

SAS Enterprise Guide 4.1

ShortCourse Handout

August 2006

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Introduction

SAS Enterprise Guide (EG) is a project-oriented Windows application designed to be used by business analysts, statisticians, and programmers. It can be used for exporting data and results to other applications and creating reports, queries, and charts.

For this course, it is assumed that you have completed the Base SAS ShortCourse or already know how to create SAS data sets. Also, familiarity is assumed with Elementary Statistics and Microsoft Access Queries. We will be using 3 sample data files (included with SAS Enterprise Guide): **Orders.sd2**, **PRDSALE.sas7bdat**, **Products.sas7bdat**, and **FixWidth.txt**, throughout this ShortCourse.

Course Objectives

After completing this ShortCourse, you should be able to:

- Create and save SAS projects,
- Add SAS and Microsoft Excel data to a project,
- Import data from a text file,
- Create and modify a list report,
- Create charts,
- Use a query to join tables,
- Use a query to select, order, create computed columns, and
- Generate summary statistics from a query.
- Combine several HTML results from multiple tasks into a single document.

Starting a New Project

- From the Start menu choose Programs
- Select SAS

- Click on Enterprise Guide 4.1.
- In the Welcome to SAS Enterprise Guide window, click New Project.

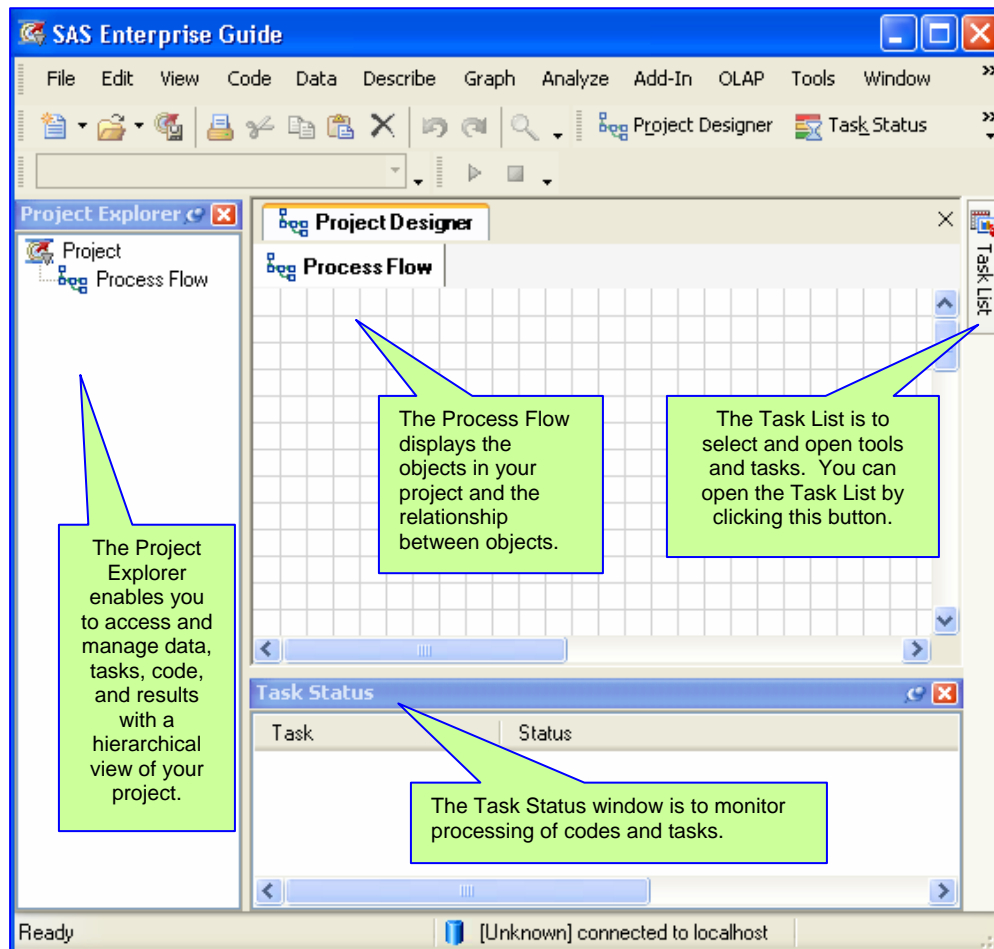
Saving a Project

- From the **File** menu, select **Save Project As**.
- Select a location for your project.
- In the **File name** box, type a name for your project. (Project files are saved with the extension **.egg**.)
- Click **Save**.

Enterprise Guide Help

- Select **Help > SAS Enterprise Guide Help**.
- On Contents tab, double-click the book icons to display the help topics.

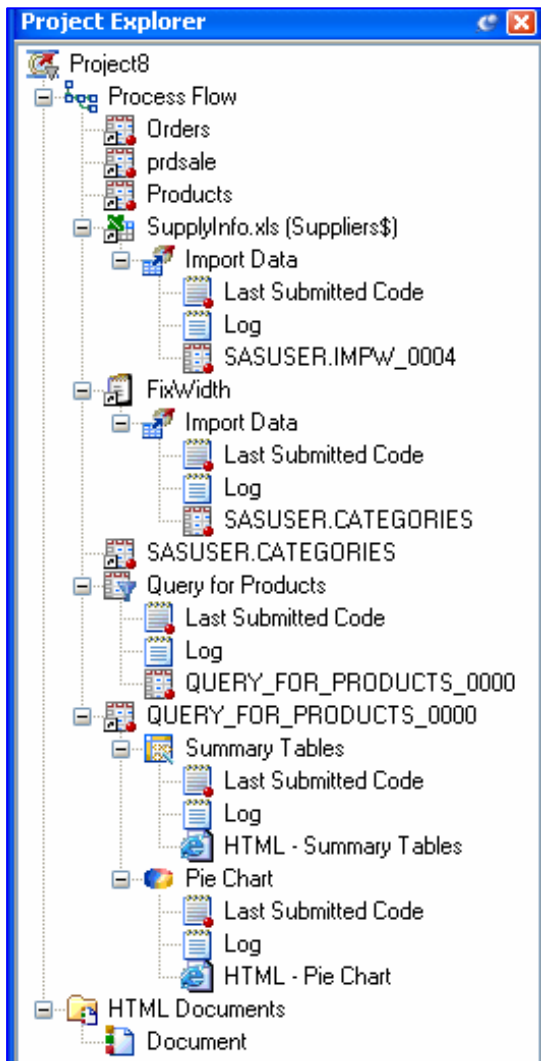
Enterprise Guide Main Windows



- SAS Enterprise Guide windows include the **Project Explorer**, **Project Designer**, **Task List (View > Task List)**, and **Task Status** windows. SAS Enterprise Guide Tasks generate SAS codes and formatted results for you. They include SAS procedures.
- Task Roles are procedures we assign to variables.

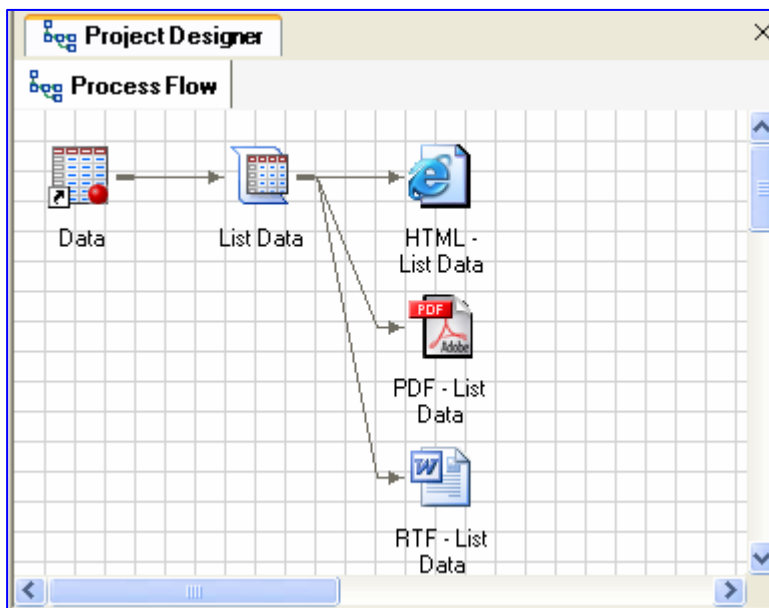
Project Explorer Window

- A project is a collection of related data, tasks, code, and results.
- By default Data entries, Tasks, and Codes are grouped together in a project.
- If you close the Project window and want to restore it, select **View > Project Explorer**.




Process Flow Window

- The Project Designer window displays the items in a project and the relationship between the items.
- As you add data, run tasks, and generate output, the process flow of your work is automatically displayed in the Project Designer window.
- You can have multiple process flow diagrams for one project.
- To view the Process Designer window:
- Select **View**, and then choose **Project Designer**.



Task List

- A task is a specific analysis that you can perform or a report that you can create from your data.
- To begin a task, first select the data that you want to use, and then click the task in the Task List.
- The Task List has two views (tabs) at the top of the window.
- The **Tasks by Category** tab lists individual tasks, grouped by type.
- The **Tasks by Name** tab lists individual tasks alphabetically. This tab also lists the SAS procedure or procedures that are related to the task.
- To view the Task List, click the Task List tool  on the toolbar or select **View > Task List**.
- The tasks that are available in the Task List are also available from the **Data**, **Describe**, **Graph**, and **Analyze** menus.

Task Status Window

- The Task Status window displays messages about the status of tasks as they process.
- The Process Flow window also displays a different background color around the task item for each phase of processing.

Data in SAS Enterprise Guide

- SAS Enterprise Guide requires all data that it accesses to be in table format. A table is a rectangular arrangement of rows and columns.
- **Rows** (also called **observations**) in a table are collections of data values related to an object.
- **Columns** (also called **variables**) in a table are collections of values that describe a characteristic.

Column (Variable) Properties

- **Name** - can be 1 to 32 characters long. They must begin with a letter (A-Z, either uppercase or lowercase) or an underscore (_). They can continue with any combination of numbers, letters, or underscores, but NO space.
- **Type** - is either **character** or **numeric**.
- **Character variables** can contain **any values**. Missing character values are represented by a blank.
- **Numeric variables** can contain **only numeric values** (the digits 0 through 9, +, -, ., and E for scientific notation).
- **Currency, date, and time data are stored as numeric variables.**
- **Missing numeric values are represented by a period.**
- **Length** - A column's **length** (the number of bytes that are used to store it) is related to its type.
- Character variables have a default length of **12 bytes**.
- All numeric variables have a default length of **8 bytes**.
- **Format** - affects how data values are displayed. SAS data formats include **character**, **numeric**, and **date and time**.
- **Informat** - determines how data values are read into a SAS data set. You **must** use informats to read numeric values that contain letters or other special characters.

- **Label** - A variable can have a **label**, which consists of descriptive text up to 256 characters in length.

Creating a New Data Set

- Select **File > New > Data**.
- Name your Data, select a location and click **Next>**.
- Select and Change column **Name A** to **ID**
- Change this column's **Label** to **Student ID** (using the column properties)
- Change this column's data **Type** to **Numeric**.
- Add the following column headings (variable names) to the table, selecting columns from the Columns List and changing their names and properties as specified:
 - Age Numeric
 - Gender Character
 - Major Character
 - GPA Numeric
 - School Character
- Click Finish
- Type data from the following table into each cell in the grid by using the Tab or arrow keys to navigate around the grid. (you can Copy & Paste data, one entry at a time)
- Delete unused rows and columns.
- Close this new data window.

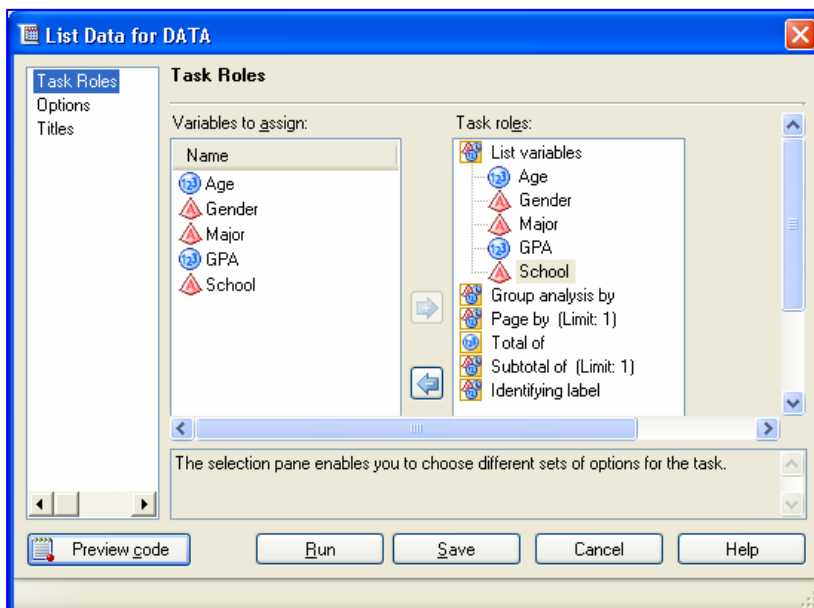
ID	Age	Gender	Major	GPA	School
1	19	male	biol	4	Smith
2	18	female	biol	3.5	Smith
3	20	male	biol	3.8	Smith
4	19	female	soci	3.9	Smith
5	18	female	soci	4	Honey
6	20	male	soci	4	Honey
7	18	male	cs	2.9	Honey
8	19	male	cs	3.2	Honey
9	20	female	cs	3.6	Honey
10	21	female	math	3.8	Honey

To change the protection mode

- Open your data set
- Select **Data > Read-only** to toggle the Update mode on and off. You are prompted for confirmation when you change a file from Read-only mode to update mode.

Assigning Task Roles

- To create reports and run analyses on the data, you select tasks from the Task List, either sorted by category or alphabetically. Double-click a task name to begin using it.
- A task is an analysis that you perform or a report that you create from your data.

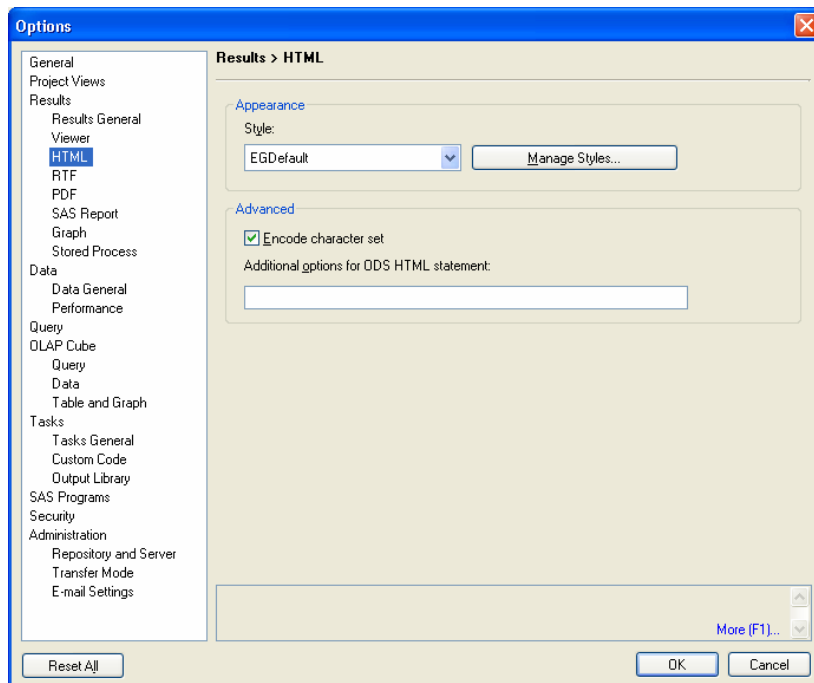


Creating a List Data

- From the **Describe** menu, select **List Data . . .**
- **Shift-click** on first and last variables names to select them all.
- On the **Task Roles** tab, drag all the variables to the right and drop them under the List variables heading.
- On the **Options** tab, uncheck mark **Print the row number** box.
- On the **Titles** tab, uncheck mark the **Use default text** box.
- Rename the Title to **"Schools Report"**.
- Click the **Preview Code**.
- Close the Preview Code window.
- Click on the **Run** button to run the procedure to generate a report.

Changing the Report Style

- From the Tools menu, select Options
- On the Results tab, select HTML
- Change the Appearance Style from EGDefault by selecting a different style sheet from the drop down menu (BarrettesBlue, for example), and then click OK.
- Close the output window.
- Choose Tools > Options > Results > Results General > Uncheck mark PDF and RTF.



Calculating One-Way Frequencies

- From the **Describe** menu, select **One-way Frequencies**
- **Shift-click** on the variable names **Age**, **Gender**, and **Major**.
- Drag the variables to the right, and drop them under the Analysis variables heading.
- Click on the **Run** button.
- Close the output window.

Creating a Scatter Plot

- From the **Graphs** menu, select **Scatter Plot . . .**
- Select **2D Scatter Plot**.

- Click the **Task Roles** tab.
- Select **Age** for **Horizontal** and **GPA** for **Vertical**, and then drag them to the Scatter Plot Task Roles.
- Click on the **Run** button.
- Close the output window.

Calculating Summery Statistics

- From the Describe menu, select **Summery Statistics . . .**
- Select GPA variable, and drag it to Analysis Variables.
- Click on the Run button.
- Close the output window.

Summary Statistics				
Results				
The MEANS Procedure				
Analysis Variable : GPA				
Mean	Std Dev	Minimum	Maximum	N
3.6700000	0.3743142	2.9000000	4.0000000	10

Local and Remote Data

- When you open data in SAS Enterprise Guide, you must select whether you want to look for the data on your local computer or on a SAS server.
- If you click **Local Computer**, a window opens so that you can browse the directory structure of your computer. You can open any type of data file that SAS Enterprise Guide can read.
- If you click **SAS Servers**, you can look for your data on a server. A SAS server can either be a local server if SAS software is installed on your own computer, or it can be a remote server if SAS software is installed on a different computer. The servers that you see depend on what repository you are connected to.
- Within each server there are icons that you can select for **Libraries** and **Files**. Libraries are shortcut names for directory locations that SAS knows about. Some

libraries are defined by SAS, and some are defined by SAS Enterprise Guide. Libraries contain only SAS data sets.

Sample Data Sets

In the SAS Enterprise Guide sample data directory there are four data files that contain data from a specialty foods store:

- **Orders** - a SAS data set that has data for product sales
- **Products** - a SAS data set that has data for products
- **PRDSALE** - a SAS data set
- **SupplyInfo** - a Microsoft Excel data file that has data for product suppliers
- **FixWidth** - a text file that has data for product categories.

Adding SAS Sample Data Sets

- From the File menu click Open > Data.
- Select **Local Computer...**
- Double-click **Enterprise Guide Sample**, and then double-click **Data**.
- Press **CTRL** and select **Orders.sd2**, **Prdsale.sas7bdat**, and **Products.sas7bdat** files, and then click Open.
- Close all data table windows.

Importing Excel Data File

- From the **File** menu, select open > Data.
- Choose **Local Computer...**
- Double-click the **SupplyInfo.xls** file.
- Select the SAS data option to open this file.
- Click the Run button.
- Close the data table window.

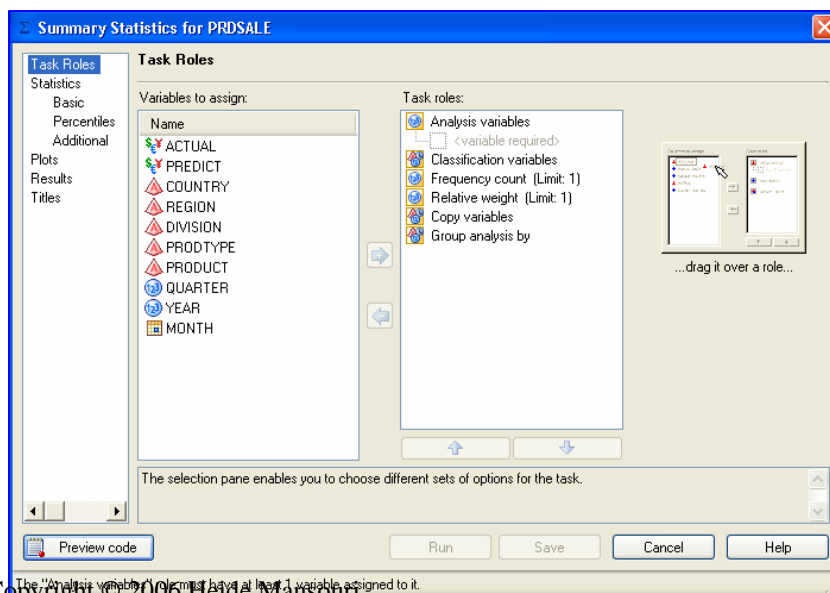
Importing SAS Sample Text Data

- From the **File** menu, select **Import Data**. Select **Local Computer...**
- Double-click **FixWidth.txt**.
- In the Region to import, click **Text Format**, be sure **Fixed Width** is selected.
- In the Region to import, click **Column Options**.
- In the **Columns** list, select **CategoryID**. Under **Column Properties**, click **Label** and change it to **Category ID**.

- In the **Columns** list, select **CategoryName**. Under **Column Properties**, click **Label** and change the label to **Product Category**.
- In the **Columns** list, select **Description**.
- Under **Column Properties**, click **Include in output** and select **No** from the drop-down list.
- In the selection pane, click **Results**. To Specify a name and a location for the table, In the Import Data task window, click the Browse... button (By default, the table is saved to your SASUSER library.)
- In the File name box, type Categories, and then click Save.
- Click **Run**.
- Close the data window.

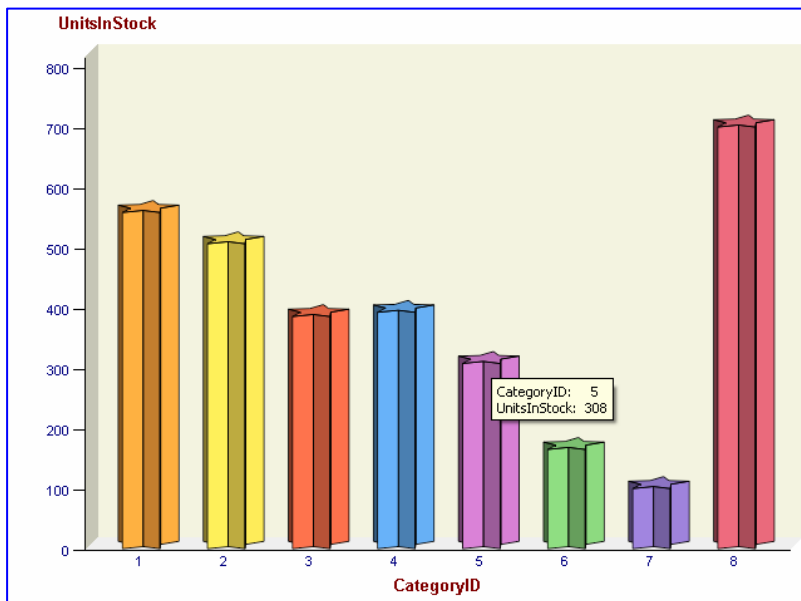
Creating Summary Statistics

- In the Project Explorer, click the PRDSALE table to make it the active data.
- You can also specify the active data by selecting it from the Active Data drop-down list directly above the Project Explorer.
- In the Task List window, scroll down to the Describe category.
- Click the Summary Statistics task.
- Press CTRL and select PRODUCT, ACTUAL, PREDICT columns in the Variables box.
- Drag the selected variables to the List variables role.
- In the List variables role, select Month and drag it to Classification Task roles and select YEAR and drag it to Group Analysis by Task roles.
- Click Run.
- Close the output window.



Creating Charts

- In the Project Explorer window, select **Products** to make it the active data set.
- From the **Graph** menu, select **Bar Chart**.
- Click the Vertical Colored Bars icon.
- In the selection pane, click **Task Roles**. In the **Columns to assign** list, select **CategoryID**, and drag it to the **Column to chart** role.
- Select **UnitsInStock**, and drag it to the **Sum of** role.
- Click **Run** to create the graph.
- Right-click on any bars.
- Select Bar options..., and then select Color by Category.
- Click OK.
- Double-click the **HTML - Bar Chart** item in the Process Flow window to view the chart.



Queries

A query is a request to retrieve data from one or more data sources (tables). Using queries, you can

- Join Tables
- Group and Summarize Data
- Classify data into groups based on the values in a column.
- Perform summary functions on any of the columns in your query.
- Examine relationships between data values

- Subset and sort your data
- Compute values
- Group and summarize data.

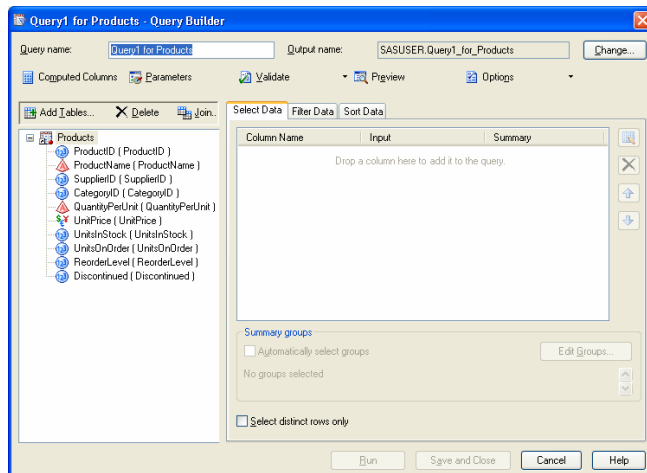
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- ✓ Examine relationships between data values
- ✓ Subset and sort your data
- ✓ Compute values
- ✓ Group and summarize data.

Creating Queries Using the Query Builder

- On the Project Explorer window, select the **Products** table.
- Select **Data > Filter and Query ...**
- On the **Select Data** tab, click on **ProductName** drag it to the Select Data window
- On the **Filter** Data tab, Select the **UnitsInStock** and drag it to the Filter Data window
- Change the operator to **"Greater than"**.
- Type **"0"** for the Value to create **Products.UnitsInStock > 0** expression
- Click the **Sort Data** tab
- Sort the **UnitPrice > Descending**
- Click **RUN**.

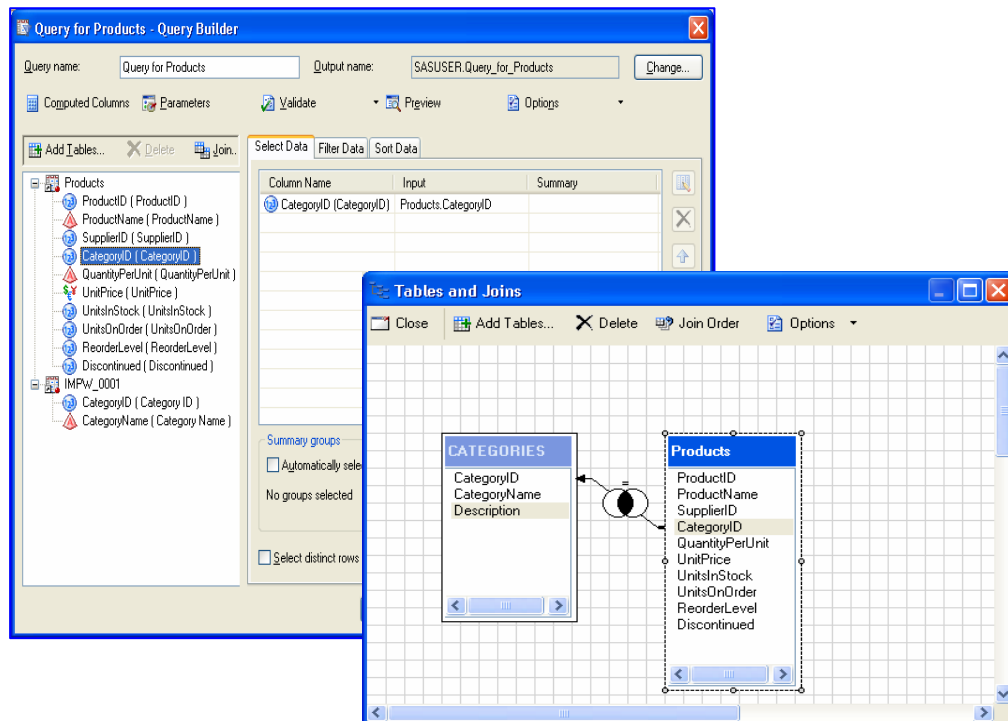


Exporting the Query Results

- Right-click on the query results data node.
- Select Send to, and then choose Microsoft Excel.

Creating a Query by Joining Tables

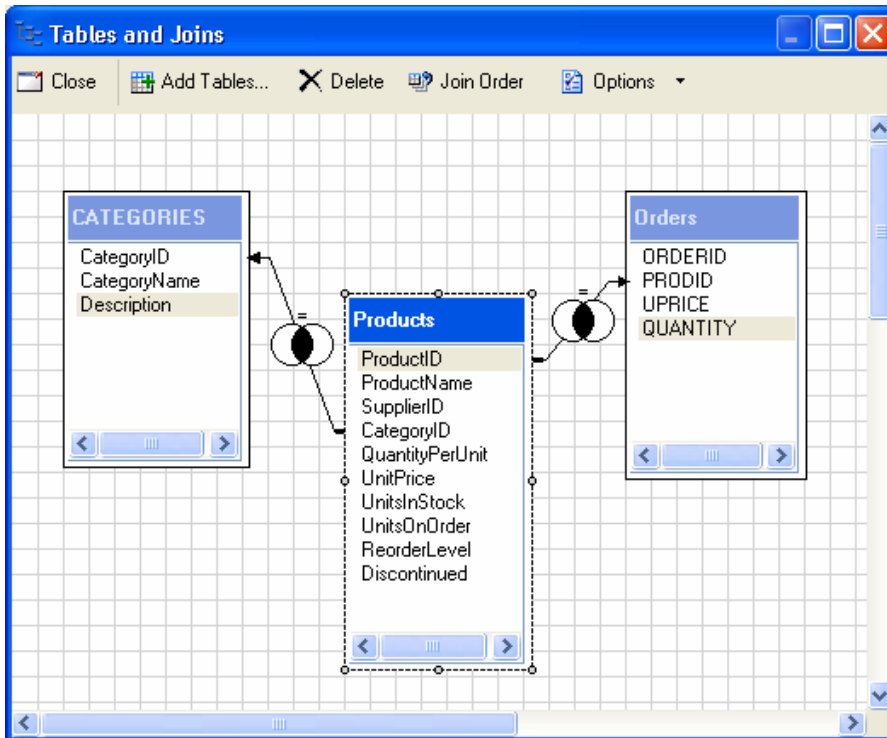
- On the Project Explorer window, click on Products data set to make it active.
- From the **Data** menu, select **Filter and Query ...**
- In the Query Builder window, click on the **Add Data...** button
- In the Open Data window, click **Project**.
- In the **Add from Project** window, select **SASUSER > CATEGORIES** data set.
- Click **OK**.
- Click the join icon to see the variable that joins the two tables. The Products and Categories tables are joined on the **CategoryID** variable.
- Close the **Tables and joins** window.



Manual join

- In the Query Builder, click **Add Tables**.
- In the Open Data window, click **Project**.

- Select **Orders table** and click **OK** to add it to the query. Because no column name and type matches are found, a message window alerts you that you will have to manually join the tables. In the message window, click **OK**.
- Although the column names are different, the values in the **ProductID** and **PRODID** columns are related and have same data types. You can join the Products and Orders tables on these columns.
- Click the **ProductID** column and drag the cursor to the **PRODID** column.
- Close the Tables and joins window.



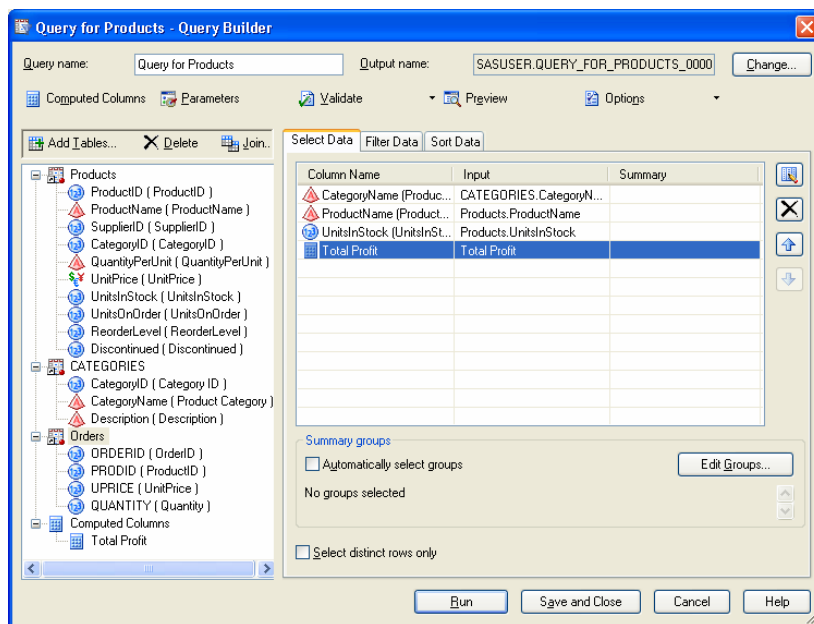
Sorting

- In the Query Builder window, click the **Sort Data** tab.
- Double-click **ProductName** and then double-click **UnitsInStock** to add the two columns to the query.
- From the list of columns for the Categories table, double-click **CategoryName** to add it to the query.
- Click **CategoryName** and then click **Move Up** to move it so that it's the first column in the report.

Creating a Computed Column and Calculating the Profit

- In the Query Builder window, click the **Computed** columns.
- Click **Build Expression...** from the drop-down menu.
- In the Advanced Expression Editor, click the Data tab, click Products.
- In the Variable values box, double-click **UnitPrice** and use the operators and other variable values to complete the expression:

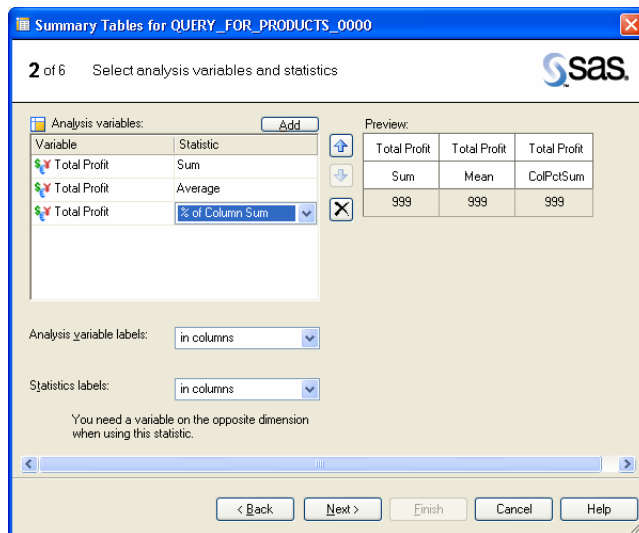
$$(\text{Products.UnitPrice} - \text{Orders.UPRICE}) * \text{Orders.QUANTIT}$$
- Click **OK**.
- Click **Run**.
- In the Computed columns window, select **Calculation1** and click **Rename**
- Type **Total Profit**, and press the Enter key.
- Select the **Total Profit** and click the **Properties** button to format it to **Currency** and **DOLLARw.d**
- Double-click the Total Profit to add it to the Query
- Click Run
- Close the query.



Generating Summary Tables from a Query

- In the Project Explorer, select **Query_for_Products** output data to make it active.
- Select **Describe > Wizards > Summary Tables ...** (the default sum is selected for the statistic).

- Click **Next >**
- Click **Add** and select **Total Profit** variable.
- Click **Add** and select **Total Profit** variable again.
- Select **Average** from the Statistic drop-down list.
- Click **Add** and Select **Total Profit** variable again.
- Select **% of Column Sum** from the Statistic drop-down list.
- Click **Next**.
- In the Rows section, click Add and select **CategoryName**
- In the Rows section, click Add and select **ProductName**
- Look at the preview area to see the layout of your report
- Click **Next**.
- Click the Rows, and select **Totals at Each level**.
- Click **Next**.
- In the Table Title, type : Profit By Products
- Delete the Footnote.
- Click **Finish**.
- Close the Output window.



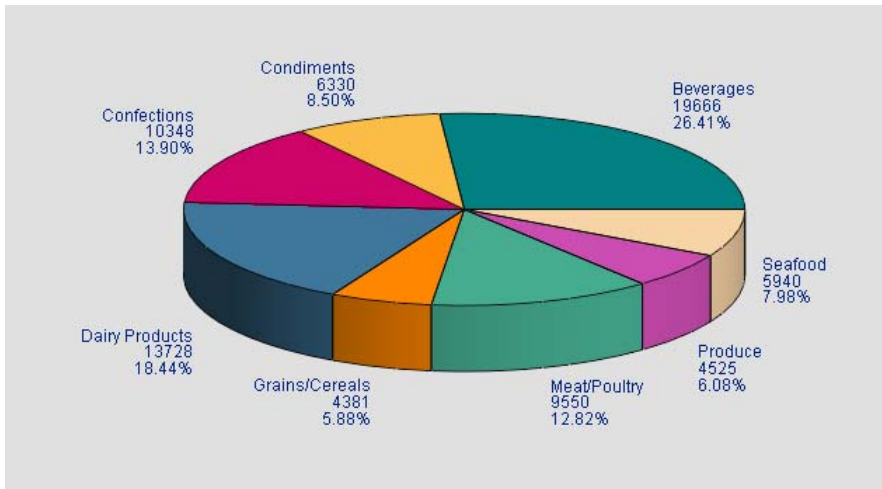
Creating a Pie Chart

- In the Project Explorer, select **Query_For_Products** output to make it active.
- From the **Graph** menu, select **Pie Chart**.
- In the Pie Chart gallery, select the Simple Pie icon.
- In the selection pane, click **Task Roles**.

- Assign the **CategoryName** column to the **Column to chart** role.
- Assign the Profit column to the **Sum of** role.

Pie Chart Options

- In the selection pane, click **Layout**.
- In the drop-down lists for **Name**, **Percentage**, and **Statistic Value**, select **Outside**.
- In the selection pane, click **Titles**.
- For the graph, clear the **Use default text** check box, and type **Profit by Product Category**.
- Click on the **Run** button.
- View the pie chart, and then close any open windows in the workspace.



Using SAS Document Builder

The Document Builder enables you to combine the HTML results from multiple tasks in your project into a single document.

- Select Tools > Create HTML Document
- In the HTML Title box, type: Profit Report
- Click Add > choose **Task Result** from the Add menu
- In the Add Results window, press CTRL, and select Summary Tables and Pie Chart
- Click OK
- In the Document Builder, select Pie Chart and click UP
- On the Options tab, choose a style for the document (sasweb for example).

- Make your selection for the Table of Contents option.
- Click Preview
- Close the HTML Report
- Click OK.

Note: You can e-mail your document by right-clicking the report, and then select Send To.

Online References

- Documentation
http://www.sas.com/technologies/bi/query_reporting/guide/index.html
- Enterprise Guide Users' Group
<http://www.bisug.org>

Book Reference

- *Getting Started with Enterprise Guide, 2nd edition*, 2002, SAS Publishing.
- The Little SAS Book for Enterprise Guide 3.0, Susan J. Slaughter and Lora D. Delwiche , Dec. 2005

Where to Get Help

- If you need help with your project, you may contact Help Central at 742-HELP.
- If you need help from your instructor, you may e-mail heide.mansouri@ttu.edu.

Please e-mail your comments or suggestions to: heide.mansouri@ttu.edu