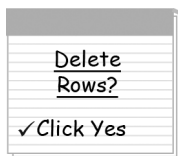
	Volcano	Departs	Days	Price	Difficulty
1	Etna	Catania	7	\$1,610	m
2	Fuji	Tokyo	2	\$335	c
3	Kenya	Nairobi	6	\$1,245	m
4	Kilauea	Hilo	1	\$85	e
5	Kilmanjaro	Nairobi	9	\$1,965	c
6	Krakatau	Jakarta	7	\$1,345	e
7	Poas	San Jose	1	\$97	e
8	Reventador	Quito	4	\$875	m
9	St. Helens	Portland	2	\$250	e
10	Vesuvius	Rome	6	\$1,495	e
11					
12					

If you need to go back and make any changes, just click the cell and type the new data value.

By default, SAS Enterprise Guide provides 12 rows for data entry. If you have more than 12 rows of data, then you can press the **Enter** key from any cell in the last row and SAS Enterprise Guide will automatically generate a new blank row for you. Because there are only 10 tours in this data file, you will need to delete the two extra blank rows. If you don't delete the blank rows, then all the values for those rows will be missing, and these missing values will appear in any report or analysis that you perform. Highlight both blank rows by clicking row 11 and dragging the cursor to row 12. Then right-click one of the rows and select **Delete rows**.



Confirm that you want to delete the rows by clicking **Yes** in the pop-up dialog box.

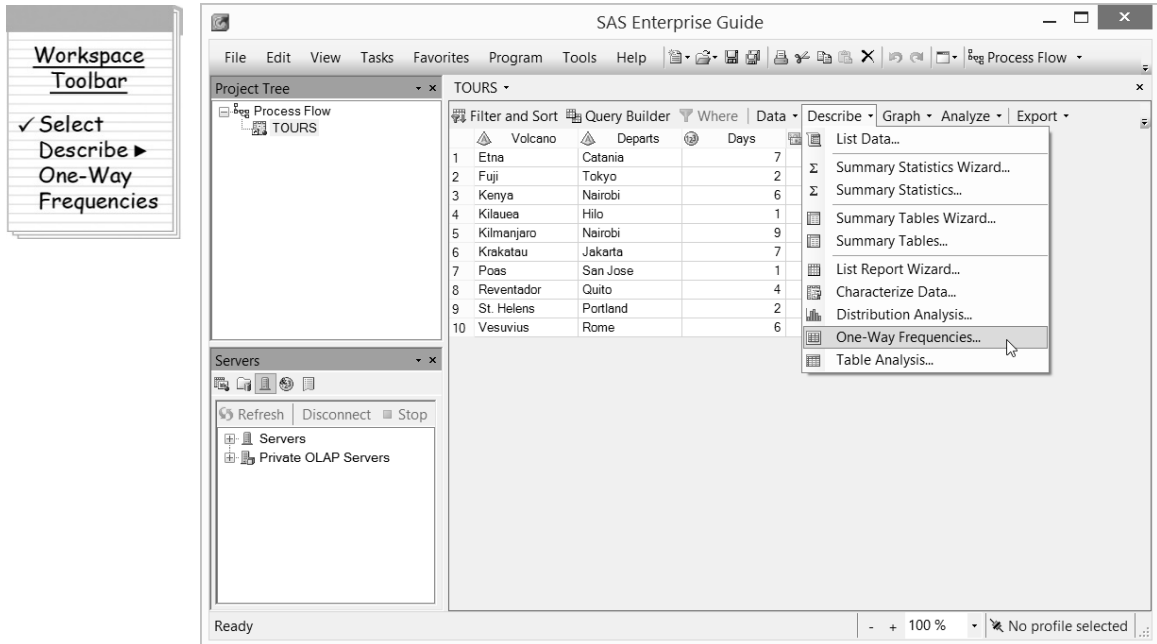


Now the Data Grid is completely filled without any extra rows or columns.

The screenshot displays the SAS Enterprise Guide interface. The main window shows a data grid with the following columns: Filter and Sort, Query Builder, Where, Days, Price, and Difficulty. The data grid contains 10 rows of data, each representing a volcano tour. The status bar at the bottom indicates 'Ready' and 'No profile selected'.

	Volcano	Departs	Days	Price	Difficulty
1	Etna	Catania	7	\$1,610	m
2	Fuji	Tokyo	2	\$335	c
3	Kenya	Nairobi	6	\$1,245	m
4	Kilauea	Hilo	1	\$85	e
5	Kilimanjaro	Nairobi	9	\$1,965	c
6	Krakatau	Jakarta	7	\$1,345	e
7	Poas	San Jose	1	\$97	e
8	Reventador	Quito	4	\$875	m
9	St. Helens	Portland	2	\$250	e
10	Vesuvius	Rome	6	\$1,495	e

Creating a frequency report To create a simple frequency report that will show the number of easy, moderate, and challenging tours, use the One-Way Frequencies task. Select **Describe ► One-Way Frequencies** from the workspace toolbar located just above the data.

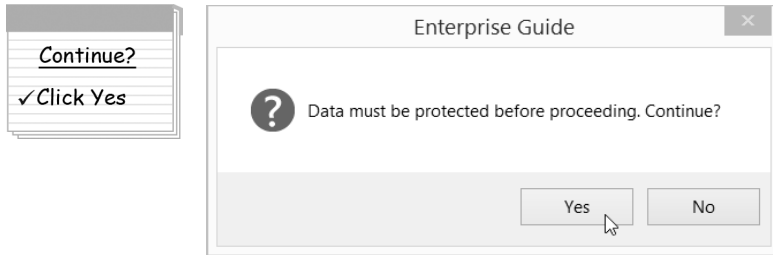


Opening Tasks and Wizards

You can open tasks by selecting them from the workspace toolbar of a Data Grid, the **Tasks** item on the menu bar, or the Task List window. Use whichever method feels more comfortable for you. In the tutorials, we describe how to open tasks using the workspace toolbar.

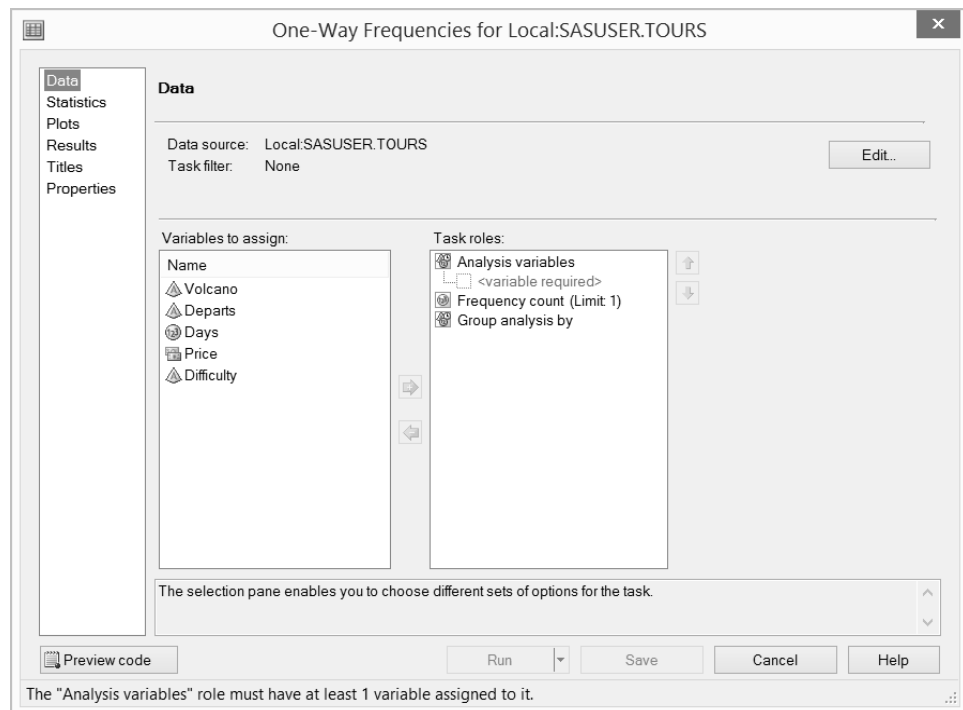
Some tasks have wizards in addition to the regular task window. A wizard guides you through the task one window at a time and gives access to some of the features of the task. Not all tasks have wizards, but if a task does have a wizard, it will be listed next to the task in the pull-down list.

Because the data have just been entered into the Data Grid, the following dialog box appears.

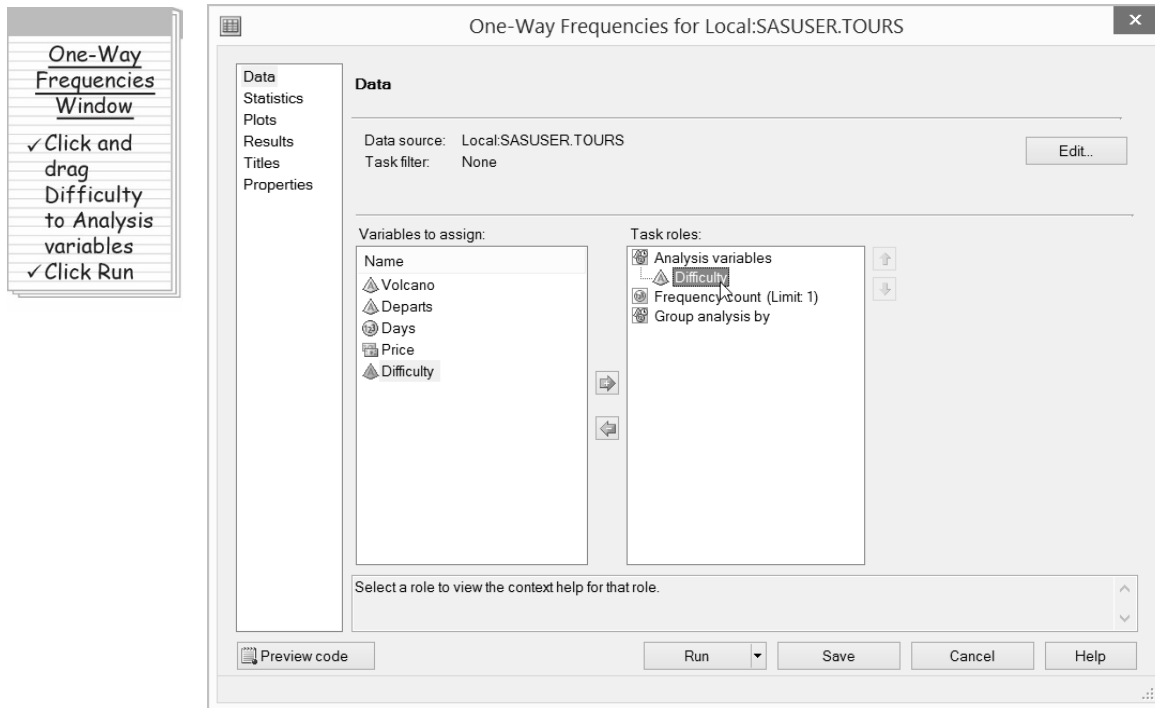


Data must be protected before you can perform any task on your data. Protecting the data ensures that the data cannot be accidentally changed. If your data are not protected, SAS Enterprise Guide will prompt you. Click **Yes**.

This opens the One-Way Frequencies task window, which has six pages: Data, Statistics, Plots, Results, Titles, and Properties. When you first open the task, the Data page will be displayed. All six pages for the task are listed in the selection pane on the left, with the displayed page highlighted.



For most tasks that you perform in SAS Enterprise Guide, you will need to assign variables to roles. To produce a report with the number of tours in each category of the variable **Difficulty**, click the variable **Difficulty** and drag it to the **Analysis variables** role.



Click **Run** to run the task and produce your report.

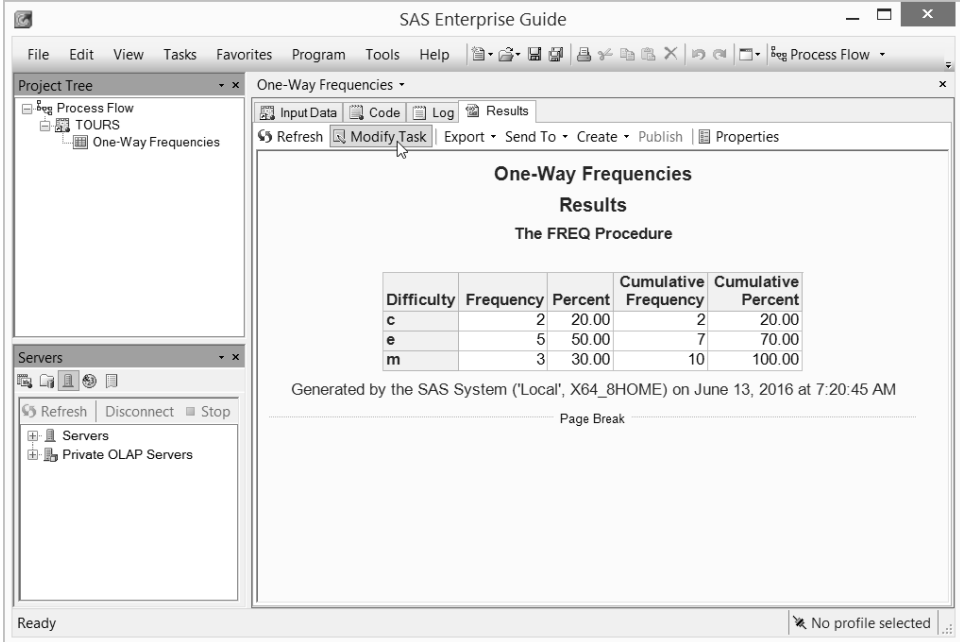
Columns or Variables?

A column and a variable are the same thing. The two terms are used interchangeably, and you will see both terms used in SAS Enterprise Guide. For example, the One-Way Frequencies task uses the term “variable,” while the Scatter Plot task uses the term “column.” Just remember, a variable is a column, and a column is a variable.

The results from the task appear in the workspace on the Results tab. Along with the Results tab, the task has also generated an Input Data tab, a Code tab, and a Log tab. The Input Data tab contains the data used in the task. The Code tab shows the SAS code generated by the task, and the Log tab shows the code along with any messages SAS produced while running the task. The results show that two tours are challenging, five are easy, and three are moderate.

**Workspace
Toolbar**

✓ Click Modify
Task



One-Way Frequencies
Results
The FREQ Procedure

Difficulty	Frequency	Percent	Cumulative Frequency	Cumulative Percent
c	2	20.00	2	20.00
e	5	50.00	7	70.00
m	3	30.00	10	100.00

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Page Break

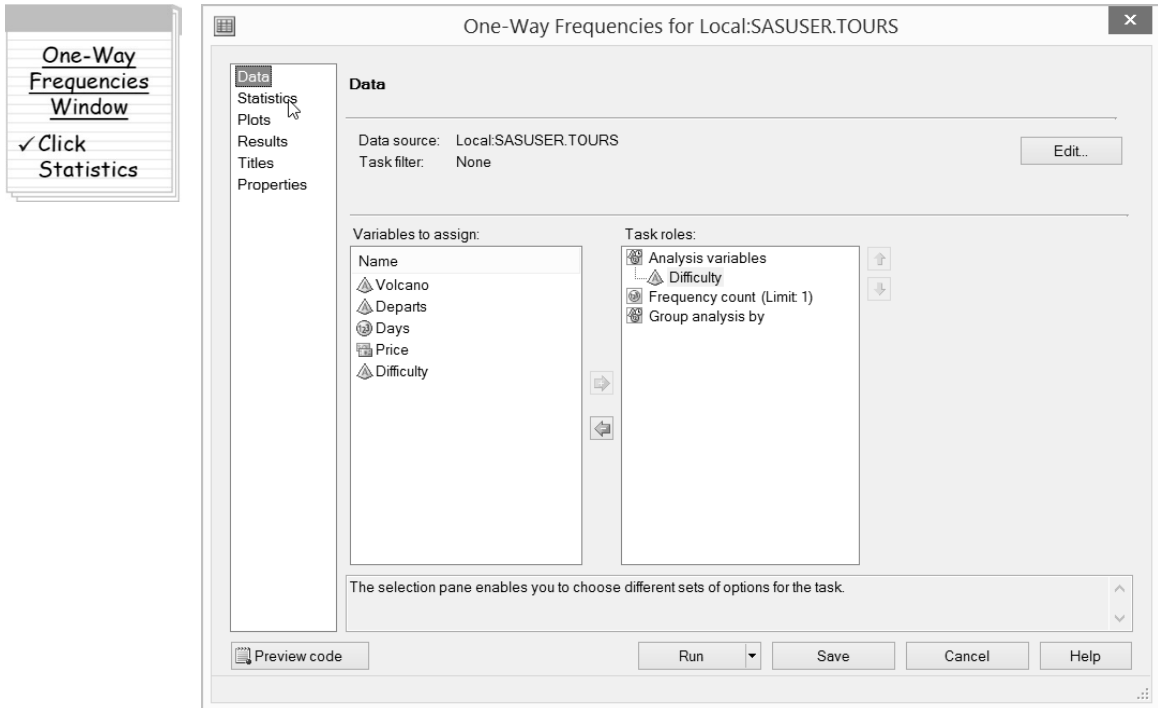
Ready No profile selected

To make changes to the task and modify the results, click **Modify Task** on the workspace toolbar to reopen the task. This reopens the One-Way Frequencies task.

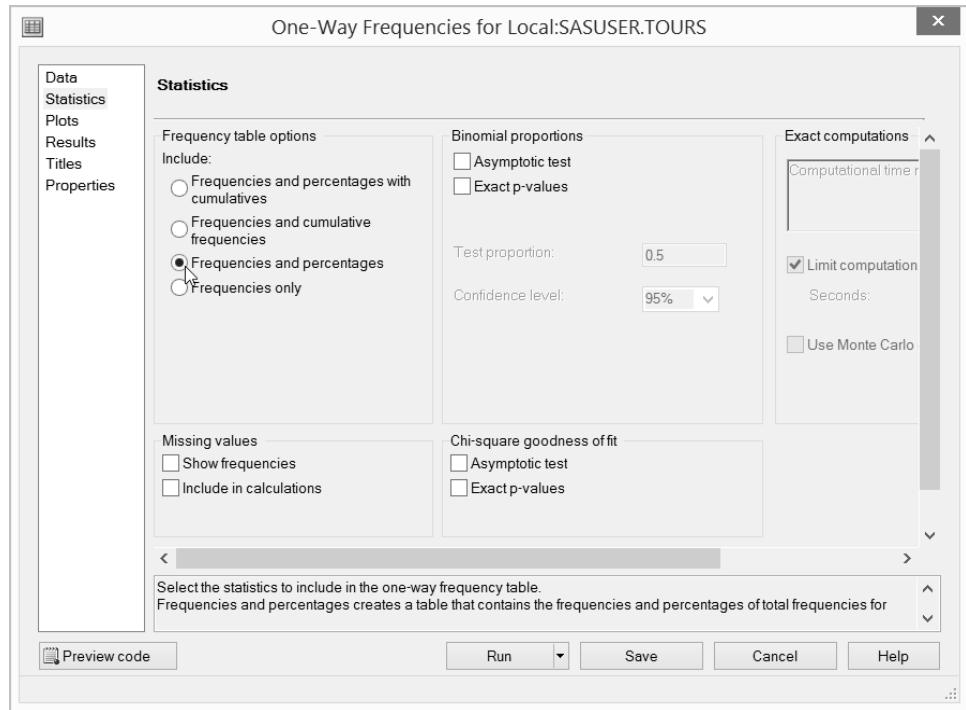
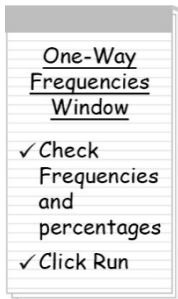
Workspace Toolbar

The workspace toolbar gives you quick access to many features you might want when viewing a particular item in the workspace. For example, the **Modify Task** button appears on the toolbar when you are viewing the results, log, or code for a task.

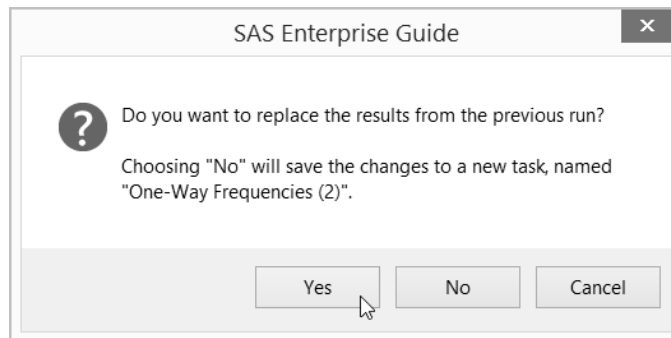
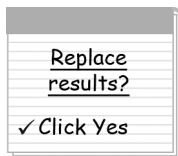
Notice that when you reopen the task, all the choices you made are still there. For this example, we are going to remove the cumulative statistics from the table, so click **Statistics** in the selection pane on the left to open the Statistics page.



There are many options in the Statistics page. In the area labeled **Frequency table options**, you can choose which frequencies and percentages will appear in the table. By default, frequencies, percentages, cumulative frequencies, and cumulative percentages will appear in the table. To exclude the cumulative statistics, check **Frequencies and percentages**.



Rerun the task by clicking the **Run** button at the bottom of the window. When you do this, SAS Enterprise Guide gives you a choice. You can either replace the results that you generated the last time you ran the task, or you can create new results.



In this case, there is no reason to keep the old results, so click **Yes**.

Here are the results that will appear in the workspace showing just the frequencies and percentages without the cumulative statistics.

One-Way Frequencies		
Results		
The FREQ Procedure		
Difficulty	Frequency	Percent
c	2	20.00
e	5	50.00
m	3	30.00

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Page Break

Creating a scatter plot To generate a scatter plot of the data, you will need to use a different task. First reopen the Tours data table to display the data. Right-click the **TOURS** data table icon in the Project Tree and select **Open TOURS**.

- Project Tree
- ✓ Right-click TOURS icon
 - ✓ Select Open TOURS

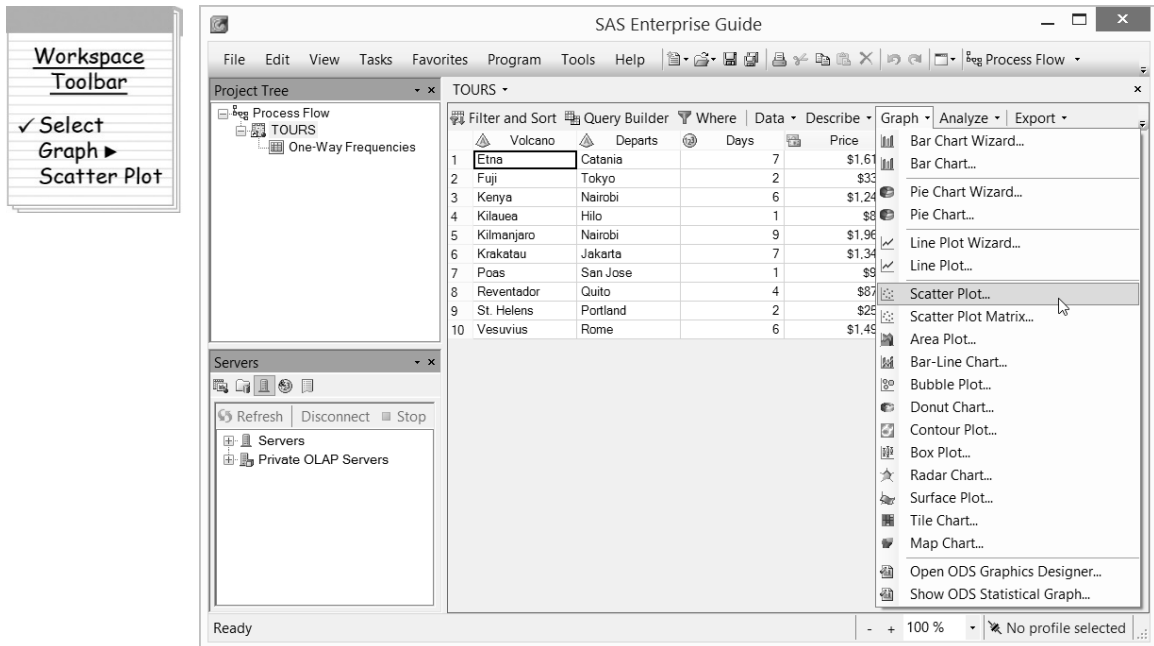
The screenshot shows the SAS Enterprise Guide interface. On the left, the Project Tree pane shows a tree structure with 'TOURS' selected. A context menu is open over 'TOURS', and the 'Open TOURS' option is highlighted. To the right, the main workspace displays the 'One-Way Frequencies Results' table, which is identical to the one shown in the previous figure. The table shows the frequency and percentage for each difficulty level: c (2, 20.00), e (5, 50.00), and m (3, 30.00). The status bar at the bottom indicates 'Ready' and 'No profile selected'.

One-Way Frequencies		
Results		
The FREQ Procedure		
Difficulty	Frequency	Percent
c	2	20.00
e	5	50.00
m	3	30.00

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Page Break

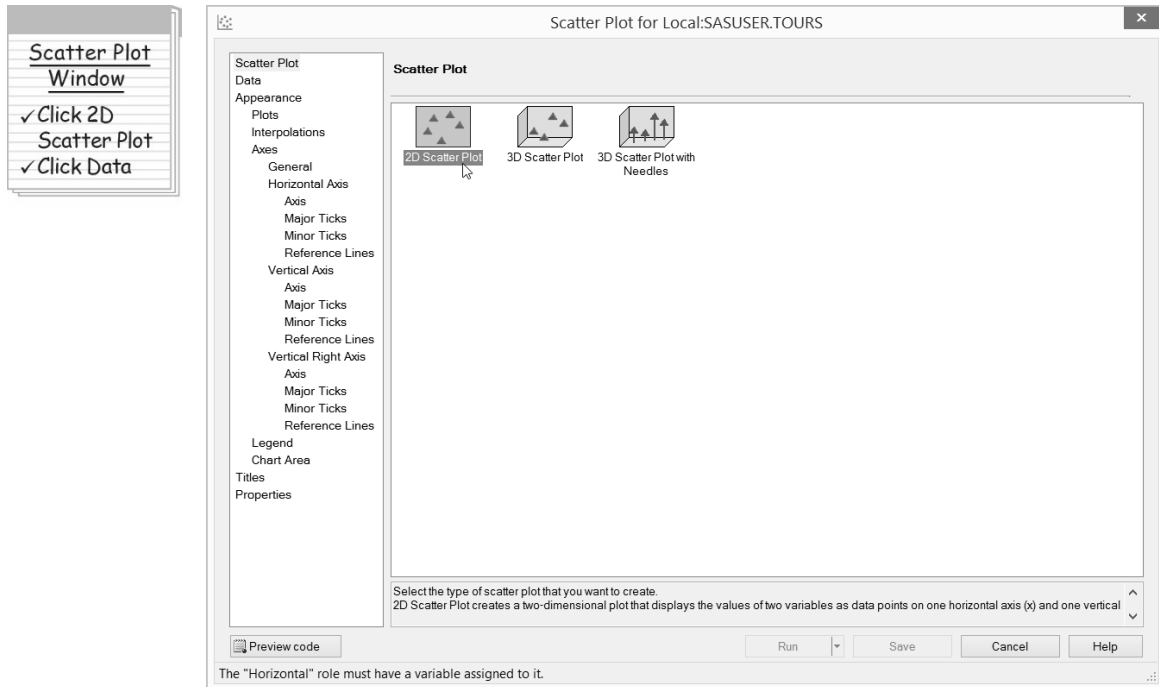
With the Tours data table open in the workspace, the workspace toolbar now shows menu items that apply to data. Select **Graph ► Scatter Plot**.



Opening Data Tables in the Workspace

There are several ways to display data tables in the workspace. You can right-click the data table icon in the Project Tree or Process Flow and select Open. You can double-click the data table icon in the Project Tree or Process Flow. Or, if you have run a task using the data, you can click the **Input Data** tab in the workspace to view the input data for the task.

This opens the Scatter Plot window. Before assigning roles to columns, you need to choose the type of scatter plot to produce. A simple two-dimensional scatter plot is appropriate for this report, so click **2D Scatter Plot**.



Next, click **Data** in the selection pane on the left to assign columns to roles.

For this plot, the column **Days** should be on the horizontal axis, and the column **Price** should be on the vertical axis. So, click **Days** and drag it to the **Horizontal** task role, and click **Price** and drag it to the **Vertical** task role.

Scatter Plot Window

- ✓ Click and drag Days to Horizontal role
- ✓ Click and drag Price to Vertical role
- ✓ Click Run

Scatter Plot for Local:SASUSER.TOURS

Scatter Plot
Data
Appearance
Plots
Interpolations
Axes
General
Horizontal Axis
Axis
Major Ticks
Minor Ticks
Reference Lines
Vertical Axis
Axis
Major Ticks
Minor Ticks
Reference Lines
Vertical Right Axis
Axis
Major Ticks
Minor Ticks
Reference Lines
Legend
Chart Area
Titles
Properties

Data

Data source: Local:SASUSER.TOURS
Task filter: None

Columns to assign:

Name
Volcano
Departs
Days
Price
Difficulty

Task roles:

Horizontal (Limit 1)
Days
Vertical (Limit 1)
Price
Vertical (Right) (Limit 1)
Group charts by

Summarize for each distinct horizontal value

Function:
Sum

Select a role to view the context help for that role.

Preview code Run Save Cancel Help

The Scatter Plot task has many groups of options, but to produce a simple plot, there is no need to change anything else. Click **Run**.

Here are the results of the Scatter Plot task that appear in the workspace.

Menu Bar

✓ Click
Process Flow

Days	Price
1	\$0
2	\$300
2	\$250
4	\$900
6	\$1250
6	\$1500
7	\$1350
7	\$1600
9	\$2000

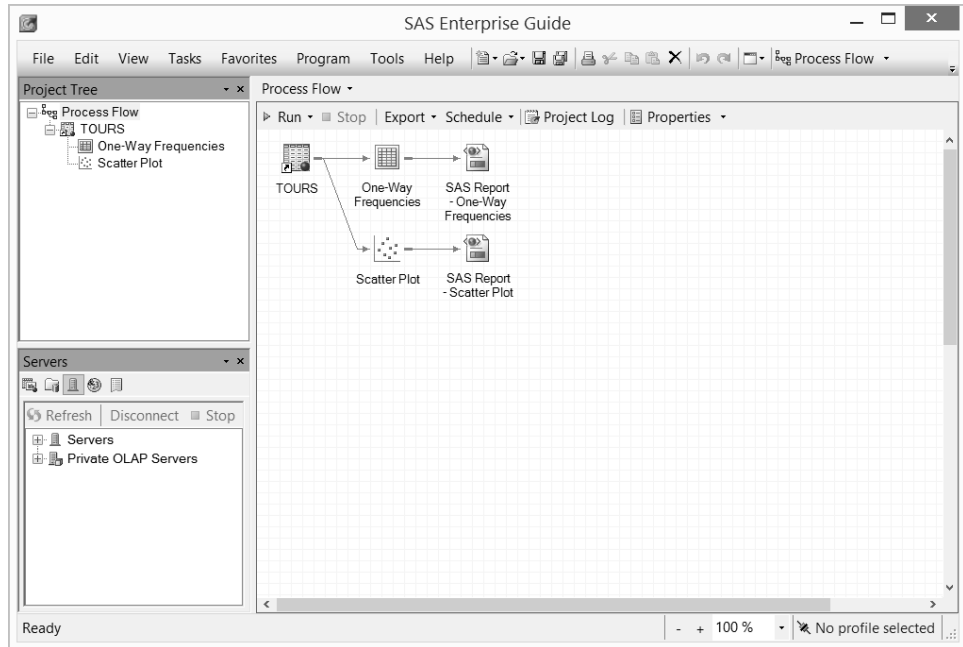
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Page Break

Now click **Process Flow** on the menu bar and take a look at the Process Flow.

Displaying the Process Flow

There are several ways to display the Process Flow in the workspace. You can select it from the Process Flow drop-down list on the menu bar, double-click its name in the Project Tree, select it from the **View** menu, select it from the drop-down list located above the workspace but below the main toolbar, or press **F4**.

Both the Project Tree and the Process Flow show the various parts of your project and how they are related. In the Process Flow, you can see that there are two arrows coming from the Tours data table. There is an arrow for the One-Way Frequencies task and one for the Scatter Plot task. Each task produces a report. The Process Flow makes it easy to see how the different parts of the project are related.



An alternate view of your project can be found in the Project Tree. The Project Tree displays the same elements as the Process Flow, except they are arranged in a hierarchical tree diagram. The Project Tree is always visible, but since the Process Flow is in the workspace, it sometimes gets hidden by other items.

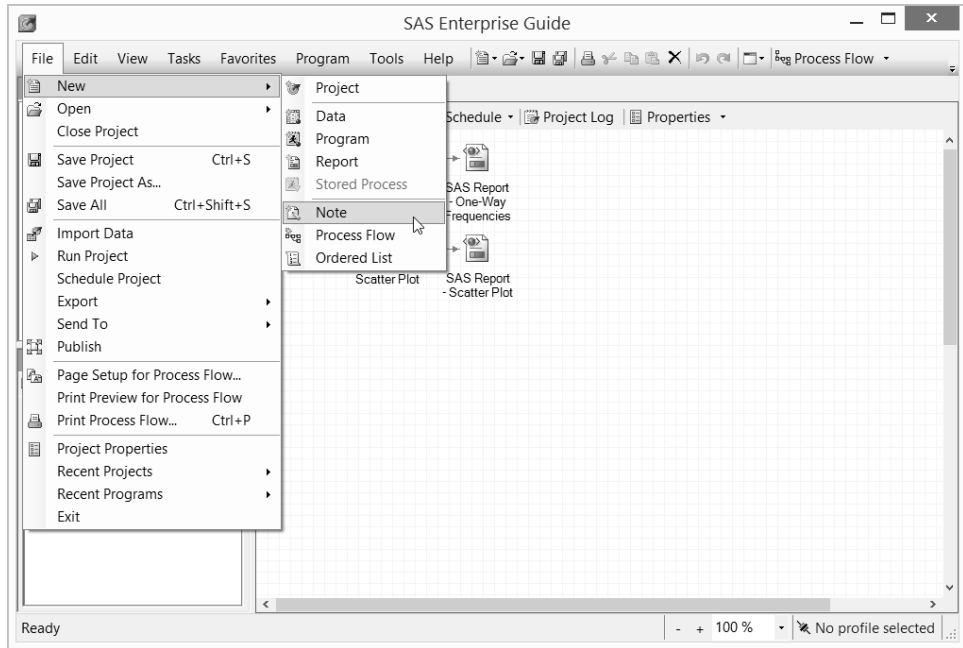
Project Tree

- ✓ Click Process Flow

Menu Bar

- ✓ Select File ► New ► Note

Adding a note to the project A nice feature of SAS Enterprise Guide is that you can add notes to your projects to document them. To add a note to the project, click the words **Process Flow** in the Project Tree so that the note will be associated with the entire process flow instead of a particular item. Then select **File ► New ► Note** from the menu bar.

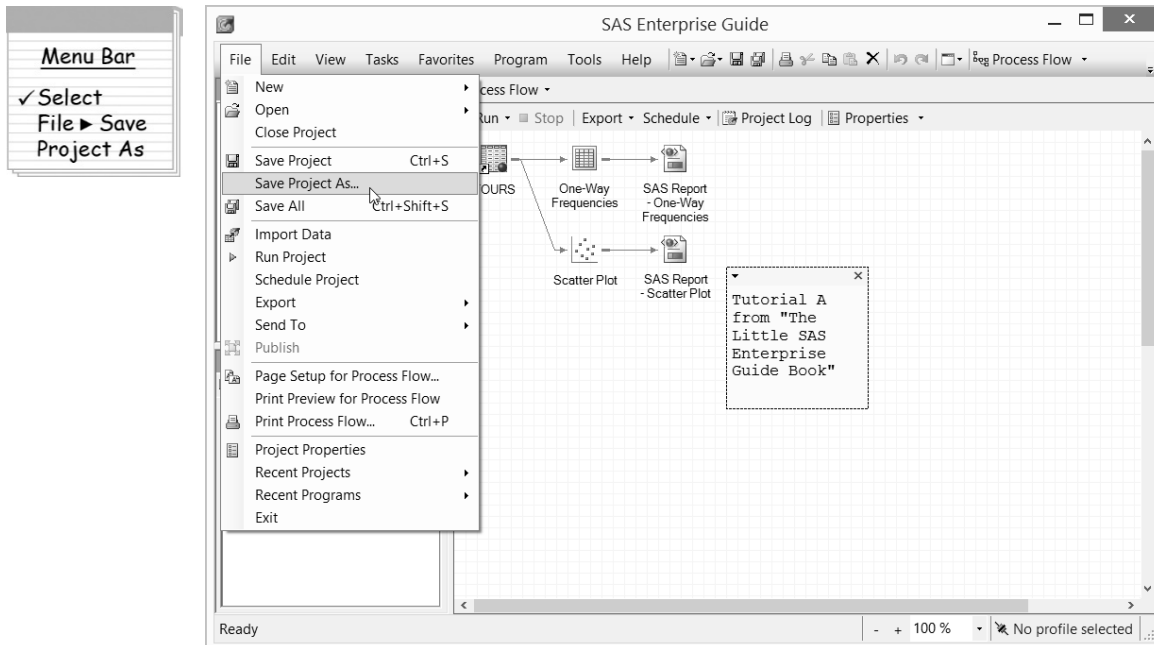


Enter a brief description of the project in the Note text box that appears in the workspace.

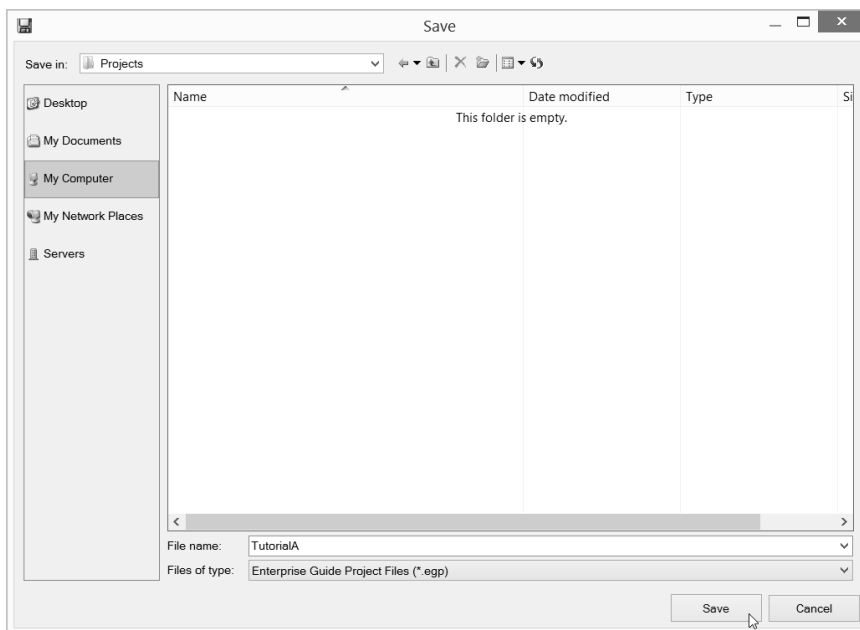
The screenshot displays the SAS Enterprise Guide interface. On the left, the Project Tree shows a process flow for 'TOURS' with steps: One-Way Frequencies, Scatter Plot, and Note. Below it, the Servers pane shows 'Servers' and 'Private OLAP Servers'. The main workspace shows a process flow diagram with nodes for 'TOURS', 'One-Way Frequencies', 'Scatter Plot', 'SAS Report - One-Way Frequencies', and 'SAS Report - Scatter Plot'. A Note text box is open in the workspace, containing the text: 'Tutorial A from "The Little SAS Enterprise Guide Book"'. The status bar at the bottom indicates 'Ready' and 'No profile selected'.

You can collapse the note into an icon by clicking the x in the upper right corner of the text box, or you can enlarge the text box by clicking the down-arrow in the upper left corner and selecting **Open** from the pop-up menu. You can also drag the note to another location in the Process Flow.

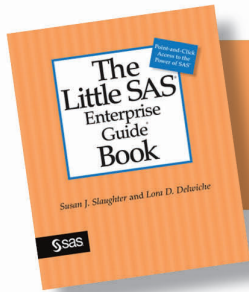
Saving the project SAS Enterprise Guide will always ask if you want to save any changes before allowing you to exit. Of course, you can save your work at any time before exiting. All the tasks created in your project, along with the results and any notes, are saved in the project. The data files are saved outside the project file—only the shortcuts to the data files are saved in the project. To save the project, select **File ► Save Project As** from the menu bar.



Navigate to the location where you want to save the project. Give the project the filename **TutorialA** and click **Save**.



Now you can exit SAS Enterprise Guide and all your work and data will be saved. From the menu bar, select **File ► Exit** to exit SAS Enterprise Guide and complete the first tutorial.



The Little SAS® Enterprise Guide® Book. Full book available for purchase [here](#).

CHAPTER 1

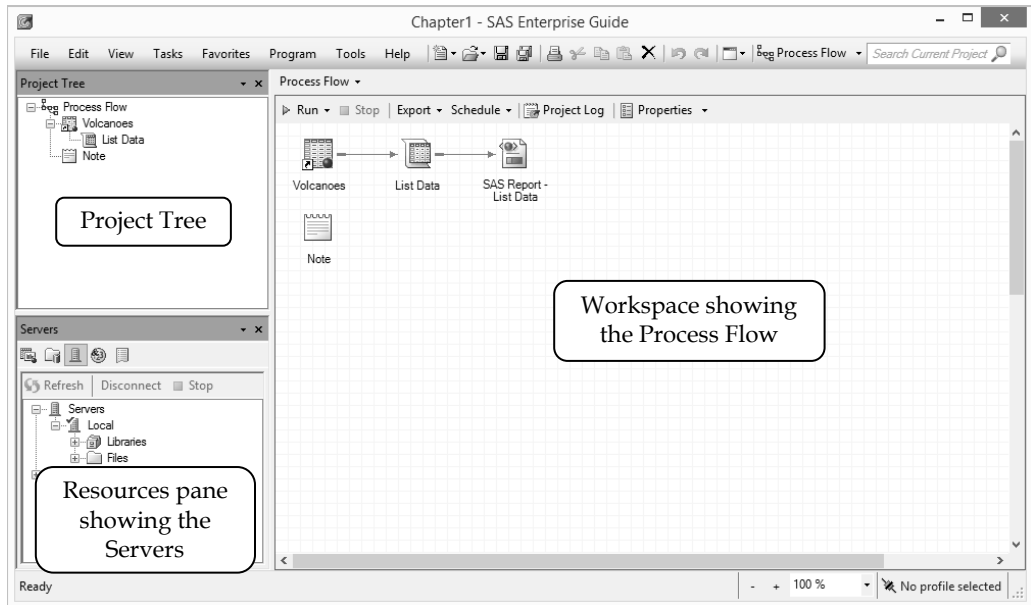
SAS Enterprise Guide Basics

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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 SAS Enterprise Guide window. 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.



Servers The Servers window lists all 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.



Tasks The Tasks window lists all available tasks. 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 SAS folders that have been defined on the SAS server. This window appears in the Resources pane, and is closed by default. To open this window, click its icon in the Resources pane.



Data Exploration History The Data Exploration History window displays a list of SAS data tables you have viewed in the Data Explorer. 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, 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 window and other items appear including data, results, programs, logs, and notes. 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 schematic diagram. You can create as many process flows as you want inside a single project. There are several ways to open a process flow. You can select it from the **View** menu, double-click its name in the Project Tree, select it from the drop-down list at the top of the workspace, select the  drop-down list on the menu bar, or press **F4**.

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**.

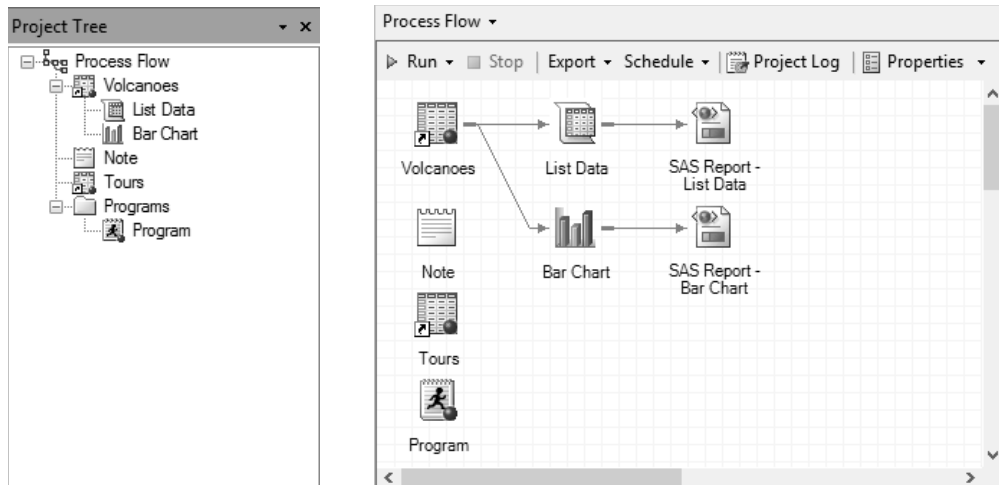
1.2 Projects

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 tables you used or what reports you ran.

You can have as many projects as you like, and you can use a data table over and over again in different projects, so there is a lot of flexibility. In a single SAS Enterprise Guide session, you can open only one project at a time. However, you can open more than one SAS Enterprise Guide session, each displaying a different project. Also, keep in mind that if you share a project 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 schematic 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, text, PowerPoint, or Excel) and the name of the task. This icon represents output in SAS Report format.

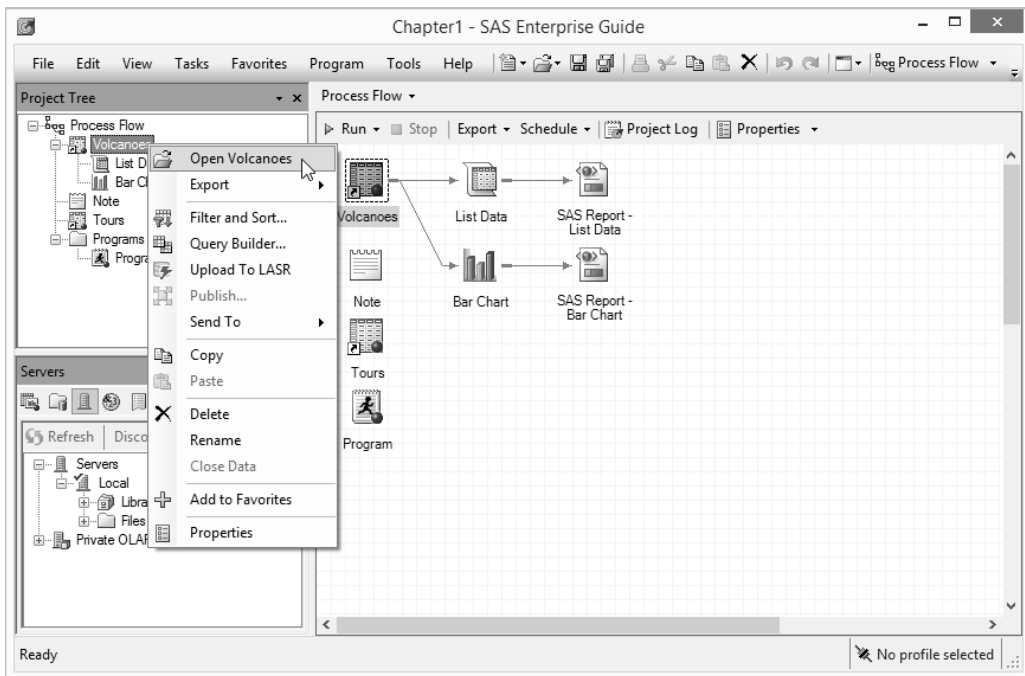


Notes Notes are optional text files you can use to document your work, or record comments or instructions for later use.



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.



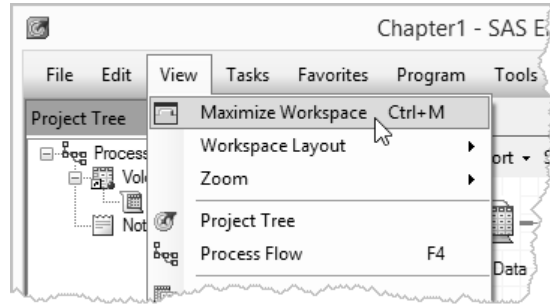
Renaming and deleting items You can rename most items by right-clicking the item and selecting **Rename** from the pop-up menu. You can delete an item from a project by right-clicking and selecting **Delete**. Note that if you delete data from a project, only the shortcut is deleted, not the actual data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

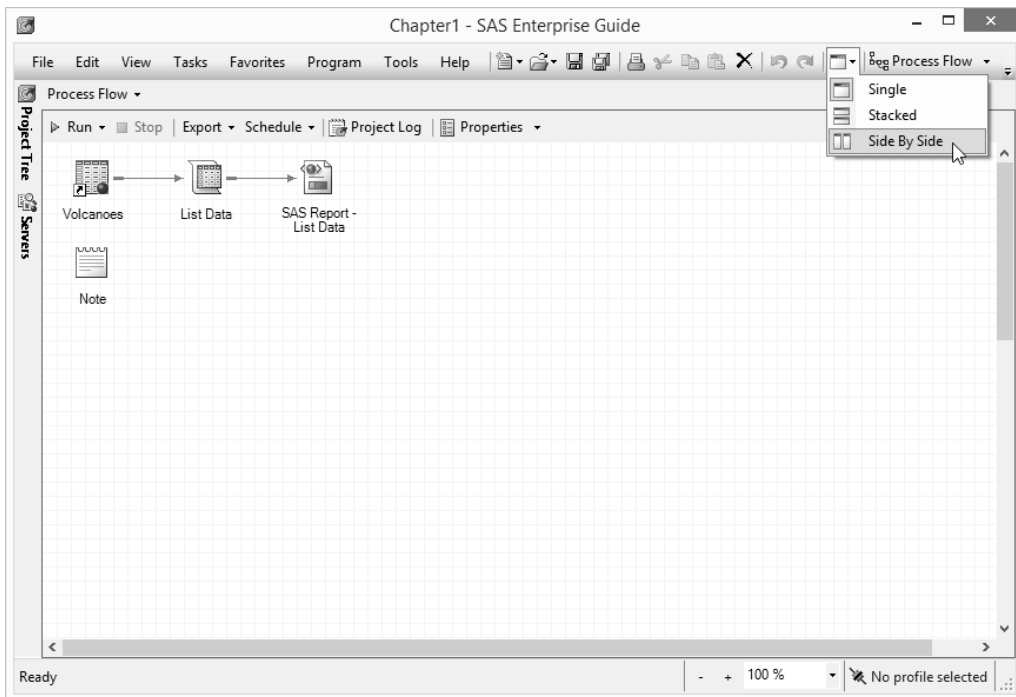
1.3 Maximizing and Splitting the Workspace

The workspace is a busy place. In addition to the process flow diagram, it is home to your data, results, program, log, and notes. By default, you can see only one of these items at a time, but you can see two if you split the workspace.

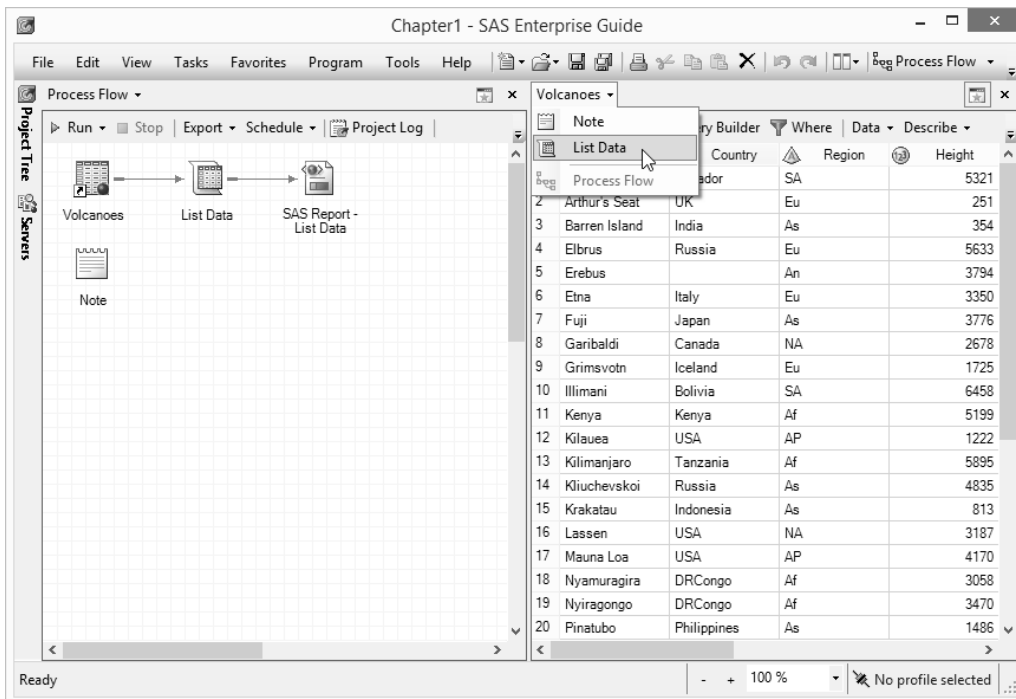
Maximizing the workspace If your screen is small, you may want to make the workspace as large as possible before you split it. To do this, select **View ► Maximize Workspace** from the menu bar. When you maximize the workspace, the Project Tree and Resources pane become tabs pinned to the edge. You can 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. To do this, 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 pull-down list of recently viewed items in your project. To display an item, select it from the list. In this example, the workspace has been split side by side. The left side shows a Process Flow window while the right shows a Data Grid.

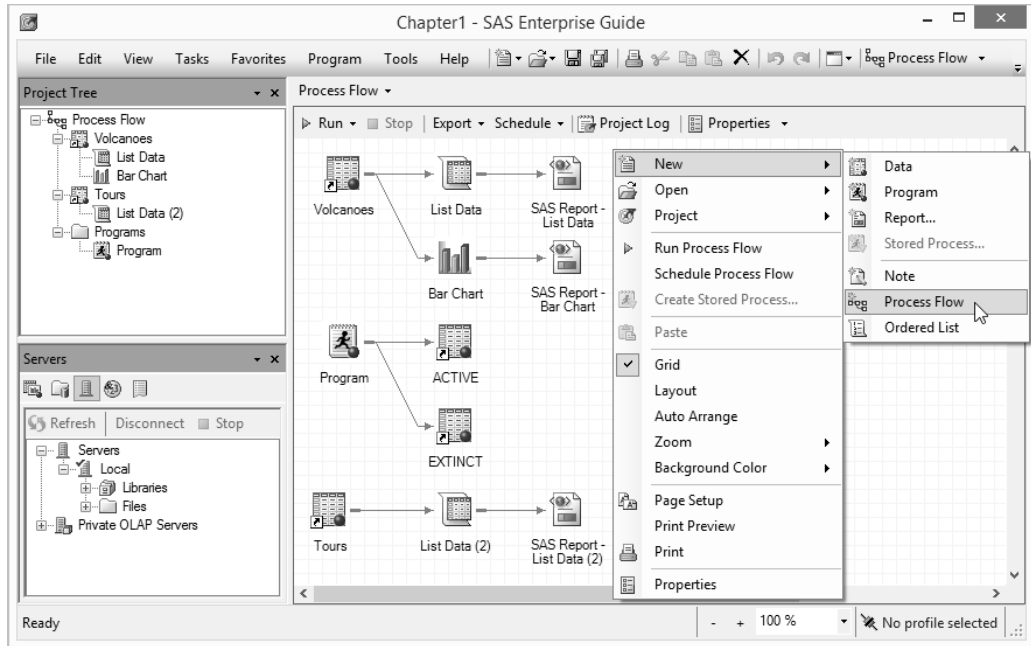


To unsplit the workspace, click the Workspace Layout icon again, and select **Single** from the pull-down list. You can also click one of the Xs in the upper-right corners to close that section of the workspace.

1.4 Managing Process Flows

SAS Enterprise Guide projects can contain an unlimited number of process flows. 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.

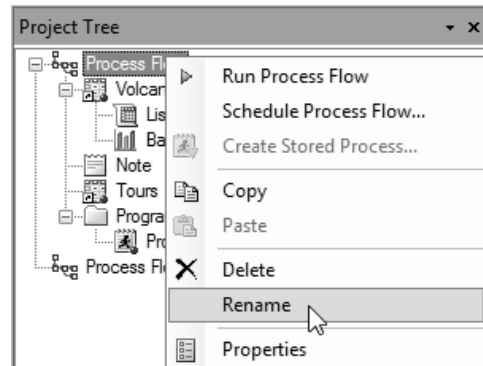


To view a process flow, double-click its name in the Project Tree, select it from the **Process Flow** drop-down list on the menu bar, or click the down-arrow above the workspace to open a pull-down list of recently viewed items.

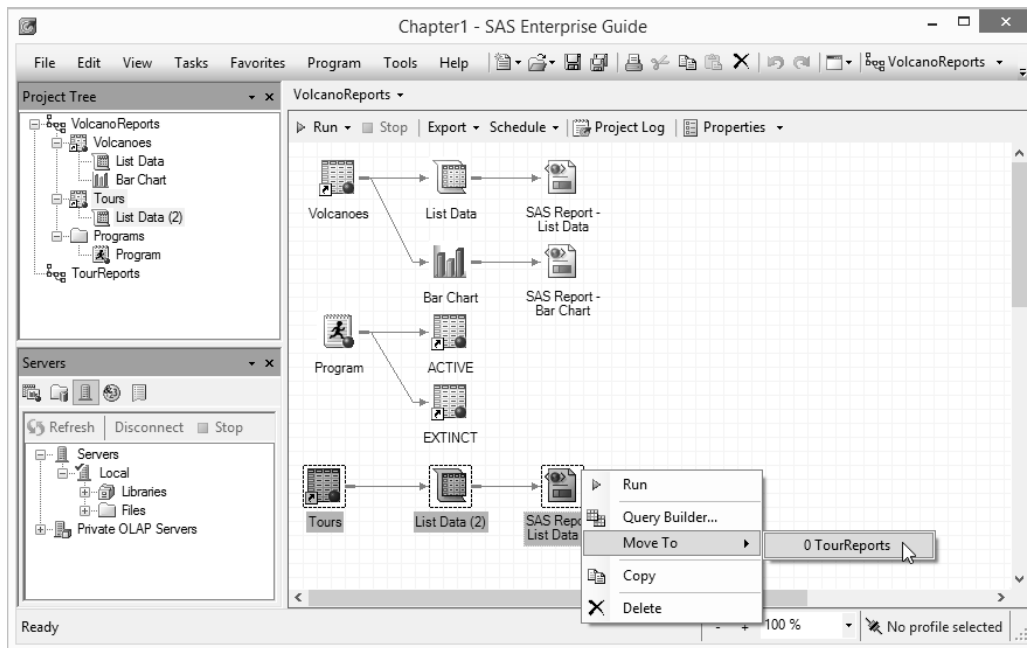
Customizing process flows When you right-click a process flow, the pop-up menu displays options for customizing the appearance of that process flow. Options include Grid, Layout, Auto Arrange, Zoom, and Background Color.

Renaming and deleting process flows

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.

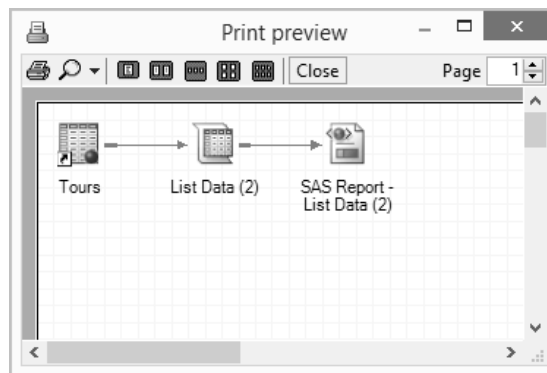


Moving and copying items To move items from one process flow to another, hold down the control key (CTRL), and click all the items you want to move. Then right-click, and select **Move to ► process-flow-name** from the pop-up menu. In this example, three items are being moved to a process flow named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



Copying items is similar to moving items except that you must also paste the items. 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**.

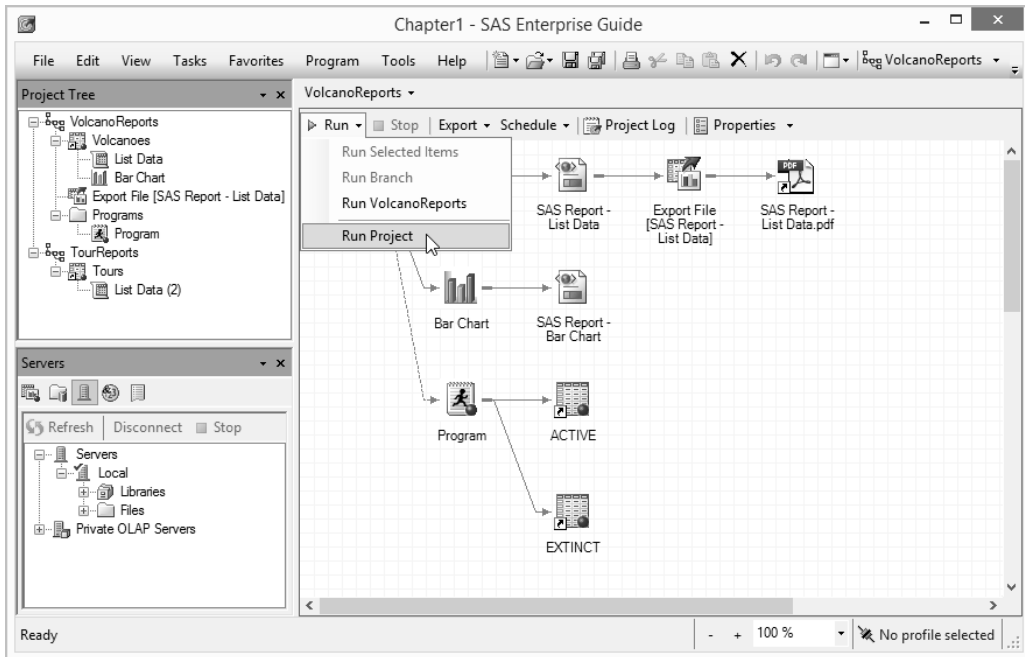
Printing process flows You can print a copy of your process flow. To control the page size and orientation, click the process flow and select **File ► Page setup for Process Flow** from the menu bar. To preview a printout, select **File ► Print preview for Process Flow**. To print the process flow, select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



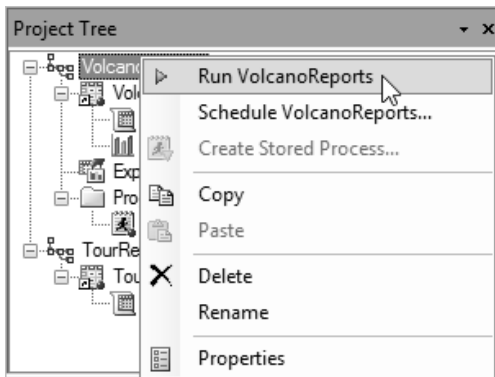
1.5 Running Projects and Process Flows

Projects have a lot of different parts. When you use a project, you may want to run the entire project, or one process flow, or a branch of a process flow, or even just one item. You can run any part of your project, but the way you do that depends on which part you want to run.

Running a project To run a complete project, select **File ► Run *project-name*** from the menu bar, or click **Run** on the workspace toolbar above a Process Flow and select **Run Project** from the pull-down menu.



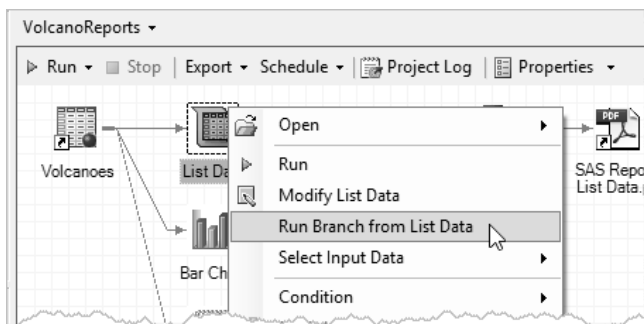
If you have more than one process flow in your project, then they will run in the order in which they appear in the Project Tree. To change that order, click the name of a process flow in the Project Tree and drag it to the place where you want it to be.



Running a process flow To run a particular process flow, right-click the name of the process flow in the Project Tree and select **Run *process-flow-name*** from the pop-up menu, or click **Run** on the workspace toolbar above that Process Flow and select **Run *process-flow-name*** from the pull-down menu. The branches in the process flow will run from top left to bottom right. In this example, a process flow named VolcanoReports is being run from the Project Tree.

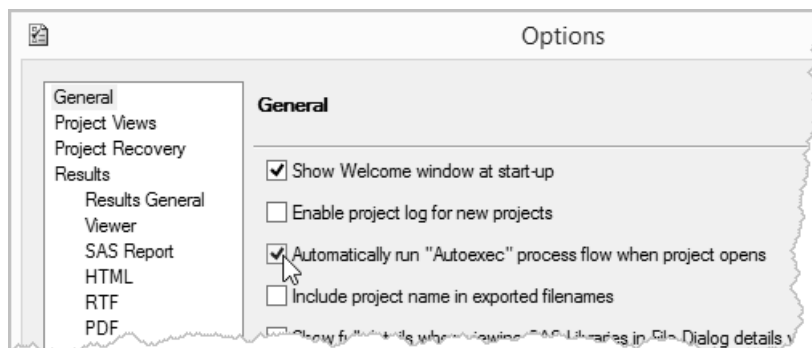
Running part of a process flow

To run one branch of a process flow or an individual item, right-click the icon for that item or branch, and select **Run** or **Run Branch from item-name** from the pop-up menu. You can also click that icon (to make it active) and then click **Run** on the workspace toolbar and select **Run item-name** or **Run Branch from item-name** from the pull-down menu. In this example, a branch starting with a List Data task is being run from the process flow.



Creating an Autoexec process flow Sometimes you have items in a project that must run first. For example, you might have an Assign Library or Create Format task that must run before anything else in your project. Dragging these items to the top left corner of your process flow will make them run first if you run the entire process flow, but that doesn't help if you run some other part of your process flow. For situations like this, you can create a special process flow called an Autoexec process flow. When SAS Enterprise Guide sees a process flow with the name Autoexec, it knows to run it whenever you open that project. To create an Autoexec process flow, simply add a new process flow as described in the preceding section, and give it the name Autoexec. Then, by default, every time you open that project, a box will open asking if you want to run the Autoexec process flow.

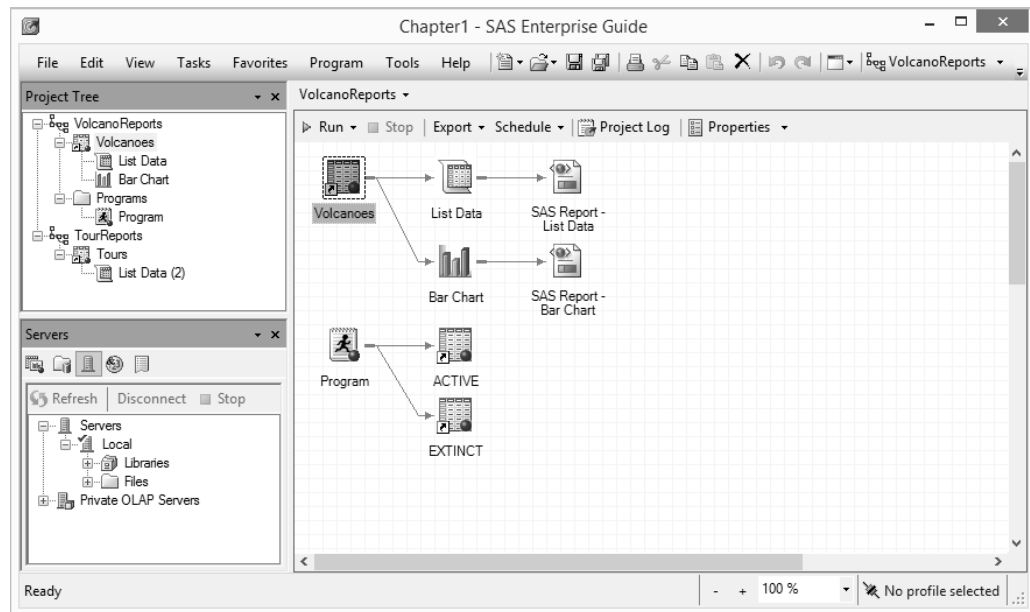
You can tell SAS Enterprise Guide to run the Autoexec process flow automatically without prompting you. To do that, select **Tools ► Options** from the menu bar to open the Options window. In the General page, check **Automatically run "Autoexec" process flow when project opens**, and click **OK**.





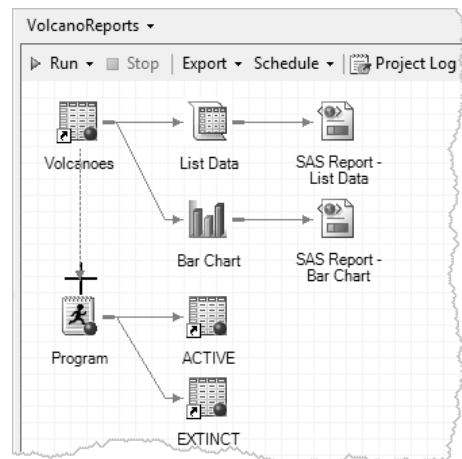
1.6 Linking Items in Process Flows

When you run a process flow, items are executed from top left to bottom right, following the branches created by links between items. If you want to change the order in which items run, you can click and drag icons to a new place in the process flow, or you can add links. For example, if you create a format that is used by a report, you might want to add a link to make sure that the task creating the format runs before the task creating the report. Adding links is also a good way to show relationships that may not be clear. Note that adding links does not change which data tables are used or how tasks are run. It only changes the order and shows relationships.

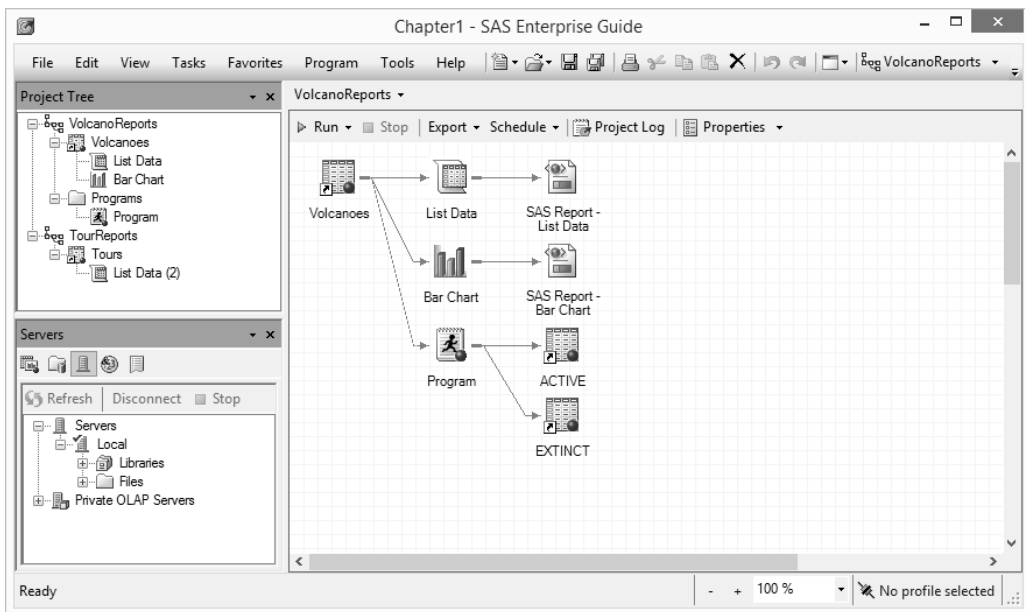
This process flow contains a program that uses the Volcanoes data table. By default, the data table and program icons are not connected. Adding a link would make the relationships between items more clear.



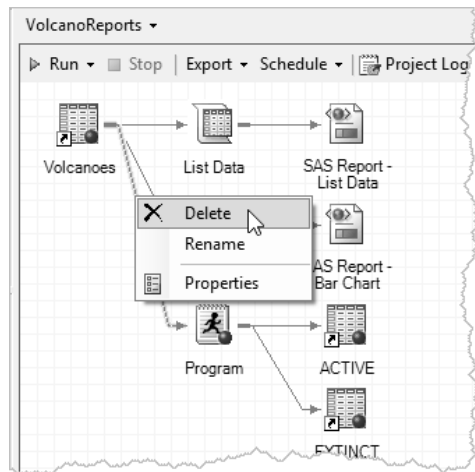
Adding links To add a link, hover your cursor to one side of the first item. When the cursor changes from a cross with four arrows  to crosshairs , then you can click and drag the cursor to the second item to link them. You can also right-click the initial item and select **Link item-name to** from the pop-up menu. In this window, a link is being added from the Volcanoes data table to the Program icon.



Now the Volcanoes data icon has been linked to the program icon. If you look closely, you will see that the new link uses a dashed line instead of a solid line.



Deleting links To delete a link that you previously added, right-click the dashed line of the link and select **Delete** from the pop-up menu. A Delete Items window will open asking you to confirm whether you want to delete the link.








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.

Data Table
(also called a Data Set)

Columns
(also called Variables)

↓

	 Volcano	 Departs	 Days	 Price	 Difficulty
1	Etna	Catania	7	\$1,610	m
2	Fuji	Tokyo	2	\$335	c
3	Kenya	Nairobi	6	\$1,245	m
4	Kilauea	Hilo	1	\$85	e
5	Kilimanjaro	Nairobi	9	\$1,965	c
6	Krakatau	Jakarta	7	\$1,345	e
7	Lassen	Sacramento	3	.	
8	Poas	San Jose	1	\$97	e
9	Reventador	Quito	4	\$875	m
10	St. Helens	Portland	2	\$250	e
11	Vesuvius	Rome	6	\$1,495	e

Rows
(also called Observations) →

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 including 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 banknotes.



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, 2020	21915	01/01/2020

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 only 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.

Names By default, the names of data tables and columns in SAS Enterprise Guide may be up to 32 characters in length, and can contain any character, including blanks. Table names cannot start with a blank or period.

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 names are different. Base SAS uses the `VALIDMEMNAME=COMPATIBLE` SAS system option for tables and `VALIDVARNAME=V7` for columns. SAS Enterprise Guide uses `VALIDMEMNAME=EXTEND` for tables, and `VALIDVARNAME=ANY` for columns. For the sake of compatibility, you may want to follow these rules: choose names that are 32 characters or fewer in length, start with a letter or underscore, and contain only letters, numerals, and underscores.


To tell SAS Enterprise Guide to use the same rules for names as Base SAS, select **Tools ► Options** from the menu bar to open the Options window, and select **Data General** in the selection pane on the left. In the section labeled **Naming Options**, click the down-arrow for **Valid variable names**, and select **Basic variable names (V7)**. Then click the down-arrow for **Valid member names**, and select **Basic member names (COMPATIBLE)**.

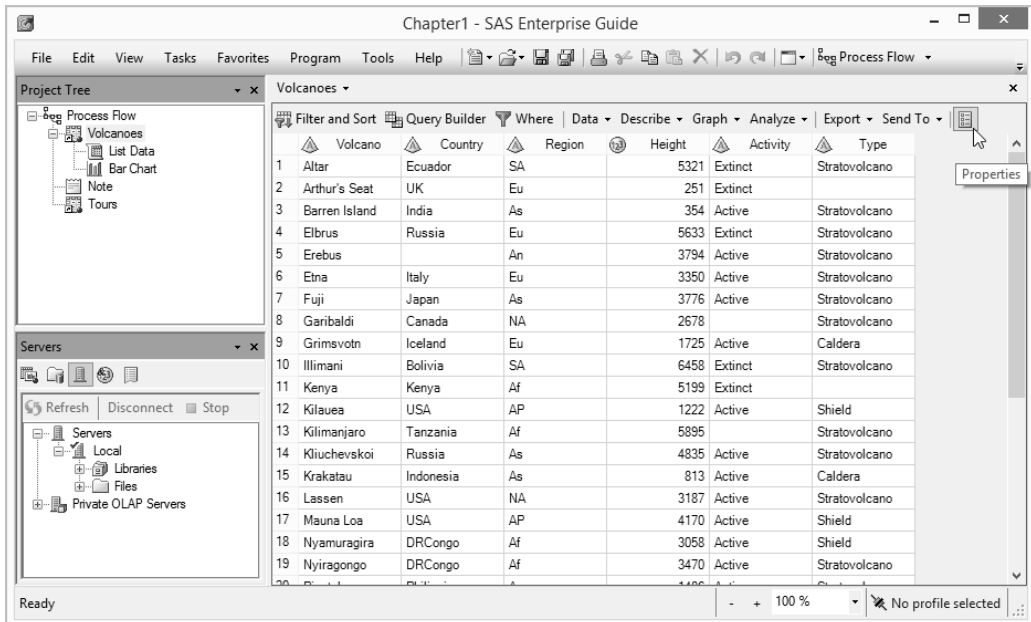
Missing data Sometimes, despite your best efforts, your data may be incomplete. The data values in a particular column may be missing for some rows. In those cases, missing character data are represented by blanks, and missing numeric data are represented by a single period (.). In the preceding Data 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 that 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 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 Viewing Properties of Data Tables and Columns

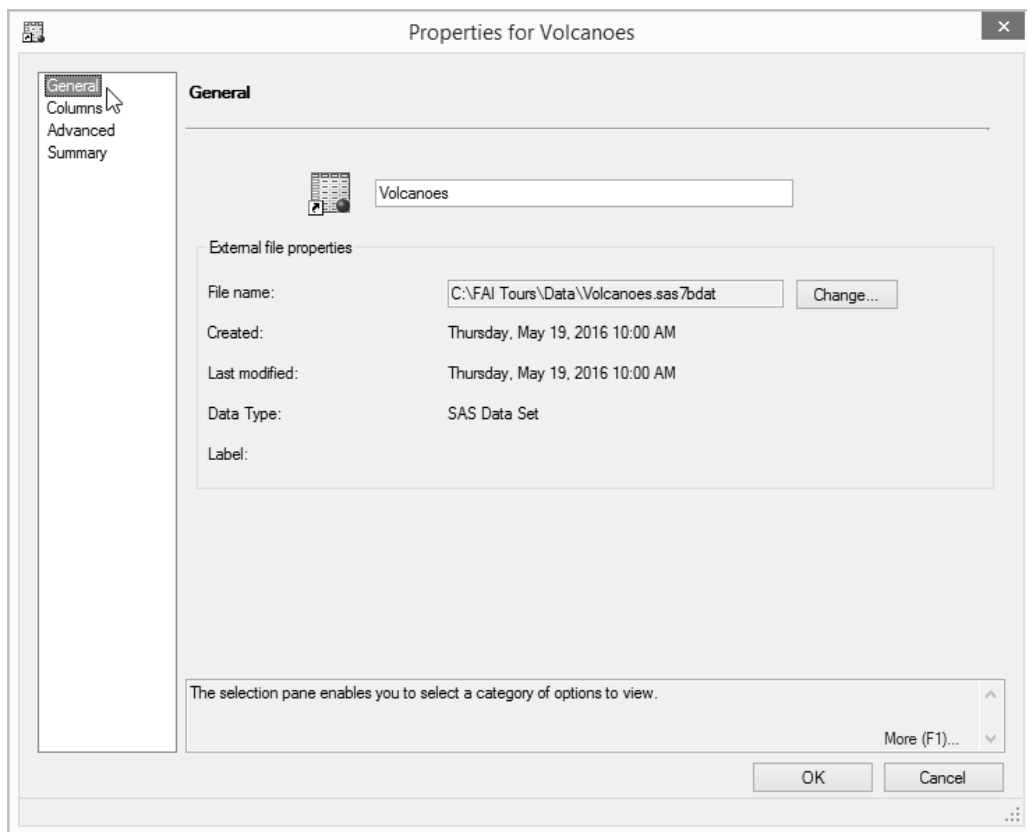
The Properties window for a data table displays general information about the data table, such as the date the table was created, along with information about each column in the table. You cannot make any changes in this window, but it is a handy way to find out more about your data.

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. In this example, the Properties window is being opened for the Volcanoes data table.

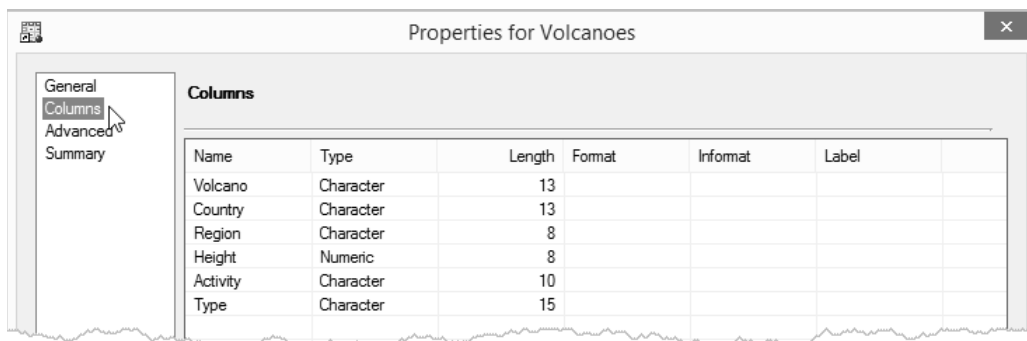


You can also right-click a data icon in the Project Tree or Process Flow, and select Properties from the pop-up menu.

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.

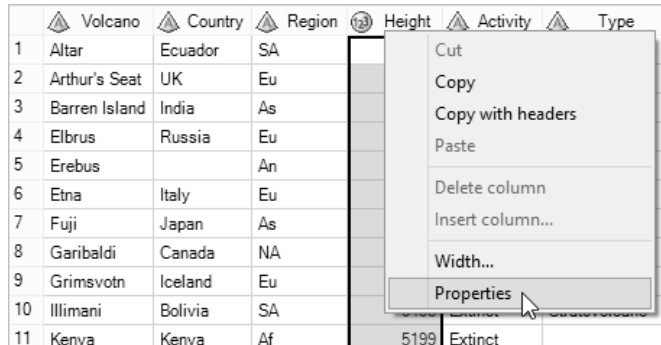


1.9 Changing Properties of Columns

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 to 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.

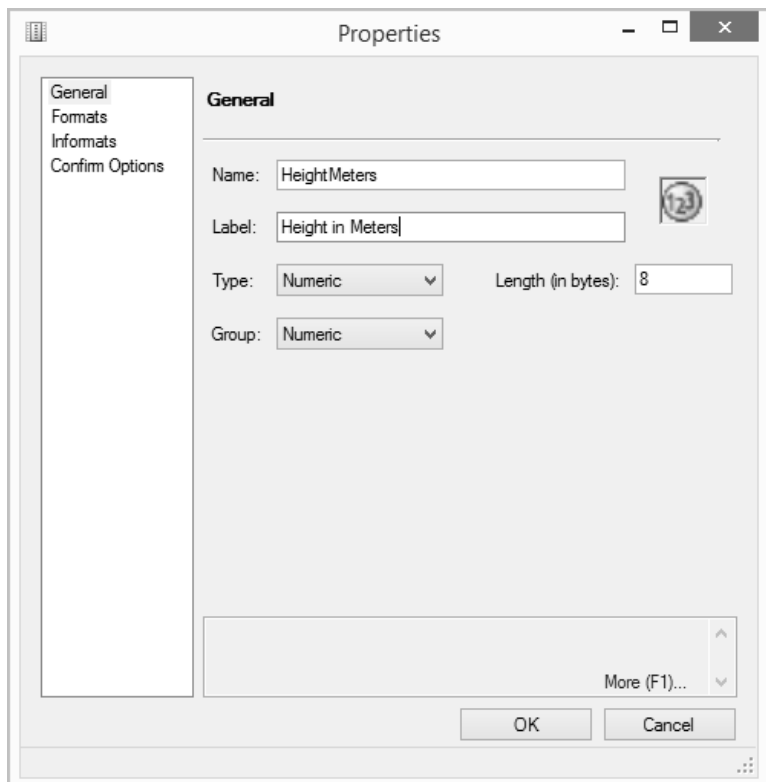
Setting the update mode The Data Grid opens in read-only mode. In this mode you cannot edit the data, and you cannot change column properties. To switch to update mode, select **Edit ► Protect Data** from the menu bar. This toggles the data table from read-only to update mode. To return to read-only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

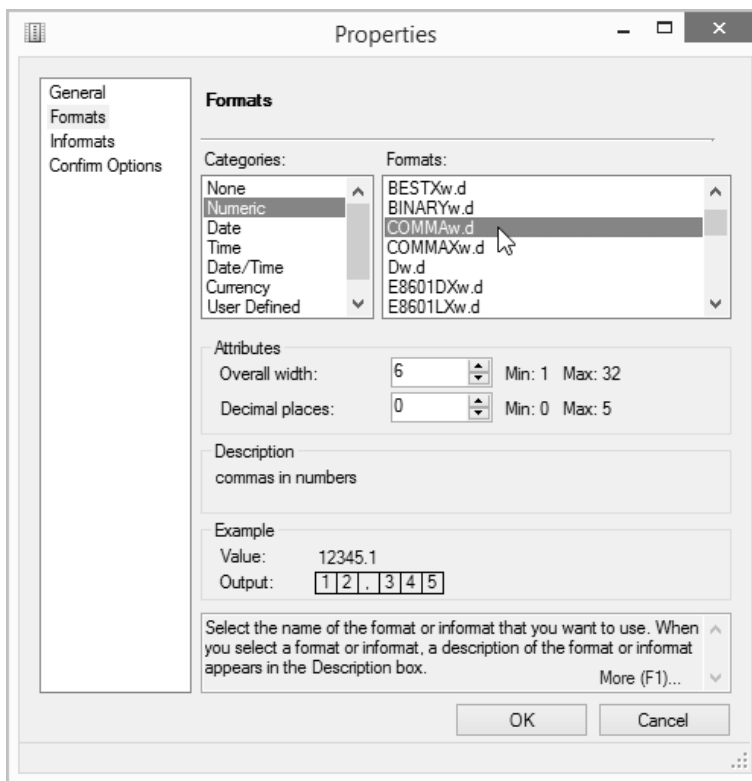


General page The Properties window has several pages. If there is no selection pane on the left, then the data table is in read-only mode and you need to switch to update mode.

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.



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 (**COMMA6.0**) has been selected. See the next section for a table of commonly used formats. To apply your changes, click **OK**.



Informats page If you click **Informats** in the selection pane on the left, the Informats page will open (not shown). Informats (also called input formats or read-in formats) tell SAS how to interpret input data. In SAS Enterprise Guide, you can use informats when you import certain types of 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. So, informats are rarely used in SAS Enterprise Guide.

	▲ Volcano	▲ Country	▲ Region	123 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	Etna	Italy	Eu	3,350	Active	Stratovolcano

Results Here is the Data Grid showing the new name, HeightMeters, and the formatted data values with commas.

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 a column Properties window in a Data Grid, a task, or a query. Here are a few of the many formats that are available in SAS Enterprise Guide.

Format	Definition	Width range	Default width
Character			
\$UPCASE <i>w</i> .	Converts character data to uppercase	1-32767	Length of column or 8
\$ <i>w</i> .	Writes standard character data – default for character data	1-32767	Length of column or 1
Date, Time, and Datetime¹			
DATE <i>w</i> .	Writes SAS date values in the form <i>ddmonyy</i> or <i>ddmonyyyy</i>	5-11	7
DATETIME <i>w.d</i>	Writes SAS datetime values in the form <i>ddmmmyy:hh:mm:ss.ss</i>	7-40	16
DTDATE <i>w</i> .	Writes SAS datetime values in the form <i>ddmonyy</i> or <i>ddmonyyyy</i>	5-9	7
EURDFDD <i>w</i> .	Writes SAS date values in the form <i>dd.mm.yy</i> or <i>dd.mm.yyyy</i>	2-10	8
JULIAN <i>w</i> .	Writes SAS date values in the Julian date form <i>yyddd</i> or <i>yyyyddd</i>	5-7	5
MMDYY <i>w</i> .	Writes SAS date values in the 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 the form <i>hh:mm:ss.ss</i> – default for times	2-20	8
WEEKDATE <i>w</i> .	Writes SAS date values in the 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 the form <i>month-name dd, yyyy</i>	3-32	18
Numeric			
BEST <i>w</i> .	The SAS System chooses the 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 proportions as percentages	4-32	6
<i>w.d</i>	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.

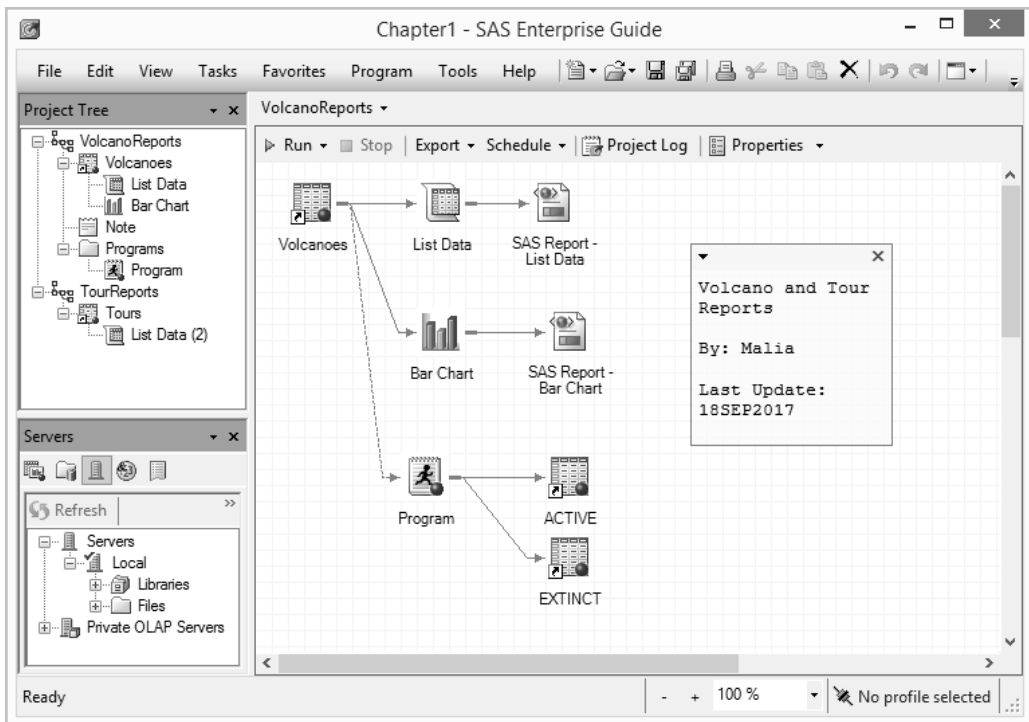
The examples below show unformatted data values and formatted results for each display format.

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

1.11 Documenting Projects with Notes

In many ways, projects in SAS Enterprise Guide are self-documenting. You can look at the Project Tree and Process Flow and see the parts of a project and how they fit together. However, unless your project is very simple, it is good practice to document your work. You do this with notes.


Adding a note for a process flow To add a note for an entire process flow, right-click the process flow background and select **New ► Note** from the pop-up menu. You can also add a note for a process flow by clicking the name of the process flow in the Project Tree, and selecting **File ► New ► Note** from the menu bar. A small text box, which looks like a sticky note, will open.

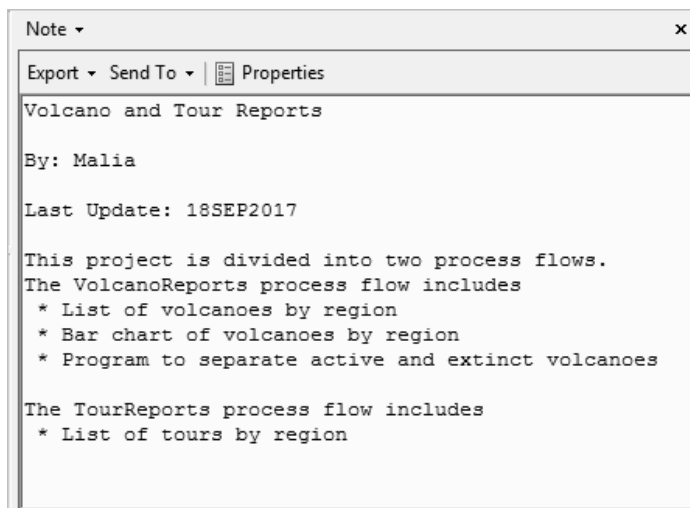


In this text box, you can type anything you want. You could type your favorite cookie recipe, but generally it makes more sense to record information about your work such as the purpose of the project and the date it was last updated. If you need more space, you can resize the text box by clicking and dragging the edges. If you click the down-arrow at the top of the text box and select **Open** from the pop-up menu, then this small text box will open in a Note window.

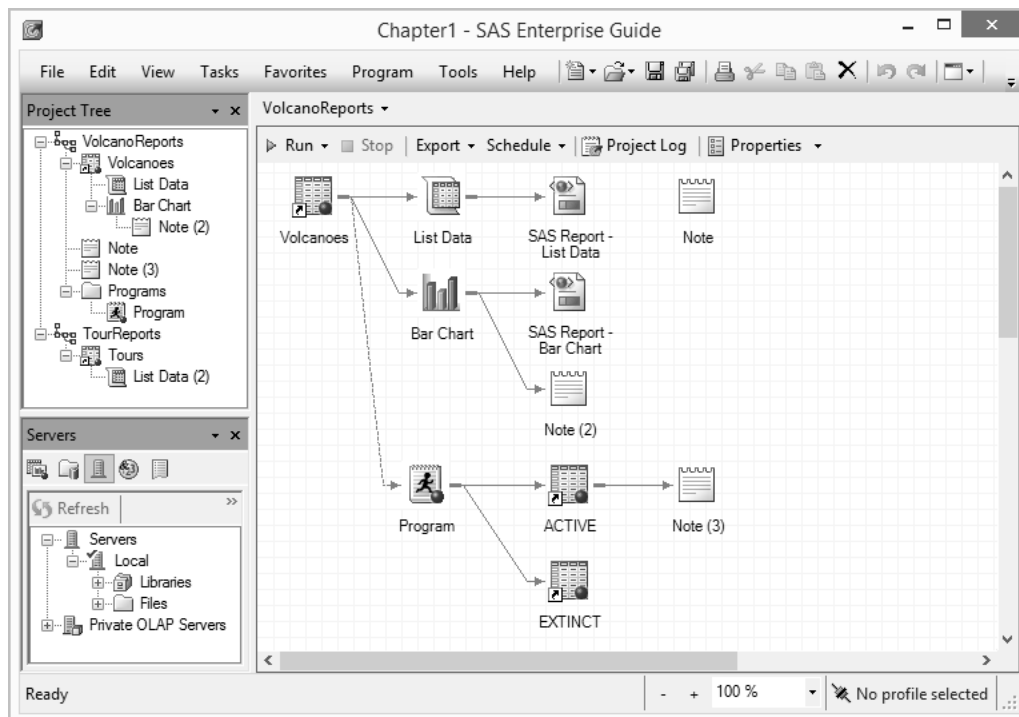
The Note window fills the workspace giving you more room to type. This example contains a brief description of the project.

To close the Note window, click the X in the upper-right corner. If you click the X in the upper-right corner of the small text box, it will close

and a note icon  will appear in your process flow. To reopen the small text box, right-click the note icon and select **Expand** from the pop-up menu. To reopen the Note window, right-click the icon and select **Open** from the pop-up menu.



Attaching a note to an item You can also attach notes to individual items in a process flow. To do this, click that item and select **File ► New ► Note** from the menu bar. A Note window will open. This process flow includes three notes: one for the entire process flow, one attached to a Bar Chart task, and one attached to a data table named Active. Notice that the note icon for the process flow is not linked to any other icons, but the note icons for the task and program are linked to their items.



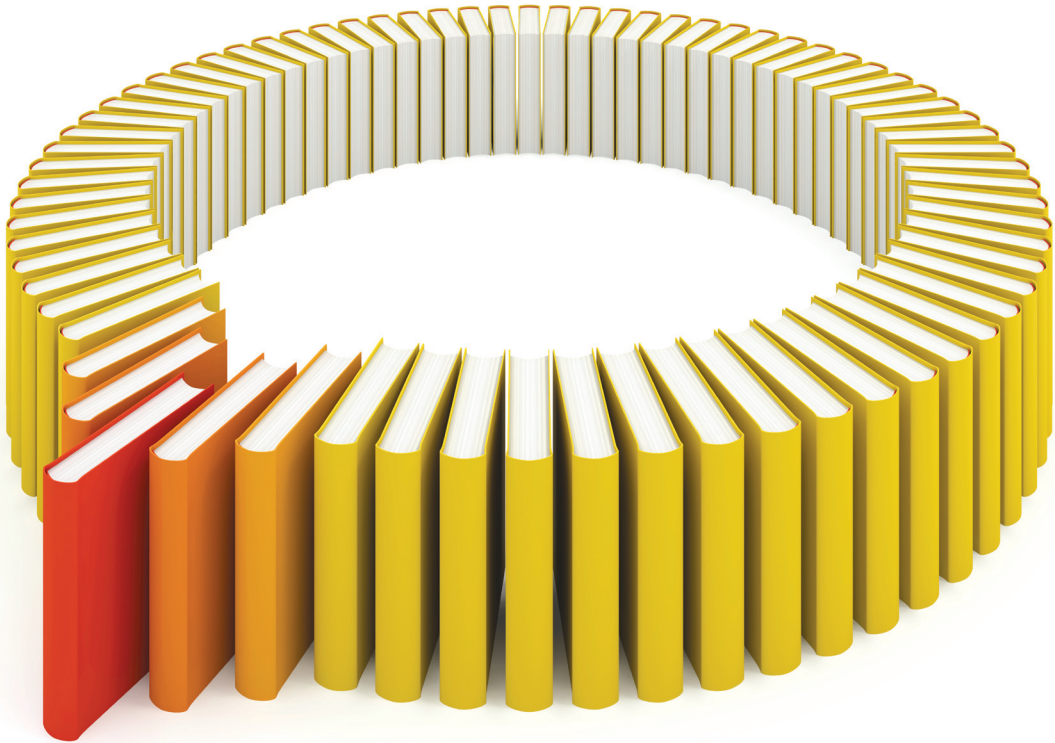
About This Book

This book is divided into two distinct but complementary sections: a tutorials section and a reference section. Each tutorial is designed to give you a quick introduction to a general subject. The reference section, on the other hand, gives you focused information on specific topics.

Tutorials section If you are new to SAS Enterprise Guide, you'll probably want to start with the tutorials. Each of the four tutorials leads you step-by-step through a complete project, from starting SAS Enterprise Guide to documenting what you've done before you exit. The tutorials are self-contained so you can do them in any order. People who know nothing about SAS or SAS Enterprise Guide should be able to complete a tutorial in 30 to 45 minutes.

Reference section Once you feel comfortable with SAS Enterprise Guide, you'll be ready to use the reference section. This is where you'll turn when you need a quick refresher on how to join data tables, or a detailed explanation of filtering data in a query. With 8 chapters and 67 topics, the reference section covers more information than the tutorials, but each topic is covered in just two pages so you can read it in a few minutes.

The data for this book The data used for the examples in this book revolve around a theme: the Fire and Ice Tours company, a fictional company offering tours to volcanoes around the world. Using a small number of data sets over and over saves you from having to learn new data for every example. The data sets are small enough that you can type them in if you want to run the examples, but to make it even easier, the data are also available for downloading via the Internet. Appendix A contains both the data and instructions on how to download the data files.



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