Doing More with SAS/ASSIST® 9.1

SAS® Documentation

The correct bibliographic citation for this manual is as follows: SAS Institute Inc. 2003. *Doing More With SAS®/ASSIST 9.1*. Cary, NC: SAS Institute Inc.

Doing More With SAS®/ASSIST 9.1

Copyright © 2003, SAS Institute Inc., Cary, NC, USA

ISBN-13: 978-1-59047-206-4

ISBN-10: 1-59047-206-3

All rights reserved. Produced in the United States of America.

For a hard-copy book: No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without the prior written permission of the publisher, SAS Institute Inc.

For a Web download or e-book: Your use of this publication shall be governed by the terms established by the vendor at the time you acquire this publication.

U.S. Government Restricted Rights Notice. Use, duplication, or disclosure of this software and related documentation by the U.S. government is subject to the Agreement with SAS Institute and the restrictions set forth in FAR 52.227-19 Commercial Computer Software-Restricted Rights (June 1987).

SAS Institute Inc., SAS Campus Drive, Cary, North Carolina 27513.

1st printing, July 2003

1st electronic book, March 2008

2nd printing, March 2008

2nd electronic book, July 2011

SAS® Publishing provides a complete selection of books and electronic products to help customers use SAS software to its fullest potential. For more information about our e-books, e-learning products, CDs, and hard-copy books, visit the SAS Publishing Web site at **support.sas.com/publishing** or call 1-800-727-3228.

SAS® and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are registered trademarks or trademarks of their respective companies.

Contents

Chapter 1 △ Introduction 1
Overview **1**
Typographical Conventions **1**
Using SAS/ASSIST Software with This Document **2**

Chapter 2 △ Common Interface Features in SAS/ASSIST Software 7
Introduction **7**
SAS/ASSIST Software Structure **7**
Backing Out and Exiting SAS/ASSIST Software **8**
Moving Between SAS/ASSIST Windows and SAS Windows **8**
Returning to SAS/ASSIST Windows from the Output Window **9**
Using the Command Line in SAS/ASSIST Software **10**
Using ? to Display Choices **11**
Additional Interface Items **12**

Chapter 3 △ Doing More with Data Management 15
Introduction **15**
Converting a Character column to a Numeric column **15**
Combining Data Using a Cartesian Product Match Merge **22**
Creating a Format **28**
Altering the Properties of a SAS Table **30**
Transporting SAS Files Across Operating Environments **34**
Transposing a Table **37**

Chapter 4 △ Doing More with Report Writing 43
Introduction **43**
Limiting the Number of Rows for a Report **43**
Adding More than Four Titles to a Report **46**
Doing More with Tabular Reports **49**

Chapter 5 △ Doing More with the Report Engine 61
Introduction **61**
Opening and Using the Report Engine Window **62**
Modifying a Report Using the Cmd Field **64**
Modifying a Report's Column Order, Headers, and Formats **66**
Modifying a Report with Usages **68**
Using the Column Information Window **70**
Choosing a Different Report Type **72**
Inserting Date and Time Stamps in Titles and Footnotes **74**
Additional Report Engine Options **75**
Saving Reports **77**
Opening an Existing Report **82**

Selecting Other Data **83**
Editing a Graph Interactively **83**

Chapter 6 △ Doing More with Graphics 85
Introduction **86**
Additional Information **86**
Doing More with Bar Charts **86**
Doing More with Pie Charts **98**
Doing More with Plots **106**
Doing More with Maps **110**
Changing the Background Color for Graphs **115**

Chapter 7 △ Doing More with Data Analysis 119
Introduction **119**
Generating a One-way Frequency Table **119**
Performing a Linear Regression **121**
Performing an Analysis of Variance **127**

Chapter 8 △ Doing More with Remote Connect 135
Introduction **135**
Assigning Librefs on Remote SAS Sessions **135**
Setting Up SAS/ASSIST Tasks On Remote Data **137**
Remote Configuration Management **140**

Chapter 9 △ Doing More with Results 143
Chapter Overview **143**
Doing More with the Result Manager **143**
Saving Source Code to an External File **149**
Browsing an External File **150**
Creating and Executing a Script File **152**

Chapter 10 △ Query and Reporting 155
Introduction to Query and Reporting **156**
Additional Information **156**
Querying Data **156**
Opening the Query Window **157**
Opening and Using the Select Window **159**
Building a Query **169**
Creating New Tables **182**
Joining Tables **184**
Query and Reporting Setup Options **199**

Chapter 11 △ Using the SQL Editor 201
Overview **201**
Opening the SQL Editor Window **202**
Entering SQL Statements Directly **202**
Creating Template SQL Programs **204**

Using the Enhanced SQL Editor **207**
Running an SQL Query and Customizing the Output **211**
Saving SQL Code or Output **213**

Chapter 12 △ Doing More with Setup 215
Introduction **215**
File Management Items **216**
Environment Items **217**
Information items **219**
Profiles items **219**
Using the Catalog Search Path **220**
Using Logon and Logoff Exits and an Alternate Main Menu **221**

Appendix 1 △ Tasks Menu Reference 225
Introduction **225**

Appendix 2 △ Customizing SAS/ASSIST Software 237
Introduction **237**
Setting User Profile Options **237**
Creating an Alternate Menu Bar **239**

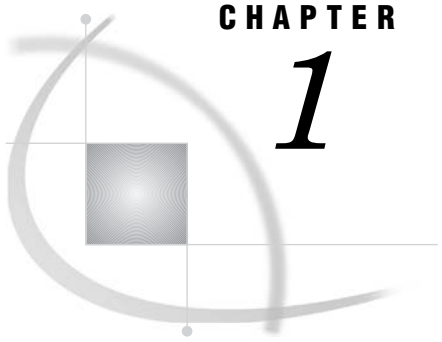
Appendix 3 △ Batch Processing with the Result Manager (z/OS Only) 243
Introduction **243**
General Batch Processing Information Under z/OS **243**
Submitting Batch Jobs **244**
Customizing the JCL Program **246**
Customizing the Batch Program Window **248**

Appendix 4 △ Migrating from QMF to SAS/ASSIST Software 251
Introduction **251**
Generating a QMF Export Procedure **251**
Exporting Queries from QMF **253**
Importing QMF Queries into Query and Reporting **253**
Alternate Method to Import Queries **255**

Appendix 5 △ Recommended Reading 257
Recommended Reading **257**

Glossary 259

Index 267



CHAPTER

1

Introduction

Overview 1
Typographical Conventions 1
Using SAS/ASSIST Software with This Document 2
Removing the Date and Time Stamp from Your Output 2
Disabling the Save Changes Dialog Box 2
Creating the SAS/ASSIST Sample Tables 2
Creating the AIRLINE Sample Tables 3

Overview

This document extends the concepts presented in *Getting Started with SAS/ASSIST*, providing additional details on the features and capabilities of SAS/ASSIST software. Additionally, features of SAS/ASSIST software not covered in *Getting Started with SAS/ASSIST* are introduced in this document.

Readers of this document should be familiar with the concepts presented in *Getting Started with SAS/ASSIST*, and should have installed, at minimum, base SAS software, SAS/ASSIST software, and SAS/FSP software. To perform the graphics tasks, users should have SAS/GRAPH software installed. To perform tasks that access or create DB2 files, or files from other database management system (DBMS) vendors, users should have installed SAS/ACCESS software and the SAS/ACCESS interface to their desired DBMS.

The illustrations and examples from this document were taken from SAS/ASSIST 9.1 under the Microsoft Windows operating environment. Your screens might look different from the illustrations in this document.

Typographical Conventions

Following is a description of the typographical conventions used in this document:

italic
Used for new terms.

monospace
Used to indicate items in windows or on menus, or items that the user types into the system.

Performing the tasks in this document occasionally requires you to make a series of window and menu selections. Where appropriate, these series are indicated with a selection path. For example,

Tasks ▶ Graphics ▶ Maps

In this case, you would select **Tasks** from the current window, then select **Graphics** from the resulting pull-down menu, and then select **Maps** from the resulting cascading menu.

In this document the word *task* refers to anything you can do with SAS/ASSIST that involves manipulating, reporting, analyzing, and presenting data. SAS/ASSIST tasks can be saved and recalled. These tasks are distinguished from other things you can do with SAS/ASSIST software, such as setup actions and utility actions. Thus, creating a listing report is a SAS/ASSIST task, but generating the graphics test pattern is not. A *task window* is a SAS/ASSIST window that is the starting point for performing a task. Examples of task windows include the List a Table window and the Bar Charts window.

Using SAS/ASSIST Software with This Document

For the examples in this document, we disabled the date and time stamp from all output, and we disabled the Save Changes dialog box that appears by default when you exit a task window. We also use the same sample tables that were used in *Getting Started with SAS/ASSIST*. For convenience, we have reprinted here the instructions for disabling the date and time stamp, disabling the Save Changes dialog box, and creating the SAS/ASSIST sample tables and the AIRLINE sample tables.

Removing the Date and Time Stamp from Your Output

To remove the date and time stamp from your output, follow this selection path from the SAS/ASSIST WorkPlace menu or any task window menu bar:**Edit ▶ Page Headers**
Deselect **Print current date**.

Note: This option is not applicable to graphics output and is not available on graphics task windows. Also, the date and time stamp are disabled for the duration of the current SAS session; they will be enabled the next time you invoke SAS. △

Disabling the Save Changes Dialog Box

To disable the Save Changes dialog box, the SAS/ASSIST user profile option **Confirm changes** is set to **No**. To set this option, do the following:

1. Follow this selection path:**Tasks ▶ Setup ▶ Profiles ▶ User**The User Profile window appears.
2. In the **Value** field for the **Confirm changes** option, type

   ```
   no
   ```

   and press ENTER.
3. Follow this selection path to save the profile change:**File ▶ Close**

If you do not set this option to **No**, you are presented with a Save Changes dialog box every time you exit a task window.

Creating the SAS/ASSIST Sample Tables

1 To create or re-create the sample tables, follow this selection path: **Tasks ▶ Setup ▶ File Management ▶ Sample tables...**The Sample Tables window appears.
2 Select **`Create sample tables`** from the Sample Tables window. The Create Sample Tables window appears.
3 Select the tables you want to create. For the exercises in this document, select all of the tables.
4 Select **`OK`**. The sample tables are created. Depending on your hardware and operating environment, this may take several minutes. When the process is complete, a message appears that indicates that all the tables were created.
5 Select **`Goback`** twice to return to the WorkPlace menu.

Note: If you are re-creating sample tables (rather than creating them for the first time), and you attempt to re-create a table that is the currently active table in one or more SAS/ASSIST tasks, you get an error message. SAS/ASSIST software does not let you re-create an active table. To remove a table from active status, follow these steps:

1 Use the **`Tasks`** menu to go to the desired task window.
2 Select **`Table`**. The Select Table window appears.
3 Select **`Refresh`**, and then select **`OK`**. The task window reappears with the **`Table`** field cleared.

△

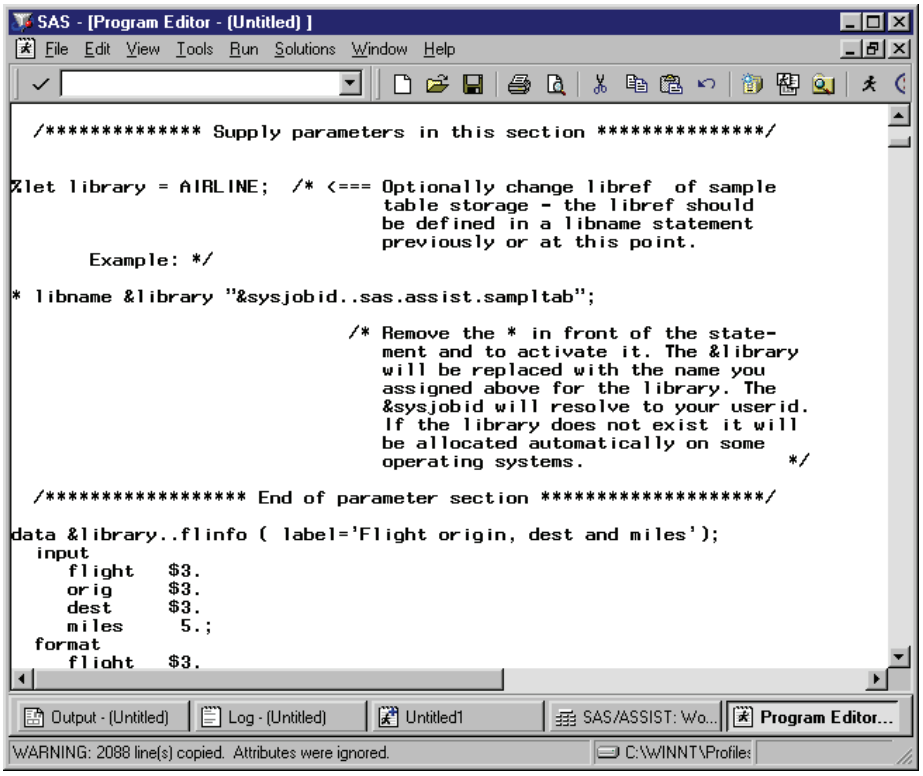
Creating the AIRLINE Sample Tables

1 If you are using the z/OS operating environment, continue to step 2. Otherwise, create a library, directory, or folder, depending on your operating environment, where you want the AIRLINE sample tables to reside. You may name this library or directory anything you want, but the name **`sampltab`** is used in these examples. See the SAS companion for your operating environment, or contact the SAS Software Consultant at your site if you do not know how to perform this step.

   Note: The name **`sampltab`** that is used in these examples is the physical file or directory name. Do not confuse this name with the libname, which you will specify in a later step. △

2 Go to the Program Editor window by using the PREVWIND function key or by clicking on the window, depending on your operating environment. From the Program Editor window, follow this selection path:**File ▶ Open object...**The Open window appears with a list of available libraries in the left pane.
3 Select the ⊞ symbol next to the **`Sashelp`** library. The contents of the **`Sashelp`** library appear in the left pane.
4 Scroll down in the left pane until you see the **`Qassist`** catalog. Select the **`Qassist`** catalog. A list of entries in the **`Qassist`** catalog appears in the right pane.
5 Scroll down in the right pane until you see the **`Samplsas`** source entry. Select the **`Samplsas`** source entry.
6 Select **`Open`**. The Samplsas program appears in the Program Editor window.
7 Scroll down in the Program Editor window (or use the DOWN function key) until you find the “Supply parameters” section, as shown in the following display.

Display 1.1 SAMPLSAS Source Code



8 Find the line that reads

```
* libname &library ''&sysjobid..sas.assist.sampltab'';
```

You might need to scroll further down to find this line. This line is the LIBNAME statement that SAS software uses to assign a libref to a physical file or directory.

9 Remove the * by placing the cursor over it and pressing the SPACE BAR or DELETE key.

10 If you are using z/OS, continue to the next step. Otherwise, replace the information between the quotation marks (") with the name of the library or directory you created in step 1. Use the following table as a guide. Ensure that the name is enclosed in quotation marks and that a semicolon (;) is at the end of the line.

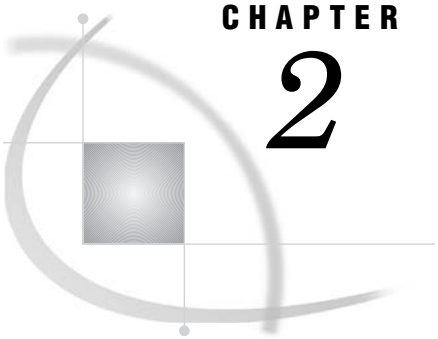
Table 1.1 Examples of LIBNAME Statements

Operating Environment	Example
z/OS	**libname &library** "*userid*.**assist.sampltab";**
Open VMS	**libname &library**"*DEVICE*:**[SAMPLTAB]";**
UNIX	**libname &library** "/u/*userid*/**assist/sampltab";**
Windows	**libname &library "C:\assist\sampltab";**

11 To run the program, follow this selection path:**Run ▶ Submit**After the program finishes, statistics about the created tables appear in the Output window.

Note: The Airline libref is assigned for the duration of your current SAS session only. The next time you invoke SAS and SAS/ASSIST software, you will need to assign the libref again. Alternatively, you can specify that the Airline libref be automatically defined, each time you invoke SAS, by assigning the libref in the SAS Explorer window. See the online help for the SAS Explorer window for details. △

12 Return to the SAS/ASSIST window by selecting **`ASSIST`** from the **`Solutions`** menu.



CHAPTER

2

Common Interface Features in SAS/ASSIST Software

Introduction **7**
SAS/ASSIST Software Structure **7**
Backing Out and Exiting SAS/ASSIST Software **8**
Moving Between SAS/ASSIST Windows and SAS Windows **8**
Returning to SAS/ASSIST Windows from the Output Window **9**
Mainframe operating environments **9**
Desktop Operating Environments **10**
Using the Command Line in SAS/ASSIST Software **10**
Using ? to Display Choices **11**
Additional Interface Items **12**
Select Table Window **12**
Select Table Variables Window **12**
Utilities Menu **13**
Additional Options **13**

Introduction

This chapter describes features in SAS/ASSIST software that help you use the SAS/ASSIST interface. Included in this chapter is a discussion of the structure of SAS/ASSIST software, information about backing out and exiting, and information on other useful features of the SAS/ASSIST interface.

SAS/ASSIST Software Structure

SAS/ASSIST software is designed to enable you to locate the part of SAS that you need. The windows that first appear when you perform a task contain only the most important information associated with that task. However, you can also access additional features to perform more sophisticated tasks. This structure enables novice users to complete a task quickly without becoming overwhelmed, while enabling expert users to complete their tasks with greater sophistication.

The following items are consistent throughout SAS/ASSIST software and should help you use the product's interface.

- The menu bar is the same for all SAS/ASSIST windows. From any window in SAS/ASSIST software that has a menu bar, you can access any task from the **`Tasks`** menu.
- Items that are shaded, or "grayed out," are not available for the task you are performing. Note that in some operating environments, unavailable items might be indicated by a different color, for example, yellow.

Backing Out and Exiting SAS/ASSIST Software

Depending on which SAS/ASSIST window you are in, you can use the **Cancel**, **Goback**, or **OK** buttons; **Cancel** or **Close** on the **File** menu; or the END function key to help you to back out of tasks in SAS/ASSIST software.

- The **Cancel** button and **Cancel** from the **File** menu ignore any information that you specified in the canceled window and return you to the previous window.
- **Goback** processes the information you specified in the window and returns you to the previous window.
- **OK** processes what you specified in a window and either returns you to the previous window or continues with the task.
- The END function key processes the information specified in the window and enables you to exit most windows in SAS/ASSIST software.

To exit SAS/ASSIST software, use the **Goback** or **Cancel** buttons, or **Cancel** or **Close** on the **File** menu until you return to the WorkPlace menu. Then select **Exit**.

If you exit SAS/ASSIST software incorrectly, for example, if your computer "crashes," then the SASPARM table may become damaged. The SASPARM table is a SAS table, normally stored in the SASUSER library, which stores information about your SAS/ ASSIST session, such as the active table and graphics options values. The next time you access SAS/ASSIST software, a message appears to indicate your SASPARM table has been damaged. To repair the SASPARM table, type **Y** and press ENTER. The table is repaired, and the SAS/ASSIST session begins.

Moving Between SAS/ASSIST Windows and SAS Windows

It is occasionally necessary to move between a SAS/ASSIST window and other SAS windows, such as the Program Editor and Log windows. You can easily move from a SAS/ASSIST window to other SAS windows by using items on the **View** menu, listed below.

Note: In most desktop operating environments, if a desired window is open, you can access it by using the **View** menu or simply clicking on the window. If a window is not already open, you must use the **View** menu to access it. △

Program Editor
raises the Program Editor window.

Log
raises the Log window.

Output
raises the Output window.

Graph
raises the Graph window. This window is empty unless you have performed graphics tasks in the current SAS session.

Results
raises the Results window.

Explorer
raises the Explorer window.

Contents Only

raises the Explorer window without the detail pane on the right.

For more information on these windows, follow this selection path from the window of interest:**Help ▶ Using This Window**

To return to the SAS/ASSIST window, follow this selection path from any window:**Solutions ▶ ASSIST**The following section contains instructions on returning from the Output window.

Returning to SAS/ASSIST Windows from the Output Window

The method of returning to a SAS/ASSIST window from the Output window varies by operating environment.

Mainframe operating environments

In mainframe operating environments, SAS procedures that generate output are suspended after the first page of output appears in the Output window. This situation is indicated by a note in the message area stating that "PROC *procedure-name* has created 1 page(s) of output so far" or "PROC *procedure-name* suspended." Before you can perform any more tasks in SAS/ASSIST software, the running procedure must be completed. Use one of the following methods to complete the running procedure:

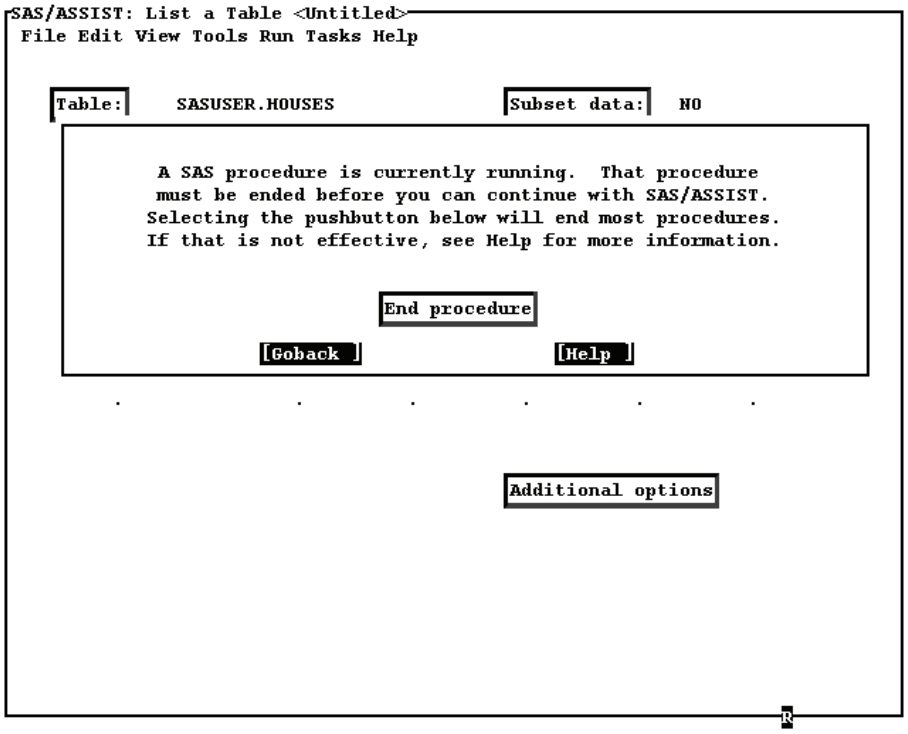
- Use the END command or function key to end the procedure.
- Use the DOWN command or function key to scroll down through subsequent windows until the procedure is complete.

After the procedure is complete, use one of the following methods to return to the SAS/ASSIST task window:

- Follow this selection path:**Solutions ▶ ASSIST**
- Use the END command or function key.
- Use the NEXT or PREVWIND keys to display the SAS/ASSIST task window.

Note: If you return to SAS/ASSIST before all procedures have finished running and you try to execute another SAS/ASSIST task, a message appears which indicates that a procedure is still in progress. Select **`End Procedure`** to terminate the running procedure.

Display 2.1 Running Procedure Message (Mainframes)



△

Desktop Operating Environments

In desktop or windows-based operating environments, procedures that generate output run to completion without user intervention. Use one of the following methods to return to the SAS/ASSIST task window:

- For Microsoft Windows, select the **SAS/ASSIST** button in the SAS window bar or follow this selection path:**Window ▸ SAS/ASSIST**
- For any operating environment, click on the SAS/ASSIST window or follow this selection path:**Solutions ▸ ASSIST**

Using the Command Line in SAS/ASSIST Software

Some users might prefer to use a command line instead of the menu bar to type commands in SAS/ASSIST software.

- If you have a toolbox or toolbar as shown in the following display, you can type commands in the command window at the left end of the toolbar. To repeat a command, select the down arrow and select the command from the list of recently-executed commands that appears. Select the check mark or press ENTER to execute the command.

Display 2.2 SAS Toolbar

- If you do not have a toolbox or toolbar, follow this selection path:**Tools ▶ Options ▶ Preferences**

  Select the **`View`** tab. Select the **`Command line`** checkbox.

  The menu bar for that window is replaced with a **`Command ===>`** prompt.

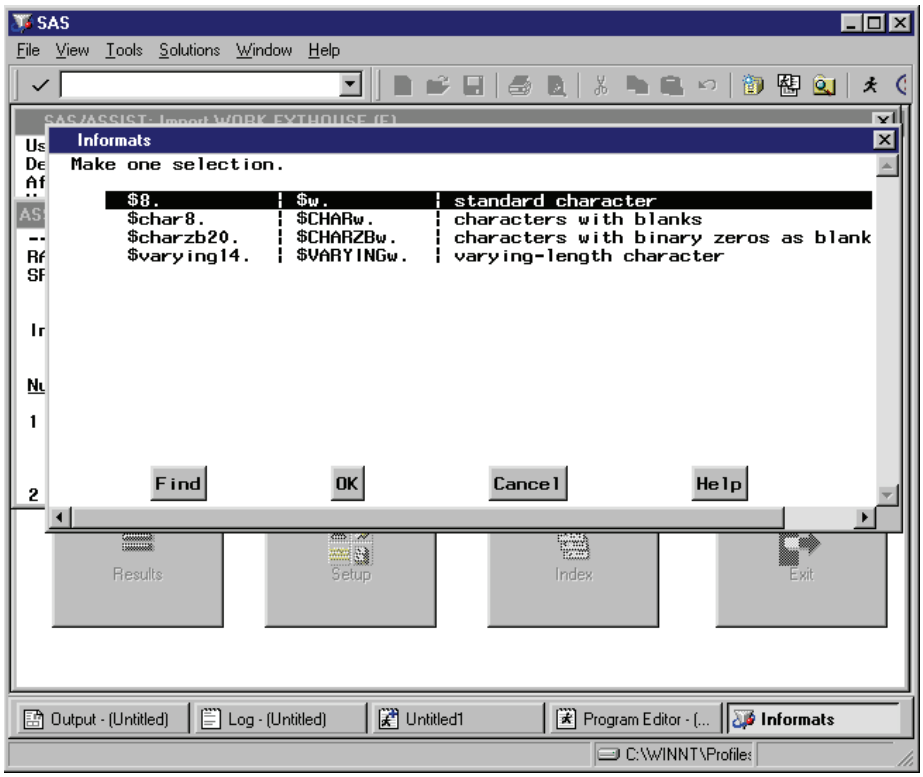
Note: Menu bars are the default for SAS/ASSIST software. If you use the **`PMENUS OFF`** command to turn the menu bars off for all SAS windows, a message appears in the message line which indicates that you cannot disable the pull-down menus while using SAS/ASSIST software. △

To return to the menu bar, type **`COMMAND`** at the **`Command ===>`** prompt and press ENTER.

Using ? to Display Choices

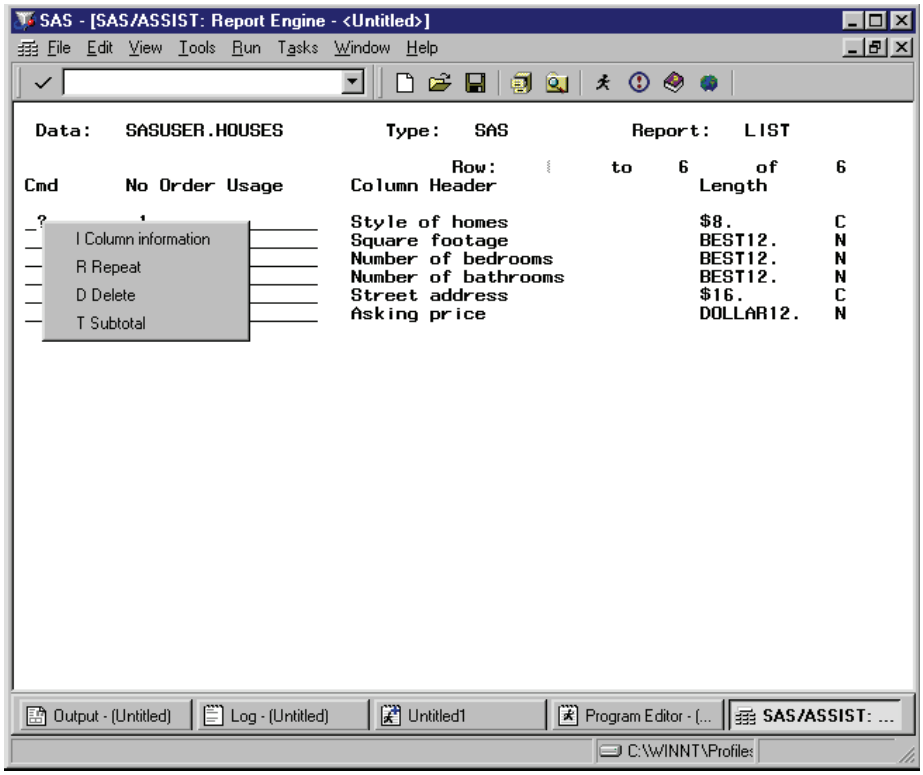
If you are not sure of the valid choices that you can type in a field, type **`?`** in the first position of the field and press ENTER. A list of valid choices appears. For example, if you type **`?`** in a field to request a format, a list of valid formats appears, and you can select the format that you want.

Display 2.3 Using a Selection List to Display Choices



Using **`?`** also displays a list of valid commands for fields. For example, if you type **`?`** in the selection field next to any of the saved tasks in the Result Manager window, a list appears which shows the valid selection-field commands.

Display 2.4 Using a Selection List to Enter Commands



Note: In windows that are called by SAS/ASSIST software, but are not actually part of the SAS/ASSIST product, the **?** command is not available. △

Additional Interface Items

There are additional items throughout SAS/ASSIST software that help you use the product. These interface items are used in the same way throughout SAS/ASSIST software, and are described below.

Select Table Window

The Select Table window is the interface that SAS/ASSIST software uses to select tables for tasks. Use of this window is described in *Getting Started with SAS/ASSIST*. Some additional features are described below.

- When you select a library in the left pane, the list in the right pane automatically adjusts itself to include only those tables in the selected library.
- You can use the **Find** button to search for tables by table name, or to find a table containing a column with a given name.

Select Table Variables Window

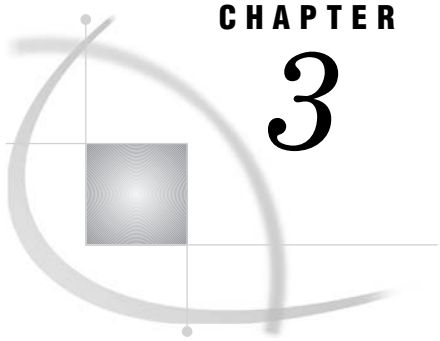
The Select Table Variables window is the interface that SAS/ASSIST software uses to select columns from tables (“variable” is another word for “column”). Use of this window is described in *Getting Started with SAS/ASSIST*.

Utilities Menu

Most of the submenus on the **Tasks** menu contain a **Utilities** item. The **Utilities** menus are specific to the task menus in which they appear and contain items to help you manage data and perform tasks.

Additional Options

The **Additional Options** item on a task window enables you to access detailed features of a task. This item is specific to the window from which it is selected. For example, when you select **Additional Options** from the List a table window under **Report Writing**, the Additional Options window that appears enables you to format the report listing you are creating. However, if you select **Additional Options** from the Summary Statistics window by using **Elementary** on the Data Analysis menu, the Additional Options window displays information that enables you to manipulate the columns for which you are creating statistics.



CHAPTER

3

Doing More with Data Management

Introduction **15**
Converting a Character column to a Numeric column **15**
Additional Information **16**
Instructions **16**
Converting Character Dates and Times to SAS Date and Time Values **22**
Combining Data Using a Cartesian Product Match Merge **22**
Additional Information **24**
Instructions **24**
Creating a Format **28**
Additional Information **28**
Instructions **28**
Altering the Properties of a SAS Table **30**
Additional Information **31**
Instructions **31**
Transporting SAS Files Across Operating Environments **34**
Additional Information **34**
Instructions **34**
Transposing a Table **37**
Additional Information **38**
Instructions **38**

Introduction

This chapter provides instructions on performing advanced data management tasks.

Converting a Character column to a Numeric column

Sometimes numeric data is stored in columns that have character data types. In order to do calculations with this numeric data, you must convert the character columns to numeric. You can use **`Subset/Copy`** on the Data Management menu to change a column from a character to a numeric format. In this section, you convert the character column DAY, which is found in the ORANGES table, to a numeric column. The value in the character column DAY is a (character) number from **`1`** to **`6`**.

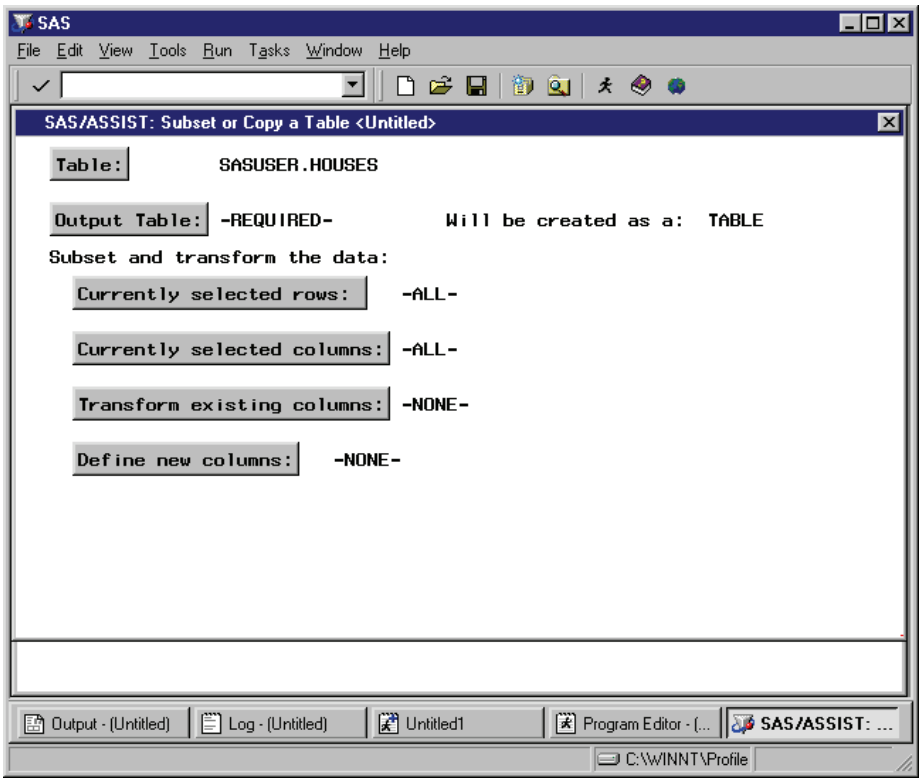
Additional Information

For additional information on changing columns from character to numeric and vice versa, refer to the PUT and INPUT functions and formats and informats in *SAS Language Reference: Dictionary*.

Instructions

1 Follow this selection path:**Tasks ▶ Data Management ▶ Subset/Copy**The Subset or Copy a Table window appears.

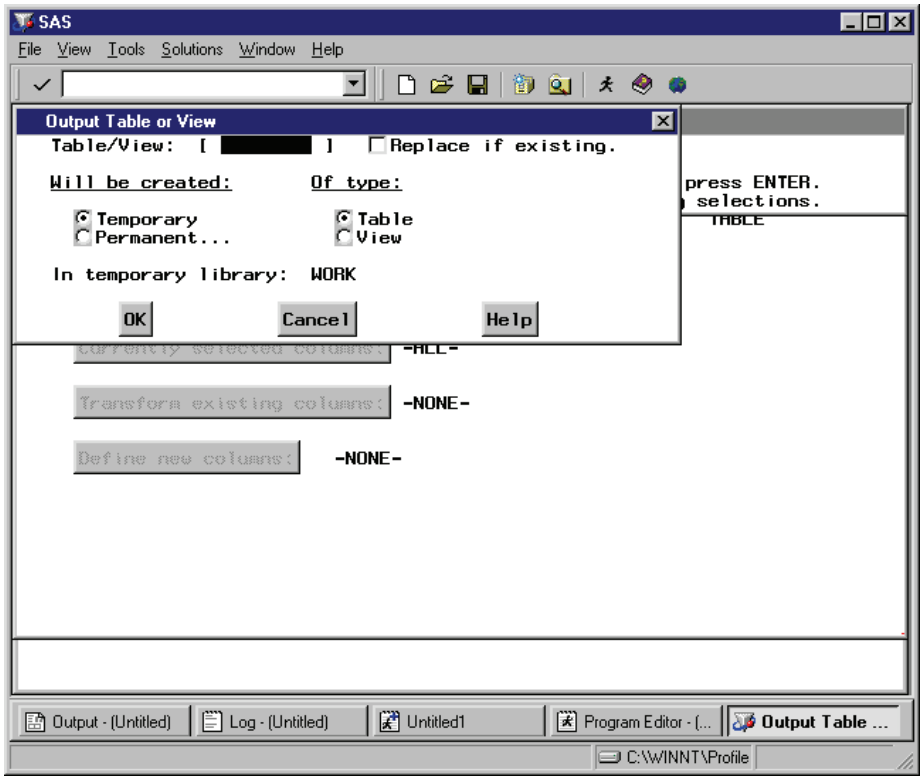
Display 3.1 Subset or Copy A Table Window



2 Use the **`Table`** button to select the SASUSER.ORANGES table.

3 Select **`Output Table`**. The Output Table or View window appears.

Display 3.2 Output Table or View Window



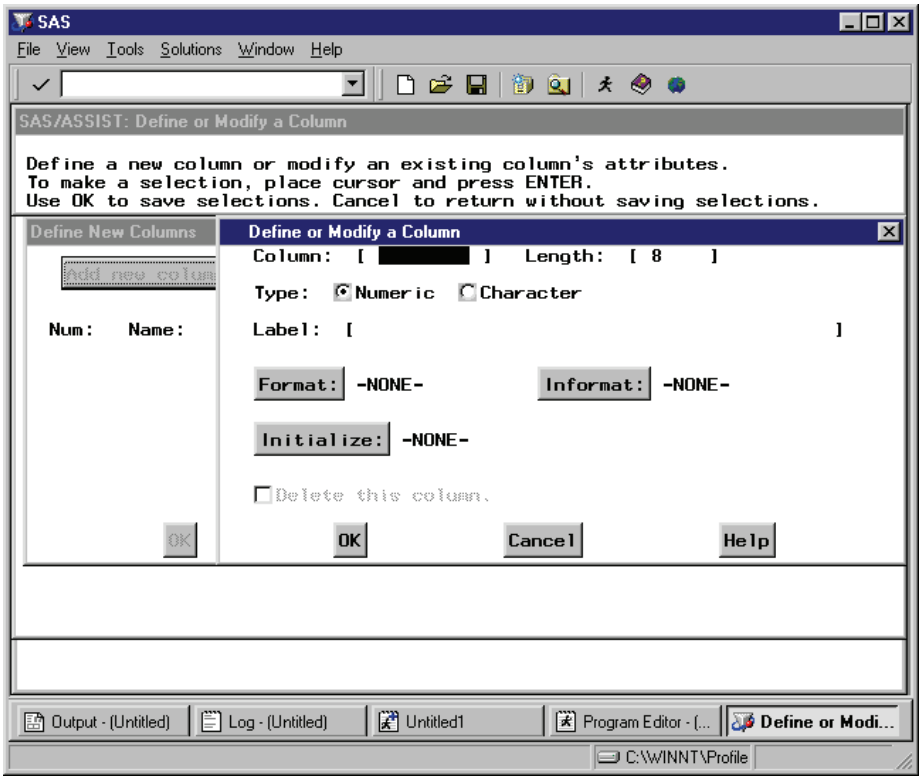
4 Type **ORANGNUM** in the **Table/View** field.

ORANGNUM is a new table that you create to contain the new numeric column DAYNUM. By leaving the defaults of **Temporary** and **Table** selected, you create a temporary table in the WORK library, which is deleted when you exit SAS. An indicator next to **Temporary** and **Table** shows that these items are selected.

5 Select **OK** to return to the Subset or Copy a Table window.

6 Select **Define new columns**. The Define New Columns window appears.

Display 3.3 Define or Modify a Column Window



You use this window to define the new columns that you are adding to the output table.

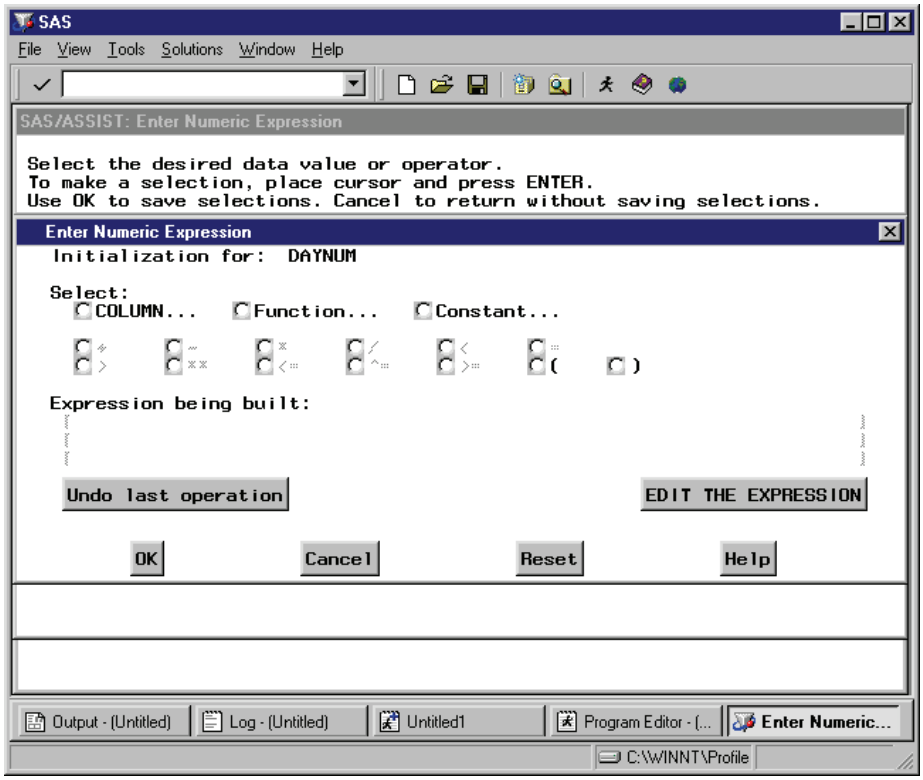
7 In the **column** field, type **DAYNUM** as the name of the column.

8 Leave the **Length** as **8**.

Leave the **Type** as **Numeric**.

9 Select **Initialize**. The Enter Numeric Expression window appears.

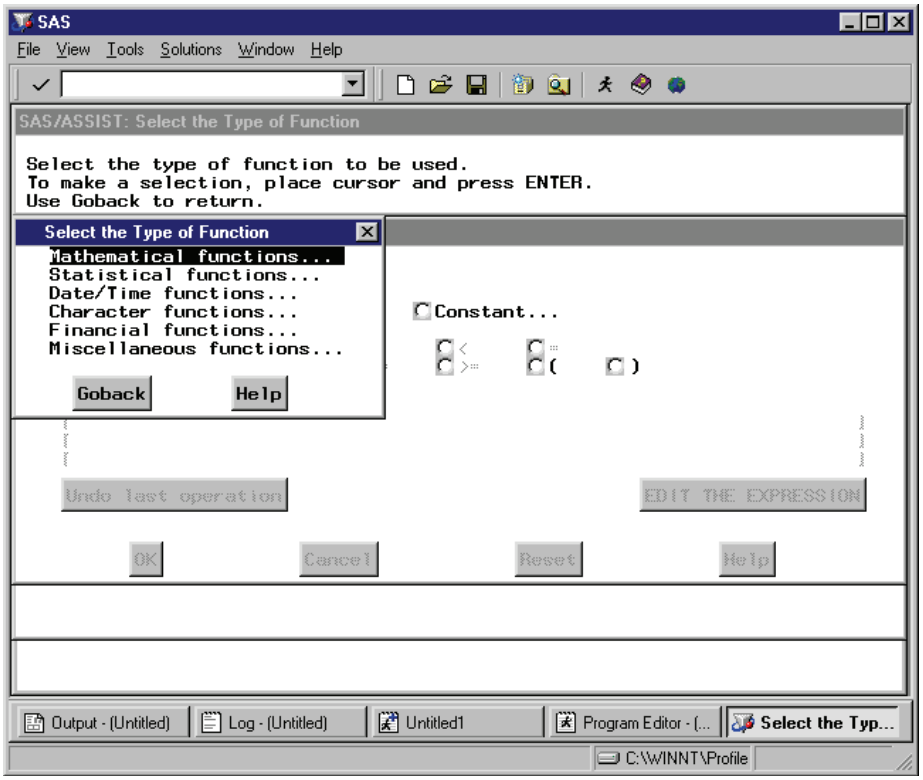
Display 3.4 Enter Numeric Expression Window



You use this window to build an expression that is used to define the new column.

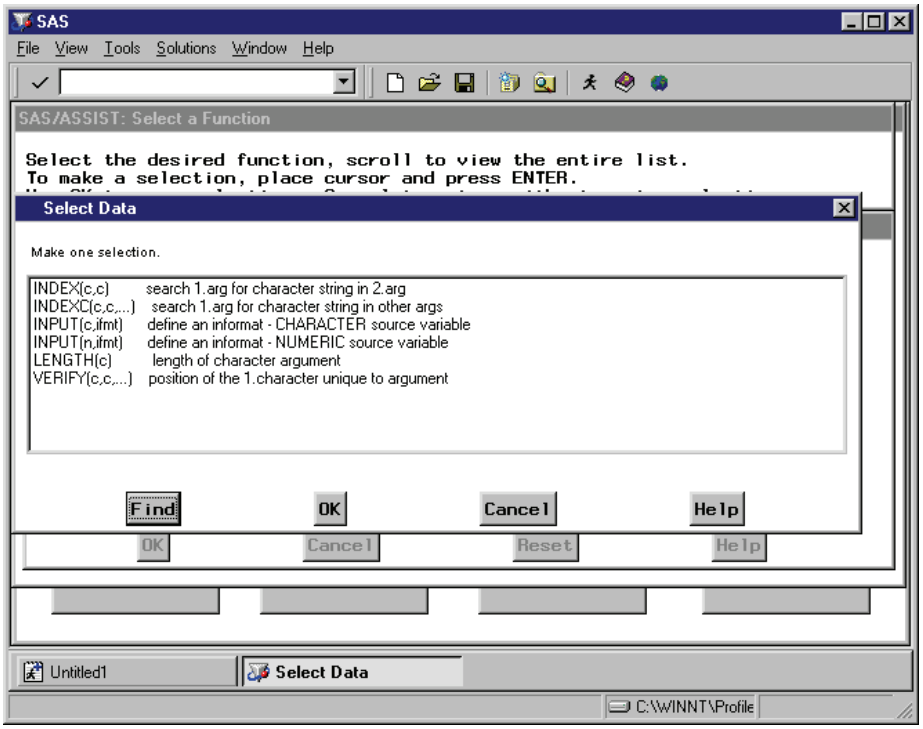
10 Select **`Function`**. The Select the Type of Function window appears.

Display 3.5 Select Type of Function Window



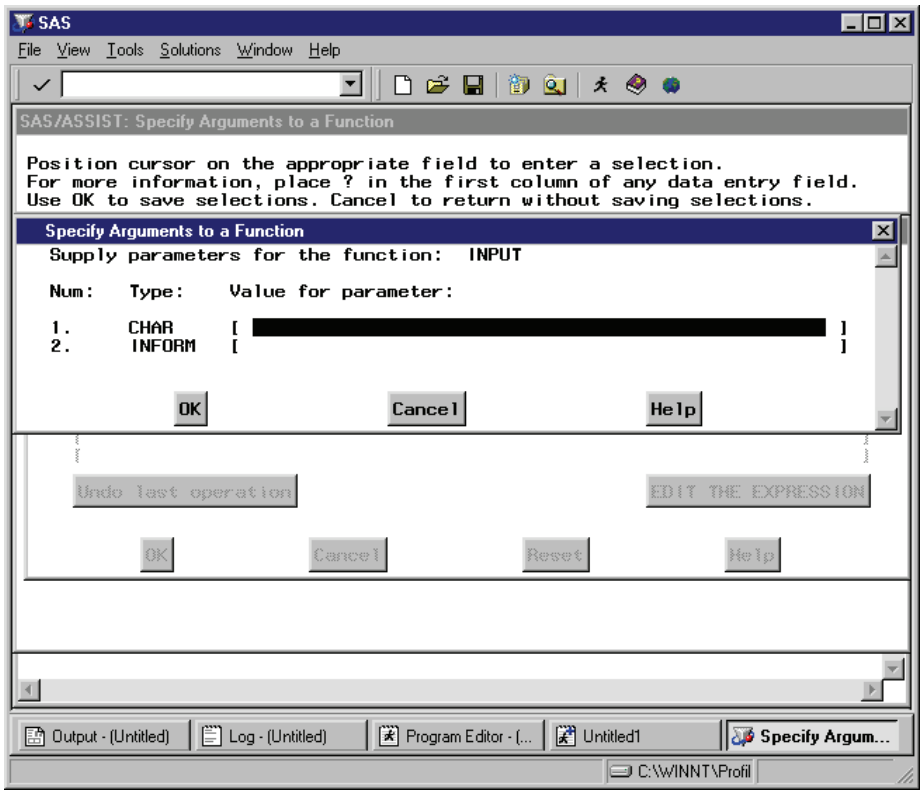
11 Select **`Character functions`**. The Select Data window for character functions appears.

Display 3.6 Select Character Function Window



12 Select **`INPUT(c,ifmt)`**. The Specify Arguments to a Function window appears.

Display 3.7 Specify Arguments to a Function Window



You select **`INPUT(c,ifmt)`** because the source column DAY is character.

13 In the **`Value for parameter`** field next to **`CHAR`**, type **`DAY`**.

In the **`Value for parameter`** field next to **`INFORM`**, type **`2.1`**.

You type **`DAY`** in the **`CHAR`** parameter field because you want to use the values of the DAY column in the ORANGES table as the source for the DAYNUM column that you are creating.

The informat 2.1 is used in this example so you can check to see that this task completed correctly. However, you can use any valid informat. In this example, if you select a format such as 1., the only indication that the new column is numeric is that it is right justified when displayed in the FSVIEW window. However, if you use 2.1 as an informat, the new column DAYNUM is right justified and converted to display tenths.

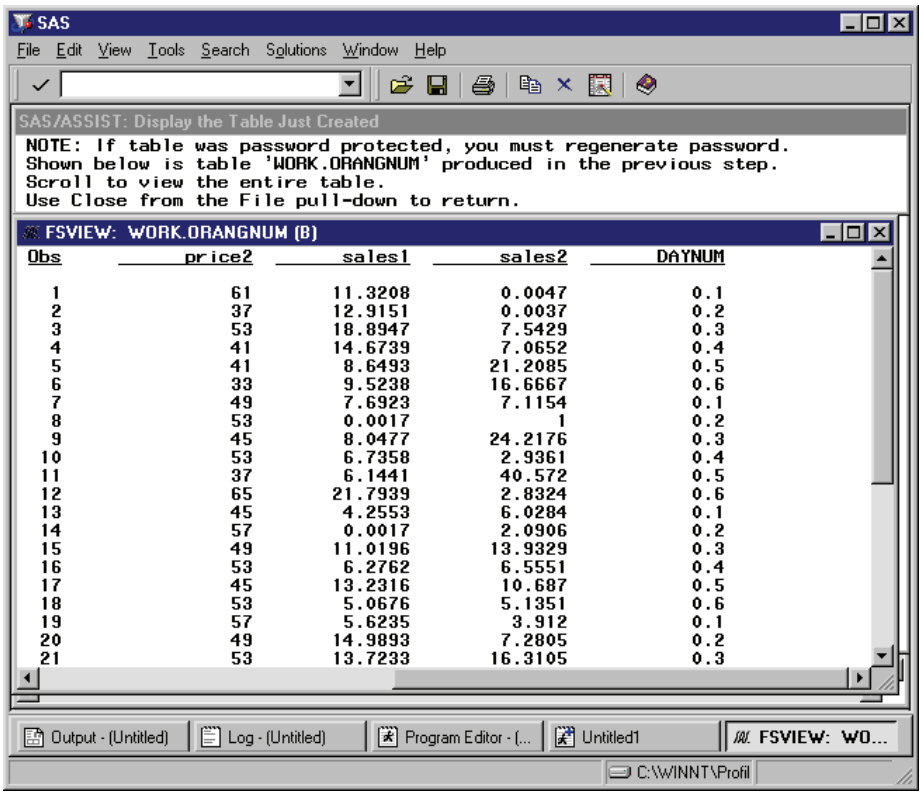
14 Select **`OK`** four times until you return to the Subset or Copy a table window.

Follow this selection path:**Run ▶ Submit**When prompted, select **`OK`**, then **`Goback`** to view the new table.

The new DAYNUM column is created, and the data is copied to the output table. An FSVIEW window appears with the data in the output table.

15 Scroll to the right or use the RIGHT command or function key to see the new column DAYNUM.

Display 3.8 New DAYNUM Column



Obs	price2	sales1	sales2	DAYNUM
1	61	11.3208	0.0047	0.1
2	37	12.9151	0.0037	0.2
3	53	18.8947	7.5429	0.3
4	41	14.6739	7.0652	0.4
5	41	8.6493	21.2085	0.5
6	33	9.5238	16.6667	0.6
7	49	7.6923	7.1154	0.1
8	53	0.0017	1	0.2
9	45	8.0477	24.2176	0.3
10	53	6.7358	2.9361	0.4
11	37	6.1441	40.572	0.5
12	65	21.7939	2.8324	0.6
13	45	4.2553	6.0284	0.1
14	57	0.0017	2.0906	0.2
15	49	11.0196	13.9329	0.3
16	53	6.2762	6.5551	0.4
17	45	13.2316	10.687	0.5
18	53	5.0676	5.1351	0.6
19	57	5.6235	3.912	0.1
20	49	14.9893	7.2805	0.2
21	53	13.7233	16.3105	0.3

To confirm that the column is numeric, browse the properties of the table. See "Altering the Properties of a SAS Table" on page 30 for more information.

16 To exit theFSVIEW window, follow this selection path:**File ► Close**

Converting Character Dates and Times to SAS Date and Time Values

You can use the above procedure to convert character dates and times to SAS date and time values. In the Specify Arguments to a Function window, specify an appropriate date, time, or datetime informat for **`INFORM`**. For example, if you have a column of character dates in the form 05MAR1999, use the DATE9. informat. In the Define or Modify a Column window, you might want to specify an appropriate date, time, or datetime format by selecting **`Format`**.

Combining Data Using a Cartesian Product Match Merge

You can use **`Combine`** on the Data Management menu to combine your data in several ways. You can concatenate, interleave, merge, or match merge your data. The **`Match Merge`** item enables you to perform a SAS match merge or Cartesian product match merge.

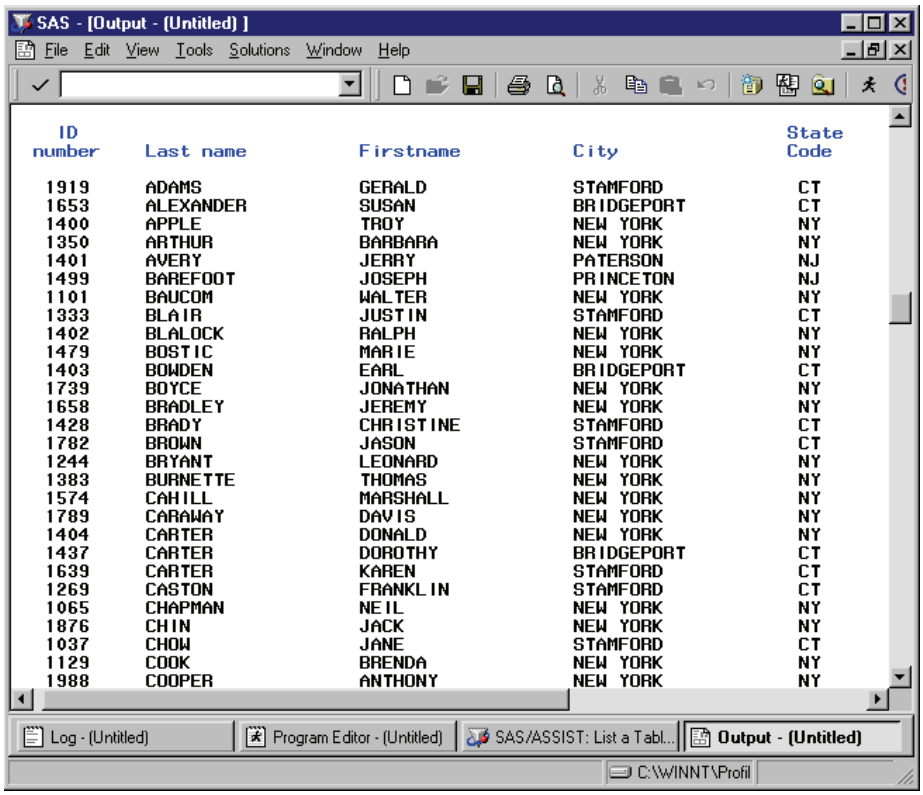
In this section, you use **`Combine`** on the Data Management menu to perform a Cartesian product match merge using the AIRLINE.SCHEDULE and AIRLINE.STAFF sample tables. If you have not created the AIRLINE sample tables, see "Creating the AIRLINE Sample Tables" on page 3.

The AIRLINE.STAFF table contains data on each employee, such as first name, last name, and employee number. The AIRLINE.SCHEDULE table includes information

about what personnel are assigned to each flight during the first week of March, including flight number, date, and employee number. This Cartesian product matches the first name and last name of each employee to the flights to which they are assigned. The employee and the schedule information are matched using the employee number found in both tables. You create a new table, WORK.STAFSKED, that contains the merged data.

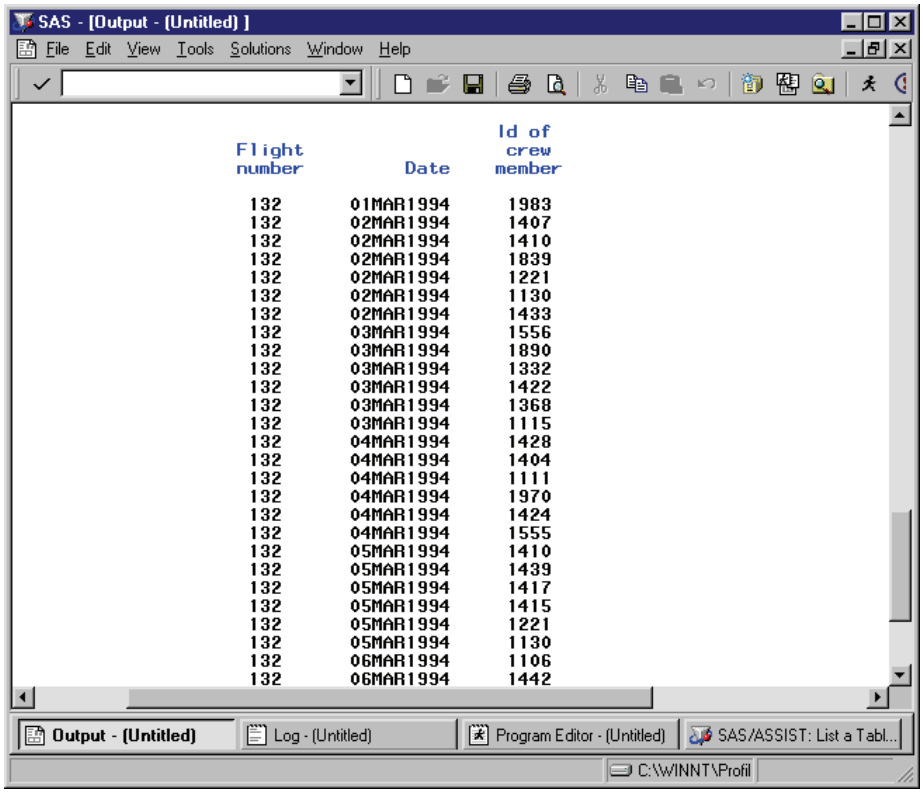
The following displays show listing reports of the AIRLINE.STAFF and AIRLINE.SCHEDULE tables before they are merged.

Display 3.9 AIRLINE.STAFF Table



ID number	Last name	Firstname	City	State Code
1919	ADAMS	GERALD	STAMFORD	CT
1653	ALEXANDER	SUSAN	BRIDGEPORT	CT
1400	APPLE	TROY	NEW YORK	NY
1350	ARTHUR	BARBARA	NEW YORK	NY
1401	AVERY	JERRY	PATERSON	NJ
1499	BAREFOOT	JOSEPH	PRINCETON	NJ
1101	BAUCOM	WALTER	NEW YORK	NY
1333	BLAIR	JUSTIN	STAMFORD	CT
1402	BLALOCK	RALPH	NEW YORK	NY
1479	BOSTIC	MARIE	NEW YORK	NY
1403	BOWDEN	EARL	BRIDGEPORT	CT
1739	BOYCE	JONATHAN	NEW YORK	NY
1658	BRADLEY	JEREMY	NEW YORK	NY
1428	BRADY	CHRISTINE	STAMFORD	CT
1782	BROWN	JASON	STAMFORD	CT
1244	BRYANT	LEONARD	NEW YORK	NY
1383	BURNETTE	THOMAS	NEW YORK	NY
1574	CAHILL	MARSHALL	NEW YORK	NY
1789	CARAWAY	DAVIS	NEW YORK	NY
1404	CARTER	DONALD	NEW YORK	NY
1437	CARTER	DOROTHY	BRIDGEPORT	CT
1639	CARTER	KAREN	STAMFORD	CT
1269	CASTON	FRANKLIN	STAMFORD	CT
1065	CHAPMAN	NEIL	NEW YORK	NY
1876	CHIN	JACK	NEW YORK	NY
1037	CHOW	JANE	STAMFORD	CT
1129	COOK	BRENDA	NEW YORK	NY
1988	COOPER	ANTHONY	NEW YORK	NY

Display 3.10 AIRLINE.SCHEDULE Table



Flight number	Date	Id of crew member
132	01MAR1994	1983
132	02MAR1994	1407
132	02MAR1994	1410
132	02MAR1994	1839
132	02MAR1994	1221
132	02MAR1994	1130
132	02MAR1994	1433
132	03MAR1994	1556
132	03MAR1994	1890
132	03MAR1994	1332
132	03MAR1994	1422
132	03MAR1994	1368
132	03MAR1994	1115
132	04MAR1994	1428
132	04MAR1994	1404
132	04MAR1994	1111
132	04MAR1994	1970
132	04MAR1994	1424
132	04MAR1994	1555
132	05MAR1994	1410
132	05MAR1994	1439
132	05MAR1994	1417
132	05MAR1994	1415
132	05MAR1994	1221
132	05MAR1994	1130
132	06MAR1994	1106
132	06MAR1994	1442

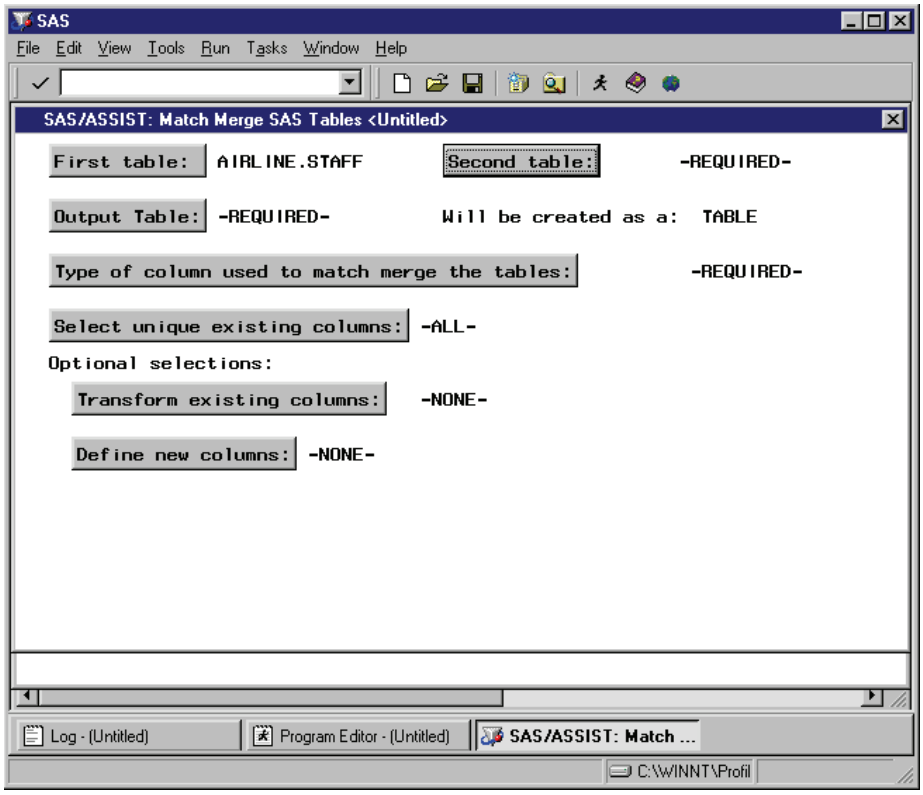
Additional Information

For additional information about concatenating, interleaving, merging, or match merging your data, refer to the information on the SET and MERGE statements in *SAS Language Reference: Dictionary*.

Instructions

1 To display the Match Merge SAS Tables window, follow this selection path starting from the WorkPlace menu:**Tasks ▶ Data Management ▶ Combine ▶ Match merge ▶ Second Method**The Match Merge SAS Tables window appears.

Display 3.11 Match Merge SAS Tables Window



2 Use the **`First table`** button to select the AIRLINE.SCHEDULE table.

3 Use the **`Second table`** button to select the AIRLINE.STAFF table.

4 Select **`Output Table`**. The Output Table or View window appears. The Output Table or View window is identical to that shown in Display 3.2 on page 17.

5 Type **`STAFSKED`** in the **`Table/View`** field as the name of the output table.

6 Select **`OK`** to return to the Match Merge SAS Tables window.

By leaving the defaults of **`Temporary`** and **`Table`**, a temporary table is created in the WORK library. The WORK.STAFSKED table is deleted when you exit SAS. An indicator next to **`Temporary`** shows that this item is selected.

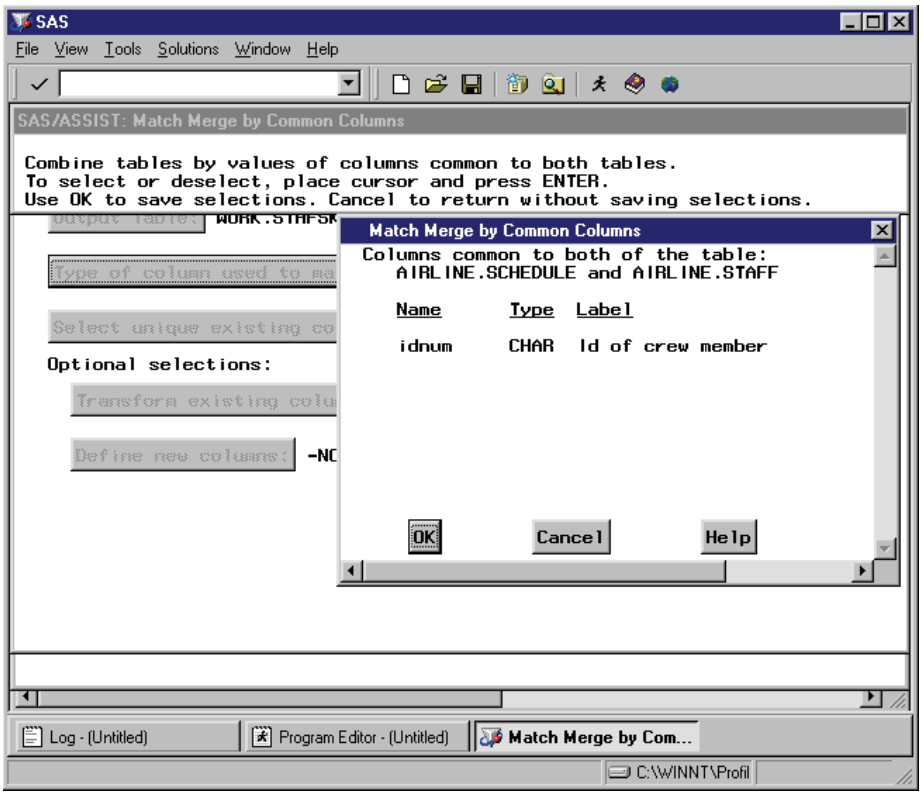
7 Select **`Type of column used to match merge the tables`**. The Select a Merge Method window appears.

8 Select **`Combine by columns common to both tables`** because the employee number column has the same name in both tables.

You combine the columns unique to each table when each table has columns with the same values but different names, for example, if the employee number is named EMPNUM in one table and IDNUM in the other. You combine the columns common to both tables when each table has a column with the same name and the same values, for example, if each table has a column called EMPNUM with the same employee number values.

The Match Merge by Common Columns window appears with a list of columns common to both tables, that is, having the same name and same data type. The only column common to both tables is IDNUM.

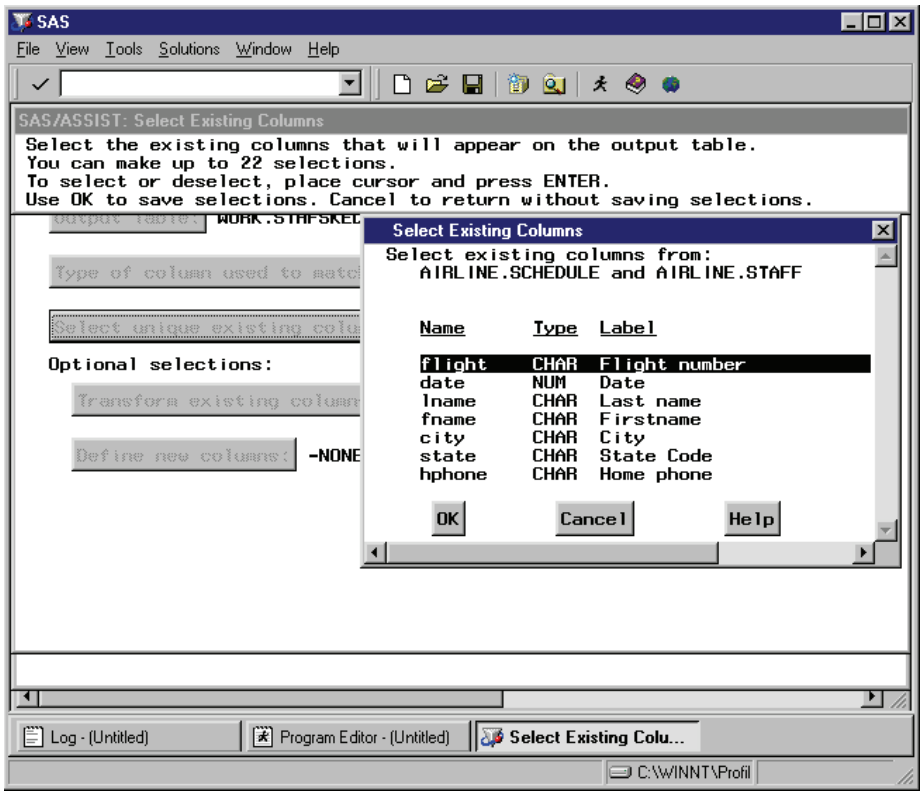
Display 3.12 Match Merge By Common Columns Window



9 Select **IDNUM**, and then select **OK** to return to the Match Merge SAS Tables window.

10 Choose **Select unique existing columns**. The Select Existing columns window appears.

Display 3.13 Select Existing Columns Window

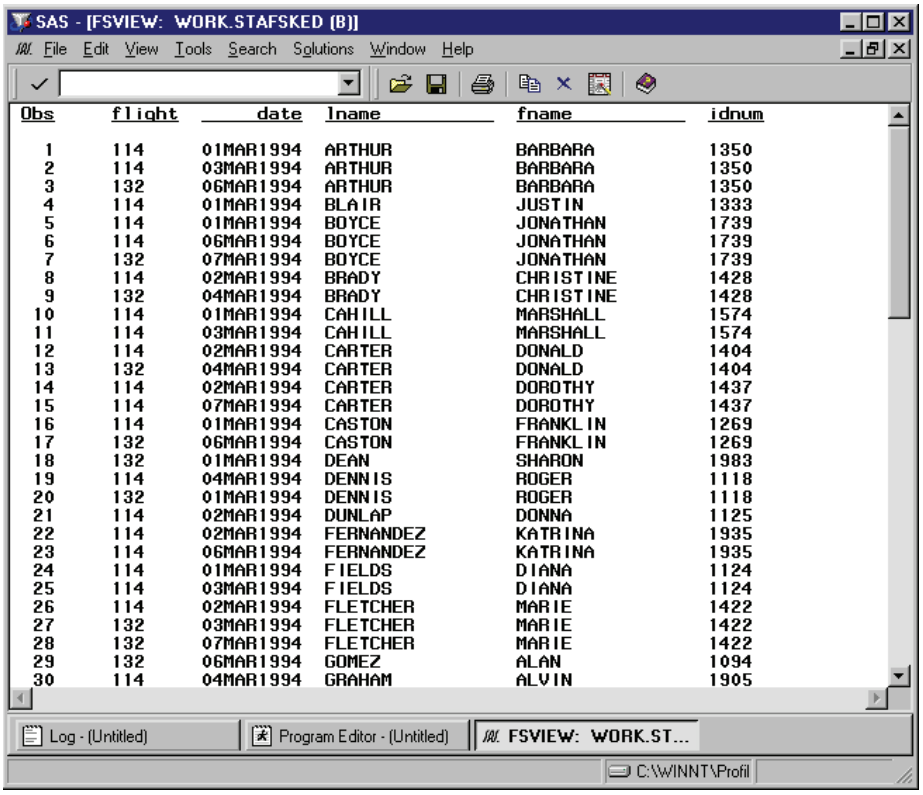


11 Select, in this order, **FLIGHT**, **DATE**, **FNAME**, and **LNAME** as the columns to be included in the new table WORK.STAFSKED. The order in which you select these columns determines the order in which they appear in the new table.

12 Select **OK** to return to the Match Merge SAS Tables window.

13 Follow this selection path:**Run** ▶ **Submit**When prompted, select **OK**, and then select **Goback** to view the new table. The new table appears in an FSVIEW window.

Display 3.14 Match Merge Output



Obs	flight	date	lname	fname	idnum
1	114	01MAR1994	ARTHUR	BARBARA	1350
2	114	03MAR1994	ARTHUR	BARBARA	1350
3	132	06MAR1994	ARTHUR	BARBARA	1350
4	114	01MAR1994	BLAIR	JUSTIN	1333
5	114	01MAR1994	BOYCE	JONATHAN	1739
6	114	06MAR1994	BOYCE	JONATHAN	1739
7	132	07MAR1994	BOYCE	JONATHAN	1739
8	114	02MAR1994	BRADY	CHRISTINE	1428
9	132	04MAR1994	BRADY	CHRISTINE	1428
10	114	01MAR1994	CAHILL	MARSHALL	1574
11	114	03MAR1994	CAHILL	MARSHALL	1574
12	114	02MAR1994	CARTER	DONALD	1404
13	132	04MAR1994	CARTER	DONALD	1404
14	114	02MAR1994	CARTER	DOROTHY	1437
15	114	07MAR1994	CARTER	DOROTHY	1437
16	114	01MAR1994	CASTON	FRANKLIN	1269
17	132	06MAR1994	CASTON	FRANKLIN	1269
18	132	01MAR1994	DEAN	SHARON	1983
19	114	04MAR1994	DENNIS	ROGER	1118
20	132	01MAR1994	DENNIS	ROGER	1118
21	114	02MAR1994	DUNLAP	DONNA	1125
22	114	02MAR1994	FERNANDEZ	KATRINA	1935
23	114	06MAR1994	FERNANDEZ	KATRINA	1935
24	114	01MAR1994	FIELDS	DIANA	1124
25	114	03MAR1994	FIELDS	DIANA	1124
26	114	02MAR1994	FLETCHER	MARIE	1422
27	132	03MAR1994	FLETCHER	MARIE	1422
28	132	07MAR1994	FLETCHER	MARIE	1422
29	132	06MAR1994	GOMEZ	ALAN	1094
30	114	04MAR1994	GRAHAM	ALVIN	1905

14 To exit the FSVIEW window, follow this selection path: **File ▶ Close**

Creating a Format

SAS uses formats and informats to interpret your data. Formats determine how a column value should be displayed, and informats determine how values entered in column fields should be interpreted. You can design your own formats and informats by using **`Design Format`** on the Data Management menu. Once you create the formats and informats, you can use them whenever you are prompted for a format or informat for a column.

In this section, you create a numeric format, COSTRNGE., that determines whether the cost of a house in the HOUSES table is low, medium, or high depending on the range in the format. You use this format in the following section, “Altering the Properties of a SAS Table” on page 30.

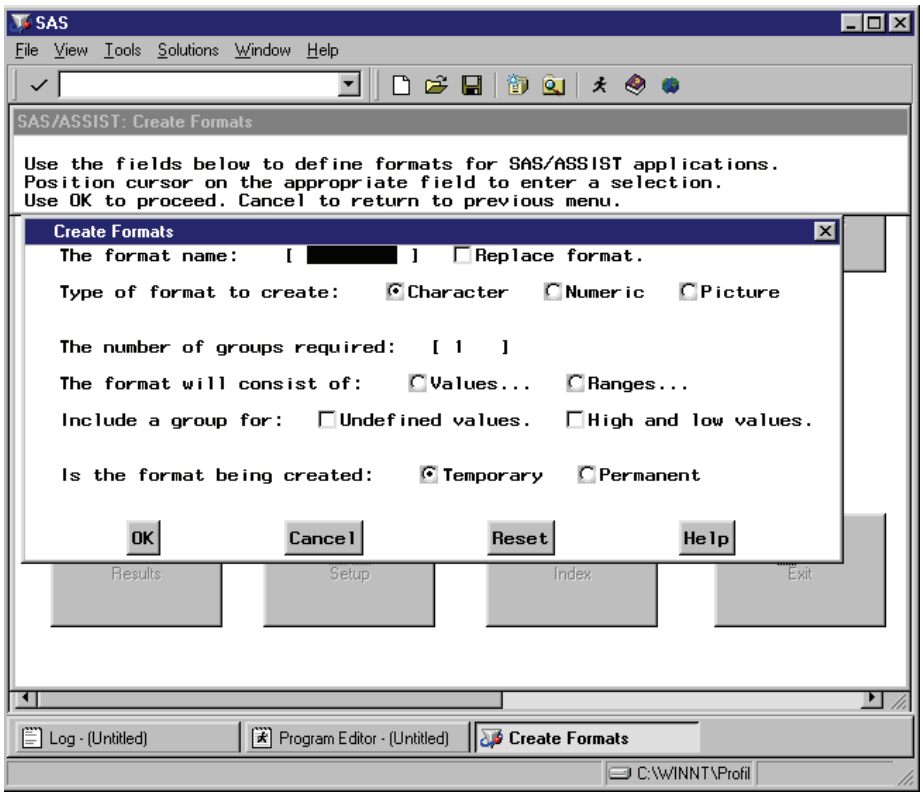
Additional Information

For additional information about creating formats and informats, refer to “The FORMAT Procedure” chapter in the *Base SAS Procedures Guide*.

Instructions

1 To display the Create Formats window, follow this selection path:**Tasks ▶ Data Management ▶ Design Format ▶ Create formats**The Create Formats window appears.

Display 3.15 Create Formats Window



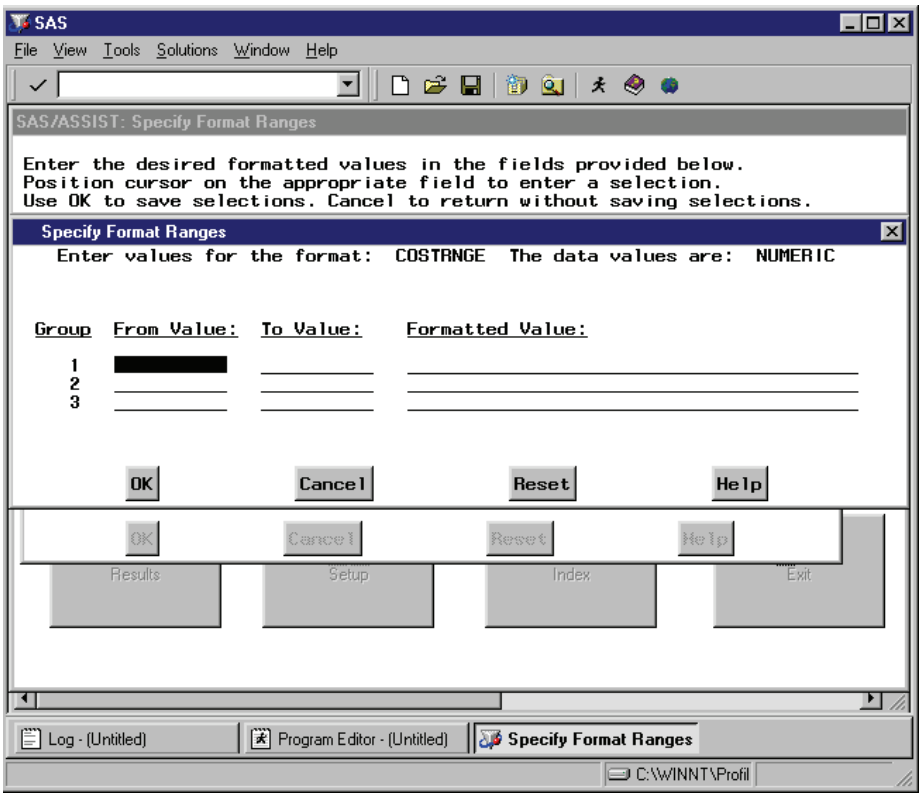
2 In the **The format name** field, type **COSTRNGE** as the name of the format.

3 Select **Numeric** as the type of format.

4 Type **3** in **The number of groups required** field. The number of groups indicates how many values or ranges you want to use for the format.

5 Select **Ranges**. The Specify Format Ranges window appears.

Display 3.16 Specify Format Ranges Window



You select **Ranges** because low, medium, and high cover a range of prices, not specific values.

6 For Group 1, type **1** as the **From Value**, **50000** as the **To Value**, and **Low** as the **Formatted Value**.

For Group 2, type **50001**, **100000**, and **Medium** for the **From Value**, **To Value**, and **Formatted Value**, respectively.

For Group 3, type **100001**, **999999**, and **High** for the **From Value**, **To Value**, and **Formatted Value**, respectively.

7 By leaving the default of **Temporary**, a temporary format is created in the WORK.FORMATS catalog. The WORK.FORMATS catalog is deleted when you exit SAS. An indicator next to **Temporary** shows that this item is selected. If you select **Permanent**, the format is permanently stored in the SASUSER.FORMATS catalog.

8 Select **OK** twice to create the format. A message appears, indicating that the format was created. Note that a period was appended to the end of the COSTRNGE. format.

9 To return to the WorkPlace menu from the message window, select **Goback** twice.

You can now use this format in the HOUSES table. In the following section, you use the Properties window to apply the COSTRNGE. format to the HOUSES table.

Altering the Properties of a SAS Table

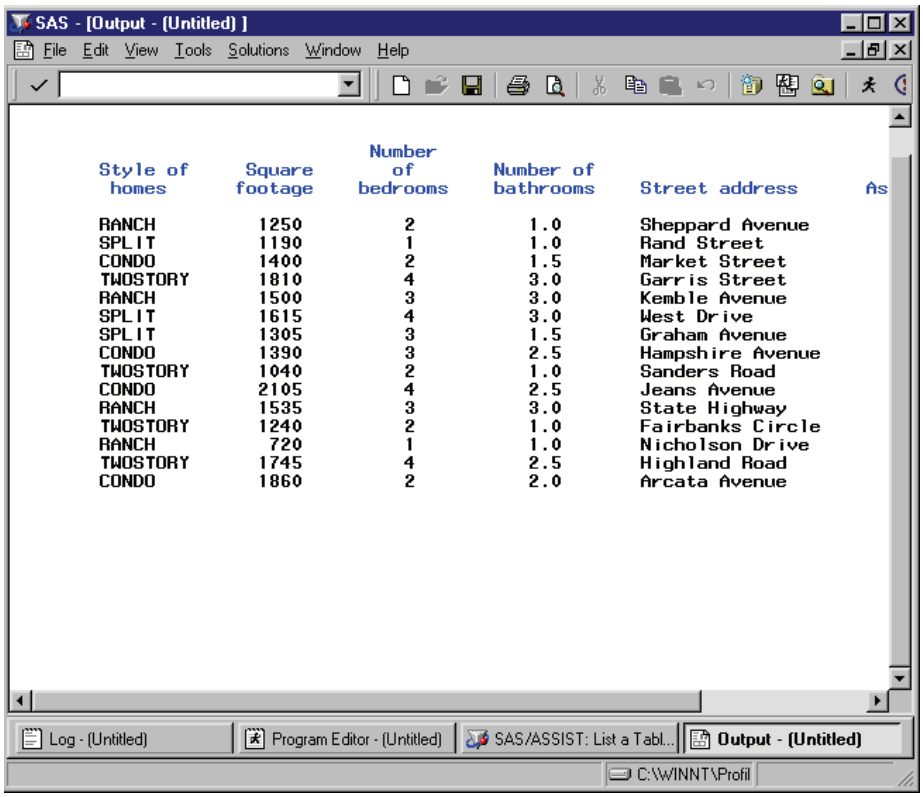
The *properties* of a SAS table describe information about the table. Using **Utilities** on the Data Management menu, you can access the Properties window to browse or

alter a table's properties. The properties of a table include the table name, engine, date created, date last modified, and number of rows, along with additional information. Of the table attributes, you can edit the table type and label. In addition, the Properties window displays information about each column, including the name, type, length, position, label, format, and informat, and whether or not the column serves as an index for the table. The name, label, format, and informat for each column can be edited.

In this section, you change the format of the PRICE column in the HOUSES table, the label for the BEDROOMS column, and the label of the table. This process uses the COSTRNGE. format that you created in the previous section. After you change the table, you run the following listing report to view your changes.

The following listing report shows the unaltered HOUSES table.

Display 3.17 Listing of Unaltered HOUSES Table



Style of homes	Square footage	Number of bedrooms	Number of bathrooms	Street address	As
RANCH	1250	2	1.0	Sheppard Avenue	
SPLIT	1190	1	1.0	Rand Street	
CONDO	1400	2	1.5	Market Street	
TWOSTORY	1810	4	3.0	Garris Street	
RANCH	1500	3	3.0	Kemble Avenue	
SPLIT	1615	4	3.0	West Drive	
SPLIT	1305	3	1.5	Graham Avenue	
CONDO	1390	3	2.5	Hampshire Avenue	
TWOSTORY	1040	2	1.0	Sanders Road	
CONDO	2105	4	2.5	Jeans Avenue	
RANCH	1535	3	3.0	State Highway	
TWOSTORY	1240	2	1.0	Fairbanks Circle	
RANCH	720	1	1.0	Nicholson Drive	
TWOSTORY	1745	4	2.5	Highland Road	
CONDO	1860	2	2.0	Arcata Avenue	

Additional Information

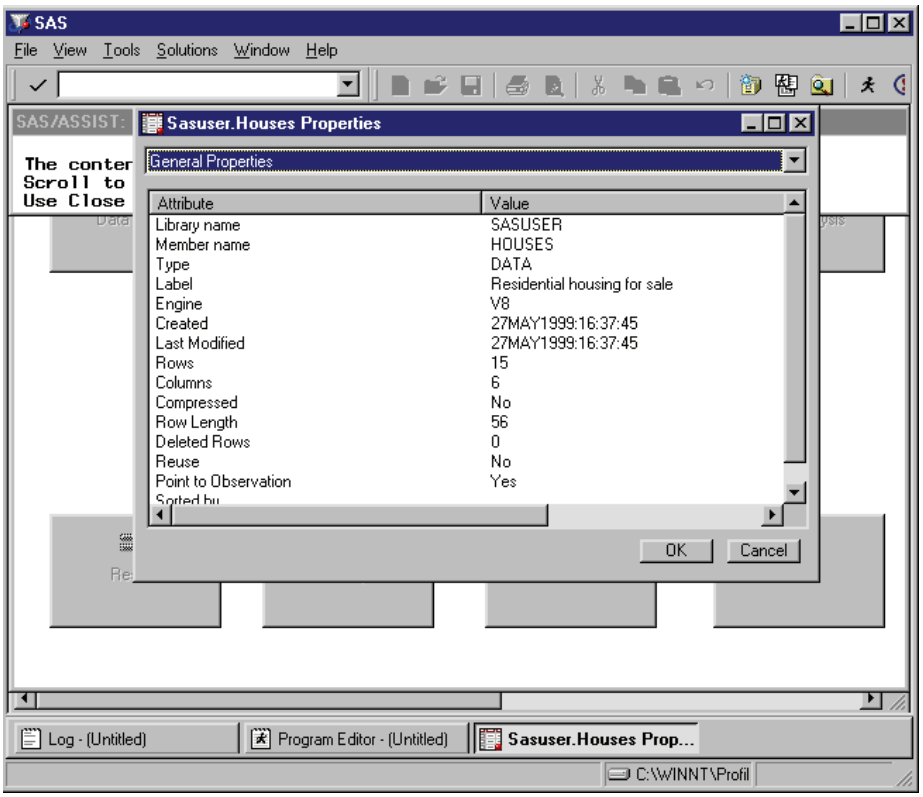
For additional information on altering the properties of a SAS table, see "The DATASETS Procedure" in *Base SAS Procedures Guide*.

Instructions

1. To edit the properties of a SAS table, follow this selection path:**Tasks ▸ Data Management ▸ Utilities ▸ Contents of a table ▸ Edit SAS table contents**The Select Table window appears.
2. Select the SASUSER.HOUSES table and select **OK**.

The Properties window opens with information about the HOUSES table.

Display 3.18 Properties Window for HOUSES table

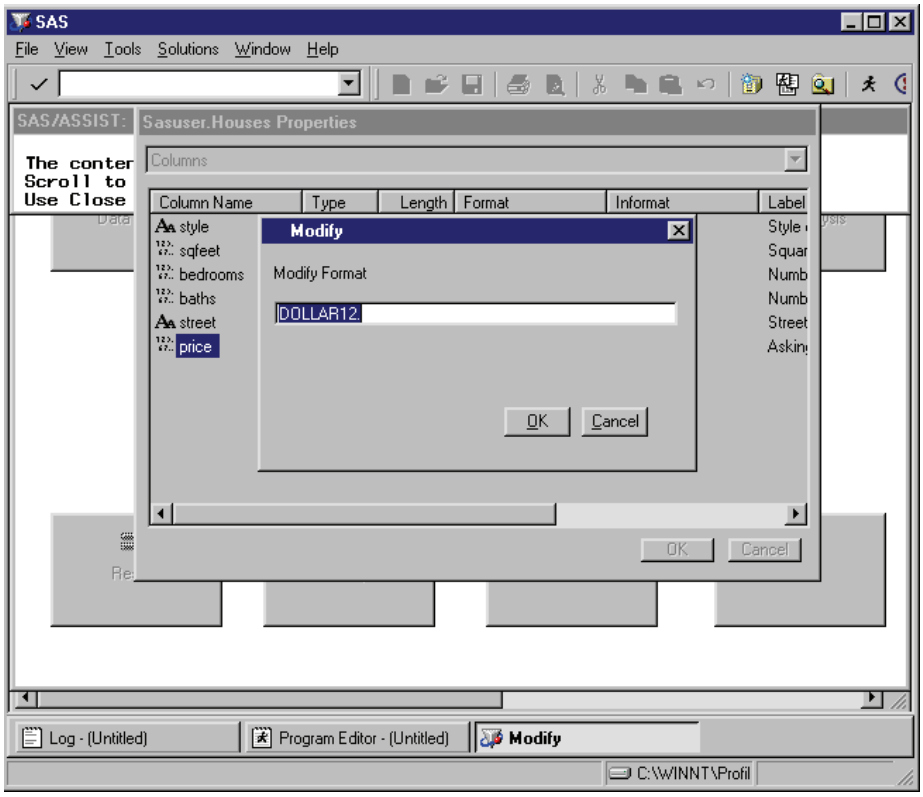


3 Select the down arrow at the top of the window, and then select **`Columns`**. A list of columns in the HOUSES table appears.

4 For mainframes: In the command field for the **`PRICE`** column, type **`S`** (for Select) and press ENTER. Then, type **`S`** in the command field for **`Format`** and press ENTER. For desktops: Right-click the **`Price`**column and select Modify Format.

The Modify window appears for the Format attribute.

Display 3.19 Modify Window



5 Type **`COSTRNGE.`** over **`DOLLAR12.`** and select **`OK`**. The Properties window reappears with the new format.

6 Repeat the previous two steps to change the label of the BEDROOMS column to **`Bedrooms`**. (If necessary, type blanks over any leftover letters from the old label.)

7 Select the down arrow at the top of the window, and then select **`General Properties`**.

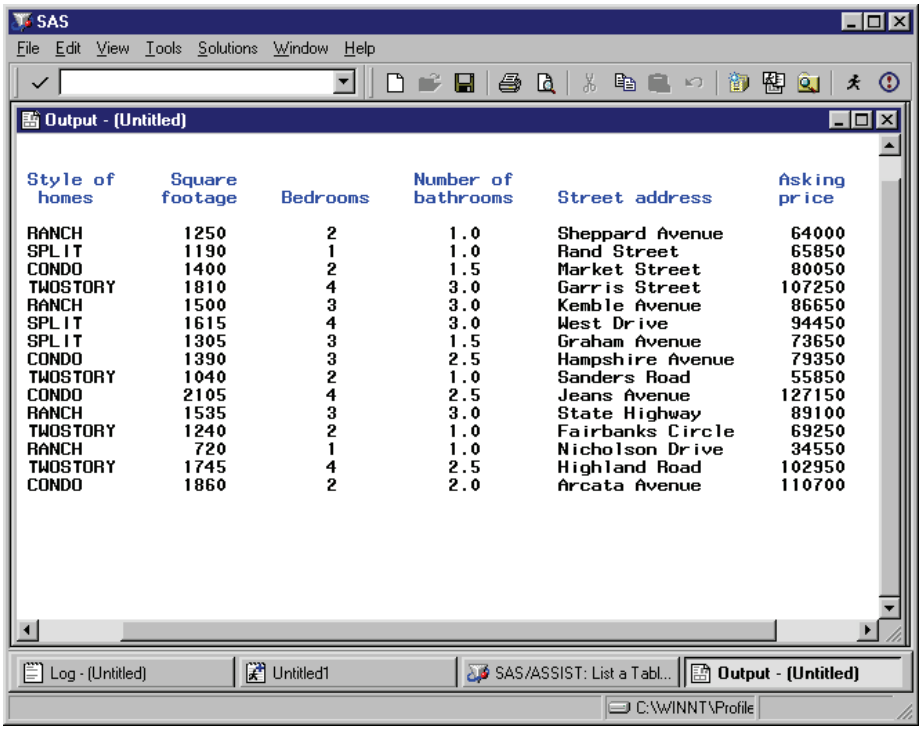
8 For mainframes: Type **`M`** in the command field for **`Label`** and press ENTER. For desktops: Double-click the **`Label`** attribute.

9 Type **`Houses for sale`** over the existing label. Type blanks over any leftover letters from the old label.

10 Follow this selection path to return to the WorkPlace menu:**OK ▶ OK ▶ Goback**

11 To display a listing report for the modified HOUSES table, follow this selection path: **Tasks ▶ Report Writing ▶ Listing**If SASUSER.HOUSES is not the active table, use the **`Table`** button to select the SASUSER.HOUSES table. Follow this selection path to view the table:**Run ▶ Submit**

Display 3.20 Listing of Altered Houses Table



Style of homes	Square footage	Bedrooms	Number of bathrooms	Street address	Asking price
RANCH	1250	2	1.0	Sheppard Avenue	64000
SPLIT	1190	1	1.0	Rand Street	65850
CONDO	1400	2	1.5	Market Street	80050
TWOSTORY	1810	4	3.0	Garris Street	107250
RANCH	1500	3	3.0	Kemble Avenue	86650
SPLIT	1615	4	3.0	West Drive	94450
SPLIT	1305	3	1.5	Graham Avenue	73650
CONDO	1390	3	2.5	Hampshire Avenue	79350
TWOSTORY	1040	2	1.0	Sanders Road	55850
CONDO	2105	4	2.5	Jeans Avenue	127150
RANCH	1535	3	3.0	State Highway	89100
TWOSTORY	1240	2	1.0	Fairbanks Circle	69250
RANCH	720	1	1.0	Nicholson Drive	34550
TWOSTORY	1745	4	2.5	Highland Road	102950
CONDO	1860	2	2.0	Arcata Avenue	110700

Notice the changes in the formats and labels.

12 Follow the directions in "Returning to SAS/ASSIST Windows from the Output Window" on page 9 to return to SAS/ASSIST software.

Transporting SAS Files Across Operating Environments

You can use SAS/ASSIST software to prepare SAS files for transport to another operating environment. **`Utilities`** on the Data Management menu enables you to convert a SAS file into transport format, and to convert a transport file to a SAS file. In this section, you convert the SASUSER.VENEER table into transport format. A file that is in *transport format* can be transported to a different operating environment, for example, across a network using File Transfer Protocol (FTP). In addition to SAS tables, you can also convert SAS libraries and catalogs to transport format.

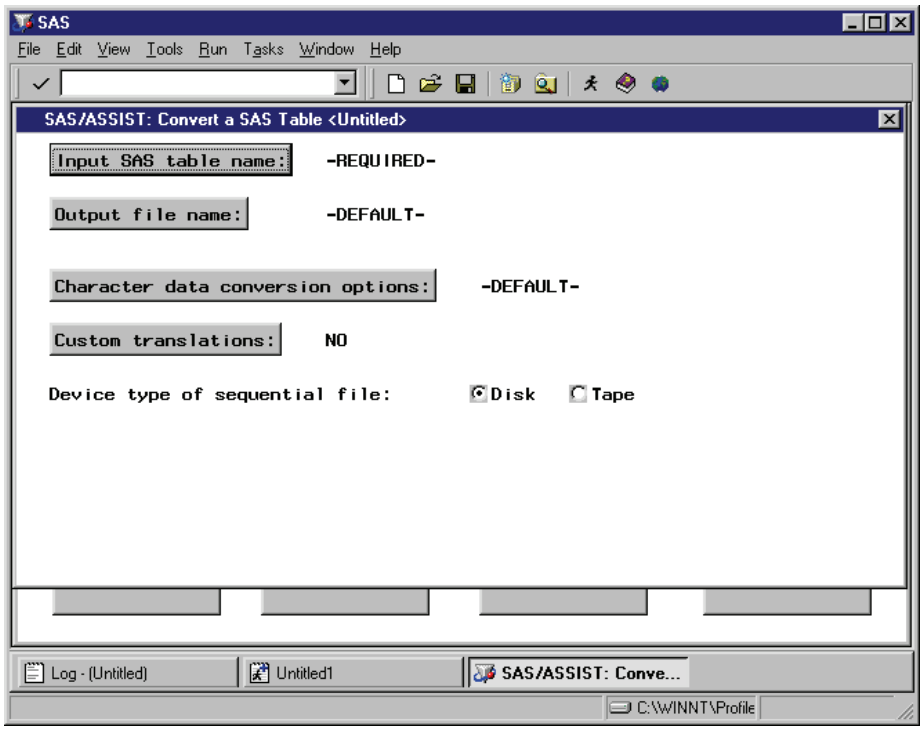
Additional Information

For additional information about converting SAS files from one format to another, refer to "The CPORT Procedure" and "The CIMPORT Procedure" in the *Base SAS Procedures Guide*.

Instructions

1 Follow this selection path:**Tasks ▶ Data Management ▶ Utilities ▶ Convert to CPORT format ▶ Table**The Convert a SAS Table window appears.

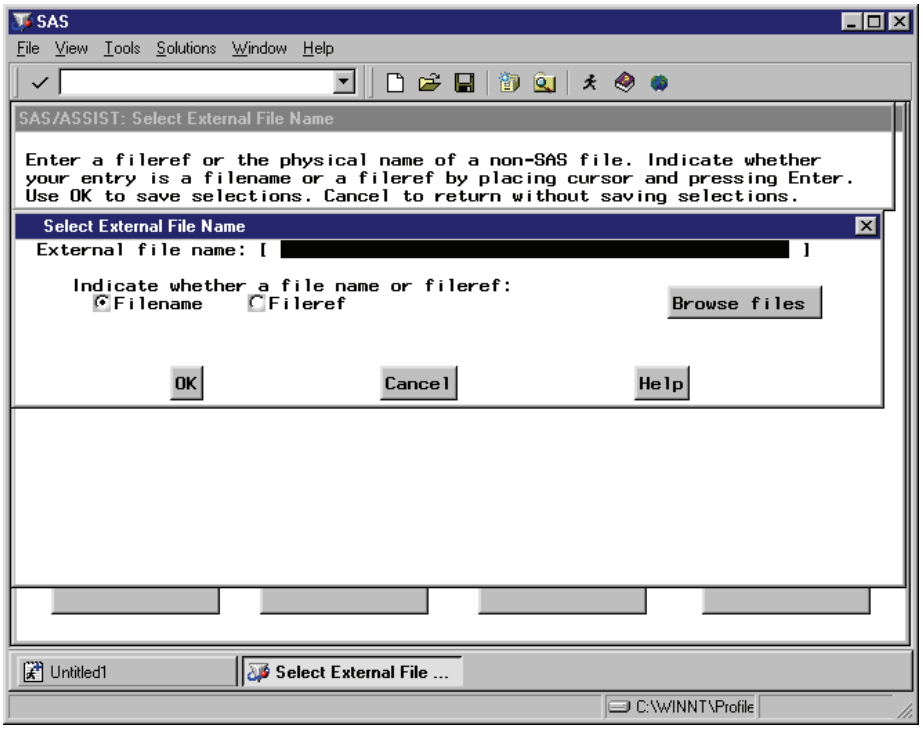
Display 3.21 Convert a SAS Table Window



2 Use the **`Input SAS table name`** button to select the SASUSER.VENEER table.

3 If desired, select **`Output file name`**; the Select External File Name window appears. Alternatively, you can accept the default output file name. See the following table for a list of default file names.

Display 3.22 Select External File Name Window



4 In the **`External file name`** field, type the name of the file as is appropriate for your operating environment to transport the VENEER table. Use the following table as a guide.

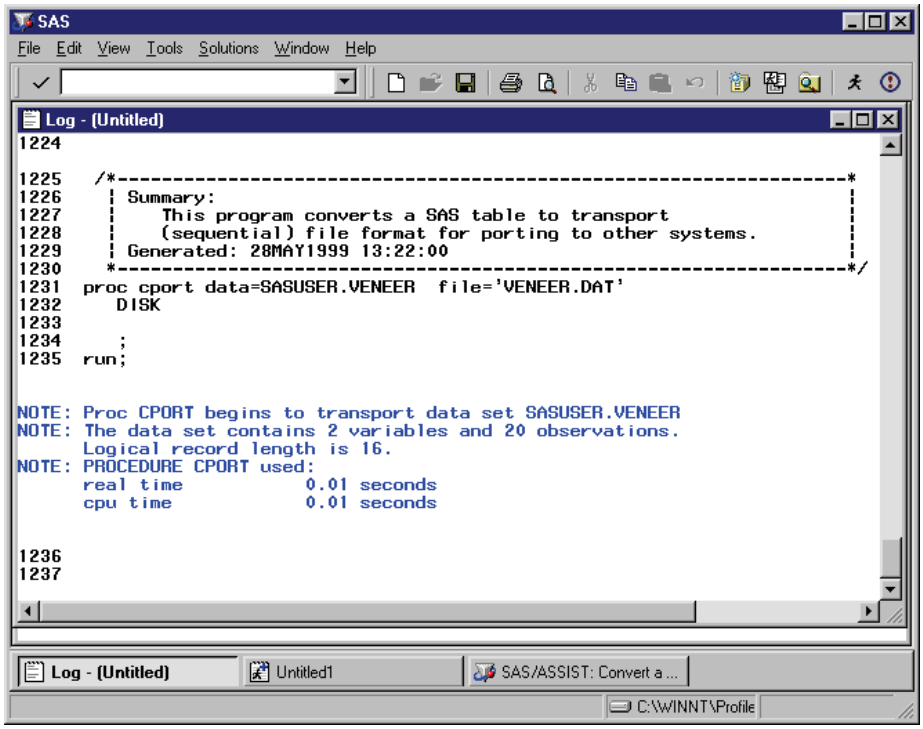
Operating Environment	**What You Type**	**Example**	Transport File Default
z/OS	an operating system data set name, and if a partitioned data set is used, a member	*USERID*.DATA. SASDATA (VENEER)	*USERID*.SASCAT.DATA
OpenVMS	the name of a device, directory, and filename	*DEVICE*:[SASDATA] VENEER.DAT	SASCAT.DAT in the default directory
UNIX	the name of a directory or subdirectory and a filename	/u/*userid*/sasdata/ veneer	sascat.dat in the working directory
Windows	the name of a drive, directory or subdirectory, and a filename and extension	C:\SASDATA\ VENEER.DAT	SASCAT.DAT in the working directory

5 Select **`Filename`** because you typed a filename and not a fileref.

6 Select **`OK`** to return to the Convert a SAS Table window.

7 Follow this selection path to create the transport file:**Run ▸ Submit**The Log window appears, displaying information to indicate that the table was converted successfully.

Display 3.23 Log Window with Conversion Results



Note: Under some operating environments, such as z/OS, if the external file does not exist, a message appears asking if you want to create it. Under other operating environments, you need to create the external file before you can output a transport table to it. See the SAS companion documentation for your operating environment for more information. △

8 To return to SAS/ASSIST software from the Log window, follow this selection path: **Solutions ▶ ASSIST**

You can now transport your file to another operating environment. To convert the file back to SAS file format on the other operating environment, follow this selection path:**Tasks ▶ Data Management ▶ Utilities ▶ Convert from CPORT format ▶ Table**Use the buttons in the Convert a Transport File window to specify the input file name and output table name.

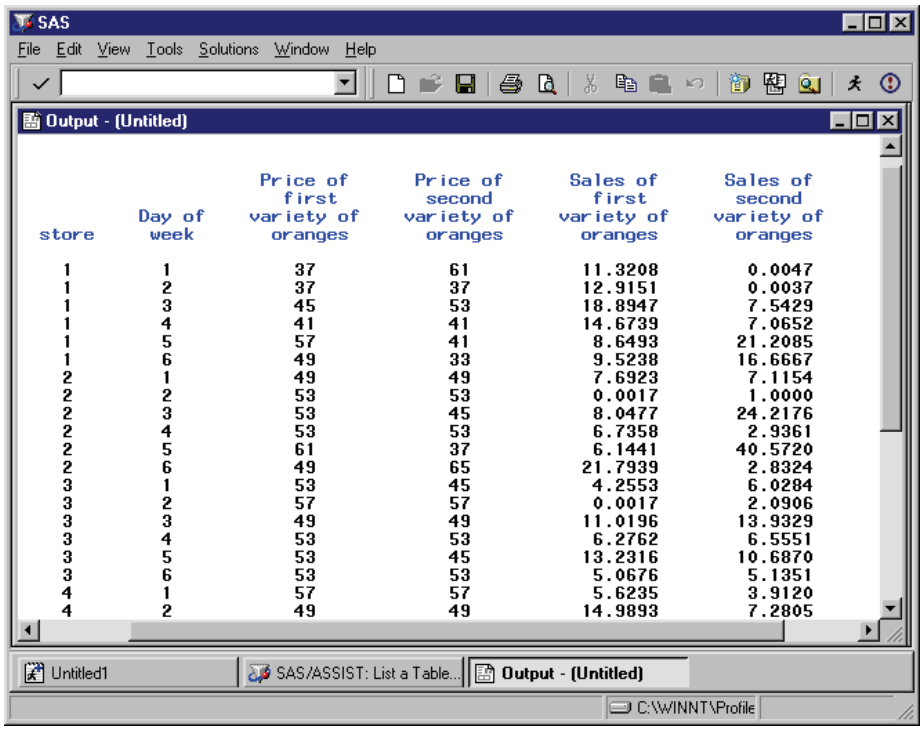
Transposing a Table

You can use **`Transpose table`** under **`Utilities`** on the Data Management menu to invert a table. Transposing a table turns the rows of a table into columns and vice versa.

In this section, you first sort the ORANGES table in order of the store number because you group the transposed rows by store. Then you transpose the sorted table so that the price for the first variety of oranges becomes a row with a separate column for each day's price.

The following display shows a listing report of the ORANGES table before it is transposed.

Display 3.24 Listing of ORANGES Table Before Transposing



store	Day of week	Price of first variety of oranges	Price of second variety of oranges	Sales of first variety of oranges	Sales of second variety of oranges
1	1	37	61	11.3208	0.0047
1	2	37	37	12.9151	0.0037
1	3	45	53	18.8947	7.5429
1	4	41	41	14.6739	7.0652
1	5	57	41	8.6493	21.2085
1	6	49	33	9.5238	16.6667
2	1	49	49	7.6923	7.1154
2	2	53	53	0.0017	1.0000
2	3	53	45	8.0477	24.2176
2	4	53	53	6.7358	2.9361
2	5	61	37	6.1441	40.5720
2	6	49	65	21.7939	2.8324
3	1	53	45	4.2553	6.0284
3	2	57	57	0.0017	2.0906
3	3	49	49	11.0196	13.9329
3	4	53	53	6.2762	6.5551
3	5	53	45	13.2316	10.6870
3	6	53	53	5.0676	5.1351
4	1	57	57	5.6235	3.9120
4	2	49	49	14.9893	7.2805

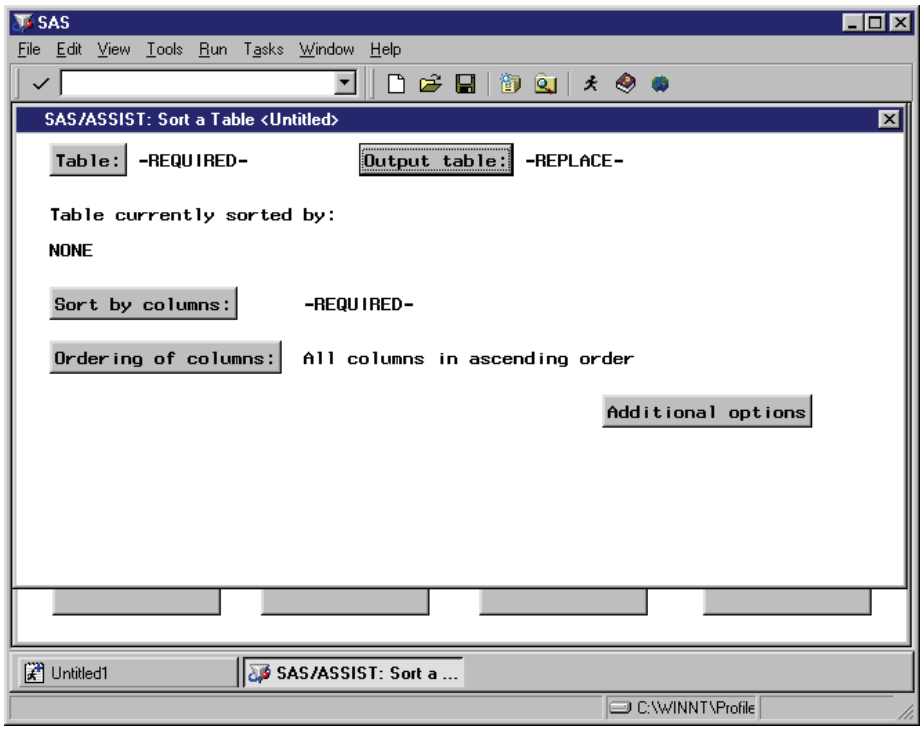
Additional Information

For additional information, refer to “The TRANSPOSE Procedure” in the *Base SAS Procedures Guide*.

Instructions

1 To display the Sort a Table window, follow this selection path:**Tasks ▶ Data Management ▶ Sort**

Display 3.25 Sort a Table Window



2 Use the **Table** button to select the SASUSER.ORANGES table.

3 Select **Output table**. The Specify Output Table window appears. The Specify Output Table is identical to the window shown in Display 3.2 on page 17.

4 In the **Table** field, type **ORGSORT** as the name of the output table.

   By leaving the default of **Temporary**, a temporary table is created in the WORK library. The WORK.ORGSORT table is deleted when you exit SAS. An indicator next to **Temporary** shows that this item is selected.

5 Select **OK** to return to the Sort a Table window.

6 Use the **Sort by columns** button to select the **STORE** column.

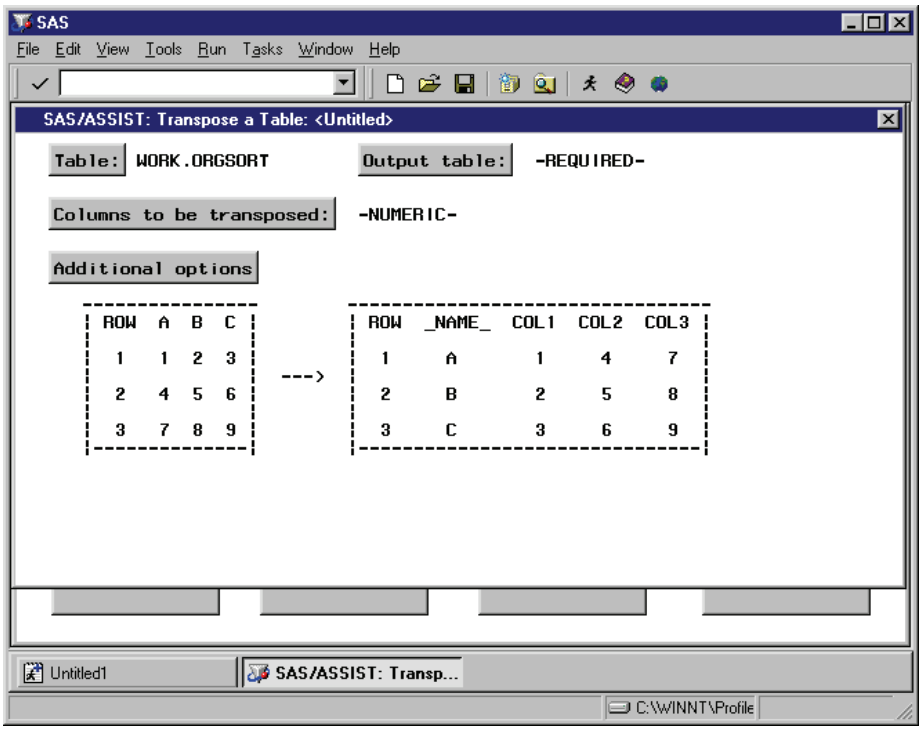
7 Select **OK** to return to the Sort a Table window.

8 To sort the table, follow this selection path:**Run** ▶ **Submit**A message appears to indicate that the table was successfully sorted.

9 Select **Goback**.

10 Follow this selection path to open the Transpose a Table window:**Tasks** ▶ **Data Management** ▶ **Utilities** ▶ **Transpose Table**The Transpose a table window appears.

Display 3.26 Transpose a Table Window



11 The WORK.ORGSORT table should already be listed for **Table**. If not, use the **Table** button to select the WORK.ORGSORT table.

12 Select **Output table**. The Specify Output Table window appears.

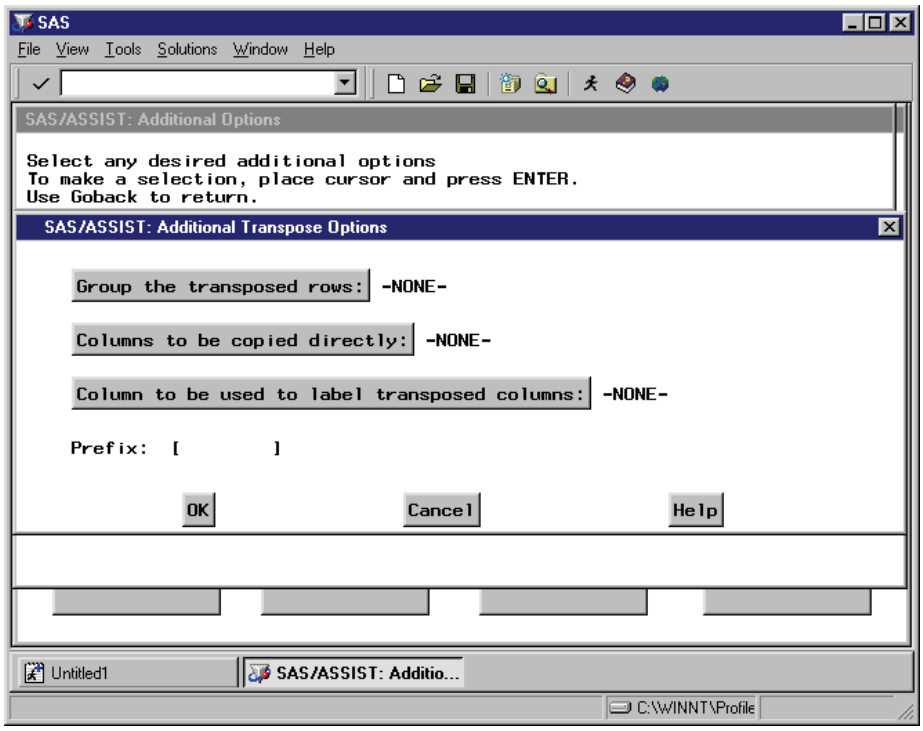
13 In the **Table** field, type **ORGTRANS** as the name of the output table, then select **OK** to return to the Transpose a Table window.

By leaving the default of **Temporary**, a temporary table is created in the WORK library. The WORK.ORGTRANS table is deleted when you exit SAS. An indicator next to **Temporary** shows that this item is selected.

14 Use the **Columns to be transposed** button to select the **PRICE1** column as the column to be transposed (that is, changed to a row).

15 Select **Additional options**. The Additional Transpose Options window appears.

Display 3.27 Additional Transpose Options Window



16 Use the **Group the transposed rows** button to select the **STORE** column as the column you want to use as a grouping column.

17 Use the **column to be used to label transposed columns** button to select the **DAY** column as the label you want to use to label the columns of the transposed data in the ORGTRANS output table.

SAS generates a row for each column that is being transposed for each group.

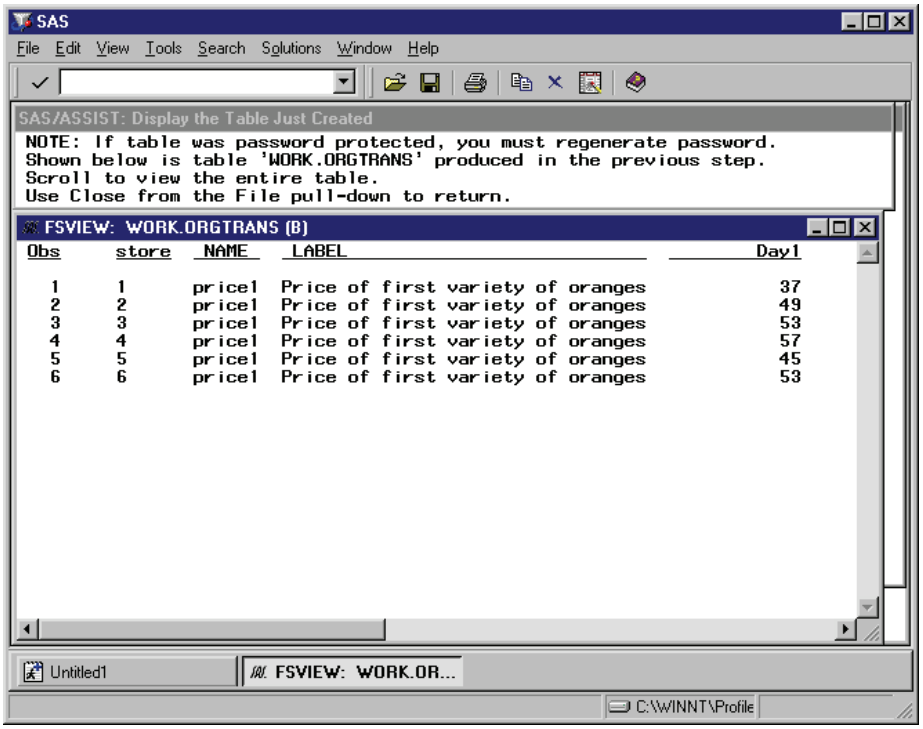
18 In the Additional Transpose Options window, position the cursor in the **Prefix** field and type **Day** as the prefix to each number that represents a day of the week.

Make sure each formatted value of the DAY column occurs only once in each group of the active table. Duplicate values produce a warning message in the LOG window and stop the procedure.

19 Select **OK** to return to the Transpose a Table window.

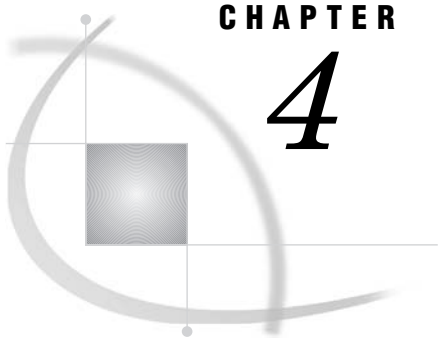
20 To transpose the table, follow this selection path:**Run** ▸ **Submit**A message appears asking if you want to view the transposed table. Select **OK**, then **Goback**. The transposed table appears in an FSVIEW window.

Display 3.28 Transposed Table



Use the scroll bars or the RIGHT command or function key to display the rest of the transposed data.

21 To exit the FSVIEW window, follow this selection path:**File ▶ Close**



CHAPTER

4

Doing More with Report Writing

Introduction **43**
Limiting the Number of Rows for a Report **43**
Additional Information **44**
Instructions **44**
Adding More than Four Titles to a Report **46**
Additional Information **47**
Instructions **47**
Doing More with Tabular Reports **49**
Additional Information **49**
Defining Terms **50**
Statistics Style **50**
Simple Group 1 Style **50**
Simple Group 2 Style **51**
2–D Group Style **52**
Multiple Group Style **53**
Advanced Style **54**
Summarize Option **55**
Additional Options **58**

Introduction

This chapter shows you how to limit the number of rows for a report, add more than four titles to a report, and create tables using the TABULATE procedure.

Limiting the Number of Rows for a Report

When you create a report, you can select **`Subset data`** in the report windows to limit the number of rows that are processed to create the report. This feature is especially useful when your final report is very long, and you want to use a limited number of rows for testing before producing the final report.

In this section, you limit the number of rows to five for a listing report of the CLASS table.

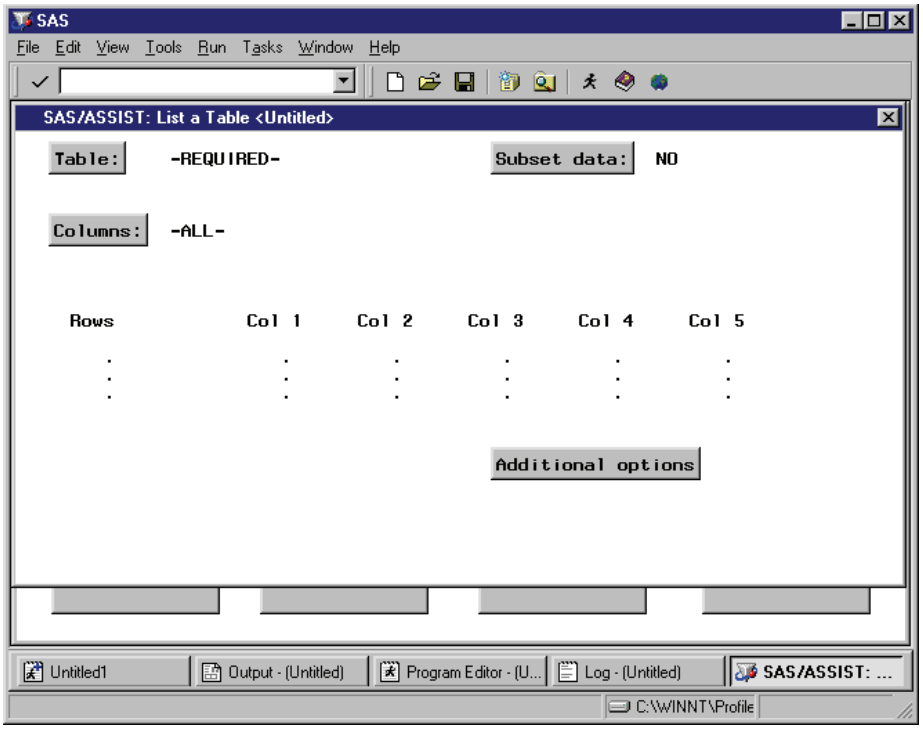
Additional Information

For additional information on writing reports, refer to the "Report Writing" and "Using the Report Engine" chapters in *Getting Started with SAS/ASSIST*, and Chapter 5, "Doing More with the Report Engine," on page 61.

Instructions

1 To display the List a Table window, follow this selection path:**Tasks ▶ Report Writing ▶ Listing**

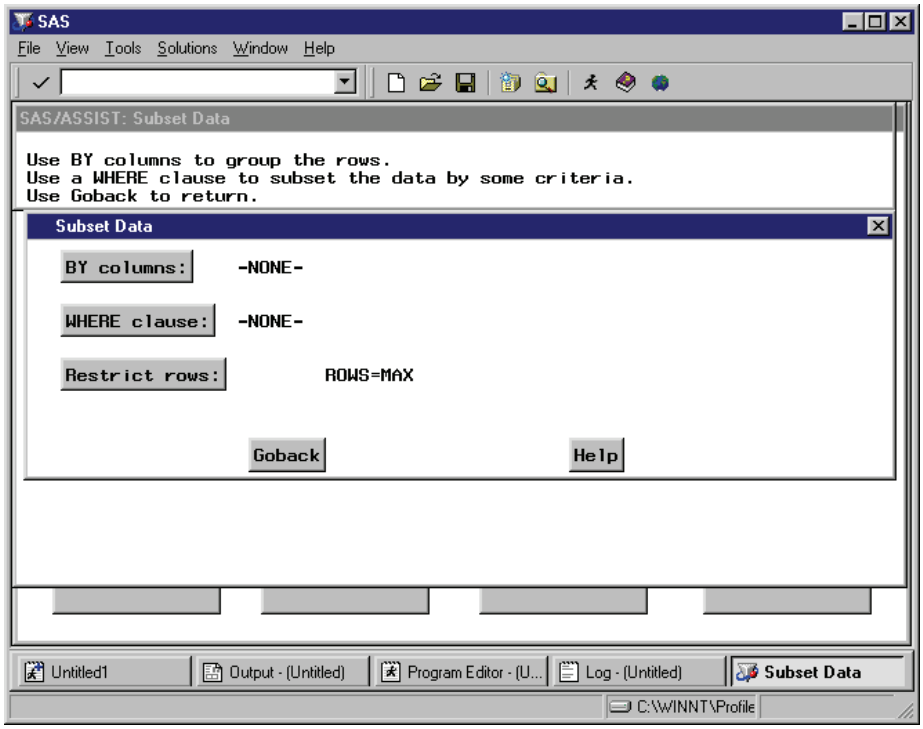
Display 4.1 List a Table Window



2 Use the **`Table`** button to select the SASUSER.CLASS table.

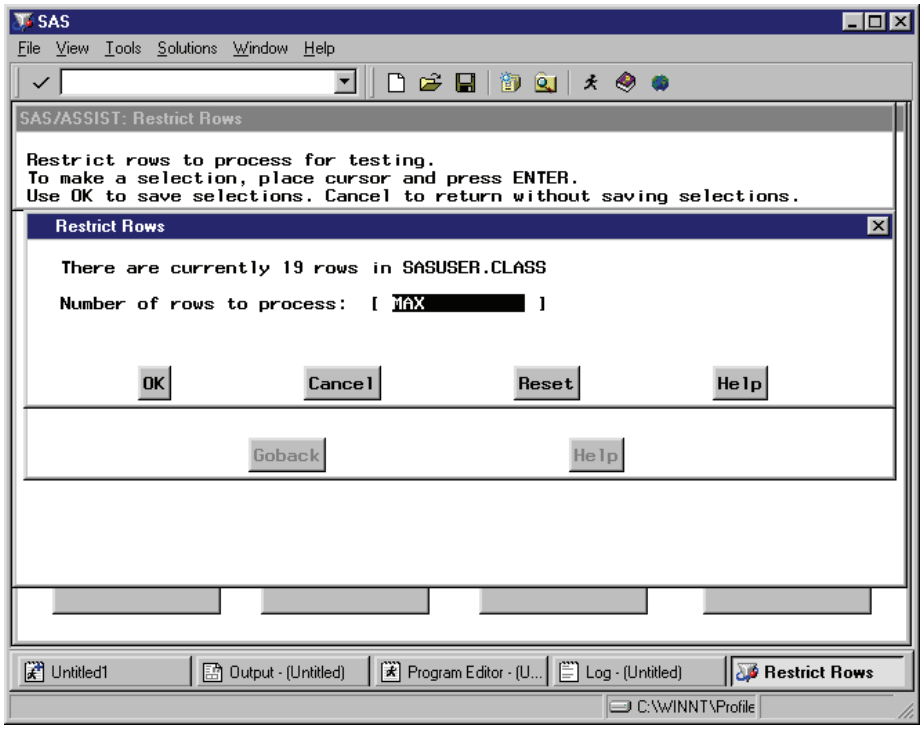
3 Select **`Subset data`**. The Subset Data window appears.

Display 4.2 Subset Data Window



4 Select Restrict Rows. The Restrict Rows window appears.

Display 4.3 Restrict Rows Window



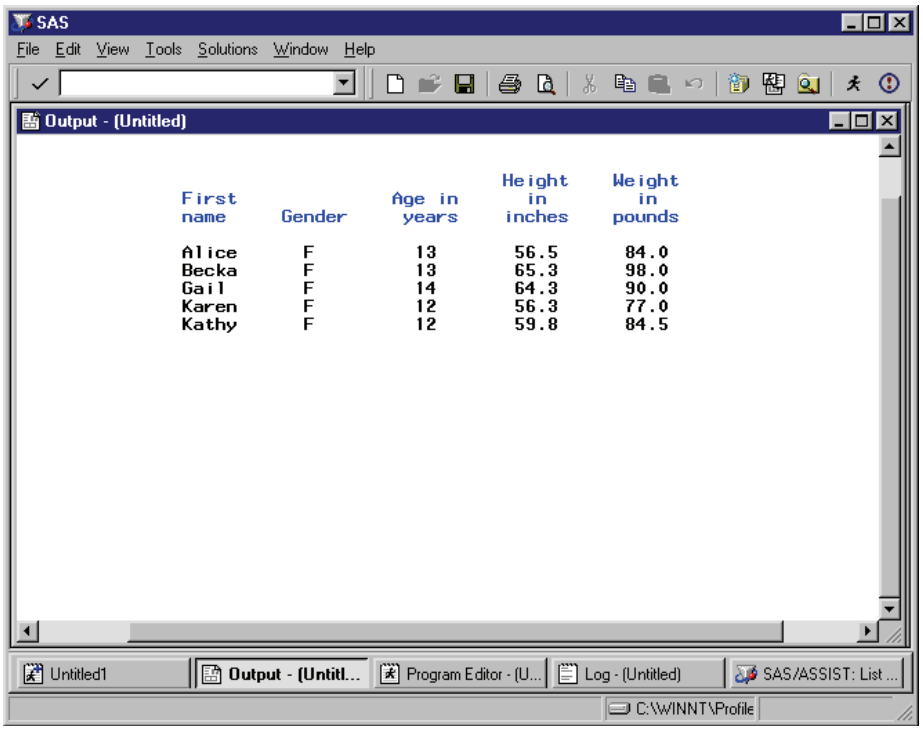
5 In the **Number of rows to process** field, type **5** as the number of rows you want to use for the listing report.

   The default for the **Number of rows to process** field is MAX, which includes all the rows in the table. To reset the field to its default value, select **Reset**.

6 Select **OK**, then **Goback** to return to the List a Table window.

7 To run the report, follow this selection path:**Run ▶ Submit**The listing report appears with only five rows.

Display 4.4 CLASS Listing Report with Restricted Rows



8 Return to SAS/ASSIST software from the OUTPUT window. See "Returning to SAS/ASSIST Windows from the Output Window" on page 9 for more information.

9 Follow this selection path from the List a Table window to save the source code for the report. You use the saved source code in the next section.**File ▶ Save as source**The Save As window appears.

10 In the **Name** field, type **CLASSRST** and press TAB.

11 In the **Description** field, type **CLASS report - restricted rows** and select **OK**. A message appears to inform you that the source code was successfully saved.

For more information on saving and editing source code, refer to the "Saving Source Code for Editing and Re-execution" chapter in *Getting Started with SAS/ASSIST*.

Adding More than Four Titles to a Report

When you create a report and select **Edit** in a report window to add titles to your report, you can add only four titles to your report. However, if you save the report source code, you can edit the report program using the Result Manager to add additional titles.

In this section, you access the source code you saved in the previous section, edit the program, add five titles to the report, and re-execute the program.

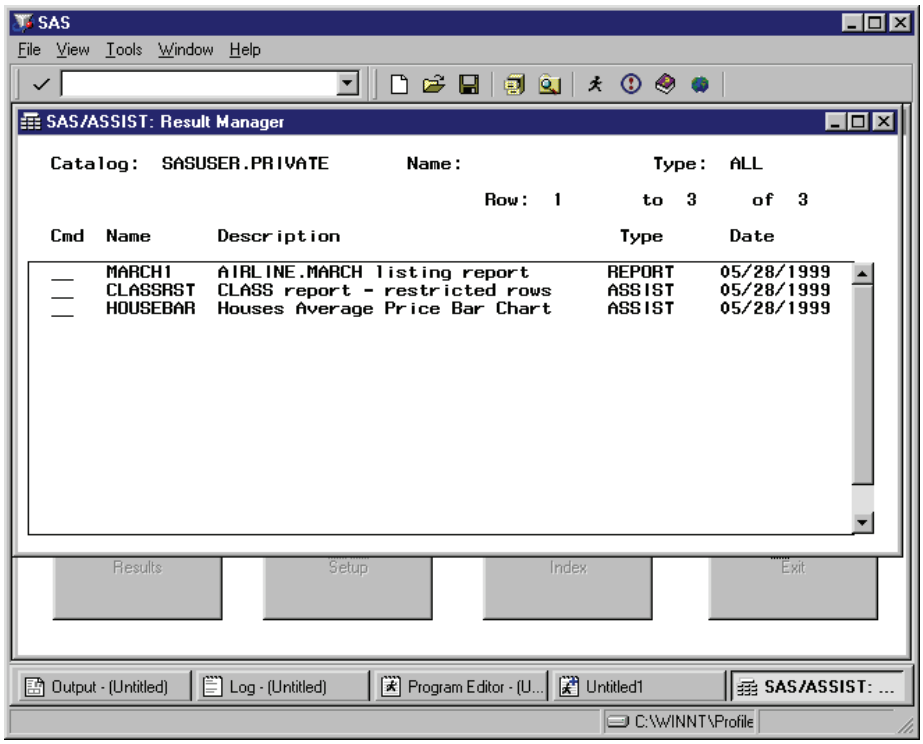
Additional Information

For additional information on writing reports, refer to the "Report Writing" and "Using the Report Engine" chapters in *Getting Started with SAS/ASSIST*. For more information on the Result Manager, see the "Using the Result Manager" chapter in *Getting Started with SAS/ASSIST* and Chapter 9, "Doing More with Results," on page 143.

Instructions

1 Follow this selection path to display the Result Manager window:**Tools ▸ Result Manager**

Display 4.5 Result Manager Window



2 In the **Cmd** field for the **CLASSRST** source entry, type **E** (for Edit) and press ENTER. The Edit window appears with the source code for the listing report.

3 Place the cursor in the line number for the **title** statement. Type **I 5** and press ENTER. Five blank rows are inserted between the **title** statement and the **footnote** statement.

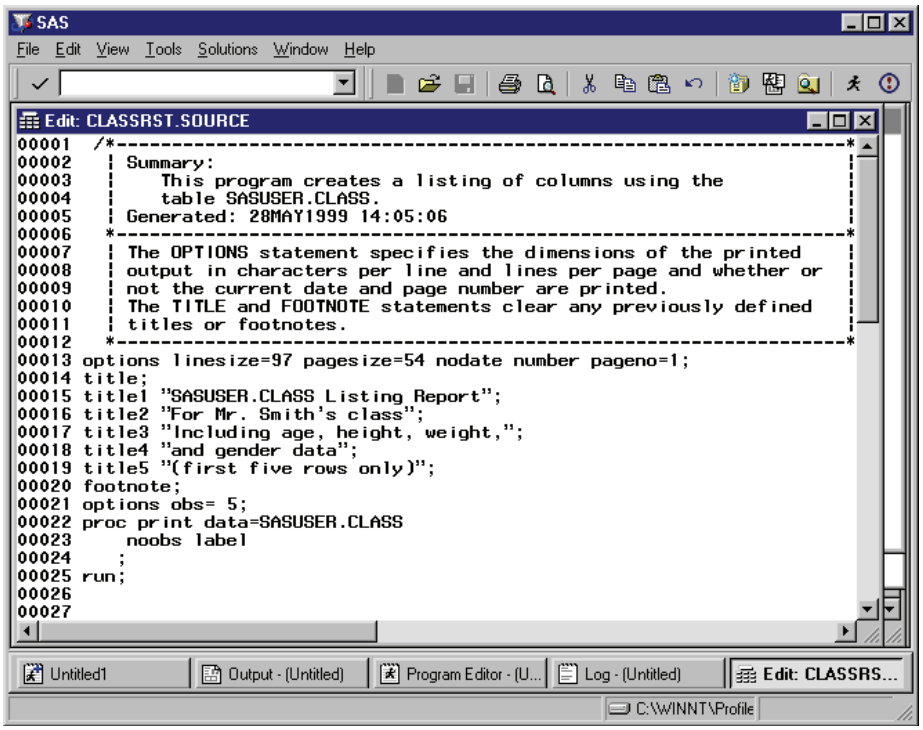
4 Type the following code in the five blank lines you created in the previous step:

```
title1 "SASUSER.CLASS Listing Report";
title2 "For Mr. Smith's class";
```

```
title3 "Including age, height, weight,";
title4 "and gender data";
title5 "(first five rows only)";
```

Your program should now resemble the following display.

Display 4.6 Edited Listing Report Program

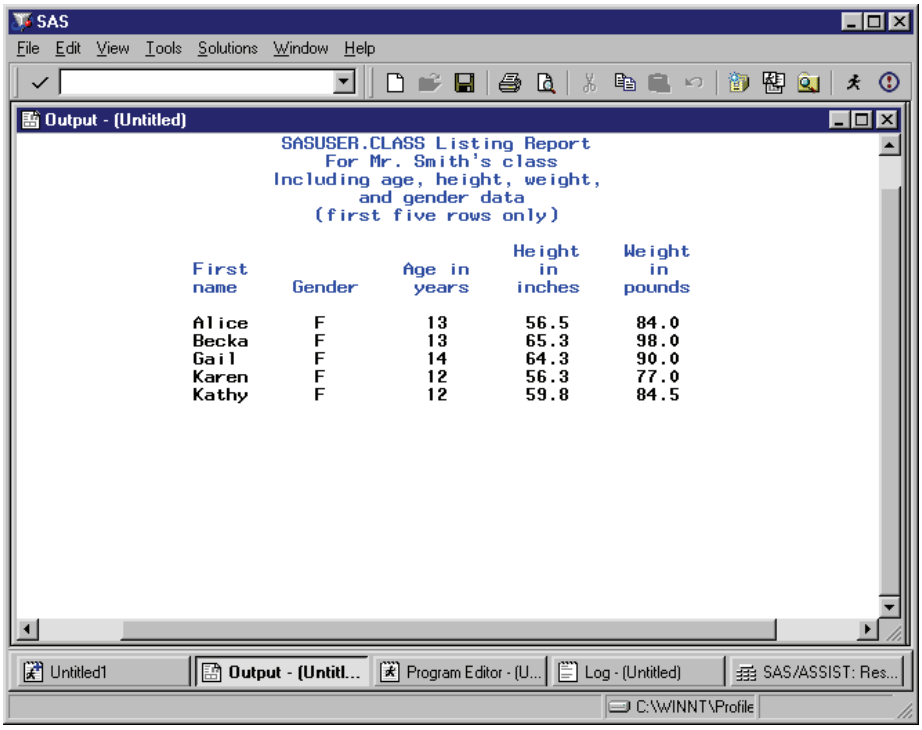


5 Follow this selection path to save your modified program:**File ▶ Save**A message appears, warning you that the program already exists. Select **R**, then **OK** to overwrite the program. A message appears, indicating the number of lines in the program that were saved to a catalog entry.

6 Follow this selection path to return to the Result Manager window:**File ▶ Close**

7 Type **X** in the **Cmd** field for the **CLASSRST** program and press ENTER to execute the program. The report with five titles appears in the OUTPUT window.

Display 4.7 CLASS Listing Report with Five Titles



8 Return to SAS/ASSIST software from the Output window. See "Returning to SAS/ASSIST Windows from the Output Window" on page 9 for more information.

9 To exit the Result Manager window, follow this selection path:**File ► Close**

Doing More with Tabular Reports

The **`Tabular Report`** item on the Report Writing menu enables you to create tables in one of six styles. A tabular report presents descriptive statistics in tabular format. The value in each table cell is calculated from the columns and statistics that define the pages, rows, and columns of the table. The statistic associated with each cell is calculated on values from all rows in that category.

In the "Report Writing" chapter of *Getting Started with SAS/ASSIST*, you learned to create a tabular report using the Simple Group 1 style. This chapter describes the different tabular report styles and shows sample output for each style. The techniques for selecting columns and statistics and for generating output are the same for all styles. Additionally, this chapter provides information on the Summarize option and Additional Options.

Additional Information

For additional information on creating tabular reports, refer to the "Report Writing" chapter in *Getting Started with SAS/ASSIST* and to the *SAS Guide to TABULATE Processing*.

Defining Terms

Before creating a tabular report, there is some terminology you should understand.

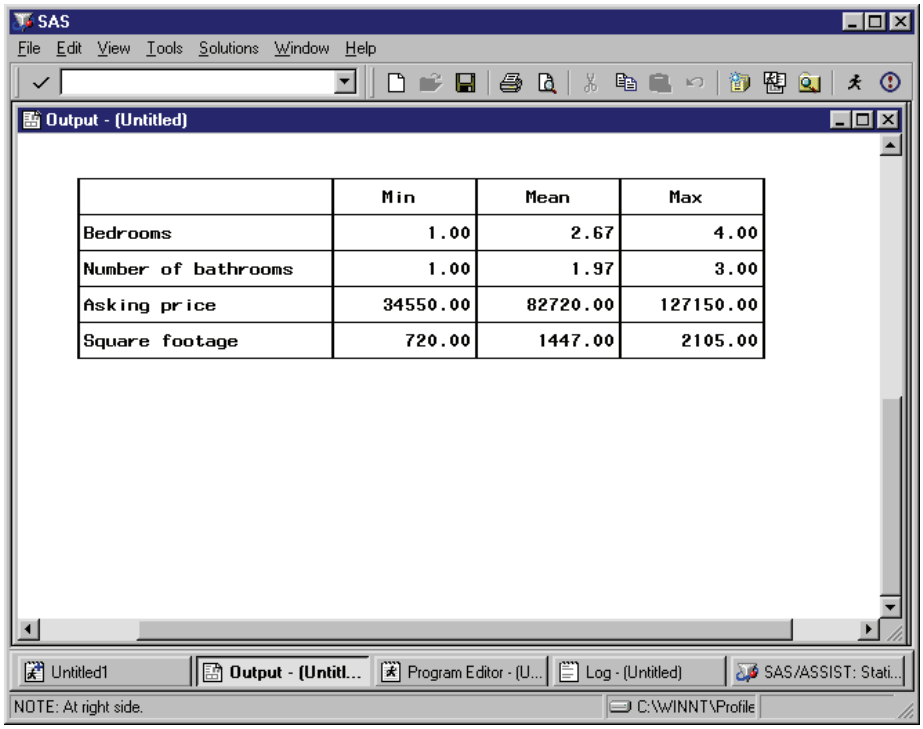
An *analysis column* is a numeric column whose values are used to calculate statistics.

A *classification column* is any column, numeric or character, that you want to use to classify your data into groups or categories of information. Classification columns can have character, integer, or even decimal values, but the number of unique values should be limited. Frequently, columns in a table have discrete values, but there are so many different values that any breakdown by these values is meaningless. You can reduce the number of classes by formatting ranges of values. See "Creating a Format" on page 28 for information on formatting ranges of values.

Statistics Style

The Statistics style of tabular report is the simplest. This style allows you to display statistics of your choice on any or all of the numeric columns in your table. The following display shows a table containing the MEAN, MIN, and MAX statistics for all the numeric variables in the HOUSES table.

Display 4.8 Statistics Report Output



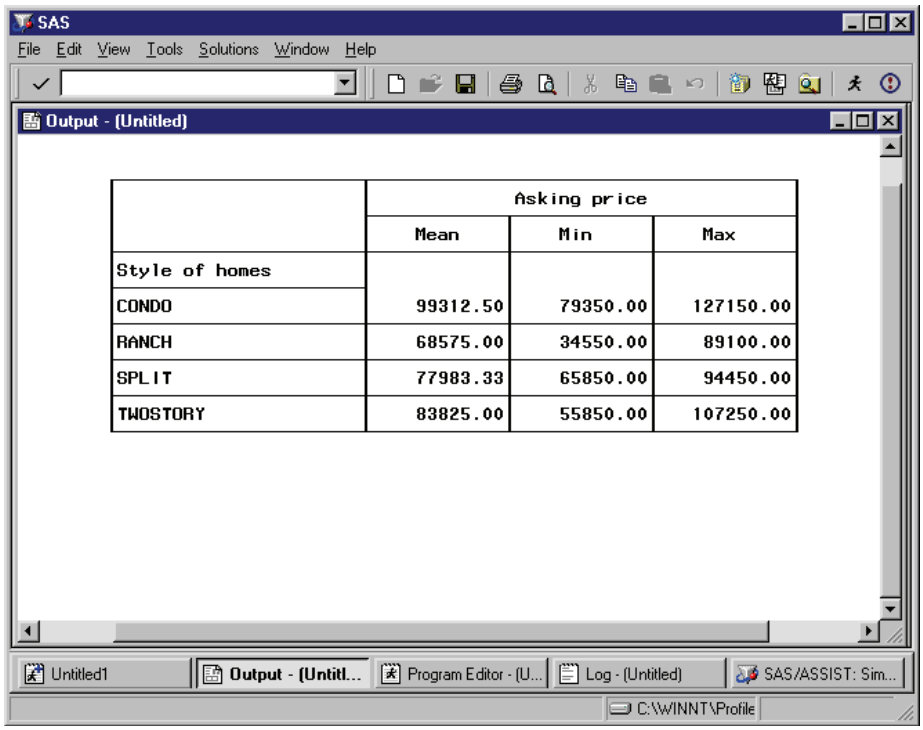
	Min	Mean	Max
Bedrooms	1.00	2.67	4.00
Number of bathrooms	1.00	1.97	3.00
Asking price	34550.00	82720.00	127150.00
Square footage	720.00	1447.00	2105.00

Simple Group 1 Style

The Simple Group 1 style of tabular report is similar to the Statistics style, except that the calculated statistics are broken down by one or more classification variables. The analysis variables are arranged across the tabular report; each one is subdivided into the selected statistics. The classification variables are arranged down the tabular report, with one row of the tabular report for each value of the classification variable.

The following display shows a Simple Group 1 style of tabular report on the HOUSES table:

Display 4.9 Simple Group 1 Report Output

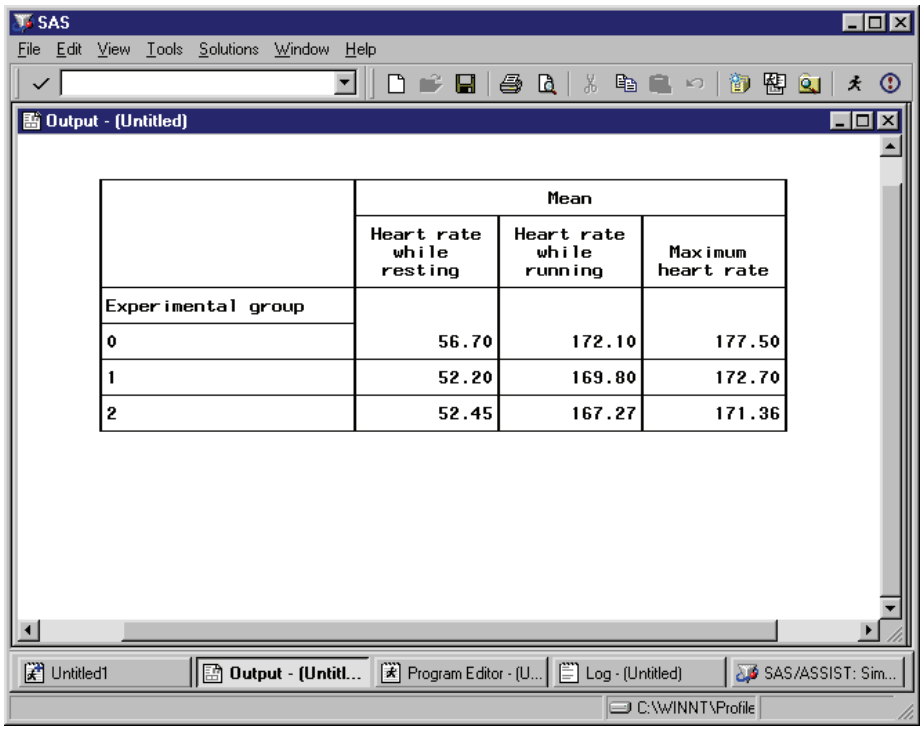


	Asking price		
	Mean	Min	Max
Style of homes			
CONDO	99312.50	79350.00	127150.00
RANCH	68575.00	34550.00	89100.00
SPLIT	77983.33	65850.00	94450.00
TWOSTORY	83825.00	55850.00	107250.00

Simple Group 2 Style

The Simple Group 2 style of tabular report is similar to the Simple Group 1 style, except that you select statistics that go across the tabular report and are subdivided by the analysis columns. With this style of report, it is easier to compare the same statistic for different analysis columns.

Display 4.10 Simple Group 2 Report Output

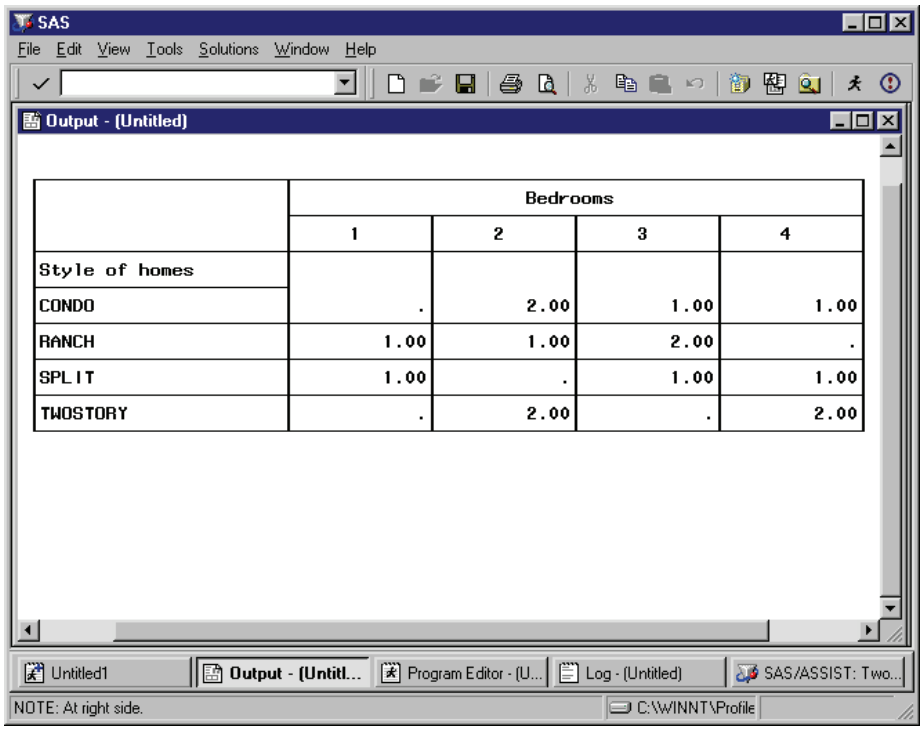


	Mean		
	Heart rate while resting	Heart rate while running	Maximum heart rate
Experimental group			
0	56.70	172.10	177.50
1	52.20	169.80	172.70
2	52.45	167.27	171.36

2–D Group Style

The 2–D Group style of tabular report enables you to create frequency tables, such as the one shown in the following display:

Display 4.11 2–D Group Report Output

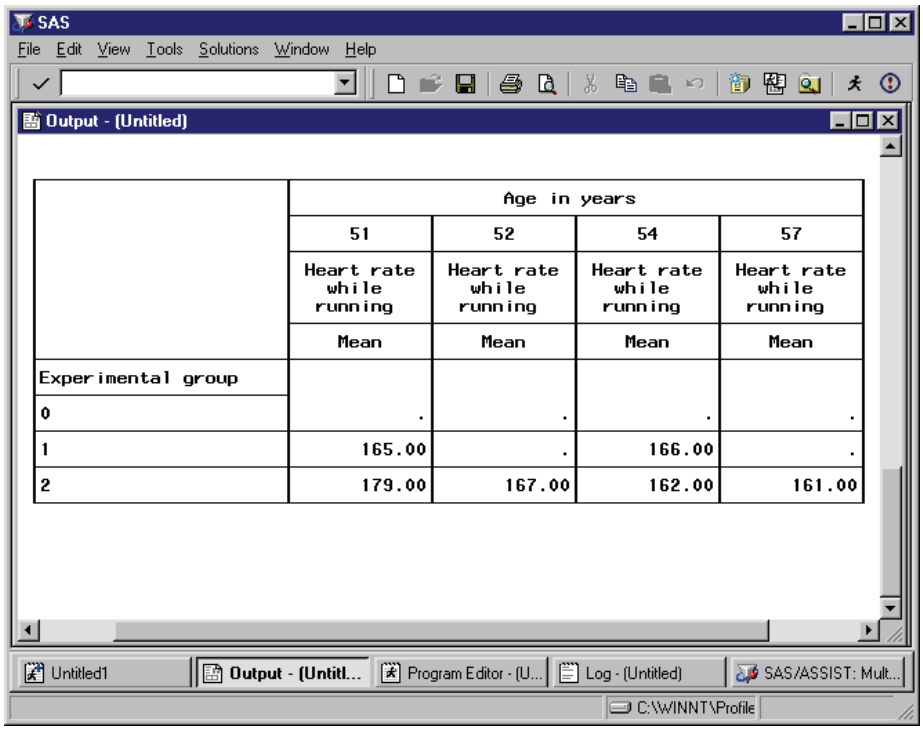


	Bedrooms			
	1	2	3	4
Style of homes				
CONDO	.	2.00	1.00	1.00
RANCH	1.00	1.00	2.00	.
SPLIT	1.00	.	1.00	1.00
TWOSTORY	.	2.00	.	2.00

Multiple Group Style

The Multiple Group style of tabular report is similar to the Simple Group 1 style, except that you specify an additional classification column to be arranged across the tabular report:

Display 4.12 Multiple Group Report Output

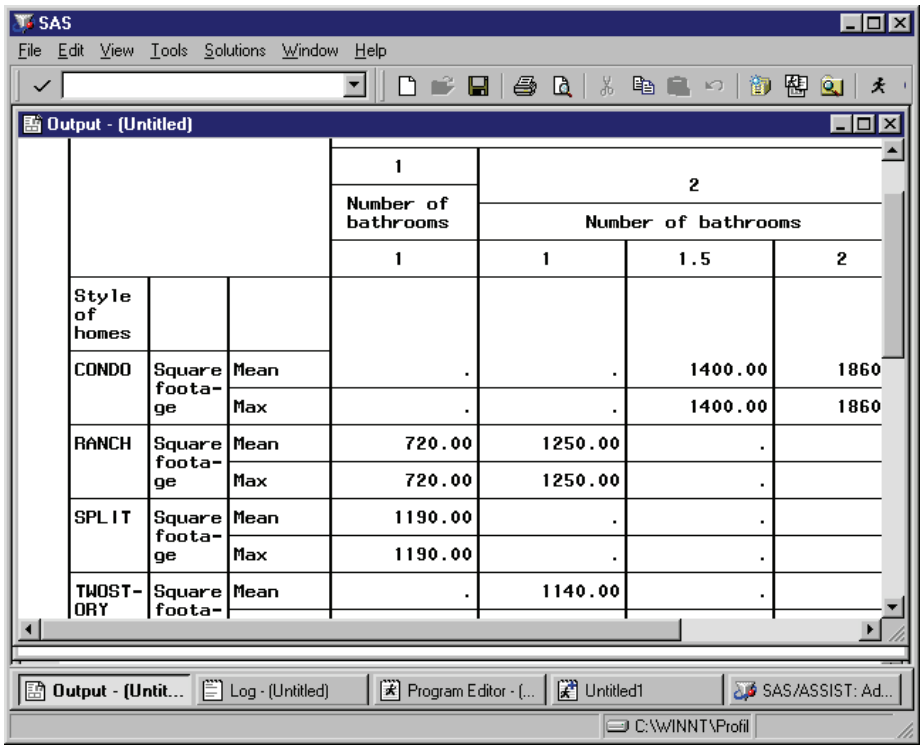


	Age in years			
	51	52	54	57
	Heart rate while running	Heart rate while running	Heart rate while running	Heart rate while running
	Mean	Mean	Mean	Mean
Experimental group				
0	.	.	.	.
1	165.00	.	166.00	.
2	179.00	167.00	162.00	161.00

Advanced Style

The Advanced style of tabular report is the most flexible. You can create any of the other report styles with the Advanced style. You build your tabular report with up to five across levels and five down levels; each level can contain one or more classification columns, analysis columns, or statistics.

Display 4.13 Advanced Report Output



			1	2		
			Number of bathrooms	Number of bathrooms		
			1	1	1.5	2
Style of homes						
CONDO	Square footage	Mean	.	.	1400.00	1860
		Max	.	.	1400.00	1860
RANCH	Square footage	Mean	720.00	1250.00	.	
		Max	720.00	1250.00	.	
SPLIT	Square footage	Mean	1190.00	.	.	
		Max	1190.00	.	.	
TWOST-ORY	Square foota-	Mean	.	1140.00	.	

When you select **`Across items`** or **`Down items`** in the Advanced window, the Across Items or Down Items window opens, enabling you to select items for the different levels. Selecting a **`Level`** button opens the Define Level window, which allows you to choose the type of item (classification column, analysis column, or statistic). The types available for a given level depend on how other levels have been defined:

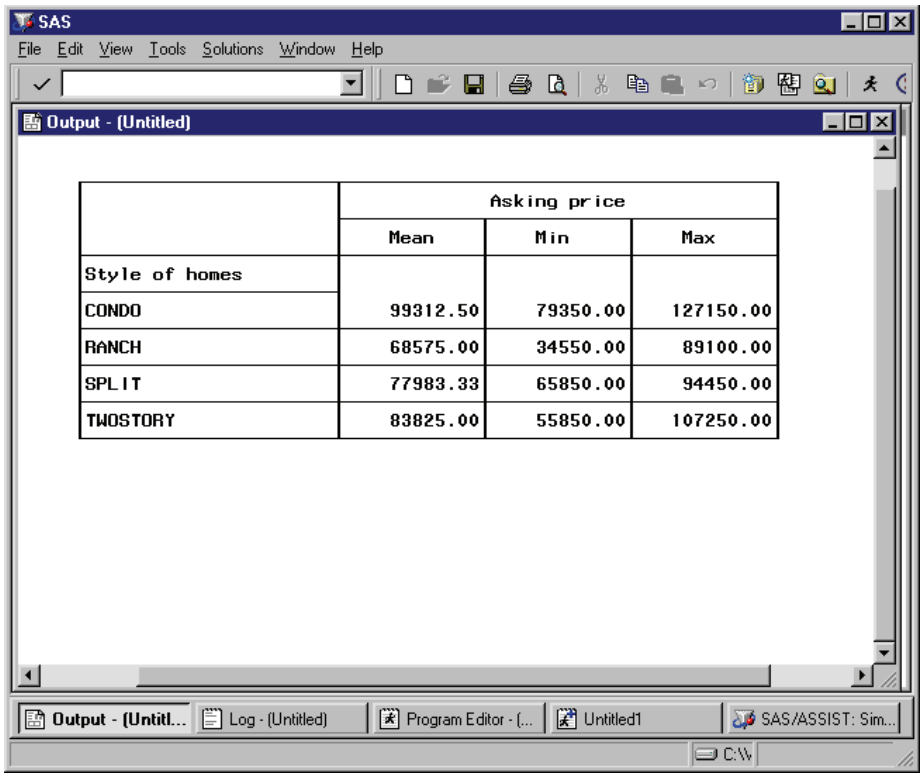
- You cannot have two levels of analysis columns, one under the other.
- You cannot have two levels of statistics, one under the other.

If you select **`Drop level`** in the Define Level window for a previously defined level, the definition for that level is deleted, and lower levels are moved up.

Summarize Option

You can add a summary to the report for all report styles except the Statistics style. A summary provides statistics calculated for all members of each classification column, as well as statistics for the table as a whole, as in the following display:

Display 4.14 Summarized Report Output

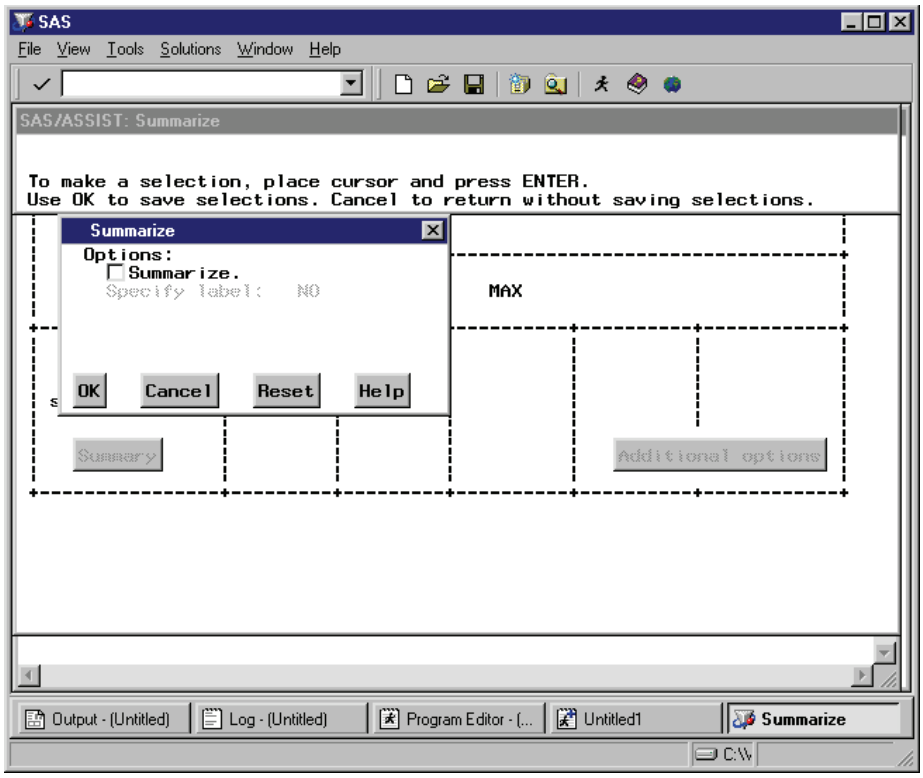


	Asking price		
	Mean	Min	Max
Style of homes			
CONDO	99312.50	79350.00	127150.00
RANCH	68575.00	34550.00	89100.00
SPLIT	77983.33	65850.00	94450.00
TWOSTORY	83825.00	55850.00	107250.00

To add a summary to a report:

1 Select **Summary**. The Summarize window opens.

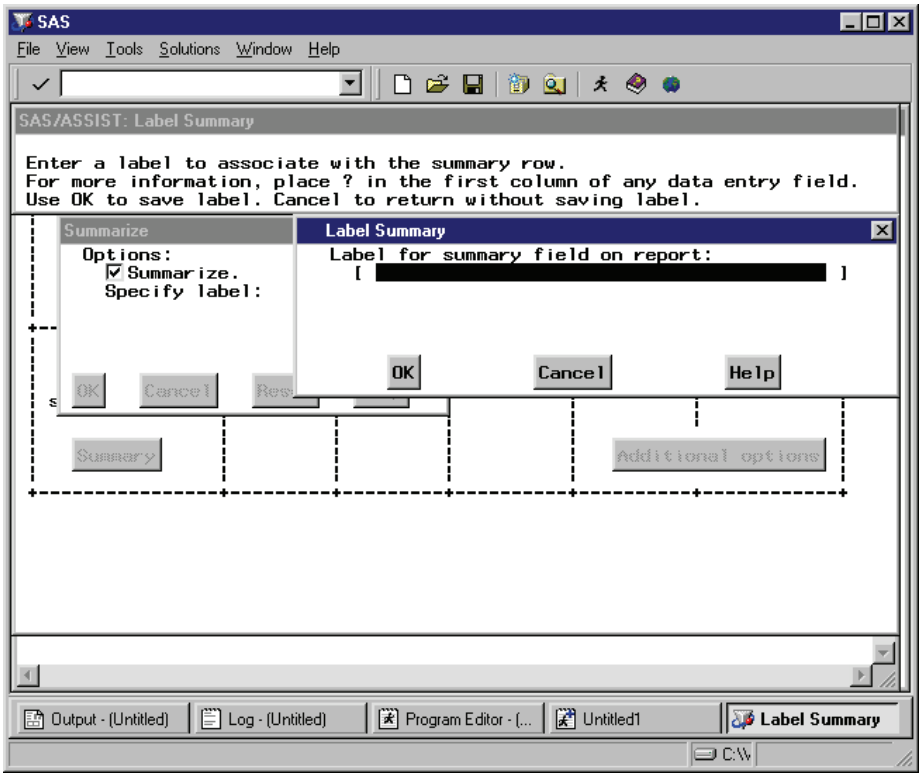
Display 4.15 Summarize Window



2 Select **Summarize**.

3 If desired, select **Specify label** to label the row with the summarized statistics. The Label Summary window appears.

Display 4.16 Label Summary Window



4 Type a label and select **OK**. If you do not specify a label, the default label "Total" is used.

5 Select **OK** to exit the Summarize window.

Additional Options

Each report style has an **Additional Options** button, enabling you to further customize your report. The number of options that are available vary from style to style. The following is a description of all the possible options:

- **Format columns**: Use this option to assign formats to the tabular report columns.
- **Data order**: Use this option to specify the order in which the classification column values are displayed.
- **Row title space**: Use this option to specify the width of the column containing the row titles. This number includes the vertical lines on the left and right.
- **Label statistics**: Use this option to specify an alternative label for each statistic.
- **Include missing values**: Use this option to include missing values as a member of the classification column(s). If this option is set to **NO**, only nonmissing values are used as classification members.
- **Missing value text**: If **Include missing values** is set to **YES**, use this option to specify text to use to identify the missing-value classification member.
- **Label columns**: Use this option to assign alternative labels to the classification and analysis columns.

- **`Default format`**: Use this option to specify a default format for all values in the table. This format is overridden on a per-column basis by any formats specified in **`Format columns`**.
- **`Form characters`**: Use this option to specify alternative symbols to use as vertical and horizontal lines, corners, etc.
- **`Use separator lines`**: Use this option to specify whether to display lines between the rows of the tabular report.
- **`Maximum depth`**: Use this option to specify the maximum number of levels for across or down items.

CHAPTER

5

Doing More with the Report Engine

Introduction **61**
Opening and Using the Report Engine Window **62**
Modifying a Report Using the Cmd Field **64**
Modifying a Report's Column Order, Headers, and Formats **66**
Modifying a Report with Usages **68**
Using the Column Information Window **70**
Choosing a Different Report Type **72**
Inserting Date and Time Stamps in Titles and Footnotes **74**
Additional Report Engine Options **75**
Grand Totals **76**
Subset Data **77**
Limit Output Rows **77**
Row Title Space **77**
Saving Reports **77**
Saving a Report to a SAS Catalog **77**
Saving Report Output to a SAS Catalog **77**
Saving a Report to an External File **78**
Saving a Dynamic Report as a SAS Table **79**
Opening an Existing Report **82**
Selecting Other Data **83**
Editing a Graph Interactively **83**

Introduction

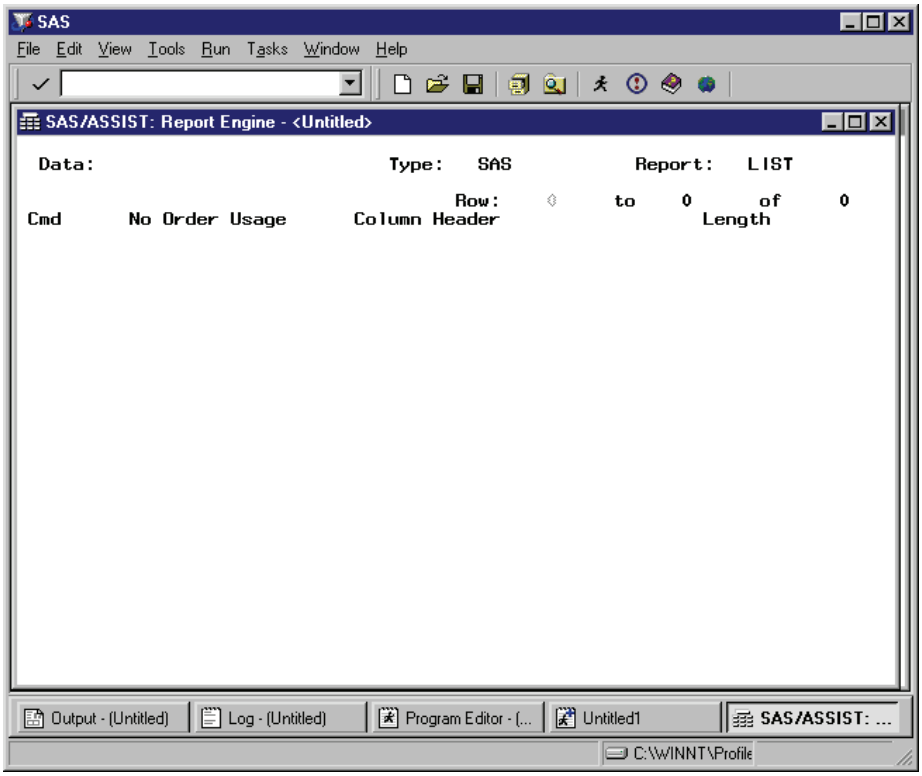
You can use the Report Engine to build different types of reports that are based on SAS tables. You also can create reports based on queries that were created by using the Query window or the SQL Editor window. (See Chapter 10, "Query and Reporting," on page 155 and Chapter 11, "Using the SQL Editor," on page 201 for information on the Query window and the SQL Editor window.) By using the Report Engine, you can create lists; tables; graphics, including horizontal and vertical bar charts, pie charts, and plots; and dynamic reports with drill-down features. You can easily change from one report style to another using the Report Engine.

The "Using the Report Engine" chapter in *Getting Started with SAS/ASSIST* introduced the Report Engine and showed you how to create a simple listing report and a drill-down report. This chapter explores the Report Engine in more depth.

Opening and Using the Report Engine Window

To open the Report Engine window, follow this selection path:**Tasks ▶ Report Writing ▶ Design Report ▶ Report Engine**You also can open the Report Engine window by following this selection path:**Tasks ▶ Data Management ▶ Query ▶ Query and Reporting ▶ Report Engine**The Report Engine window appears.

Display 5.1 Report Engine Window



When you open the Report Engine window, the last report that you created appears. Select **`New`** from the **`File`** menu to clear the window. You can use **`New`** to clear the Report Engine window at any time.

You use commands and make choices from selection lists to produce reports in the Report Engine window. When you press TAB, your cursor moves to any field that contains text that you can edit. The fields in the Report Engine window are described in the following table. Type a **`?`** in any field and press ENTER to list possible selections for that field.

Table 5.1 Fields in the Report Engine Window

Field	Description
Data	lists the name of the data source. Fill in the **Type** field *before* you select the data source.
Type	lists the type of data, such as a SAS table or query, or a query on a DB2 table that you saved from the SQL Editor or the Query window. The default value is **SAS**.
Report	controls the type of report you want to generate. The default value is **LIST**.

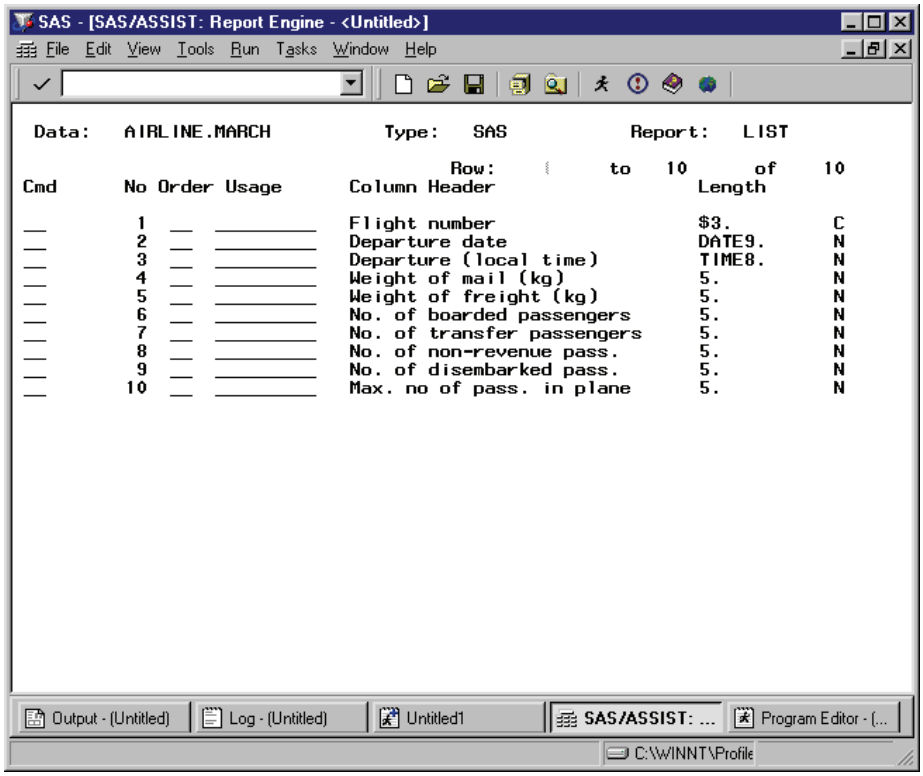
To produce a report, first select the type of data in the **Type** field. You can select SAS tables or views (type SAS), a query that was created by using the Query window (type QUERY), or a query that was created by using the SQL Editor window (type SQL). Queries do not contain any data but rather point to one or more tables.

After you select the type of report, type the name of the data source in the **Data** field. If you type a **?** in the **Data** field and press ENTER, the window that appears depends on what is in the **Type** field:

- If the type is **SQL** or **QUERY**, the Open window appears showing your SQL or QUERY entries. To sort the queries, select **Sort By** from the **Edit** menu and select **Name**, **Description**, or **Date** to reorder the queries listed. Type **S** in the **Cmd** field to select a query.
- If the type is **SAS**, the Select Table window appears. Select a table and select **OK**.

After you select the data source, type of data, and report, the Report Engine window shows you the columns for the data you selected. For example, the following display shows the columns for the AIRLINE.MARCH SAS table. See "Creating the AIRLINE Sample Tables" on page 3 for more information on the AIRLINE sample tables.

Display 5.2 Report Engine With AIRLINE.MARCH Table



To customize your report, you make modifications as described in the rest of this chapter. To run the report, follow this selection path:**Run ▶ Submit**The report appears in the Report Output window. To return to the Report Engine window after viewing your report, follow this selection path:**File ▶ Close**

You can use the fields described in the following table to manipulate your report in the Report Engine window.

Table 5.2 Fields in the Report Engine Window

Field	Description
Row	indicates the number of the first line of column information shown in the window. If the table has more columns than will fit in the window, the row number is in a different color, and you can type a new number in the **Row** field to begin the display at the specified row number.
to	indicates the column number of the last column shown in the window.
of	indicates the total number of columns in the data source.
Cmd	enables you to specify commands to manipulate the columns in the report. Type a **?** and press ENTER to list all of the commands, which are described in Table 5.3 on page 65.
No	indicates the order of the columns. (**No** is an abbreviation for Number). You can change the column order by typing a new order number over the old order number. To drop a column from the report, delete (or type blanks over) the number in this field. The column header and length remain in the window. See the **D** command in Table 5.3 on page 65 for an alternate method of dropping columns from the report.
Order	sorts the column data in the specified order. Type **A** to sort the column data in ascending order. Type **D** to sort the column data in descending order.
Usage	defines what a column represents. Usages change the appearance of the report. You can type the usage into this field or type a **?** for a list of the possible usages. To produce reports other than lists, you must define at least one usage such as GROUP, ACROSS, BREAK, or PAGE. See Table 5.4 on page 68 for a list and description of the usages.
Column Header	indicates the column label. You can change the column label by typing over the existing label. To reset the label to its original value, type an **I** in the **Cmd** field to display the Column Information window. In the Column Information window, select **Reset** and **OK** to return to the original column label value.
Length	indicates both the SAS format and data type of a specific column. You can use any SAS format in this field. The format changes how the column looks on your report. Type a **?** to list SAS formats. A **C** to the right of the column length indicates a character column, whereas an **N** indicates a numeric column.

Modifying a Report Using the Cmd Field

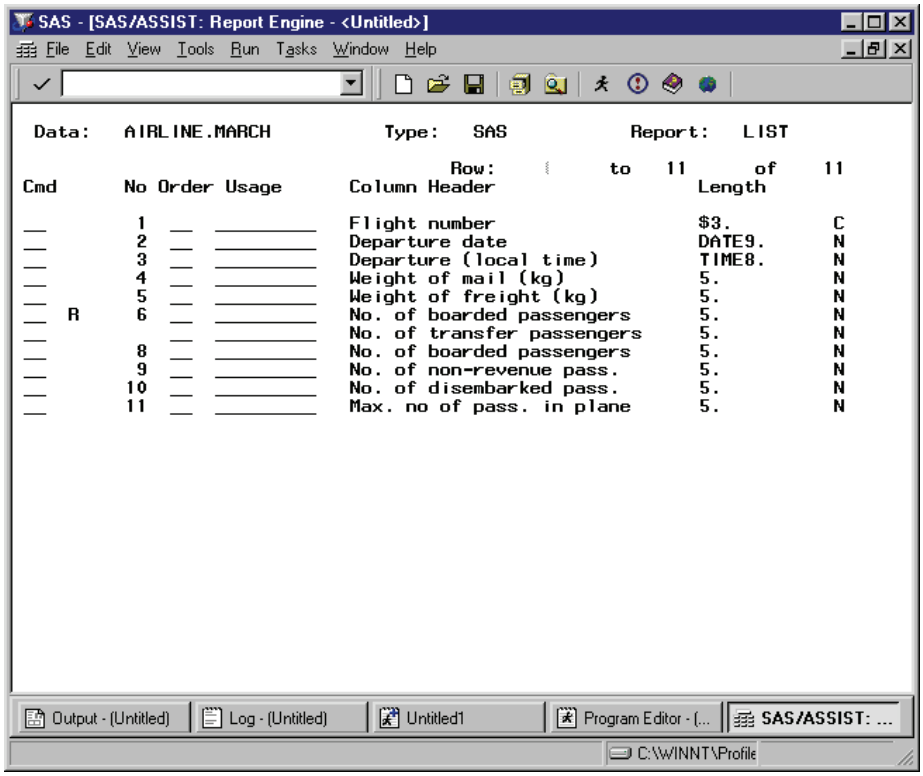
You can use commands in the Report Engine window **Cmd** field to modify your report. Type a **?** in the **Cmd** field to list the commands described in the following table.

Table 5.3 Cmd Field Commands

Command	Name	Description
I	Column Information	displays detailed information about a column. See "Using the Column Information Window" on page 70 for more information.
R	Repeat	repeats a column.
D	Delete	deletes a column from the report only. To restore deleted columns, select **Reset Columns** from the **Edit** menu. When you delete a column using **D**, all information for that column is removed from the Report Engine window. See the No field in Table 5.2 on page 64 for an alternate method of dropping columns from a report.
T	Subtotal	computes a subtotal on the column for each group defined by a GROUP, PAGE, or BREAK usage. See Table 5.4 on page 68 for more information on usages.

The following display shows the Report Engine window with the command to repeat the **No. of boarded passengers** column. This display also shows that the number in the **No** field for the **No. of transfer passengers** column has been erased to drop the column from the report. After you press ENTER, repeated fields are indicated with an **R** between the **Cmd** and **No** fields; dropped columns are moved to the bottom of the list, and the other columns are renumbered. Any columns used to create subtotals are indicated with a **T**.

Display 5.3 Using the Cmd Field



Modifying a Report's Column Order, Headers, and Formats

You can use fields in the Report Engine window to modify the report's column order, headers, and formats as follows:

- Rearrange the report's columns by changing the numbers of the **No** (Number) field.
- change the column headers by typing a new column header over the existing one.
- Change the presentation of the column in your report by selecting a new format in the **Length** field.

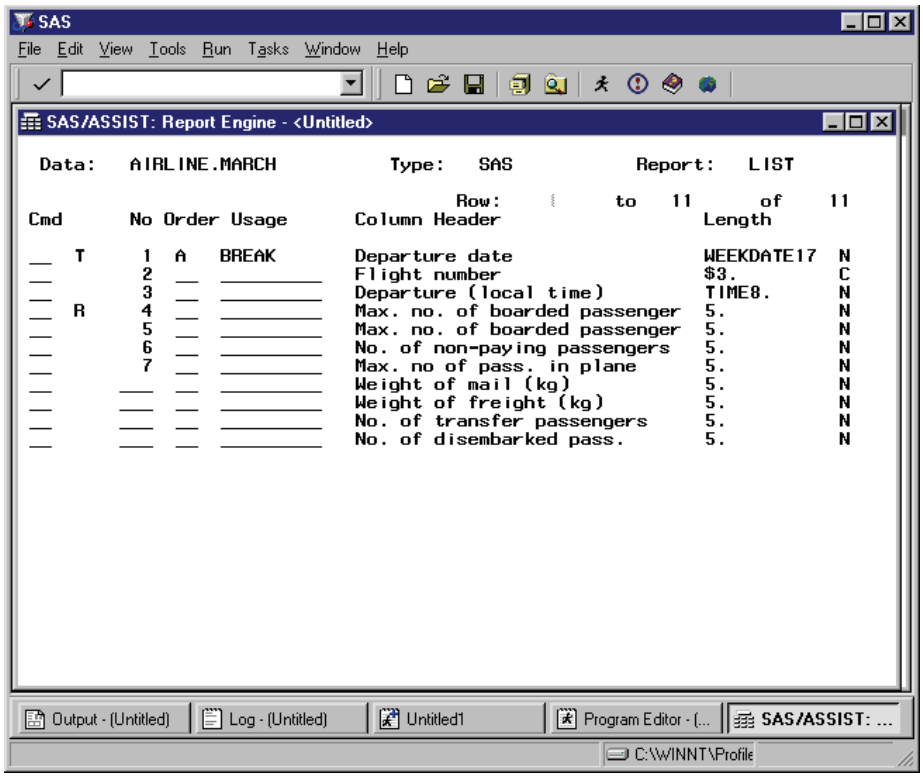
After you make your changes and press ENTER, the columns are reordered in the Report Engine window and are renumbered to account for any dropped columns. Also, the new formats are listed in the **Length** field.

Note: If the table has been sorted, you can set the User Profile option **Column Order** to automatically put the BY column or columns at the top of the list in the Report Engine window. See Appendix 2, "Customizing SAS/ASSIST Software," on page 237 for information. △

The following display shows the Report Engine window with the AIRLINE.MARCH data file with the following modifications:

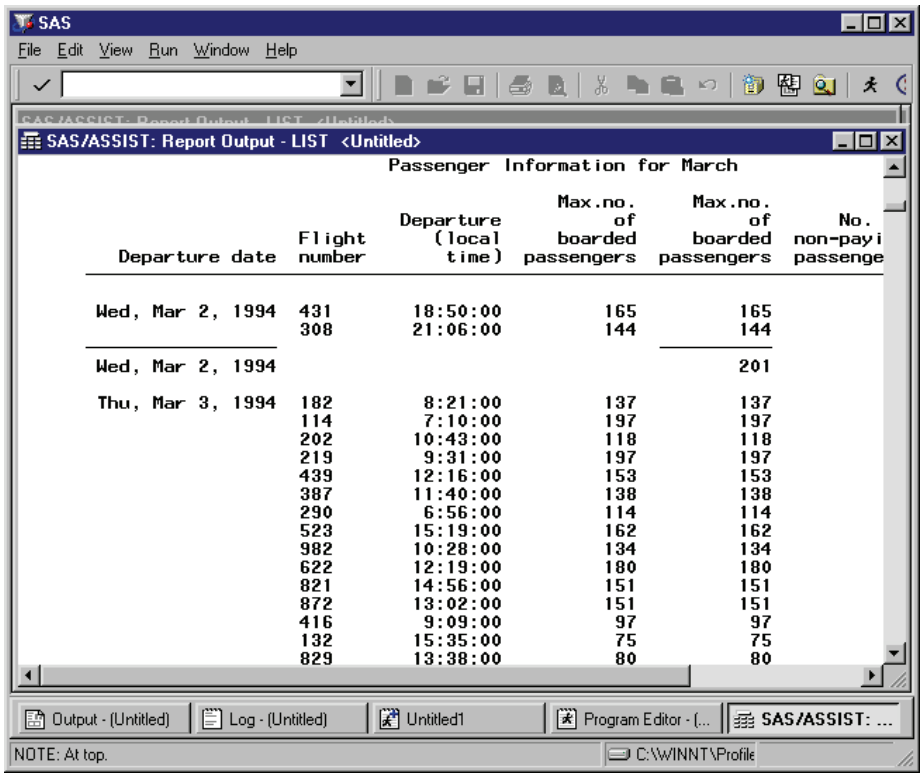
- The **Weight of mail (kg)**, **Weight of freight (kg)**, **No. of transfer passengers**, and **No. of disembarked pass.** columns have been dropped from the report by erasing their position numbers in the **No** field.
- The order of the **Departure date** and **Flight number** columns has been reversed.
- The column header for the **No. of non-revenue pass.** column has been changed to **No. of non-paying passengers.**.
- The format for the **Departure date** column has been changed to **WEEKDATE17.** using the Column Information window (see "Using the Column Information Window" on page 70 for details).
- The **Departure Date** column has been sorted in ascending order.
- The width for all columns has been changed to 10, except for the width for **Flight number**, which has been changed to 6, and the **Departure Date** column, which has been changed to 17 to accommodate its new format. Column widths do not appear in the Report Engine window; you view and change the column width in the Column Information window. See "Using the Column Information Window" on page 70 for more information.
- The title "Passenger Information for March" has been added by selecting **Titles** from the **Edit** menu, and centered by selecting **Page Layout** from the **Edit** menu. Title information does not appear on the Report Engine window.
- The repeated **No. of boarded passengers** column has been assigned a usage of **MAX**, the column header has been changed to **Max. No. of boarded passengers**, and the width has been changed to 10. For information on changing usages, see "Modifying a Report with Usages" on page 68.
- The **Departure date** column has been assigned a usage of **BREAK** so that the report breaks on each new date value.

Display 5.4 Report Engine Window with Modifications to AIRLINE.MARCH Table



The following display shows the modified list report for the passenger data in the AIRLINE.MARCH table. The report has been scrolled forward to show that the maximum number of boarded passengers for a single flight for each day is given at the bottom of the data for each day.

Display 5.5 AIRLINE.MARCH Listing Report With Modifications



Passenger Information for March

Departure date	Flight number	Departure (local time)	Max.no. of boarded passengers	Max.no. of boarded passengers	No. non-payi passenge
Wed, Mar 2, 1994	431	18:50:00	165	165	
	308	21:06:00	144	144	
Wed, Mar 2, 1994				201	
Thu, Mar 3, 1994	182	8:21:00	137	137	
	114	7:10:00	197	197	
	202	10:43:00	118	118	
	219	9:31:00	197	197	
	439	12:16:00	153	153	
	387	11:40:00	138	138	
	290	6:56:00	114	114	
	523	15:19:00	162	162	
	982	10:28:00	134	134	
	622	12:19:00	180	180	
	821	14:56:00	151	151	
	872	13:02:00	151	151	
	416	9:09:00	97	97	
	132	15:35:00	75	75	
	829	13:38:00	80	80	

Modifying a Report with Usages

The values of **Usage** define what a column represents and change the appearance of the report. The following table describes the different values of **Usage**. Note that SUM, MEAN, MIN, MAX, AVG, COUNT, N, and NMISS are aggregate (summary) functions.

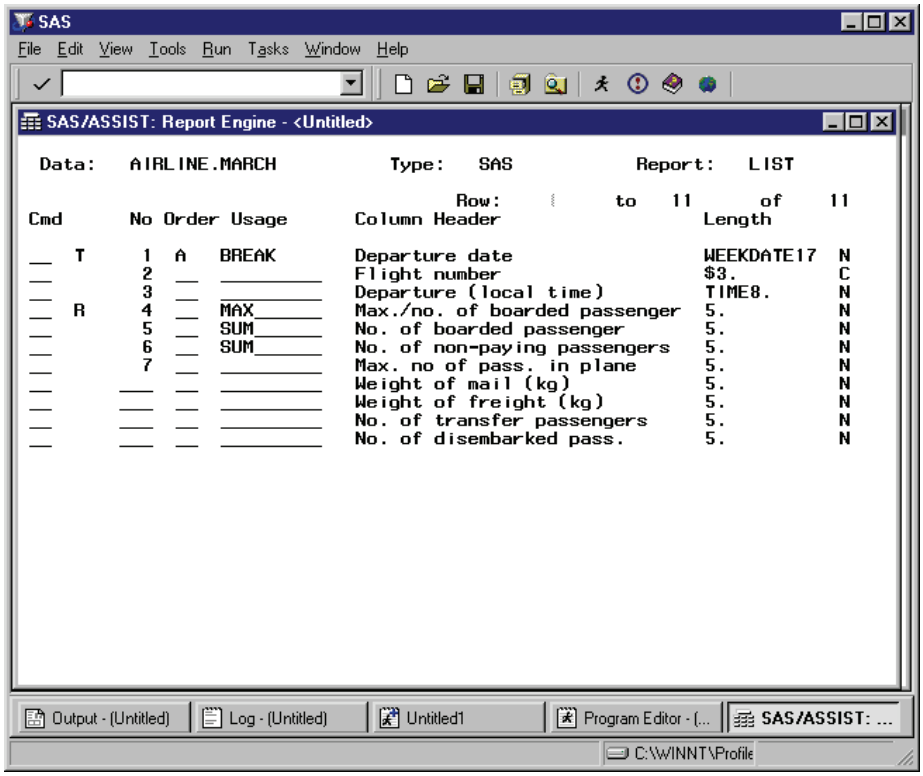
Table 5.4 Usages

Usage	Description
PAGE	creates a new page at each new column value. PAGE is used with the ACROSS, GROUP, or BREAK usages. PAGE is valid only with a report of type TABLE. With other types of reports, PAGE is used like a GROUP usage. The corresponding SAS/GRAPH option for this usage is BY, which creates a new page for each BY value.
GROUP	groups data by the values in the column. The corresponding SAS/GRAPH option for this usage is GROUP, which organizes bars and pies into groups by different values of the GROUP variable.
ACROSS	groups the report into subgroups across the report. The corresponding SAS/GRAPH option for this usage is ACROSS, which is used to place multiple pies "across" on a page and also is used by the LEGEND statement.
BREAK	computes one summary for each column in a LIST report. With other types of reports, BREAK is used like a GROUP usage.

Usage	Description
SUM	computes the sum of the values. The corresponding SAS/GRAPH option for this usage is SUM, which prints the value of the sum statistic above bars.
MEAN	computes the mean of the values. The corresponding SAS/GRAPH option for this usage is MEAN, which is the value of the statistic for the variable being used for calculations.
MIN	computes the smallest value
MAX	computes the largest value
AVG	computes the average of the values (equal to mean)
COUNT	computes the number of nonmissing values
N	computes the number of nonmissing values
NMISS	computes the number of missing values

The following display shows the AIRLINE.MARCH table in the Report Engine window. All of the modifications made in the previous section are in effect; in addition, the report has been further modified so that the report shows totals (SUM usage) for the number of boarded and nonpaying passengers. A forward slash (**/**) has been inserted in the column header for the **Max No. of boarded passengers** so the header breaks after the word **Max**.

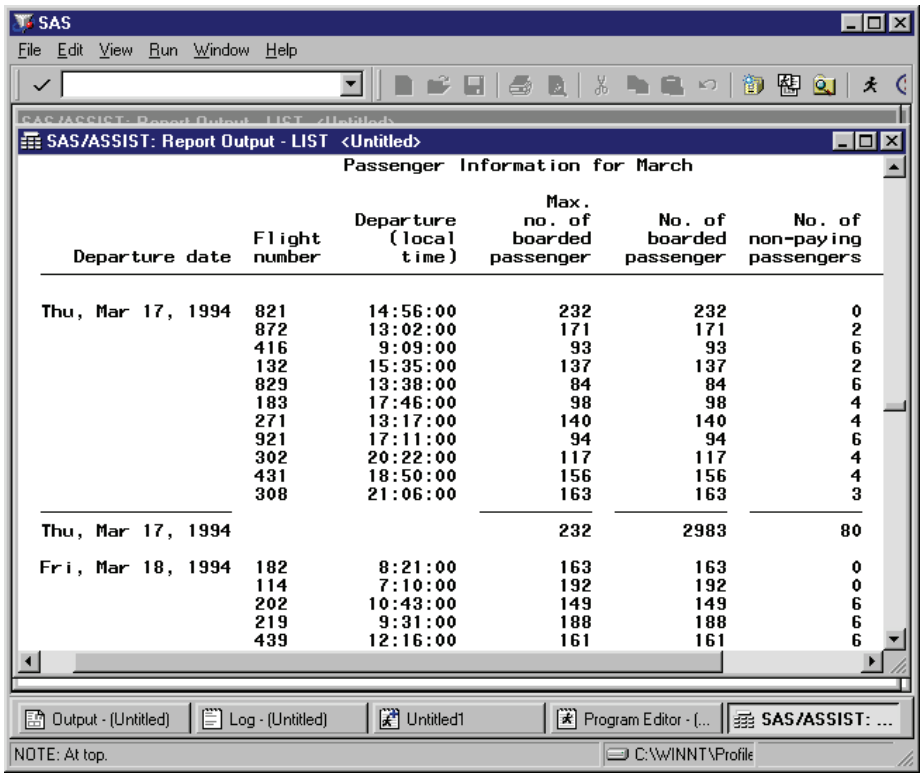
Display 5.6 Report Engine Window with AIRLINE.MARCH Table and More Modifications



The following display shows the passenger information report grouped by date with the sum of the boarded passengers, the maximum number of boarded passengers, and

the sum of the nonpaying passengers. The report has been scrolled forward to show the sums for the boarded and nonpaying columns.

Display 5.7 AIRLINE.MARCH Listing Report with More Modifications



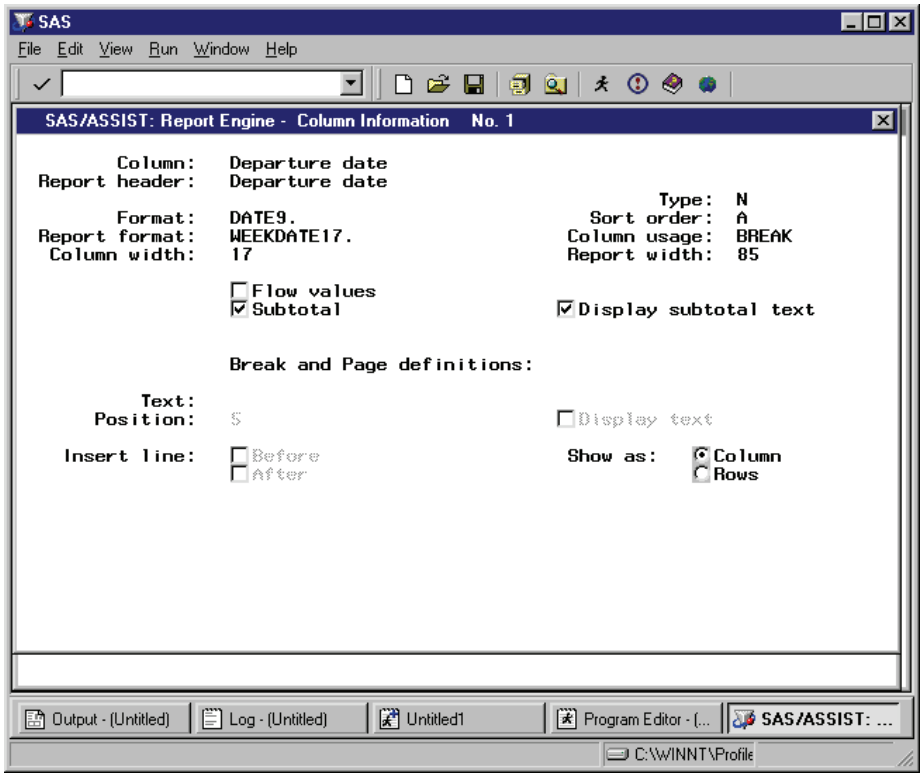
Passenger Information for March

Departure date	Flight number	Departure (local time)	Max. no. of boarded passenger	No. of boarded passenger	No. of non-paying passengers
Thu, Mar 17, 1994	821	14:56:00	232	232	0
	872	13:02:00	171	171	2
	416	9:09:00	93	93	6
	132	15:35:00	137	137	2
	829	13:38:00	84	84	6
	183	17:46:00	98	98	4
	271	13:17:00	140	140	4
	921	17:11:00	94	94	6
	302	20:22:00	117	117	4
	431	18:50:00	156	156	4
	308	21:06:00	163	163	3
Thu, Mar 17, 1994			232	2983	80
Fri, Mar 18, 1994	182	8:21:00	163	163	0
	114	7:10:00	192	192	0
	202	10:43:00	149	149	6
	219	9:31:00	188	188	6
	439	12:16:00	161	161	6

Using the Column Information Window

To display information about a column, type **`I`** in the **`Cmd`** field for the desired column and press ENTER. The following display shows the information for the **`Departure Date`** column, as modified in the previous sections.

Display 5.8 Column Information Window



When you press TAB in this window, your cursor moves to any field that you can select or that contains text that you can edit to update the information in this window. The information in this window varies according to the type of usage associated with a column.

To reset the **Report Header** and **Report Format** to their original values, select **Reset** from the **Edit** menu.

The fields on the Column information window are described in the following table.

Table 5.5 Fields in the Column Information Window

Field	Description
Column	indicates the column label stored with the source table.
Report Header	indicates the column label to be used in the report.
Format	indicates the column format stored with the source table.
Report format	indicates the column format to be used in the report.
Column width	indicates the width of the column in the report.
Type	indicates the type of column data, **C** for character data, **N** for numeric data.
Sort order	specifies how the column data are sorted in the report. **A** specifies that the column data is sorted in ascending order in the report. **D** specifies that the column data is sorted in descending order in the report.
Column Usage	indicates the usage for the column. To produce reports other than lists, you must define at least one of the following usages: GROUP, ACROSS, BREAK, or PAGE. See Table 5.4 on page 68 for more information.

Field	Description
Report Width	indicates the total width of the report.
Flow values	specifies that character columns longer than the width indicated in the **Width** field are flowed to multiple lines.
Subtotal	writes a summary line (a line containing summaries of statistics and computed variables) for each group defined by a BREAK, GROUP, or PAGE usage. This parameter is available only on columns with a BREAK, GROUP, or PAGE usage.
Display subtotal text	prints the value of the group to the left of the subtotals. This parameter is available only on columns with a BREAK, GROUP, or PAGE usage for which the **Subtotal** parameter has been selected.

The following parameters are available only on columns with BREAK or PAGE usages.

Table 5.6 Additional Fields in the Column Information Window for Columns with BREAK or PAGE Usages

Field	Description
Show as	**Column** displays the value of each group in a column to the left of the other columns. **Rows** displays the value of each group in a line above the data for each group. Selecting **Rows** activates the other BREAK and PAGE fields.
Position	indicates where the group value appears, in spaces from the left margin.
Display text	determines whether the group value appears in the report.
Text	If **Display text** is checked, the text you supply in the **Text** field is used instead of the group value. Leave this field blank to display the group value.
Insert line	determines whether to insert blank lines above and below the group value.

Choosing a Different Report Type

You can use the Report Engine window to create several types of reports. You can change from one type of report to another in one of two ways:

- within the Report Engine window, type a new value in the **Report** field before running the report. Alternatively, type **?** in the field and press ENTER to list the types of reports; then select the type of report.
- after you run one type of report, select a new type of report from the **Run** menu in the Report Output window.

You can select the following types of reports:

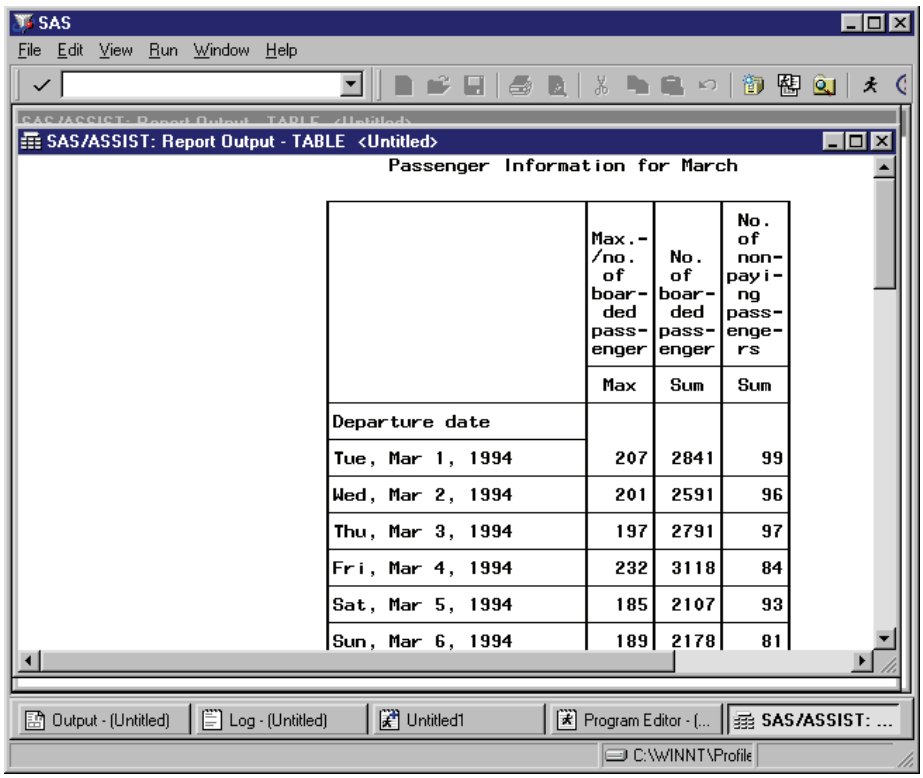
- **LIST** creates a list report
- **TABLE** creates a tabular report
- **DRILL** creates a dynamic report
- **HBAR** creates a horizontal bar chart
- **VBAR** creates a vertical bar chart

- **PIE** creates a pie chart
- **PLOT** creates an X by Y plot.

For any type of report other than **LIST**, you must assign a usage of BREAK, ACROSS, GROUP, or PAGE to at least one column, which becomes the classification column for tabular reports or the chart column for graphical reports.

To see the passenger information report as a table, type **TABLE** in the **Report** field in the Report Engine window. Select **Submit** from the **Run** menu. The following display shows the passenger information report as a table.

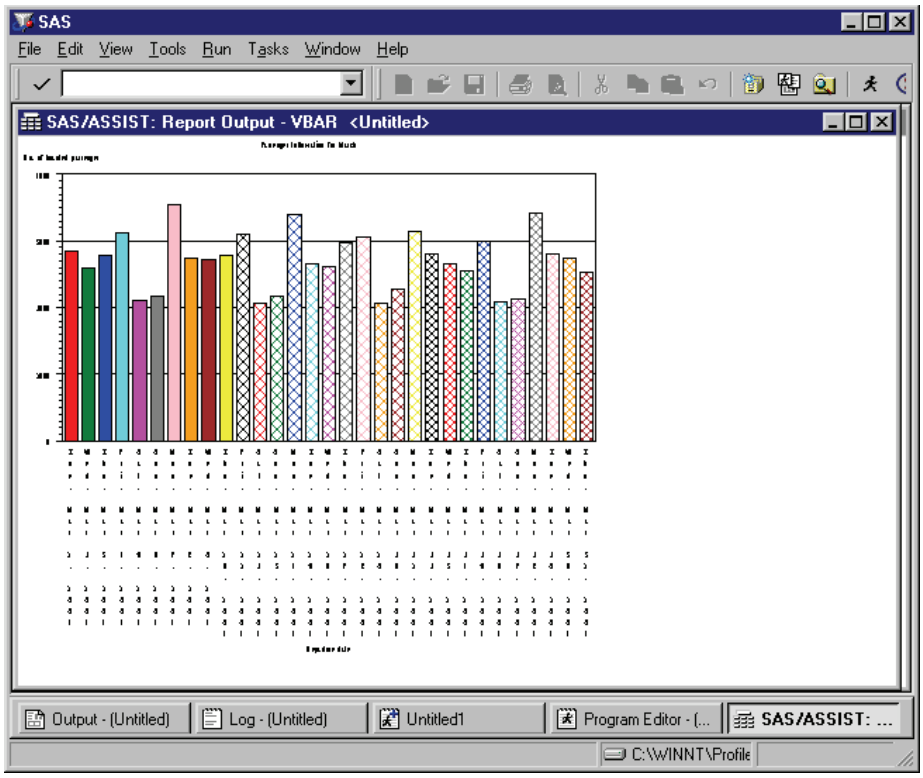
Display 5.9 Tabular Report Output



	Max.-/no. of boar-ded pass-enger	No. of boar-ded pass-enger	No. of non-payi-ng pass-enge-rs
	Max	Sum	Sum
Departure date			
Tue, Mar 1, 1994	207	2841	99
Wed, Mar 2, 1994	201	2591	96
Thu, Mar 3, 1994	197	2791	97
Fri, Mar 4, 1994	232	3118	84
Sat, Mar 5, 1994	185	2107	93
Sun, Mar 6, 1994	189	2178	81

To see the passenger information report as a vertical bar chart, select **Vertical Bar Chart** from the **Run** menu of the Report Output window. Alternatively, type **VBAR** in the Report Engine window **Report** field. The following display shows the passenger information report as a vertical bar chart. Note that the format for the DATE column has been changed to DATE9. to make more room for the bars.

Display 5.10 Vertical Bar Chart Output

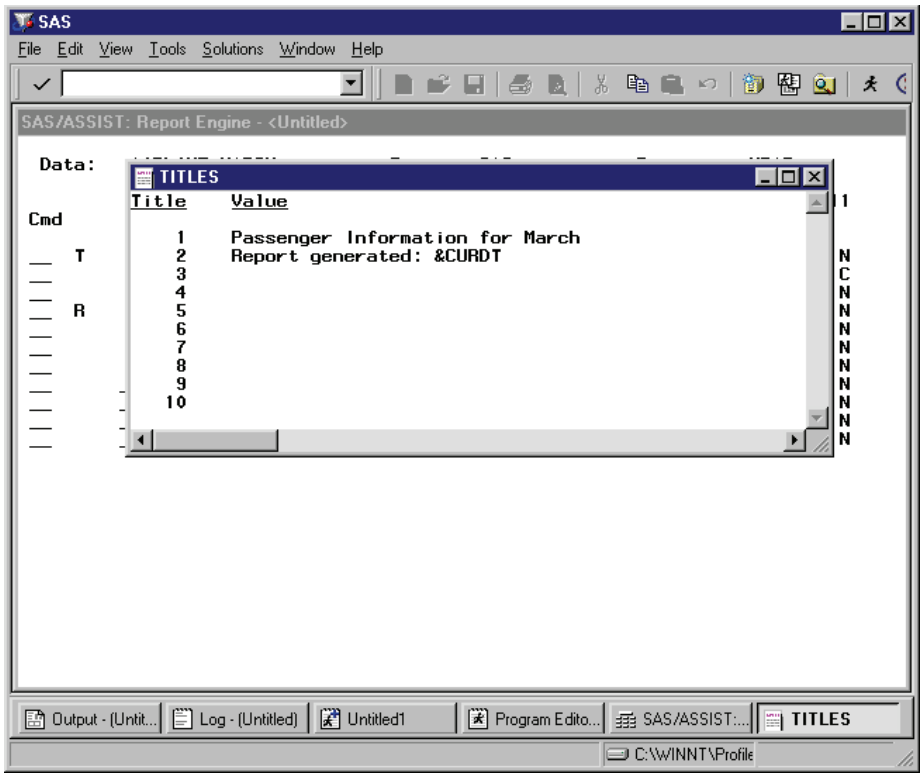


Inserting Date and Time Stamps in Titles and Footnotes

As discussed in the "Using the Report Engine" chapter of *Getting Started with SAS/ASSIST*, you can add titles and footnotes to your report by selecting **`Titles`** or **`Footnotes`** from the **`Edit`** menu of the Report Engine window. You can use the macros &CURDATE, &CURTIME, and &CURDT to automatically generate the current date, the current time, or both the current date and time, respectively, for your output.

In the **`Value`** field for each line of the title, type the text and the macro you want to use. An example of an edited TITLES window is shown in the following display.

Display 5.11 Edited TITLES Window



Select **Close** from the **File** menu. When prompted, select **Yes** to save the changes. When you run your report, the &CURDT macro automatically generates both the current date and time. You can assign a format to the macros &CURDATE, &CURTIME, and &CURDT in your user profile by using the Date format, Time format, and Datetime format options for a profile type of REPORT ENGINE. See "Setting User Profile Options" on page 237 for additional information about user profile options.

You can also edit titles and footnotes by selecting **Report Output Manager** from the **View** menu. In the **Cmd** field next to the report you want to change, type **E** and press ENTER. The code for your report appears in the Edit window where you can edit your titles and footnotes as well as the rest of your report.

Note: Any changes that you make to your report in the Edit window are saved only if you save your output to an external file or a SAS file. When you save your report in the Report Engine window, changes made in the Edit window are not saved with your report. △

Additional Report Engine Options

The **Edit** menu contains additional options that enable you to customize your report. This section describes items on the **Edit** menu that are not discussed elsewhere in this chapter.

Grand Totals

The **Grand Totals** item enables you to display overall totals for the report. You can display column grand totals or row grand totals.

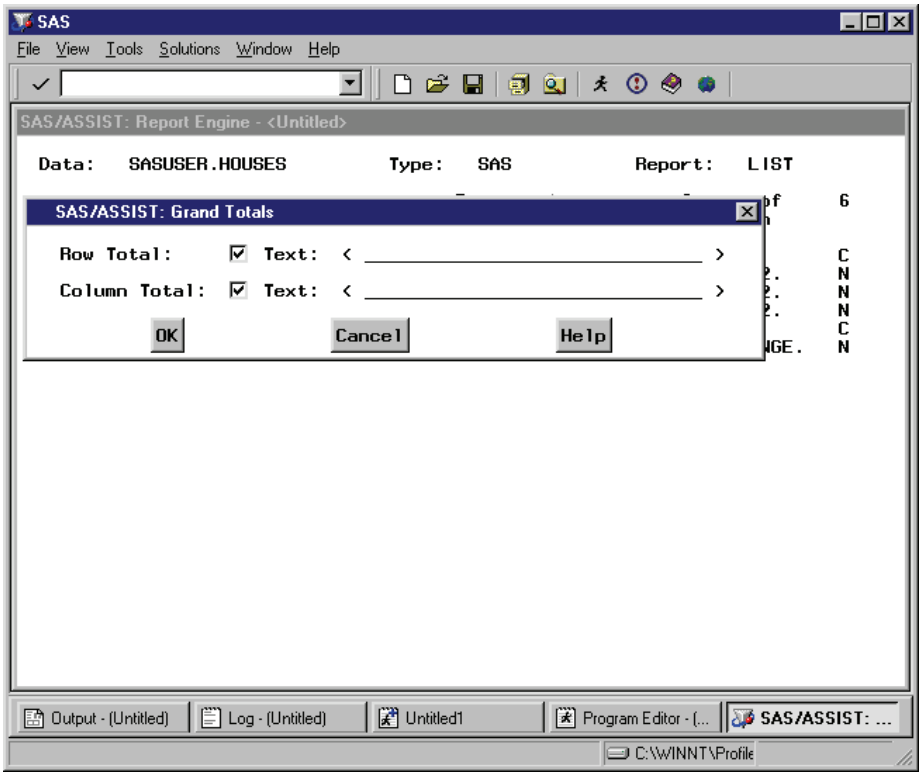
Follow these directions to display column grand totals.

1 For LIST reports, specify a usage of BREAK, GROUP, or PAGE for a column. For TABLE reports, specify a usage of GROUP for a column.

2 Specify a statistics usage (such as MIN, MAX, MEAN, and so on) on at least one column. This statistic will be calculated on that column in each BREAK, GROUP, or PAGE value and for the overall report.

3 Follow this selection path:**Edit ▶ Grand Totals**The Grand Totals window appears.

Display 5.12 Grand Totals Window



4 Type some identifying text (for example, **Overall**) in the **Column Total** field. Select **Text** if it is not already selected.

5 Select **OK**. Run the report.

To display row grand totals, follow the above directions, except use an ACROSS usage instead of BREAK, PAGE, or GROUP. Also, use the **Row Total** field to enter your identifying text.

Note: Sometimes the grand total identifying text does not appear in the report output. Usually this happens because the line size is not large enough to accommodate the text. To solve this problem, select **Page Layout** from the **Edit** menu and specify a larger value for **Line Size**. △

Subset Data

The **Subset Data** item opens the Build a WHERE Clause to Subset Your Data window, enabling you to apply a WHERE clause to your data when creating your report. For details on this window, see the "Report Writing" chapter in *Getting Started with SAS/ASSIST*.

Limit Output Rows

The **Limit Output Rows** item opens the Limit Number of Output Rows window, enabling you to limit the report output to the number of rows you specify. The default is **MAX**, or all rows.

Row Title Space

The **Row Title Space** item is used only for the TABLE report style. Selecting this item opens a dialog box which enables you to set the width of the row title, that is, the left column or columns which identify the contents of the row.

Saving Reports

Saving a Report to a SAS Catalog

To save Report Engine window selections for future use, select **Save As** from the **File** menu in the Report Engine window. The Save As window appears.

Type a name and, optionally, a description for the report and the catalog where you want to save the report. Select **OK** to save the report or **Cancel** to cancel the save. If the report name exists, you are prompted to select **OK** again to write over the existing report, or you can type a new name for the report. After you name the report, you can use **Save** from the **File** menu to save the report again.

For a list of existing reports, type a **?** in the **Name** field of the Save As window. You can type **S** in the **Cmd** field to select a report from the resulting selection list. For a list of available catalogs, type a **?** in the **Catalog** field. Select the catalog from the resulting selection list.

Report Engine window selections are saved as type REPORT.

Saving Report Output to a SAS Catalog

To save a report output to a SAS catalog for future use, select **Save As** from the **File** menu in the Report Output window. The Save As window appears.

Type a name and, optionally, a description for the report output and the catalog where you want to save the report output. Select **OK** to save the report output or **Cancel** to cancel the save. If the report output name exists, you are prompted to type a new name or to select **OK** again to write over the existing report output.

CAUTION:

If a new entry has the same name as an existing ASSIST entry, you might not receive a prompt that warns about overwriting an existing entry. If you last saved from one of the

three windows that has a different type than the one you are currently saving, you might not receive the warning prompt and your entry will be overwritten. △

You can view a selection list of existing OUTPUT entries and catalogs in the same manner as described for reports in the previous section.

Report output is saved as type OUTPUT. You can access your saved output using the Result Manager or the Report Output Manager. Refer to Chapter 9, "Doing More with Results," on page 143 for additional information.

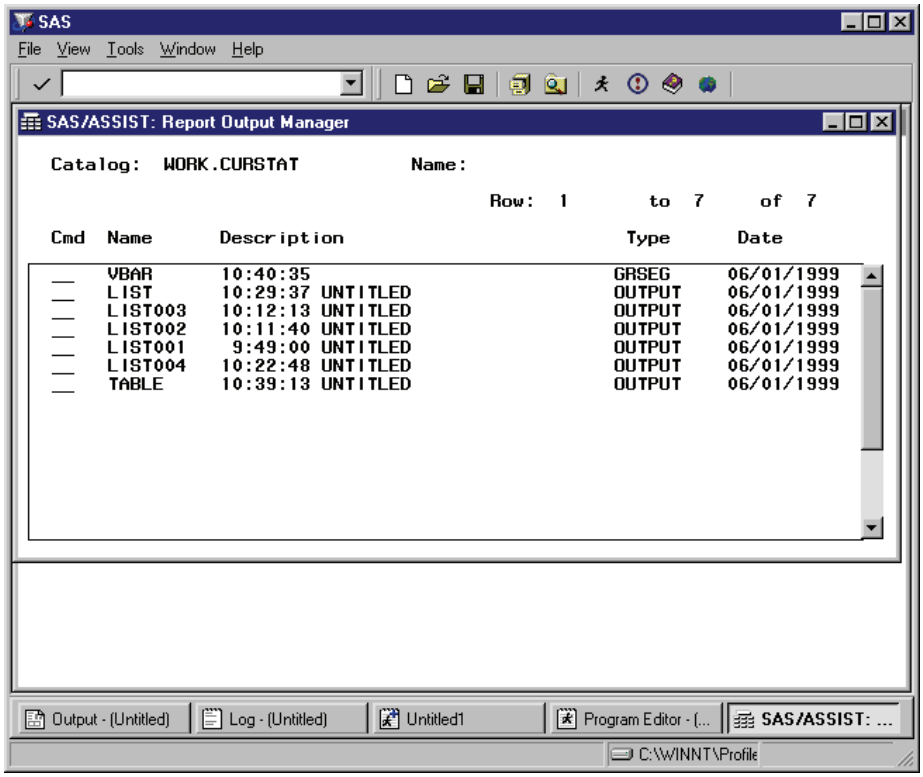
Saving a Report to an External File

Before you save your report to an external file, make sure that the value for the **`Output window`** User Profile option is set to **`Report`** in your user profile. See Appendix 2, "Customizing SAS/ASSIST Software," on page 237 for more information.

To save the report to an external file, follow this path from the Report Engine Window or the Report Output Window:

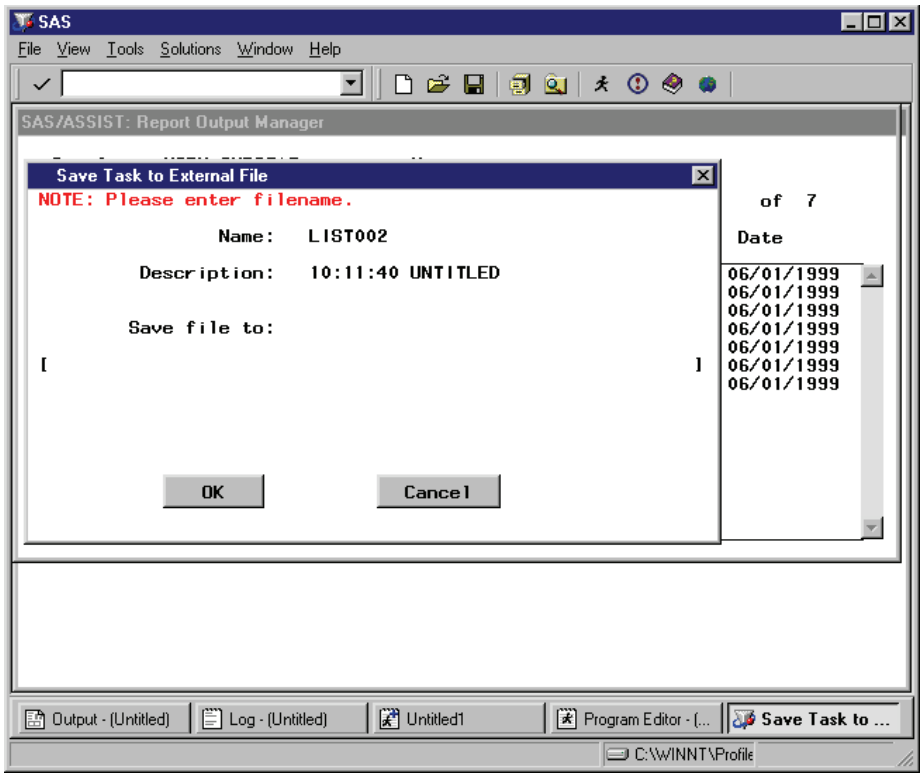
View ▶ Report Output Manager The Report Output Manager window appears as shown in the following display.

Display 5.13 Report Output Manager Window



Type **`F`** (for File) in the **`Cmd`** field next to the report you want to save and press ENTER. The Save Task to External File window appears as shown in the following display.

Display 5.14 Save Task to External File Window

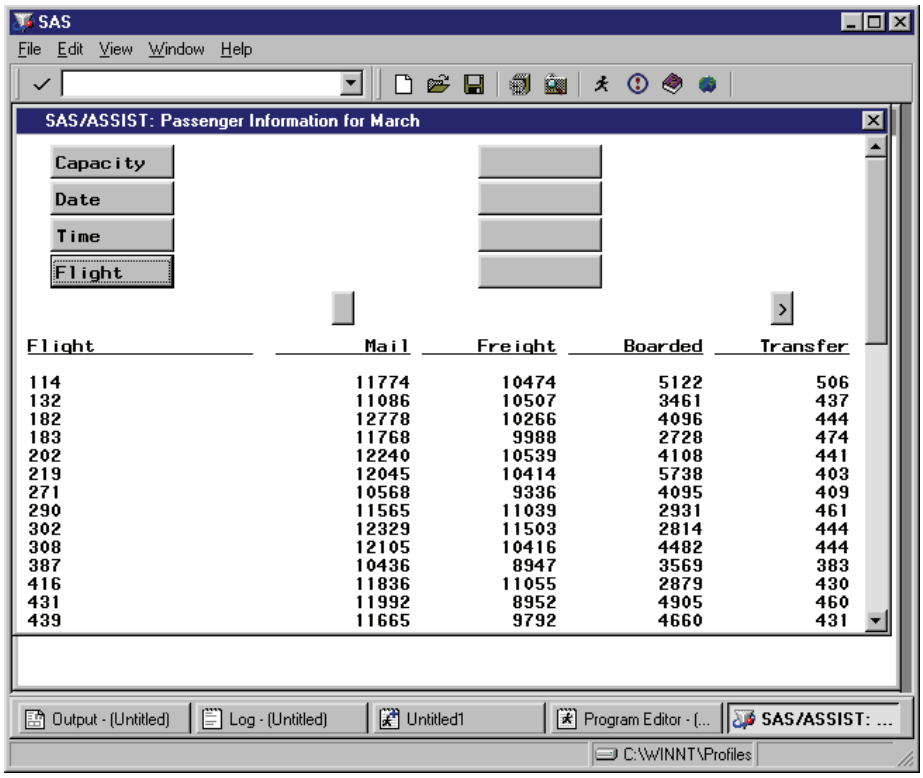


In the **`Save file to`** field, type the name of the external file where you want to store the report and select **`OK`**. Select **`Close`** from the **`File`** menu to return to the Report Engine window.

Saving a Dynamic Report as a SAS Table

Dynamic (or drilldown) reports are described in detail in the "Using the Report Engine" chapter of *Getting Started with SAS/ASSIST*. You can save the information for a column in a dynamic report to a SAS table or view. For example, if you select **`Flight`** to see the column values for the aggregation level as shown in the following display, you can save the data in the report to a SAS table or view.

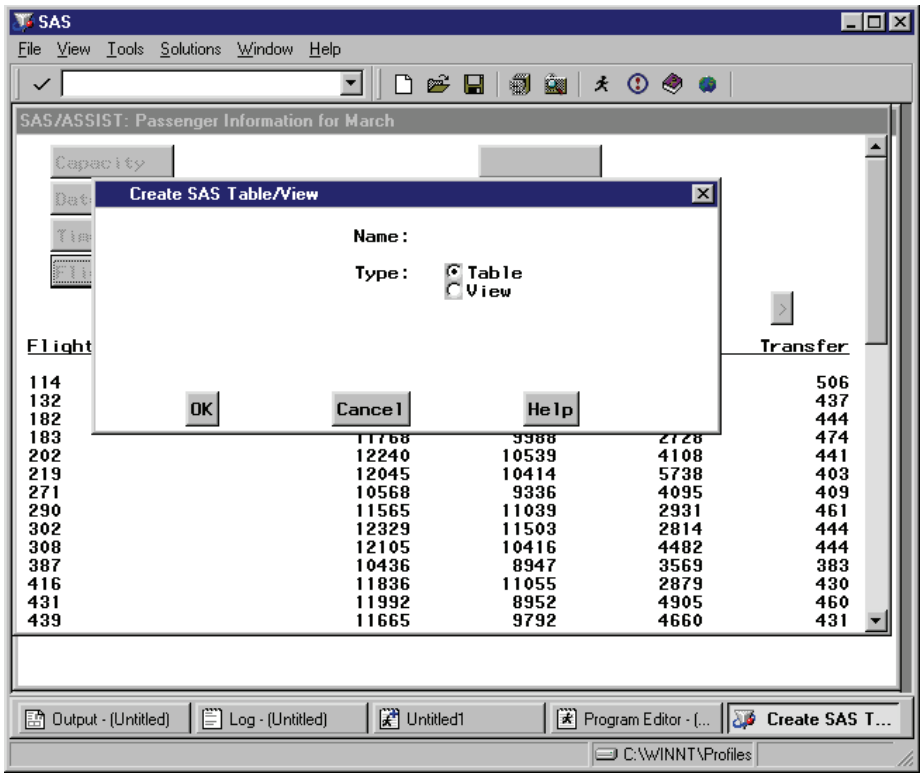
Display 5.15 Dynamic Report With Flight Information



To save information from a dynamic report to a SAS table, follow these instructions:

1 Select **`Save As SAS Table...`** from the **`File`** menu. The Create SAS Table/View window appears.

Display 5.16 Create SAS Table/View Window

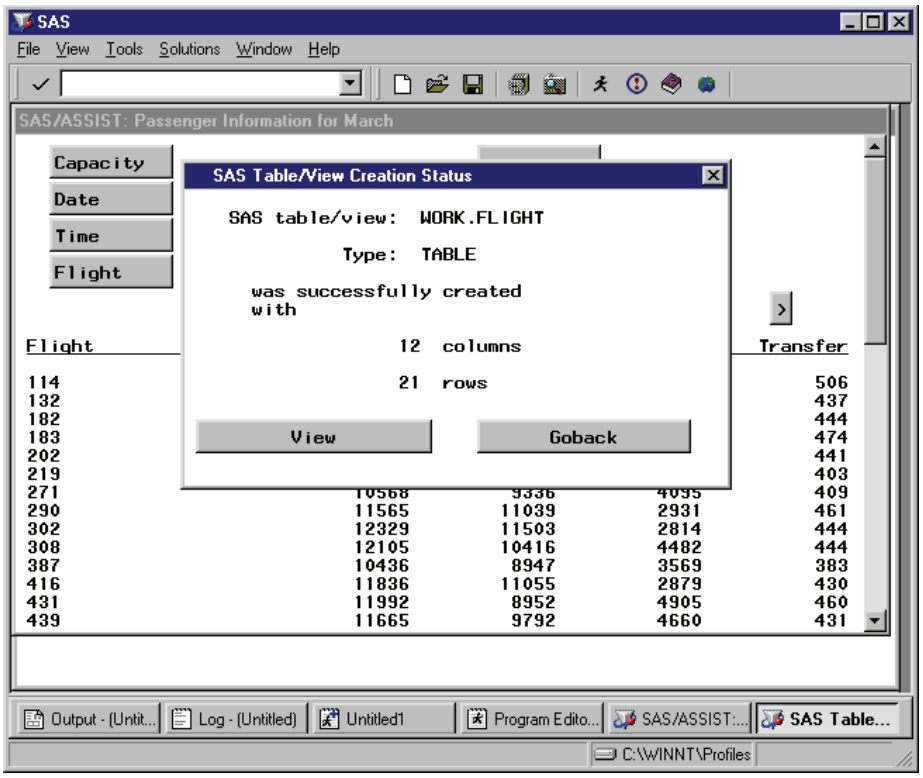


2 In the **Name** field, type the two-level name of the SAS table or view that you want to create. If you omit the libname, the table is placed in the temporary WORK library.

3 Select **Table** or **View** for the **Type**.

4 Select **OK**. The SAS Table/View Creation Status window appears, as shown in the following display, indicating that the table or view was created.

Display 5.17 SAS Table/View Creation Status Window

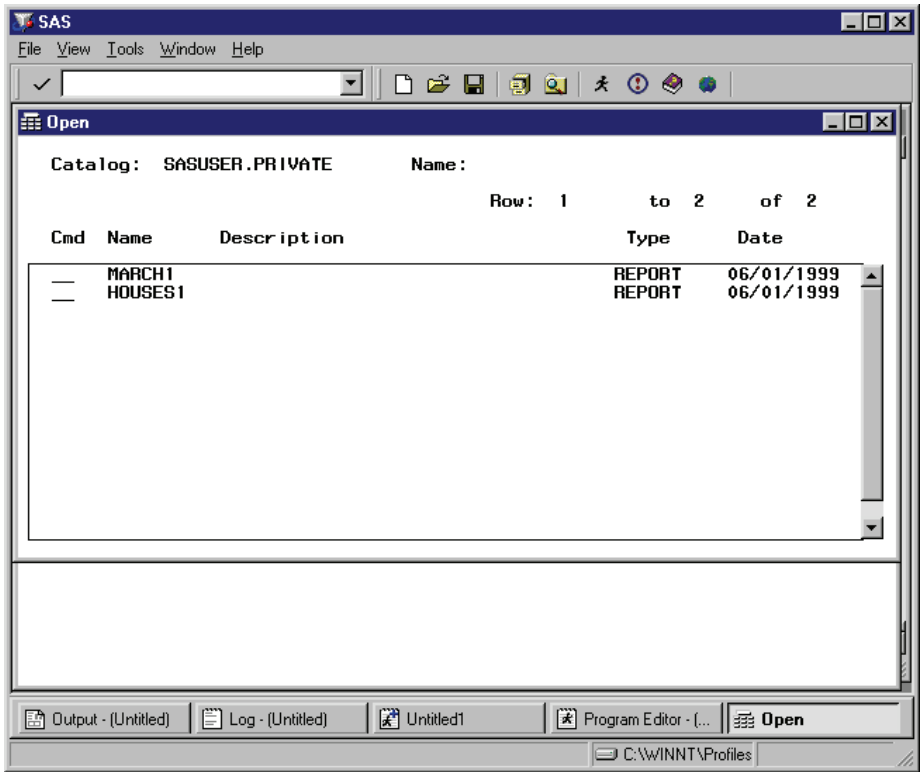


5 Select **`View`** to browse the table or view that you just created. After you have finished browsing the table or view, select **`Close`** from the **`File`** menu to return to the SAS Table/View Creation Status window. Select **`Goback`** to return to the Dynamic Report window.

Opening an Existing Report

To open an existing report from the Report Engine window, select **`Open`** from the **`File`** menu. The Open window appears, as shown in the following display.

Display 5.18 Open Window for Reports



You can type **S** in the **Cmd** field and press ENTER to select and open a report in the Report Engine window. To sort the reports, select **Sort By** from the **View** menu and select **Name**, **Description**, or **Date** to reorder the reports listed.

Selecting Other Data

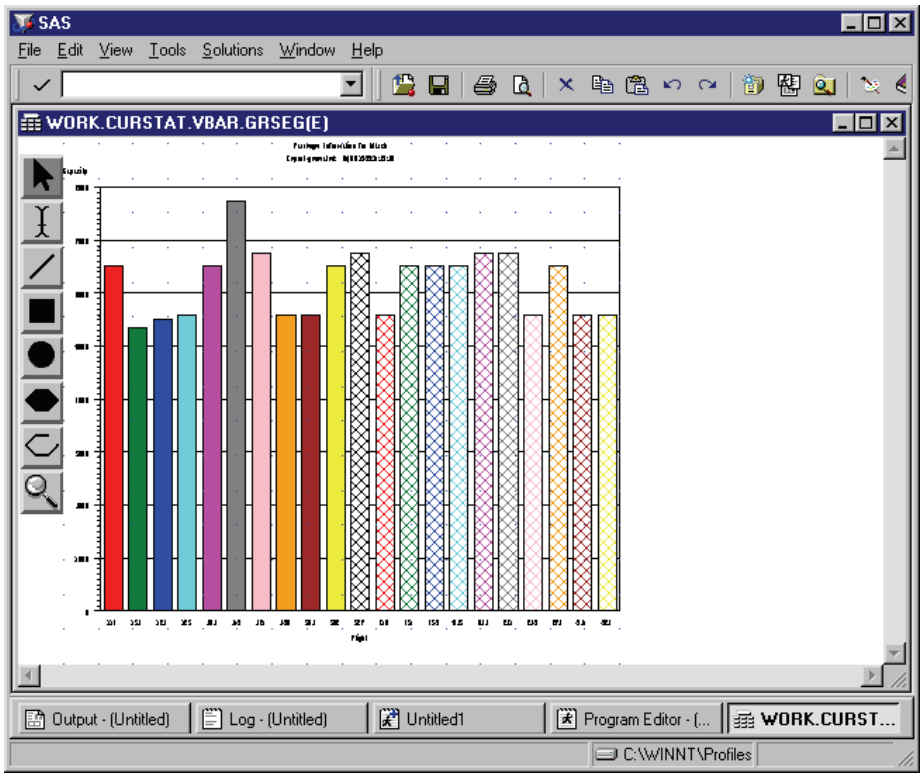
In the Report Engine window, you can select new tables and queries and retain modified column information. For example, you may have a query that is based on the AIRLINE.MARCH data file. If you change the format for the **Departure date** column from DATE7. to DATE9. for the report and then select another query with a **Departure date** column, the new report also uses the DATE9. format.

To select another query or table, fill in the **Data** and **Type** fields as described in "Opening and Using the Report Engine Window" on page 62.

Editing a Graph Interactively

If you create a graph, you can edit the graph interactively. From the Report Output window, select **Edit Report** from the **Edit** menu to invoke the SAS/GRAPH software interactive graphics editor, as shown in the following display. You must have SAS/GRAPH software installed to edit a graph interactively. Refer to the online help for this window for more information.

Display 5.19 Editing a Graph Interactively



To return to the Report Output window, select **`Close`** from the **`File`** menu.

CHAPTER

6

Doing More with Graphics

Introduction **86**
Additional Information **86**
Doing More with Bar Charts **86**
Generating a Bar Chart with the Mean Displayed **86**
Setting Up the Bar Chart **86**
Customizing the Bar Chart with Additional Options and Titles **88**
Running the Bar Chart **93**
Other Bar Chart Options **94**
Three-dimensional Bar Charts **94**
Grouping and Stacking **95**
Horizontal Bar Charts **97**
Other Options **98**
Doing More with Pie Charts **98**
Creating a Pie Chart **98**
Setting Up the Pie Chart **98**
Setting Additional Options **99**
Running the Pie Chart **102**
Other Pie Chart Options **103**
Pie Chart Display Options **103**
Slice Values **106**
Additional Options **106**
Doing More with Plots **106**
Creating a Scatter Plot with the Regression Line Superimposed **106**
Setting Up the Plot **106**
Adding a Regression Line and a Title **107**
Running the Plot **108**
Additional Plot Options **109**
*X * Y Plot by Category* **109**
Multiple Plots Per Axes **109**
Other Plot Options **109**
Doing More with Maps **110**
Types of Maps **110**
Two-dimensional Maps **110**
Block Maps **111**
Prism Maps **112**
Surface Maps **113**
Number of Levels **114**
Additional Map Options **114**
Pattern and Legend Options **114**
2-D and Prism Options **115**
Block Options **115**

Surface Options **115**
Changing the Background Color for Graphs **115**

Introduction

This chapter extends the concepts introduced in the "Graphics" chapter of *Getting Started with SAS/ASSIST*. Included are discussions of advanced options for bar charts, pie charts, plots, and maps, and how to change the background color of a graphic.

For most of the tasks presented here, you must have SAS/GRAPH software licensed and installed. If you do not have SAS/GRAPH software licensed, you can perform some of the tasks using low-resolution graphics, but many of the advanced options are not available.

You are encouraged to explore and experiment with the different options. See the online help for additional information.

Additional Information

For additional information on creating high-resolution graphics, refer to *SAS/GRAPH Software: Reference, Volumes 1 and 2*. For additional information on creating low-resolution graphics, refer to the *Base SAS Procedures Guide*.

Doing More with Bar Charts

You can use **`Bar Charts`** on the Graphics menu to create horizontal or vertical simple bar charts, stacked bar charts, grouped bar charts, and grouped and stacked bar charts. In the "Graphics" chapter of *Getting Started with SAS/ASSIST*, you learned how to create a bar chart. This section describes some of the more advanced options available when generating bar charts.

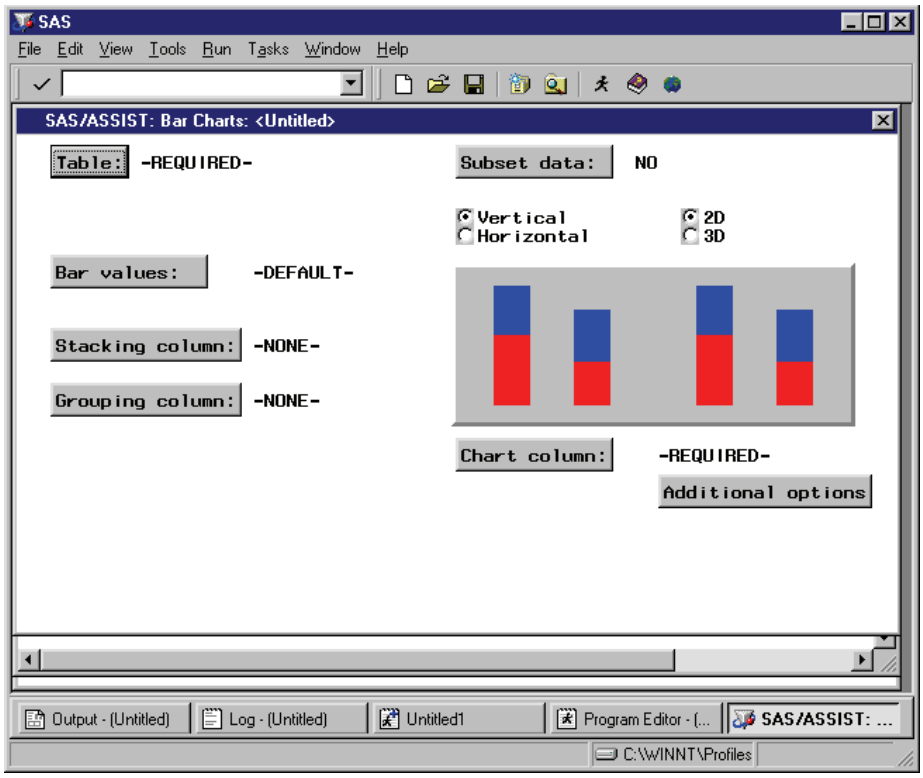
Generating a Bar Chart with the Mean Displayed

In this section you create a vertical bar chart showing the mean weight by age in the CLASS data set. You choose to have the mean of each bar displayed above the bar, adjust the fill patterns of the bars, add a title to the chart, and change the font of the title.

Setting Up the Bar Chart

1 To display the Bar Charts window, follow this selection path:**Tasks ▸ Graphics ▸ Bar Charts**The Bar Charts window appears.

Display 6.1 Bar Charts Window

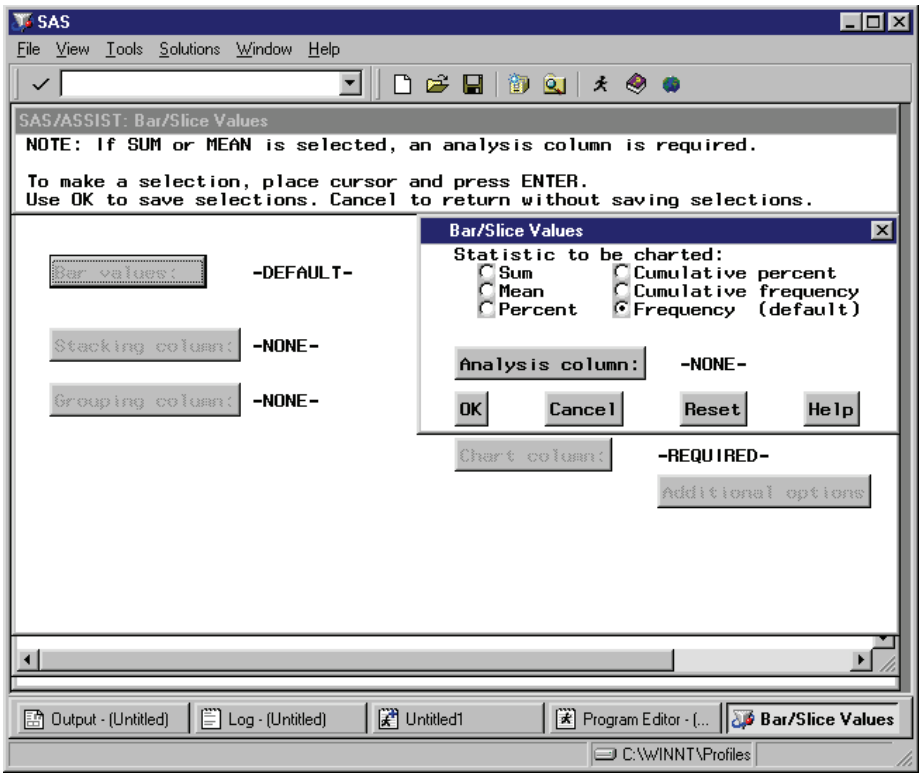


2 Select **`Vertical`** and **`2D`**.

3 Use the **`Table`** button to select the SASUSER.CLASS table.

4 Select **`Bar values`**. The Bar/Slice Values window appears.

Display 6.2 Bar/Slice Values Window



5 Select **Mean** as the statistic you want the bars to represent. By selecting **Mean**, each bar represents the mean of the analysis variable. You must select an analysis column if you select **Sum** or **Mean** as the bar value.

6 Use the **Analysis column** button to select the WEIGHT column.

7 Select **OK** to return to the Bar Charts window.

8 Use the **Chart column** button to select the AGE column.

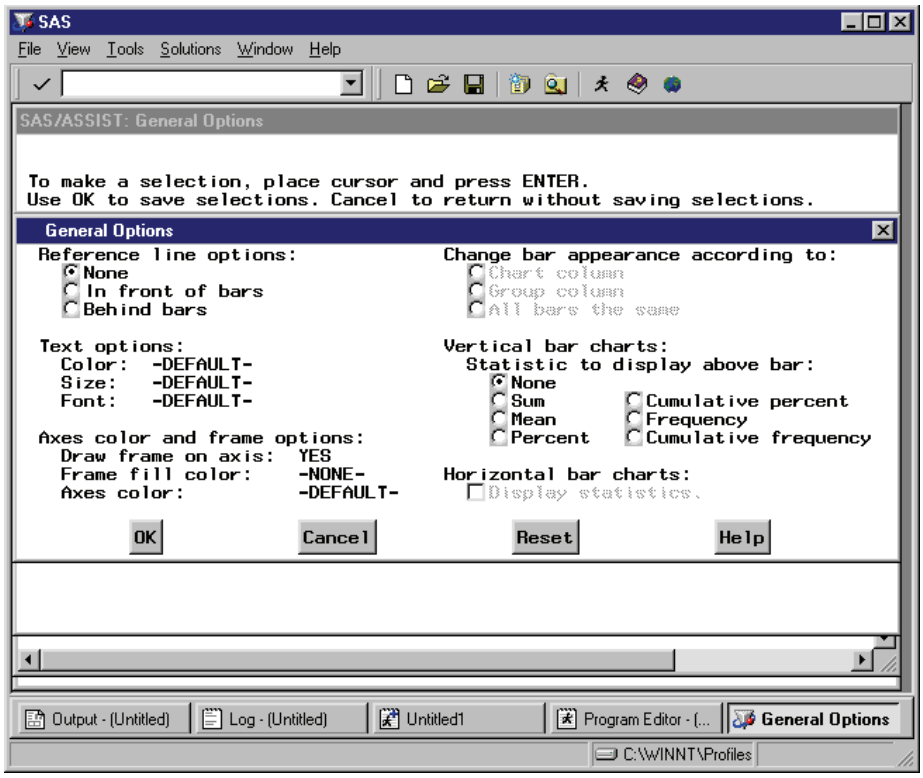
9 Select **OK** to return to the Bar Charts window.

Customizing the Bar Chart with Additional Options and Titles

1 Select **Additional options**. The Additional Options window appears.

2 Select **General options**. The General Options window appears.

Display 6.3 General Options Window

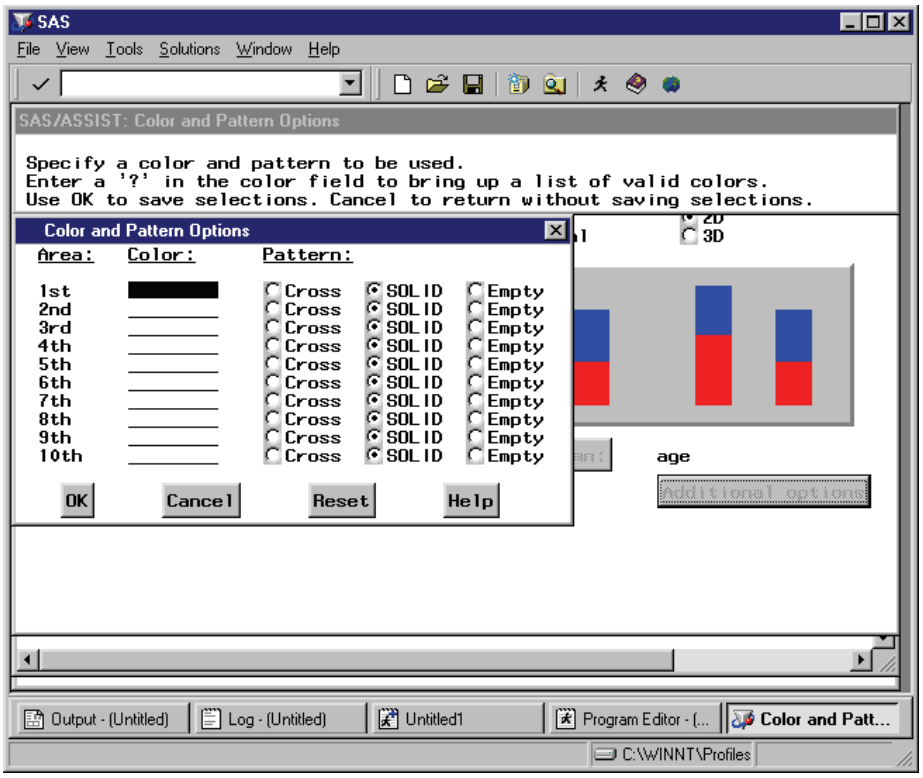


3 Select **Mean** as the statistic to display above the bars for the vertical bar chart.

4 Select **OK** to return to the Additional Options window.

5 Select **Color and pattern options**. The Color and Pattern Options window appears.

Display 6.4 Color and Pattern Options Window



6 For the **1ST** and **4TH** areas, select **Cross** as the pattern.

For the **2ND** and **5TH** areas, leave the pattern as **Solid**.

For the **3RD** and **6TH** areas, select **Empty** as the pattern.

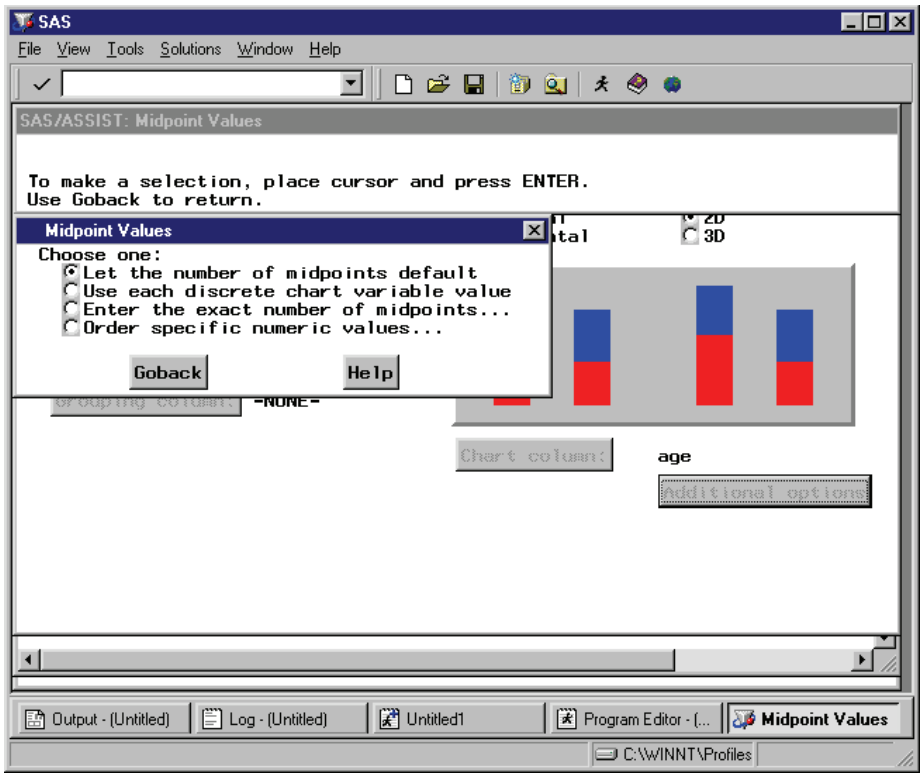
The pattern selected by default for the bars is **Solid**.

If you print a color graphic, you can use colors to distinguish one bar from another. To display a list of valid colors, type **?** in the first position of the **Color** field and press ENTER. Select the color you want to use.

7 Select **OK** to return to the Additional Options window.

8 Select **Number of bars**. The Midpoint Values window appears.

Display 6.5 Midpoint Values Window



9 Select **`Use each discrete chart variable value`**. The Additional Options window reappears.

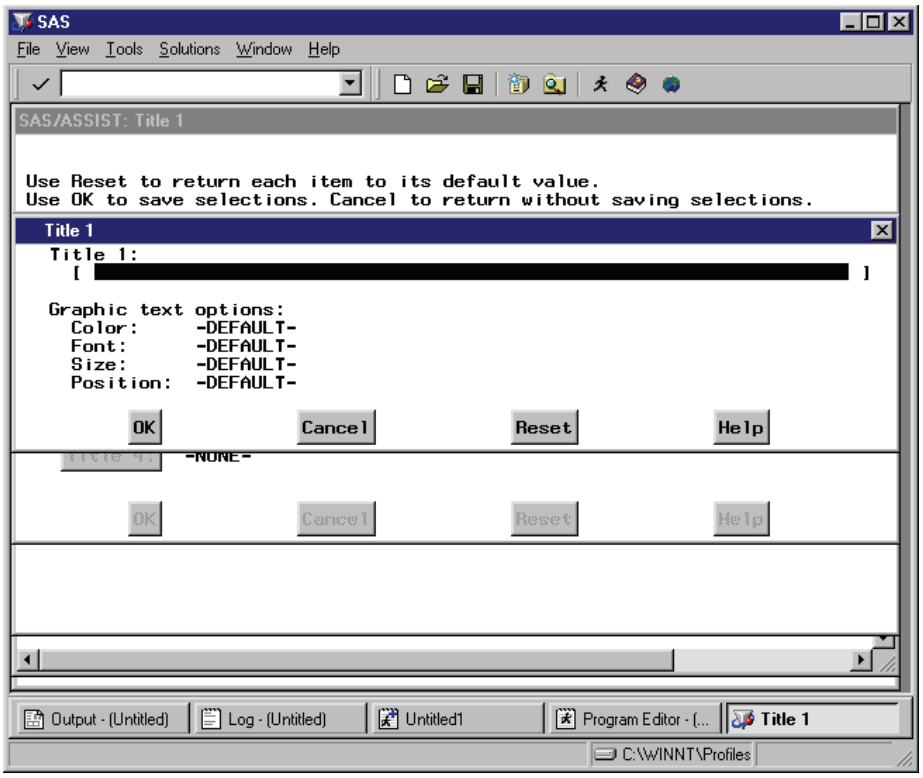
You select **`Use each discrete chart variable value`** to display one bar for each age represented in the CLASS data set (11, 12, 13, 14, 15, and 16). The default for the number of bars is **`Let the number of midpoints default`**, which lets the procedure determine the number of midpoints (bars) for the chart column. Each midpoint represents a median of a range of values. In this example, if you use **`Let the number of midpoints default`**, the bars represent the midpoints of the AGE variable (11.4, 12.6, 13.8, 15, and 16.2).

The window that appears when you select **`Number of bars`** is different for numeric and character chart columns.

10 Select **`Goback`** to return to the Bar Charts window.

11 To display the Title 1 window, follow this selection path starting from the Bar Charts window:**Edit ▶ Titles ▶ Title 1**

Display 6.6 Title 1 Window



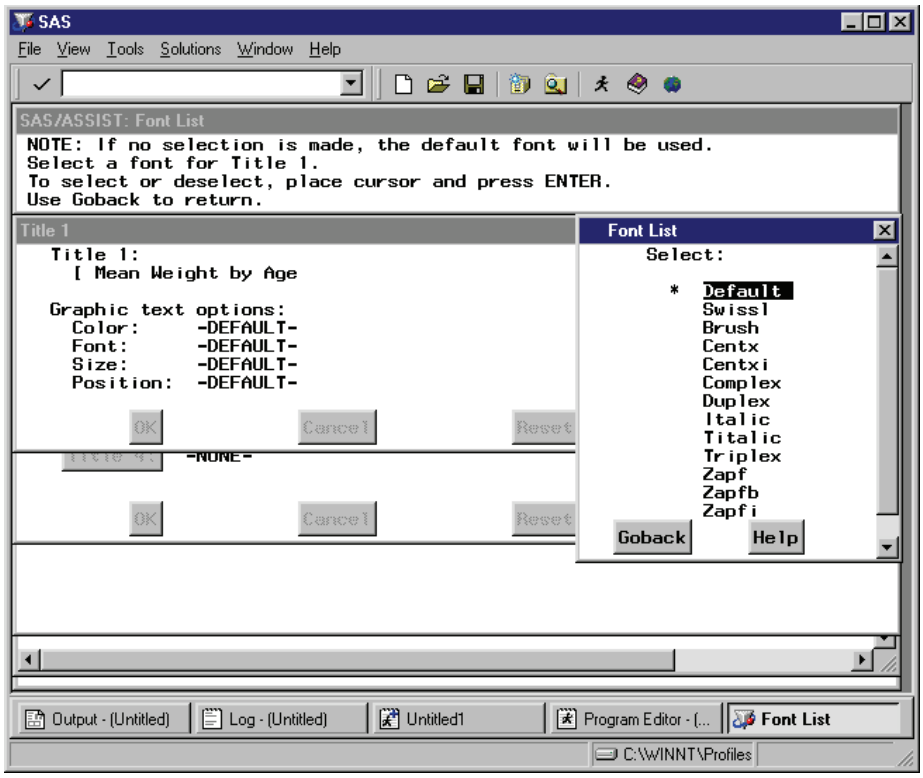
12 Type **`Mean Weight by Age`** as the title for the plot.

Note: Titles carry over from one report or graphic to another. If you do not type a title and a title was selected previously in the current SAS/ASSIST session, the previous title automatically appears on your graphic. △

13 Select **`Font`** from the Title 1 window.

The Font List window appears.

Display 6.7 Font List Window

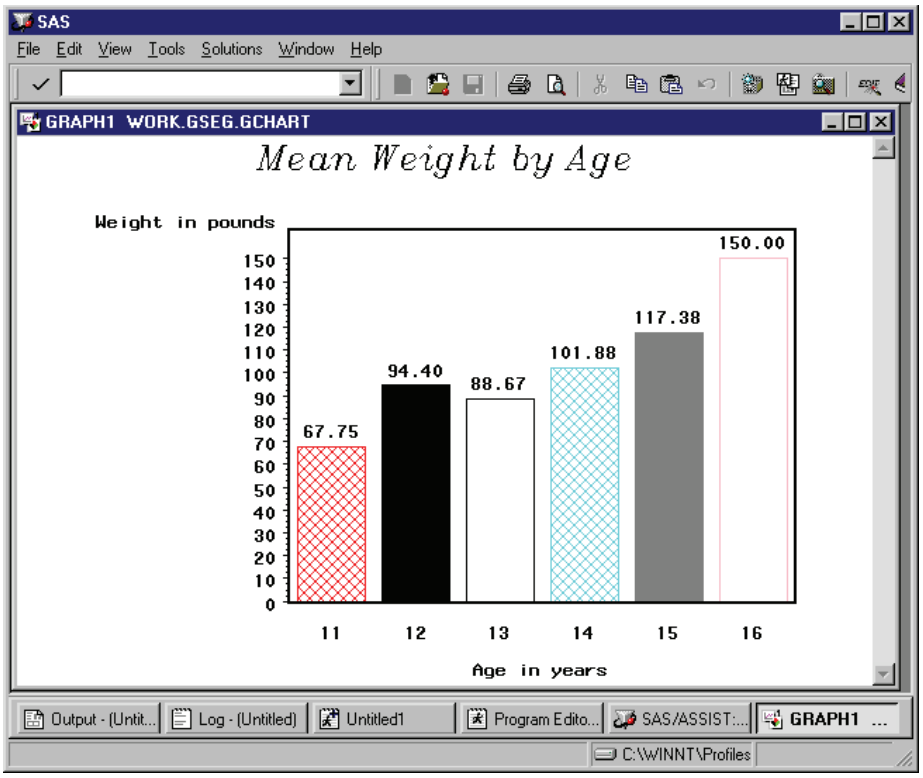


14 Select **`Italic`** as the font for Title 1; the Title 1 window reappears.
Select **`OK`** twice to return to the Bar Charts window.

Running the Bar Chart

1 Select **`Submit`** from the **`Run`** menu. The bar chart appears in the GRAPH window.

Display 6.8 Bar Chart Output



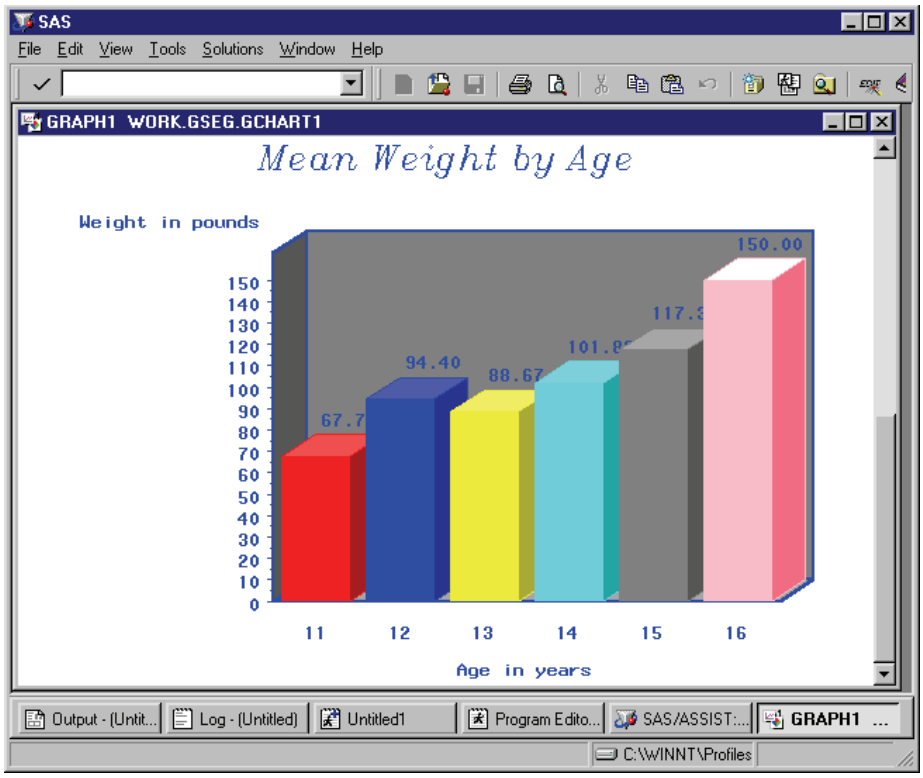
2 To return to the Bar Charts window from the GRAPH window, follow this selection path: **File ▶ Close**

Other Bar Chart Options

Three-dimensional Bar Charts

By selecting **3D** in the Bar Charts window, you can create three-dimensional bar charts, as shown in the following example.

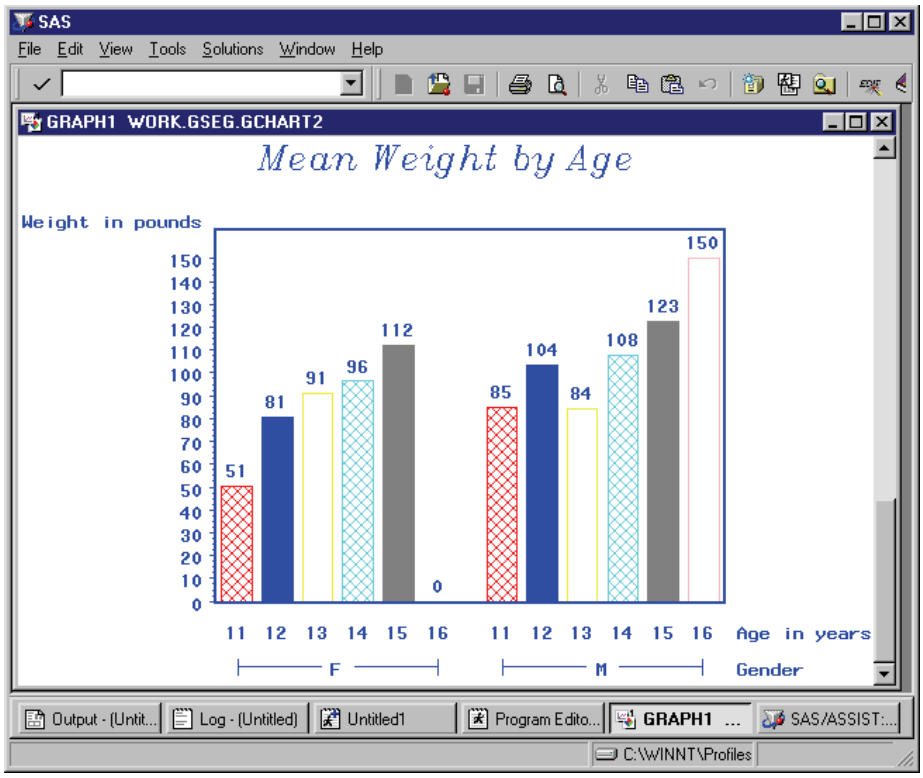
Display 6.9 Three-dimensional Bar Chart Output



Grouping and Stacking

By assigning a column to **`Stacking column`** or **`Grouping column`**, you can create bar charts that show more interesting relationship in your data. For example, if you assign the SEX column to **`Grouping column`** in the previous example, you create a bar graph that separates the data for males and females:

Display 6.10 Grouped Bar Chart Output



Similarly, if you assign the SEX column to **`Stacking column`** and use frequency for **`Bar values`**, you can create a bar chart with males and females distinguished in the same bar for each age:

Display 6.11 Stacked Bar Chart Output

You can also combine stacking and grouping to create grouped stacked bar charts.

Horizontal Bar Charts

By selecting **`Horizontal`** on the Bar Charts window, you can create bar charts with the bars running horizontally rather than vertically. Grouping and stacking options are also available for horizontal bar charts. Instead of being able to display a particular statistic for each bar (as in the vertical bar chart example earlier in this section), you can select **`Display statistics`** on the General Options window (found on the Additional Options window), which causes statistics to be displayed to the right of the bar chart.

Display 6.12 Horizontal Bar Chart Output

Other Options

By choosing items from the Additional Options menu, you can add a reference line to your bar chart; change the color, size, and font of the label text; change the appearance of the axes; and change the appearance of the legend.

Doing More with Pie Charts

In the "Graphics" chapter of *Getting Started with SAS/ASSIST*, you learned how to create a simple pie chart. This section describes some of the more advanced options available when generating pie charts.

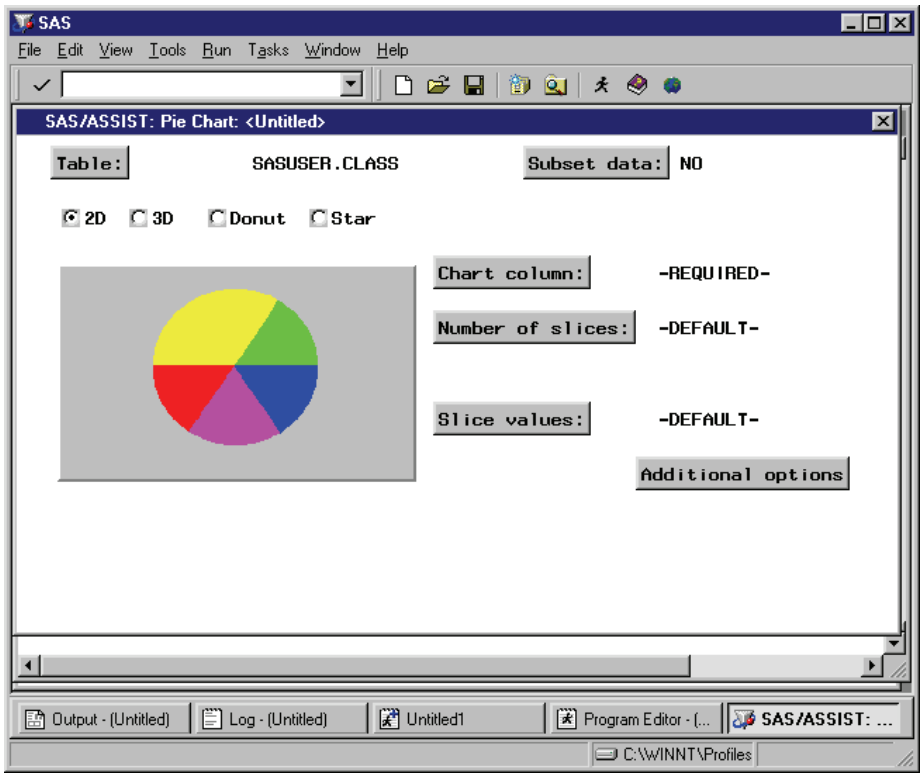
Creating a Pie Chart

In this section you create a pie chart that shows what portion of the CLASS table falls into each age group. You select the pattern, labeling, and header options, and explode a slice.

Setting Up the Pie Chart

1 To display the Pie Chart window, follow this selection path starting from the WorkPlace menu:**Tasks ▶ Graphics ▶ Pie chart**The Pie Chart window appears.

Display 6.13 Pie Chart Window



2 Use the **Table** button to select the CLASS table.

3 Use the **Chart column** button to select **AGE** as the column you want the pie to represent.

4 Select **2D** if it is not already selected.

5 Select **Number of slices**. The Midpoint Values window appears. The Midpoint Values window is the same for pie charts and bar charts.

The sizes of the slices are determined by the values of the chart column. If you have any slices that represent four percent or less of the total pie, these slices are grouped together automatically into one slice labeled **OTHER**.

6 Select **Use each discrete chart column value**; the Pie Chart window reappears.

You select **Use discrete chart column value** to display one slice of pie for each age represented in the CLASS table, that is 11, 12, 13, 14, 15, and 16. The default for the number of bars is **Let the number of midpoints default**, which lets the procedure determine the number of midpoints (pie slices) for the chart column. Each midpoint represents a median of a range of values. In this example, if you use **Let the number of midpoints default**, the pie slices represent the midpoints of the AGE column, that is 11.4, 12.6, 13.8, 15, and 16.2.

The window that appears when you select **Number of slices** is different for numeric and character chart columns.

Setting Additional Options

1 Select **Additional options**; the Additional Options window appears.

2 Select **Color and pattern options**. The Color and Pattern Options window appears. The Color and Pattern Options window is the same for pie charts and bar charts.

3 For the **1ST** and **4TH** areas, select **Cross** as the pattern.

For the **2ND** and **5TH** areas, leave the pattern as **Solid**.

For the **3RD** and **6TH** areas, select **Empty** as the pattern.

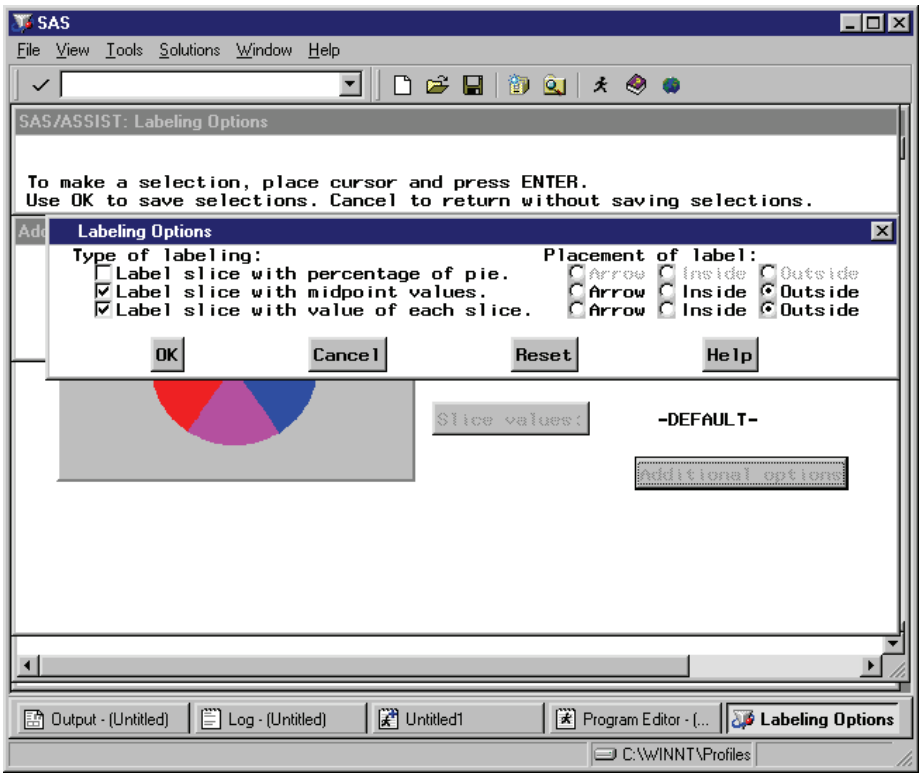
The pattern selected by default for the pie slices is **Solid**.

If you print a color graphic, you can use colors for the various pie slices to distinguish one pie slice from another. To display a list of valid colors, type **?** in the first position of the **Color** field and press ENTER. Select the color you want to use.

4 Select **OK** to return to the Additional Options window.

5 Select **Labeling options**. The Labeling Options window appears.

Display 6.14 Labeling Options Window



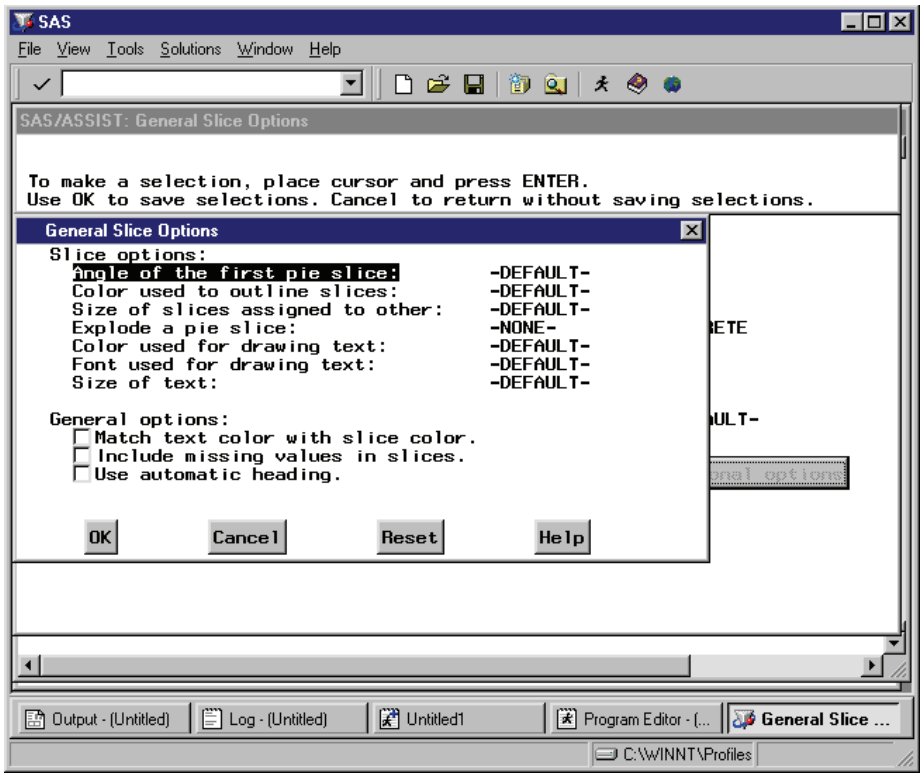
6 Select **Label slice with percentage of pie**, and de-select **Label slice with value of each slice**.

You choose the label selections as indicated so that the percent of students in each age group is shown on the pie. If you leave **Label slice with value of each slice** selected, the number of students in each age group (rather than the percentage) is shown on the pie.

7 Select **OK** to return to the Additional Options window.

8 Select **General slice options**. The General Slice Options window appears.

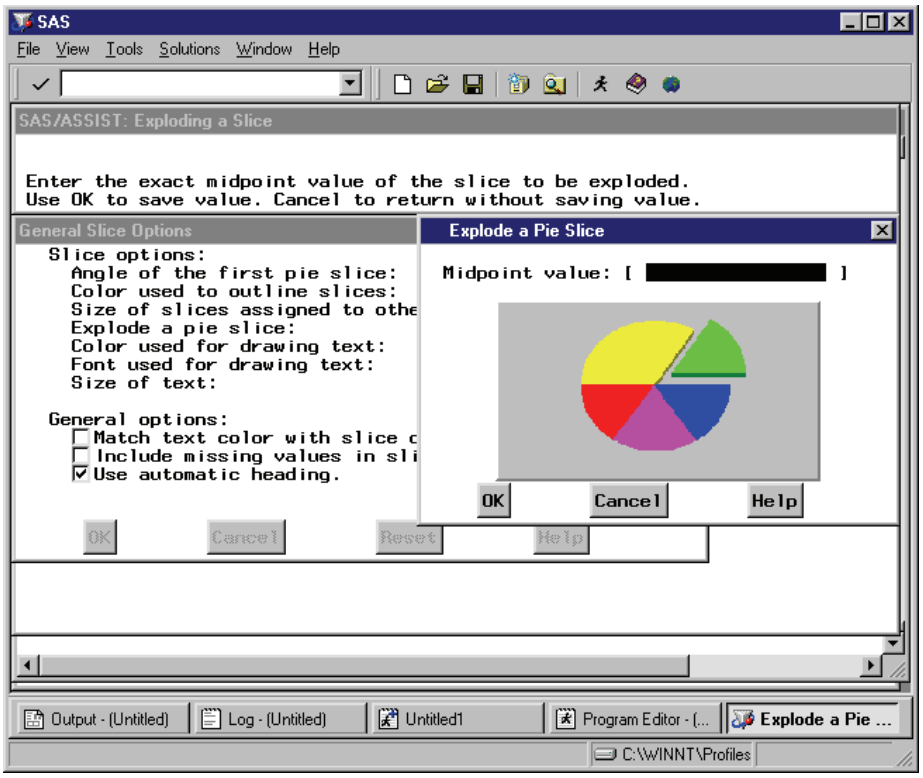
Display 6.15 General Slice Options Window



9 Select **`Use automatic heading`** to generate an automatic title for the chart.

10 To emphasize the slice representing 13-year-olds from the rest of the slices, select **`Explode a Pie Slice`**. The Explode a Pie Slice window appears.

Display 6.16 Explode a Pie Slice



11 In the **`Midpoint value`** field, type

```
13
```

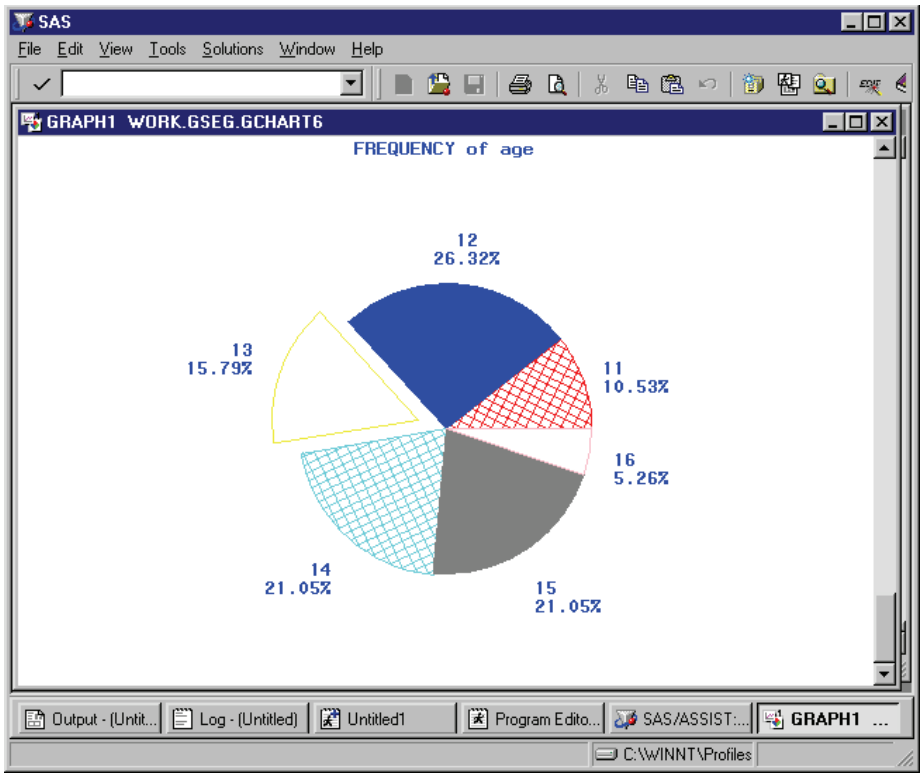
and select **`OK`**.

12 Select **`OK`** and then **`Goback`** to return to the Pie Chart window.

Running the Pie Chart

1 Follow this selection path:**Run** ▶ **Submit**The pie chart appears in the GRAPH window.

Display 6.17 Pie Chart Output



Note: Titles carry over from one report or graphic to another. If you do not type a title and a title was previously selected in the current SAS/ASSIST session, the previous title automatically appears on this graphic.

If the title **`Mean Weight by Age`** appears at the top of the chart, this title carried over from the bar chart created in the previous section. To delete the title, from the Pie Chart window select **`Edit`**, **`Titles`**, and then **`Reset`**. △

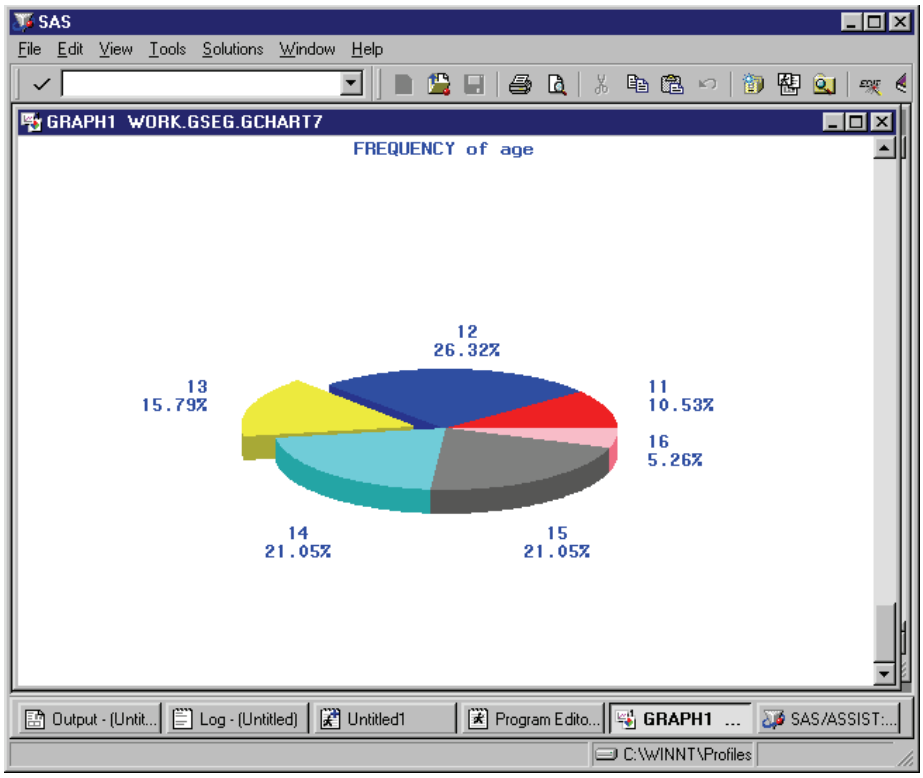
2 To return to SAS/ASSIST software from the GRAPH window, follow this selection path: **File ▸ Close**

Other Pie Chart Options

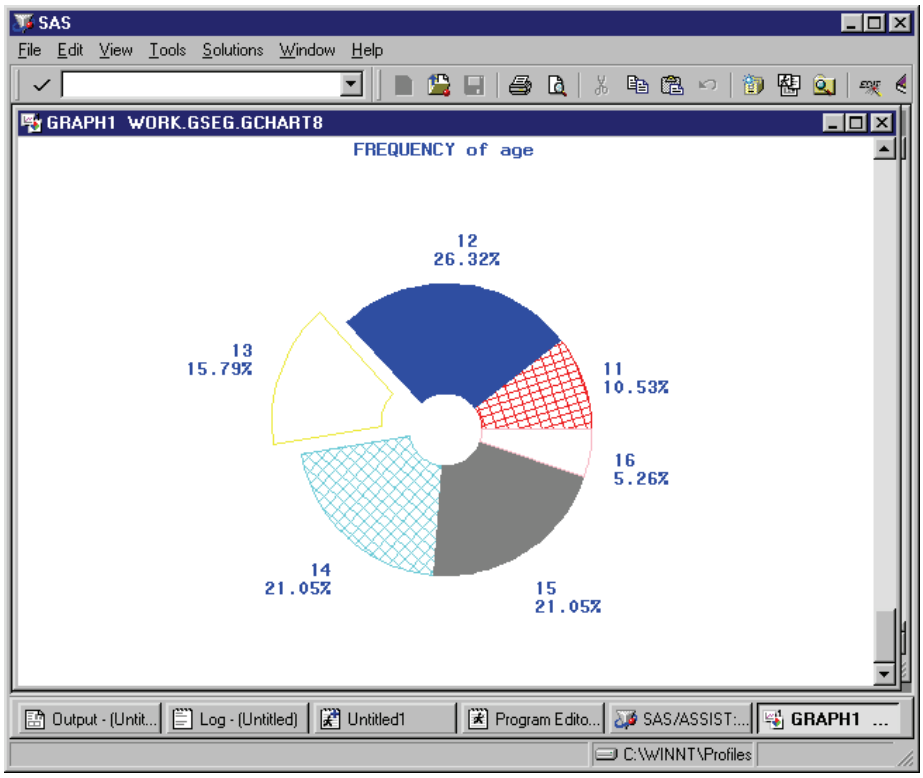
Pie Chart Display Options

By default, pie charts are two dimensional. However, you can select **`3D`**, **`Donut`**, or **`Star`** to produce pie charts as shown in the following examples.

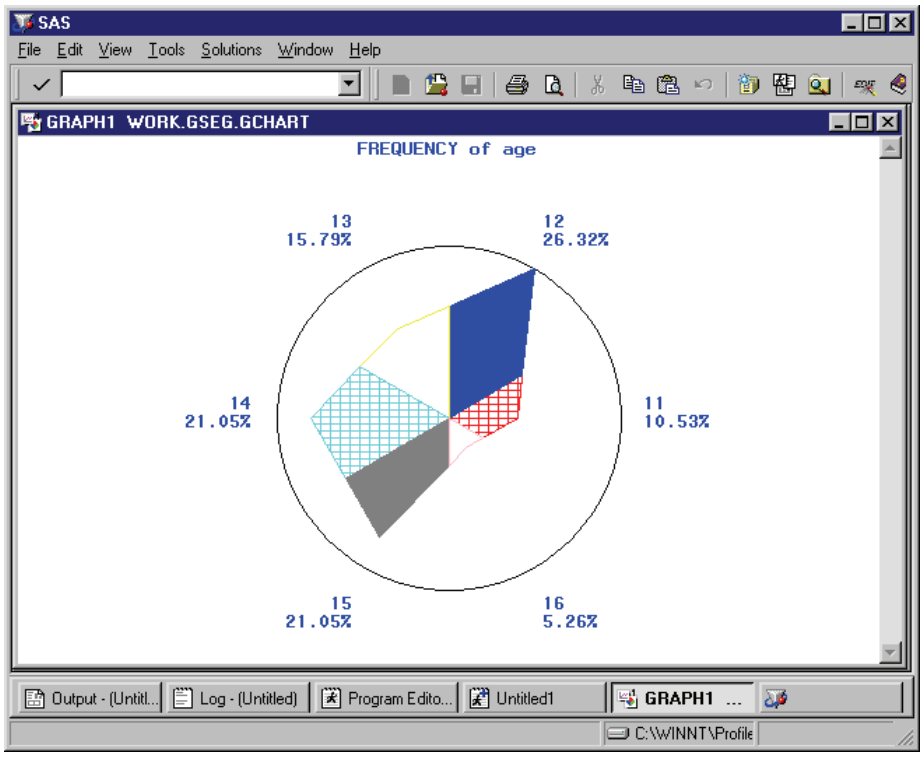
Display 6.18 Three-dimensional Pie Chart Output



Display 6.19 Donut Pie Chart Output



Display 6.20 Star Pie Chart Output



Slice Values

By default, pie slices represent the frequency of each value of the chart column. By selecting **`Slice values`**, however, you can make the slices represent one of several statistics on analysis column for each value of the chart column. For example, using the CLASS table, you could select the WEIGHT column as an analysis column and **`Sum`** as a statistic; the slices would then represent the total weight of the children of each age as a percentage of the total weight of all the children.

Additional Options

By Selecting **`Additional Options`**, you can

- specify the angle of the first pie slice
- specify the color used to outline the pie slices
- specify the size of the slice assigned to OTHER
- specify the color, size, and font of the labels
- match the label color with the slice color
- include missing values as a legitimate value for generating a slice.

Doing More with Plots

You can use **`Plots`** on the Graphics menu to create simple X * Y plots, X * Y plots by category, or multiple plots on one set of axes. In the "Graphics" chapter of *Getting Started with SAS/ASSIST*, you learned how to produce a simple line plot. This section describes some of the more advanced plotting options.

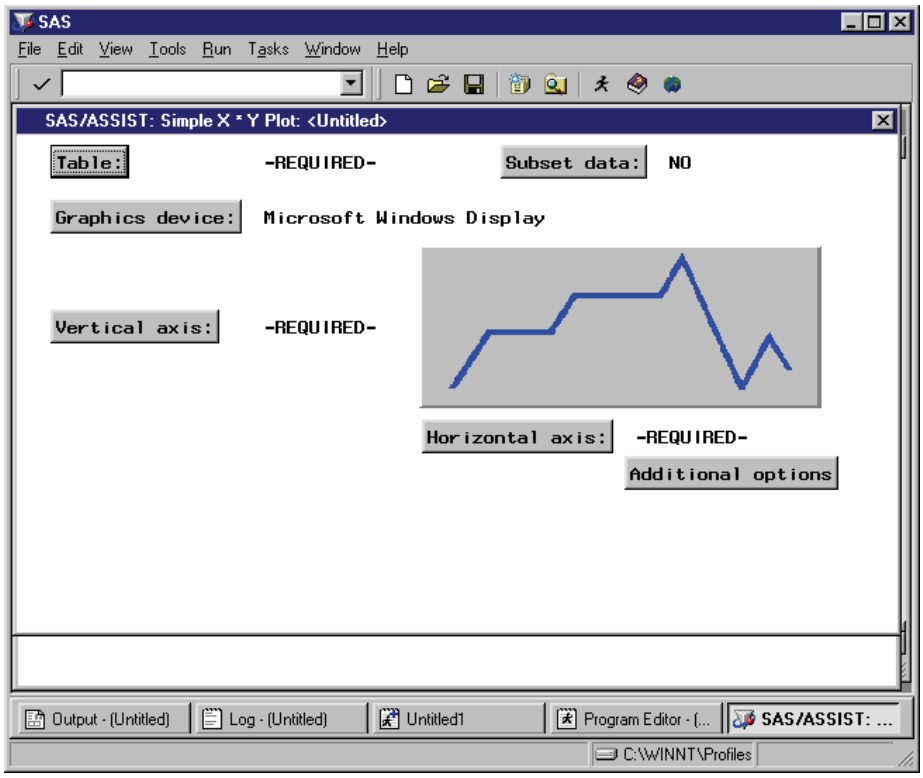
Creating a Scatter Plot with the Regression Line Superimposed

In this section you create a plot showing the relationship between the height and the age of students in the CLASS table, and you leave the points on the plot unconnected. Additionally, you plot the fitted regression line and upper and lower 95% confidence limits for an individual prediction.

Setting Up the Plot

1 To display the Simple X * Y Plot window, follow this selection path starting from the WorkPlace menu:**Tasks ▶ Graphics ▶ Plots ▶ Simple X * Y plot**

Display 6.21 Simple X * Y Plot Window



2 Use the **`Table`** button to select the SASUSER.CLASS table.

3 Use the **`Vertical axis`** button to select HEIGHT as the vertical axis column.

The default label associated with the vertical axis column, **`Height in inches`**, is used as the vertical axis label.

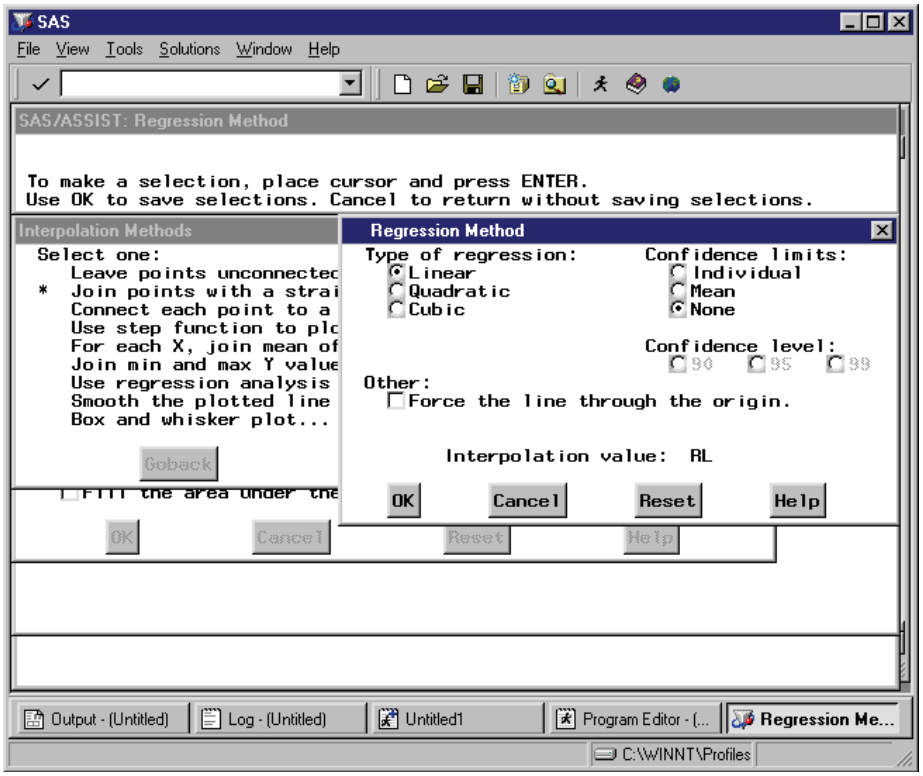
4 Use the **`Horizontal axis`** button to select AGE as the horizontal axis column.

The default label associated with the horizontal axis column, **`Age in years`**, is used as the horizontal axis label.

Adding a Regression Line and a Title

1 Follow this selection path to display the Regression Method window:**Additional options ▶ Line and symbol options ▶ Interpolation method ▶ Use regression analysis to plot**

Display 6.22 Regression Method Window



The **Additional options** item displays different windows depending on the type of plot you select.

2 Leave the **Type of regression** as **Linear**.

3 Select **Individual** for the **Confidence limits**, and leave the **Confidence level** as **95**.

4 Select **OK** to return to the Line and Symbol Options dialog box.

5 Select **Plot Symbol**.

6 In the Symbols List dialog box, select a symbol. For this example, **Empty circle** is selected.

7 Select **OK**, then **Goback**.

8 Follow this selection path to display the Title 1 window:**Edit ▶ Titles ▶ Title 1**

9 Type **Height by Age** as the title for the plot.

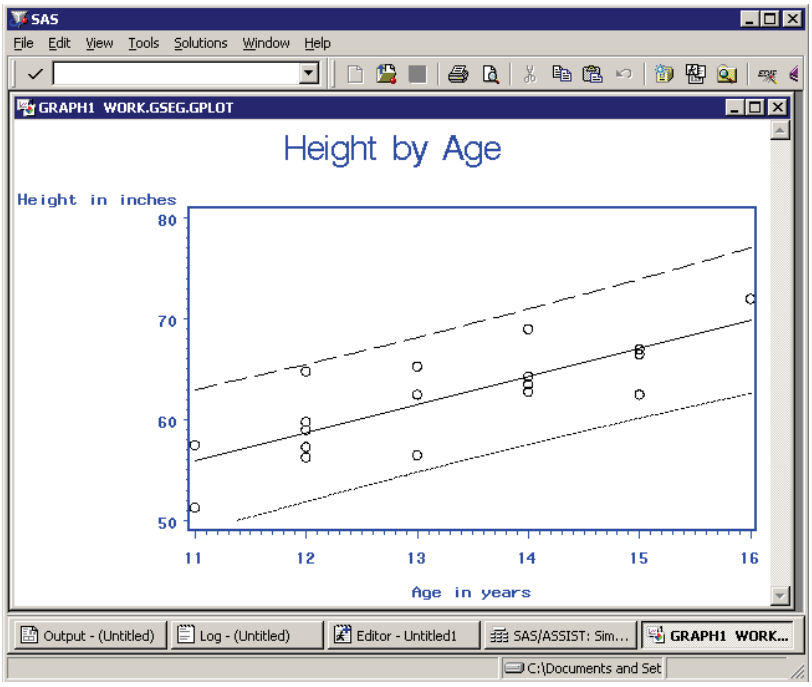
Note: Titles carry over from one report or graphic to another. If you do not type a title and a title was previously selected in the current SAS/ASSIST session, then the previous title automatically appears on this graphic. △

10 Select **OK** twice to return to the Simple X * Y Plot window.

Running the Plot

1 Follow this selection path:**Run ▶ Submit**The plot of the regression line with the actual data points and the upper and lower 95% confidence limits for an individual prediction appears in the GRAPH window.

Display 6.23 X * Y Plot Output



2 To return to the SAS/ASSIST software from the GRAPH window, follow this selection path: **File ▶ Close**

Additional Plot Options

X * Y Plot by Category

By choosing **`X * Y Plot by Category`** instead of **`Simple X * Y Plot`**, you can add an extra dimension to your plot. For example, using the SASUSER.CLASS table, and plotting HEIGHT versus WEIGHT, you can choose AGE as a category column. Each point on the plot is a different color depending on the age of the child represented by the data point. You can choose different line and symbol options for each value of the category column.

Multiple Plots Per Axes

By choosing **`Multiple Plots Per Axes`** instead of **`Simple X * Y Plot`**, you can specify up to four columns for the vertical axis. For example, using the SASUSER.CLASS table, you can plot both HEIGHT and WEIGHT versus AGE. For each plot, you can specify different line and symbol options.

Other Plot Options

By selecting **`Additional Options`**, you can

- Change the color, width, length, style, label, and tick marks for each axis
- Change the range of values for each axis
- Change the symbol, line style, and color of each plot
- Fill in the area under the curve

- Add vertical and horizontal reference lines
- Change the color, size, and font of the text
- Change the plot frame style and fill color
- Change the placement and configuration of the legend (Multiple Plots and Category Plots)
- Add a second vertical axis.

Doing More with Maps

By using the **Maps** item on Graphics menu, you can produce two-dimensional maps, three-dimensional block and prism maps, and surface maps. The "Graphics" chapter in *Getting Started with SAS/ASSIST* showed how to create a two-dimensional map. This chapter describes in more detail the different types of maps and the available advanced options. You must have SAS/GRAPH software licensed to create maps; there is no low-resolution equivalent.

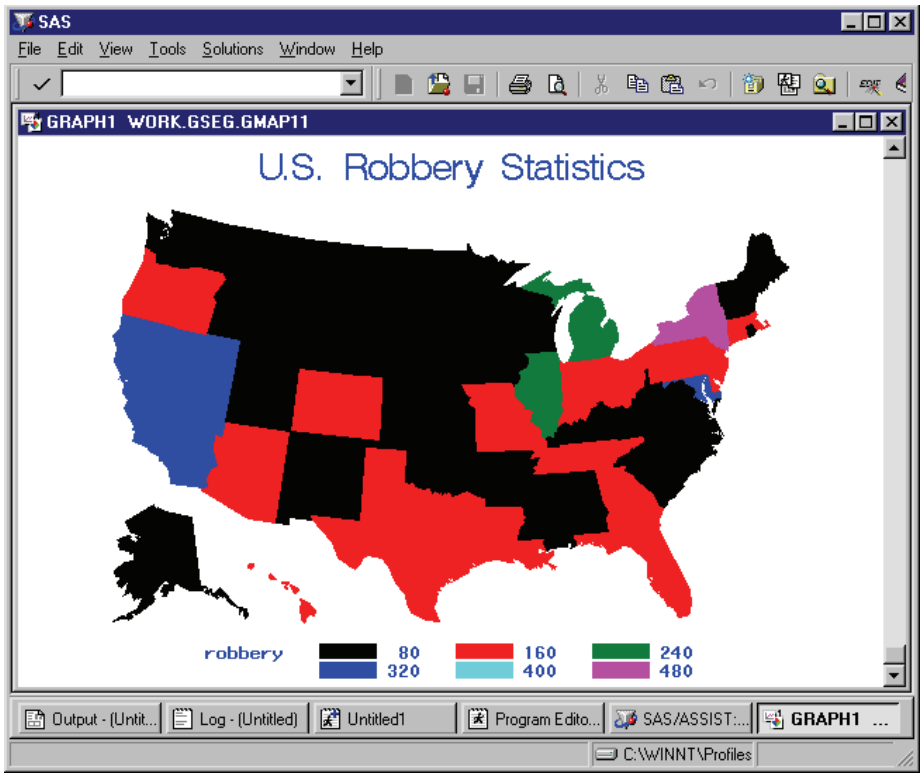
Note: Under some operating systems, such as UNIX, the maps in the SAS data library are in a compressed format and need to be decompressed before you use them. See the SAS Software Consultant at your site for more information. △

Types of Maps

Two-dimensional Maps

Two-dimensional maps are flat maps. The analysis column is divided into ranges, and each region of the map is colored according to what range its value falls into.

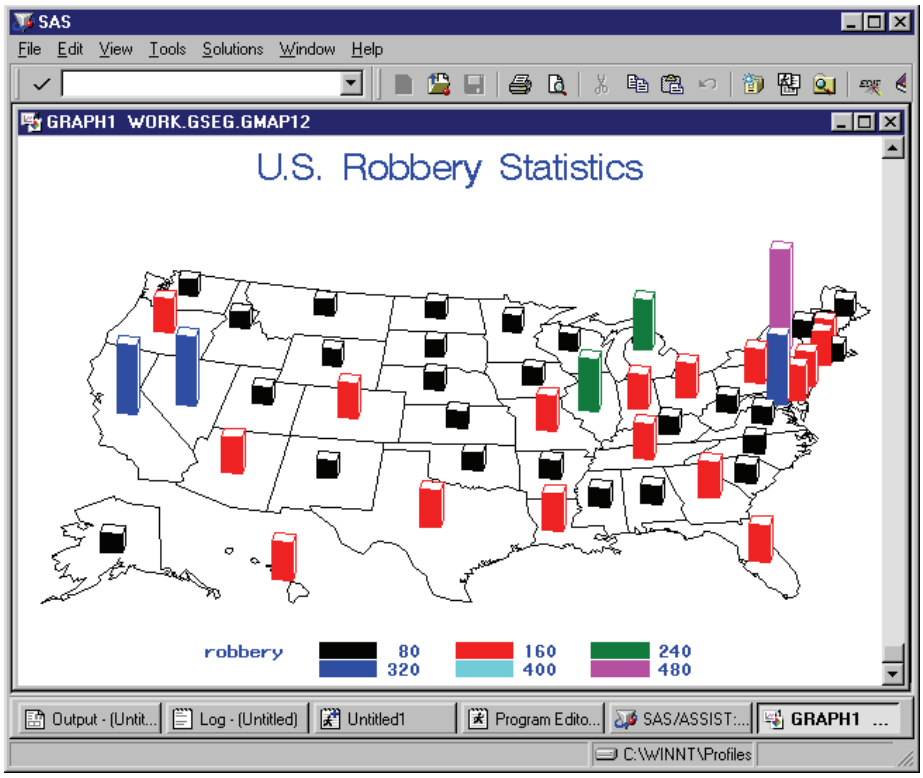
Display 6.24 Two-dimensional Map Output



Block Maps

Block maps are like flat maps, except that blocks are superimposed on each region of the map. Each block's height and color represents the range in which the value of the analysis column for that region falls.

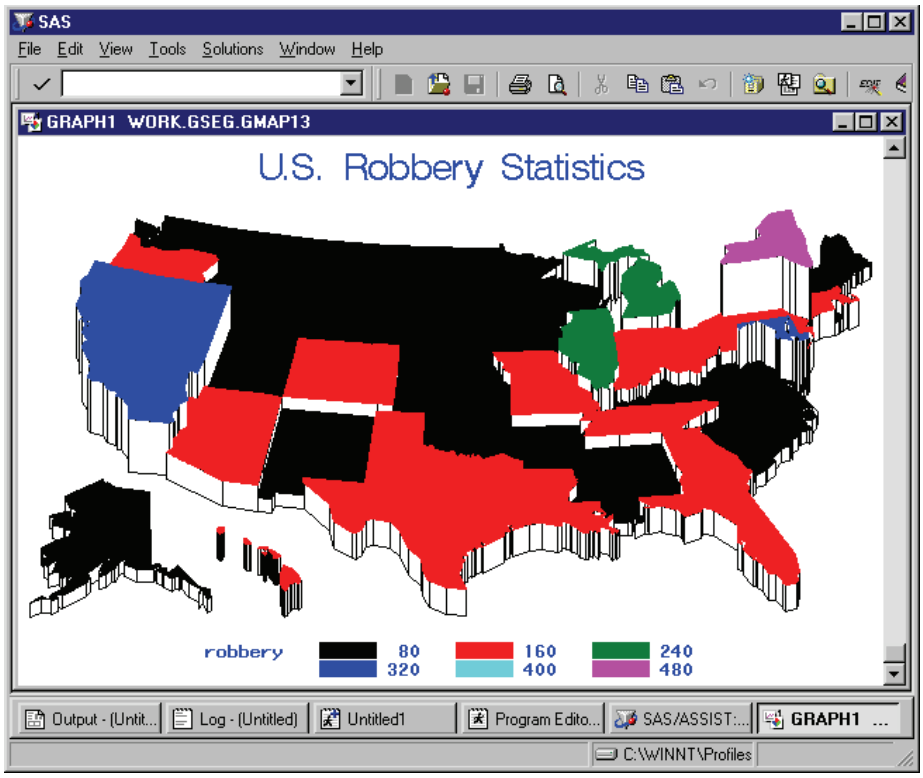
Display 6.25 Block Map Output



Prism Maps

Prism maps are three-dimensional maps. Each region is colored and "raised" above "sea level" to a height representing the range in which the value of the analysis column for that region falls.

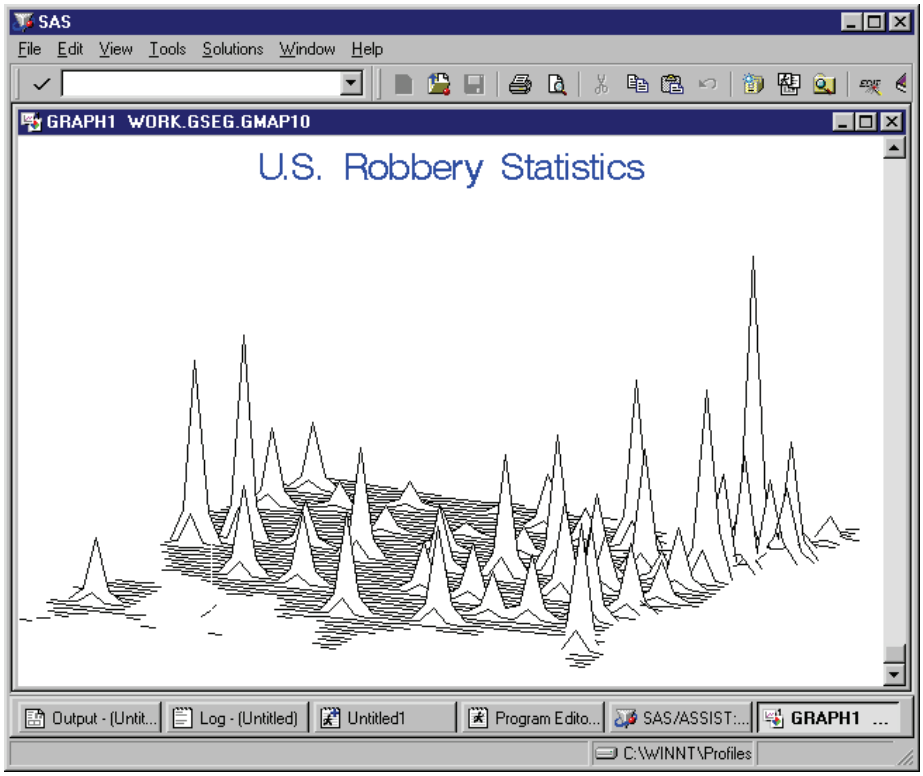
Display 6.26 Prism Map Output



Surface Maps

Surface maps are another type of three-dimensional map. The values of the analysis column are not divided into ranges; instead, a “spike” is placed on each region of the map. The height of each spike represents the value of the analysis column for that region.

Display 6.27 Surface Map Output



Number of Levels

For two-dimensional, block, and prism maps, the analysis column is divided into ranges or levels. By default, these levels are calculated automatically. However, by selecting **`Number of levels`**, you can specify how levels are calculated. The three options are **`Default number of levels`** (as described above), **`Discrete number of levels`**, and **`Enter number of levels (1-12)`**.

- When you select **`Discrete number of levels`**, the analysis column is not divided into ranges. Each region on the map has its own color, and the height of each region's prism or block is determined by the value of the analysis column for that region.
- When you select **`Enter number of levels (1-12)`**, you type a whole number from 1 to 12; SAS/ASSIST software divides the analysis column into that number of ranges.

Additional Map Options

Each type of map has a slightly different set of additional options. Select **`Additional Options`** to access the Additional Options menu.

Pattern and Legend Options

For two-dimensional, block, and prism maps, you can specify the pattern and color for each level, and determine the placement and configuration of the legend.

2-D and Prism Options

For two-dimensional and prism maps, you can specify the text and boundary colors, the vertical and horizontal size of the map, treat missing values as a valid level for the analysis column, and exclude internal political boundaries.

Block Options

For block maps, you can specify the color and pattern of the map surface and blocks, the size of the blocks (thin, medium, or wide), and all of the options listed for "2-D and Prism Options."

Surface Options

For surface maps, you can specify the surface color, the angle of rotation and tilt of the map, and the vertical and horizontal size of the map.

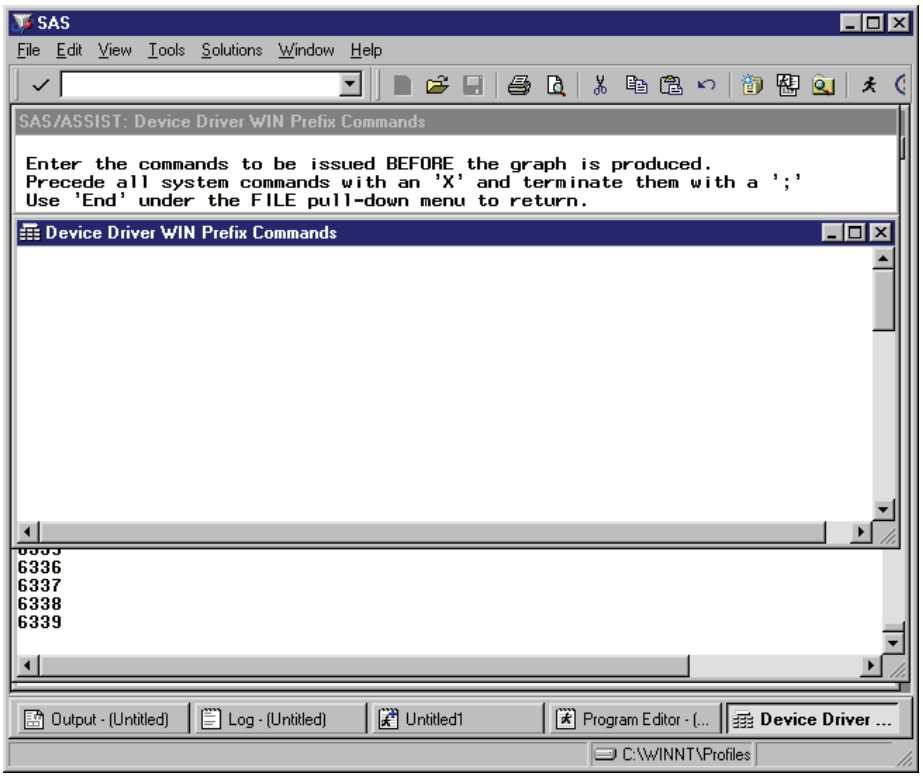
Changing the Background Color for Graphs

To change the background color and add various other features to graphs, you use prefix and suffix commands as described in these steps.

1. To display the Device Driver Prefix Commands window, follow this selection path:**Tasks ▶ Setup ▶ Environment ▶ Graphics options ▶ Active graphics device**

   The Active Graphics Device window appears.
2. Select **`Driver Management`** from the Active Graphics Device window. The Device Driver Management window appears.
3. Select **`Supplemental commands`** from the Device Driver Management window. The Device Driver Supplemental Commands window appears.
4. Select **`Prefix commands`** from the Device Driver Supplemental Commands window. The Prefix Commands window appears.

Display 6.28 Prefix Commands Window



5 Type

```
goptions cback=color;
```

where *color* is one of the following:

black	lilac	rose
blue	lime	salmon
brown	magenta	steel
charcoal	maroon	tan
cream	olive	violet
cyan	orange	white
gold	pink	yellow
gray	purple	
green	red	

In the Prefix Commands window, you type the SAS statements or system-specific commands that you want to use. In this step, you use a prefix command to change the background color of your graphic. In the next step, you use a suffix command to reset the color to the default after the chart has been displayed and printed.

The prefix and suffix commands remain in effect and are associated with the active graphics device until you change them, even after you end your SAS

session. Therefore, if you change the background color for a graph, each graph you create with that driver uses the new background color until you change the prefix command.

When you set up prefix and suffix commands, a catalog entry of *dev*.SOURCE is created for prefix commands, and a catalog entry of *dev*.OUTPUT is created for suffix commands, where *dev* is the device driver. If the GDEVICE0 libref has been assigned to your personal device driver catalog, the catalog entries are created in your SASUSER.PROFILE catalog and the catalog is referenced by GDEVICE0. If GDEVICE0 has not been assigned, the entries are created only in your SASUSER.PROFILE catalog.

6 Follow this selection path: **File** ▶ **Close**A prompt appears asking if you want to save the changes; select **`Yes`**.

7 Select **`Suffix commands`**; the Device Driver Suffix Commands window appears.

8 Type

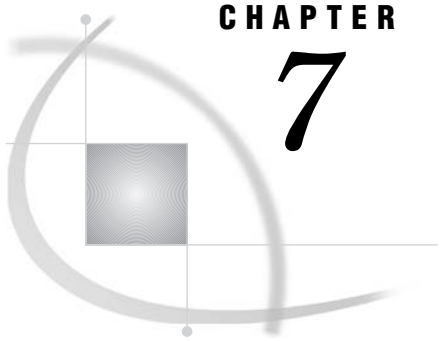
```
goptions cback=;
```

to reset the background color to the default. Resetting the background color ensures that when you select different drivers in the same SAS session, the prefix commands of any previously selected drivers are not in effect.

9 Follow this selection path: **File** ▶ **Close**A prompt appears asking if you want to save the changes; select **`Yes`**.

10 Select **`Goback`** twice, then **`OK`** to return to the WorkPlace menu.

Note: To clear the prefix and suffix commands, access the Device Driver Prefix Commands window and Device Driver Suffix Commands window as described above. Delete the commands, then select **`Close`** from the **`File`** menu for each window. △



CHAPTER

7

Doing More with Data Analysis

Introduction **119**
Generating a One-way Frequency Table **119**
Additional Information **120**
Instructions **120**
Performing a Linear Regression **121**
Additional Information **121**
Instructions **122**
Performing an Analysis of Variance **127**
Additional Information **127**
Instructions **127**
Performing a Repeated Measures ANOVA **130**
Entering the Data **130**
Calculating Logarithms **132**
Performing the Analysis **132**

Introduction

This chapter shows you how to use **Data Analysis** to generate a one-way frequency table, perform a linear regression, and perform an analysis of variance. You must have SAS/STAT software licensed to complete most of the tasks that use **Data Analysis**.

There are many more analyses that you can perform with **Data Analysis**, but there is not sufficient space to describe them all in detail here. However, the techniques for performing data analysis tasks are similar for all tasks. When you have mastered the techniques described in this chapter, you should have no trouble performing any of the other analyses.

For more information on using SAS software for statistical analysis, see the *SAS/STAT User's Guide, Volumes 1, 2, and 3* and the *Base SAS Procedures Guide*.

Generating a One-way Frequency Table

You can use the **Elementary** item on the Data Analysis menu to generate frequency tables. Frequency tables show the distribution of column values and can include frequencies, cumulative frequencies, percentages of the total frequency, and cumulative percentages for each *level*, or distinct value, of the analysis column. In this section you create a one-way frequency table showing the frequency of use of a seat belt in the automotive accidents recorded in the HIGHWAY table.

The one-way frequency table task can generate tables for both numeric and character columns. However, if you have a numeric column with many distinct values, the resulting table may not be informative.

Note: SAS/STAT software is *not* required to complete this task. △

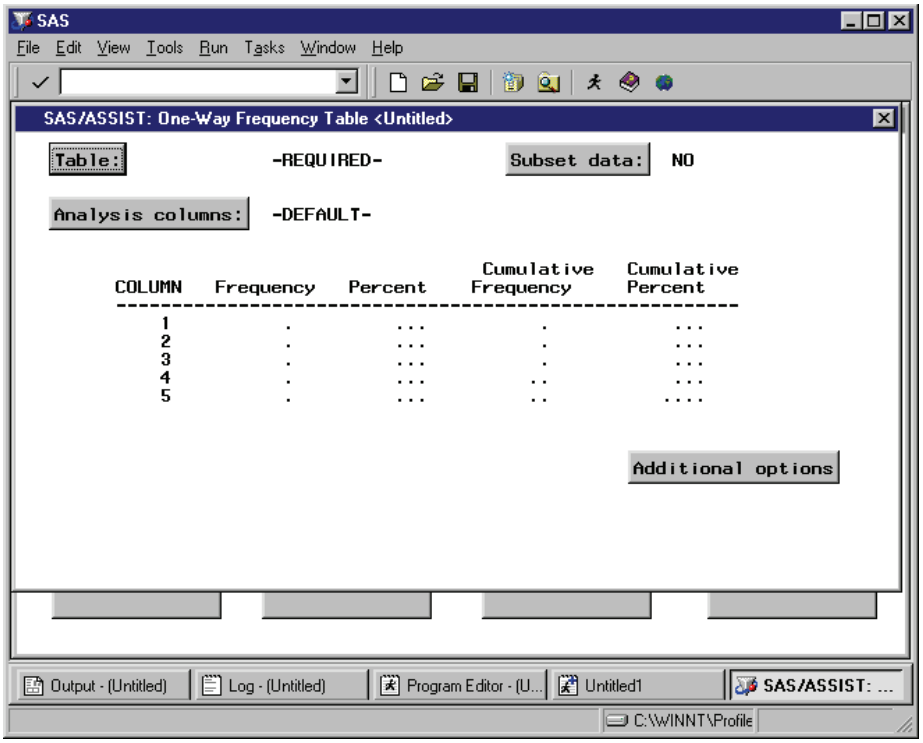
Additional Information

For additional information on creating frequency tables, refer to "The FREQ Procedure" in the *Base SAS Procedures Guide*.

Instructions

1 Follow this selection path:**Tasks ▶ Data analysis ▶ Elementary ▶ Frequency Tables ▶ Generate One-Way Frequency Table**The One-Way Frequency Table window appears.

Display 7.1 One-way Frequency Table Window



2 Use the **`Table`** button to select the SASUSER.HIGHWAY table.

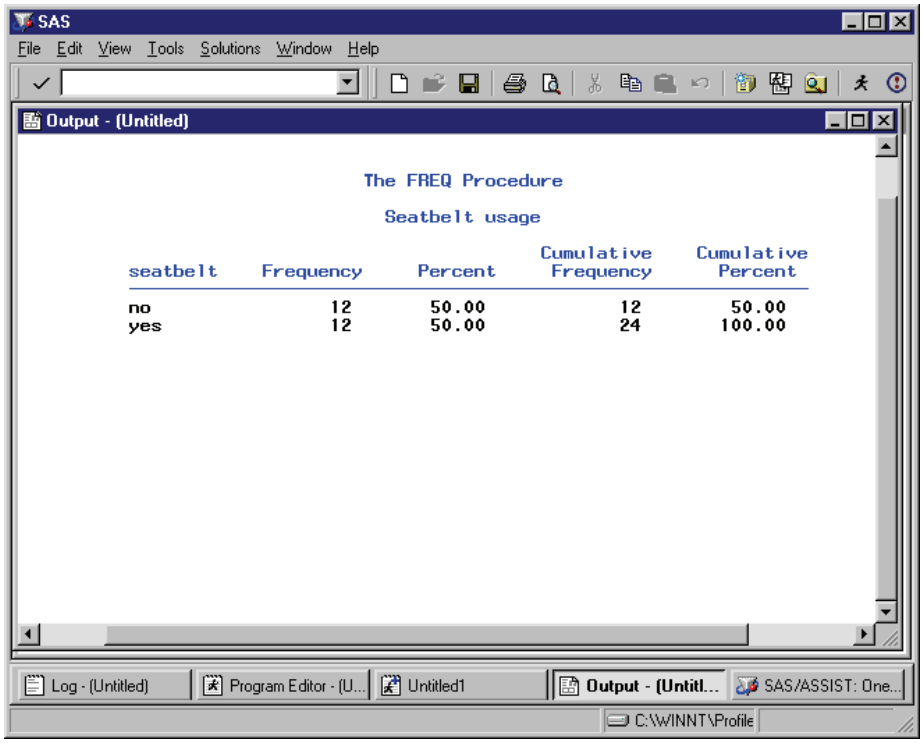
3 Use the **`Analysis columns`** button to select SEATBELT as the analysis column.

4 Follow this selection path:**Run ▶ Submit**

Note: You can select as many analysis columns as you want, up to the number of numeric columns in the table. A frequency table is generated for each analysis column. Any columns selected as BY or weight columns are not displayed in the Select Table Variables window. △

The frequency table appears showing how often a seat belt was worn in the automotive accidents recorded in the HIGHWAY table.

Display 7.2 One-way Frequency Table Output



5 Return to SAS/ASSIST software from the Output window. See "Returning to SAS/ASSIST Windows from the Output Window" on page 9 for more information.

Performing a Linear Regression

Regression analysis is an analysis of the relationship between one dependent column and one or more independent columns. You can use **Regression** on the Data Analysis menu to perform linear regression, logistic regression, and regression for correction with autocorrelation. When you use the **Linear Regression** item, you fit linear regression models by the method of least-squares. In addition, you can use **Linear Regression** to generate scatter plots and various diagnostic measures. You must have SAS/STAT software licensed to complete this task.

In this section, you perform a linear regression showing the relationship between the oxygen consumption rate of subjects while they run and the time it took for the subjects in the FITNESS table to run 1.5 miles. You use the 95% individual confidence interval option to display the 95% upper- and lower-confidence limits for an individual value.

To superimpose a regression line on a plot, refer to "Doing More with Plots" on page 106.

Additional Information

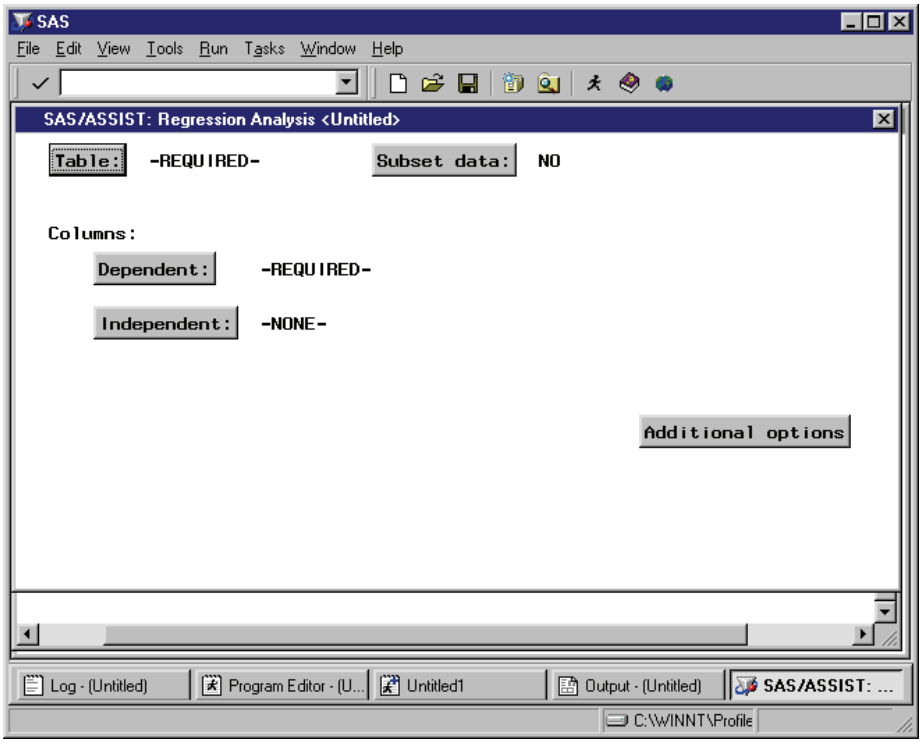
For additional information on performing linear regressions, refer to "The REG Procedure" chapter in the *SAS/STAT User's Guide, Volumes 1, 2, and 3*.

You can perform other types of regressions, in addition to the linear regression, with SAS/ASSIST software. For more information on logistic regression, which requires SAS/STAT software, refer to "The LOGISTIC Procedure" in *SAS/STAT User's Guide, Volumes 1, 2, and 3*. For information on regression with correction for autocorrelation, which requires SAS/ETS software, refer to "The AUTOREG Procedure" in *SAS/ETS User's Guide*.

Instructions

1 To display the Regression Analysis window, follow this selection path:**Tasks ▸ Data Analysis ▸ Regression ▸ Linear**

Display 7.3 Regression Analysis Window



2 Use the **`Table`** button to then select the SASUSER.FITNESS table.

3 Use the **`Dependent`** button to select OXYGEN as the dependent column.

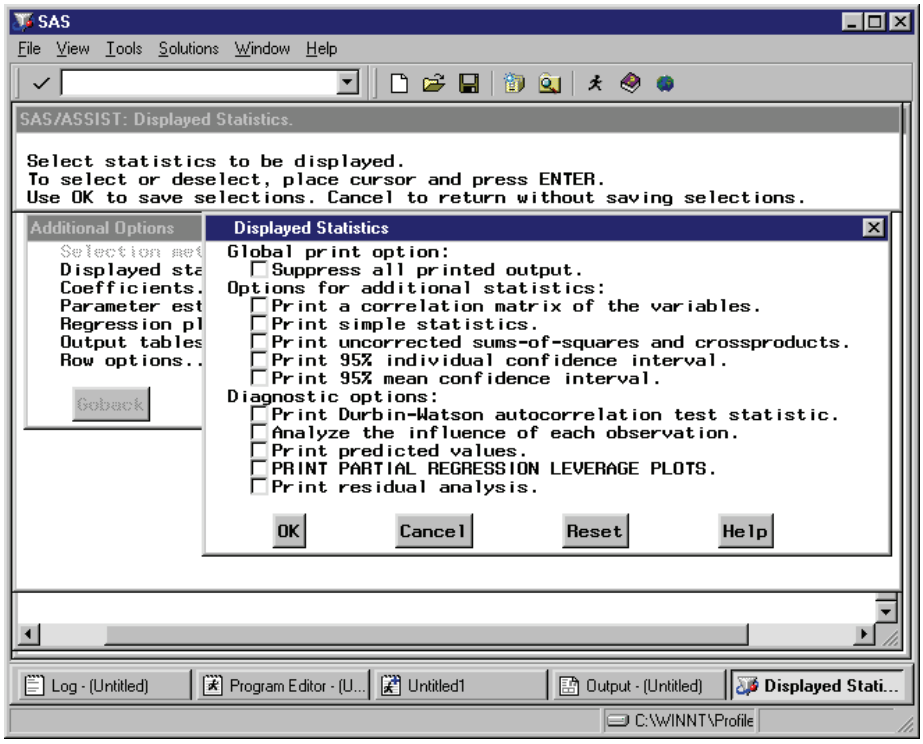
The dependent columns contain the observed values that the regression equation attempts to predict. The Select Table Variables window displays all the numeric columns in the FITNESS table except for any columns selected as BY or independent columns. A separate regression analysis is generated for each dependent column that you select.

4 Use the **`Independent`** button to select RUNTIME as the independent column.

The independent columns contain the values used to predict the dependent columns. The Select Columns window displays all the numeric columns in the FITNESS table except for any columns selected as BY or dependent columns.

5 Select **`Additional options`**, then **`Displayed statistics`**. The Displayed Statistics window appears.

Display 7.4 Displayed Statistics Window

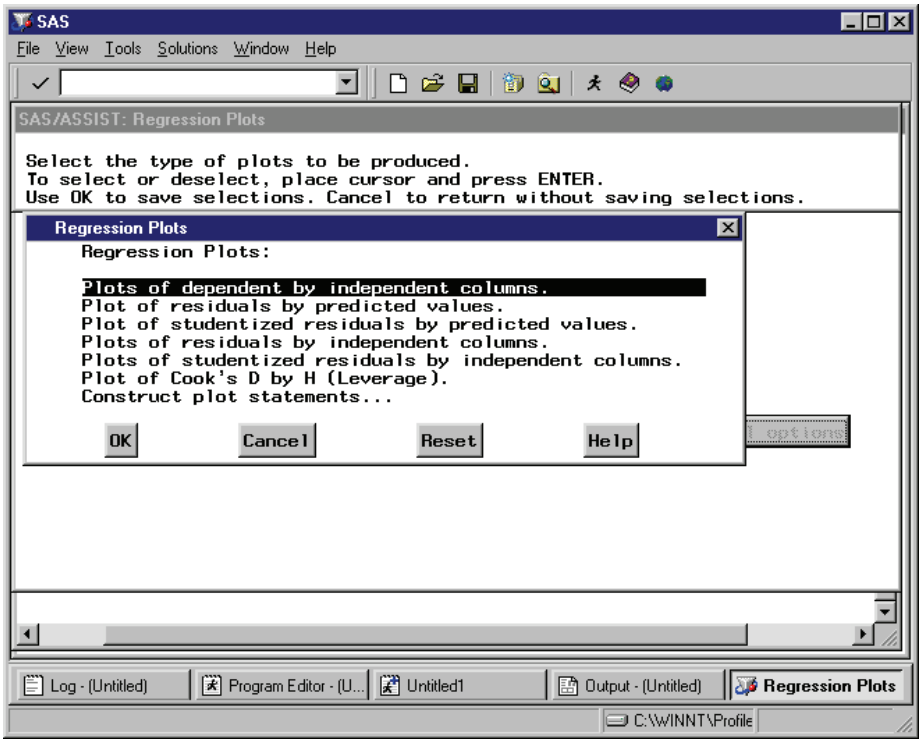


6 Select **`Print 95% individual confidence interval`**, then select **`OK`** to return to the Additional Options window.

You use the 95% individual confidence interval to display the 95% upper- and lower-confidence limits for an individual value to reflect not only the variability in the predicted mean value, but also the variability in a single future observation.

7 Select **`Regression plots`**. The Regression Plots window appears.

Display 7.5 Regression Plots Window



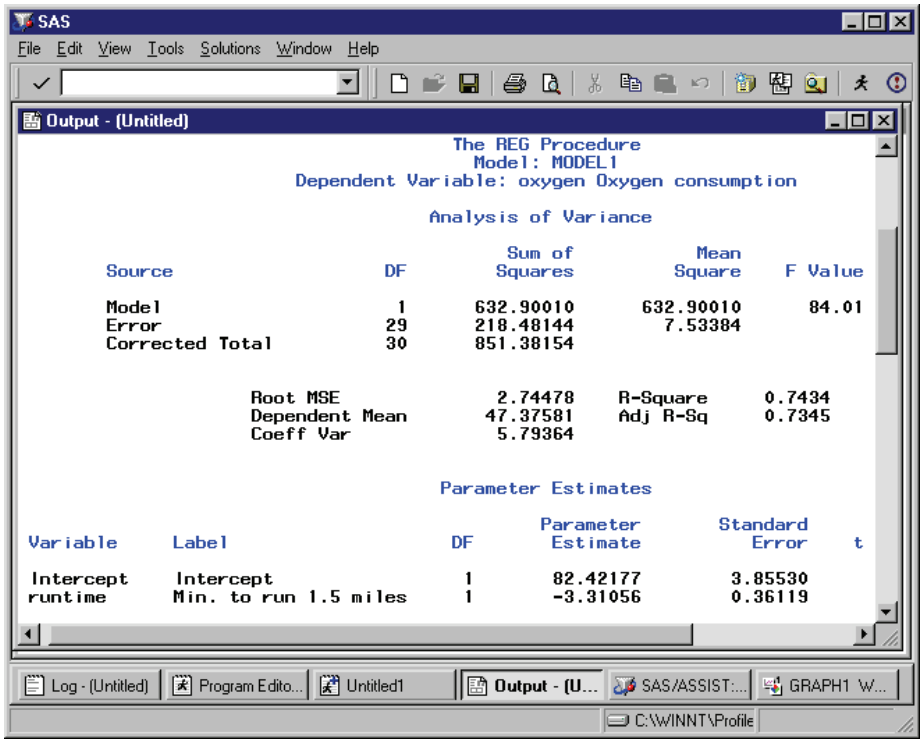
8 Select **`Plots of dependent by independent columns`**.

By choosing to generate a plot for each dependent column with each independent column, you can detect a nonlinear relationship between columns in the regression model.

9 Select **`OK`** and then **`Goback`** to return to the Regression Analysis window.

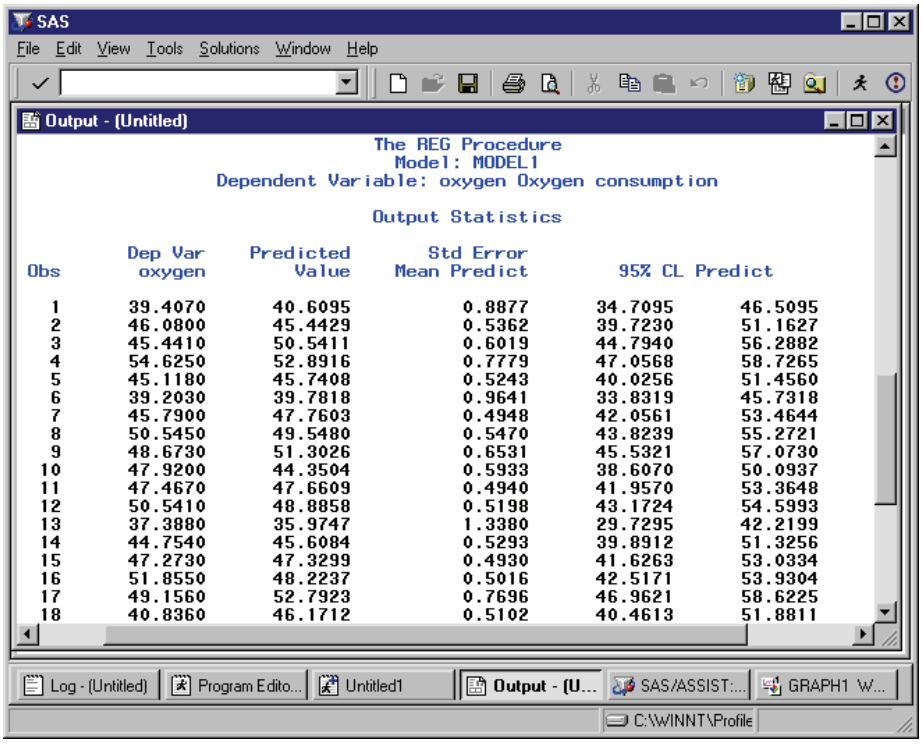
10 Follow this selection path:**Run ▸ Submit**The analysis appears in the Output window.

Display 7.6 Regression Analysis Output



11 Use the scroll bars or the FORWARD command or function key to display the page of the analysis that shows the 95% individual confidence interval in the **`95% CL Predict`** columns.

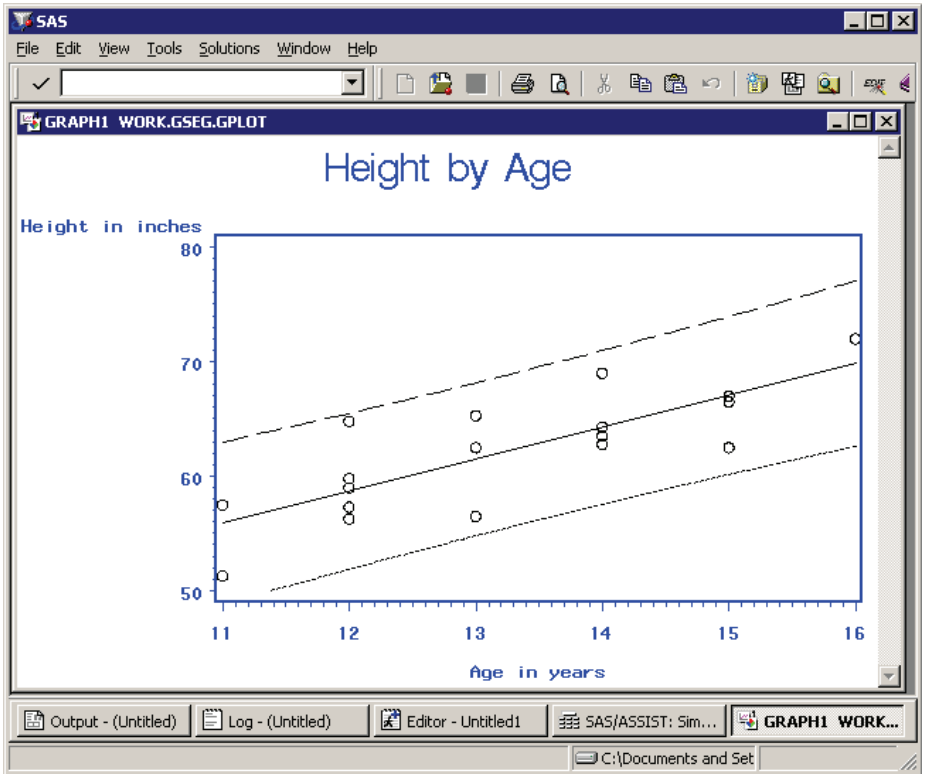
Display 7.7 Regression Analysis Output (continued)



Individual confidence intervals are referred to as prediction intervals, hence the word **`Predict`** in the output.

12 Access the GRAPH window to see the plot of the dependent by independent column.

Display 7.8 Regression Plot Output



13 Return to SAS/ASSIST software from the Output window. See "Returning to SAS/ASSIST Windows from the Output Window" on page 9 for more information.

Performing an Analysis of Variance

You can use the **Anova** item on the Data Analysis menu to perform an analysis of variance (ANOVA). You can construct a simple analysis of variance, analysis of covariance (ANCOVA), multivariate analysis of variance (MANOVA), and repeated measures ANOVA. You must have SAS/STAT software licensed to complete this task.

In this section, you perform an analysis of variance on the VENEER table to show the relationship between the brand of veneer and the amount of veneer that was worn away during testing.

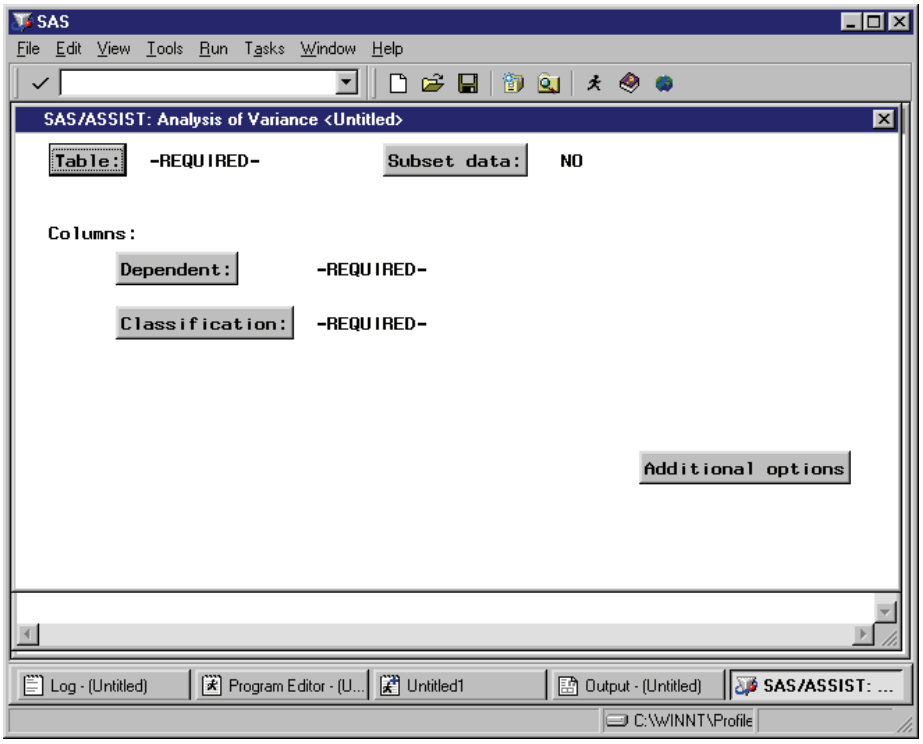
Additional Information

For additional information on performing an analysis of variance, refer to the GLM and ANOVA procedures in the *SAS/STAT User's Guide, Volumes 1, 2, and 3*.

Instructions

1 To display the Analysis of Variance window, follow this selection path:**Tasks ▶ Data Analysis ▶ Anova ▶ Analysis of Variance**

Display 7.9 Analysis of Variance Window



2 Use the **Table** button to select the SASUSER.VENEER table.

3 Use the **Dependent** button to select **WEAR** as the dependent column.

The dependent column contains the measurements to be analyzed. The Select Table Variables window displays all the numeric columns in the VENEER table except any columns selected as BY or classification columns. If you have more than one dependent column, you can generate a separate ANOVA model for each dependent column or one multivariate model for the set of dependent columns.

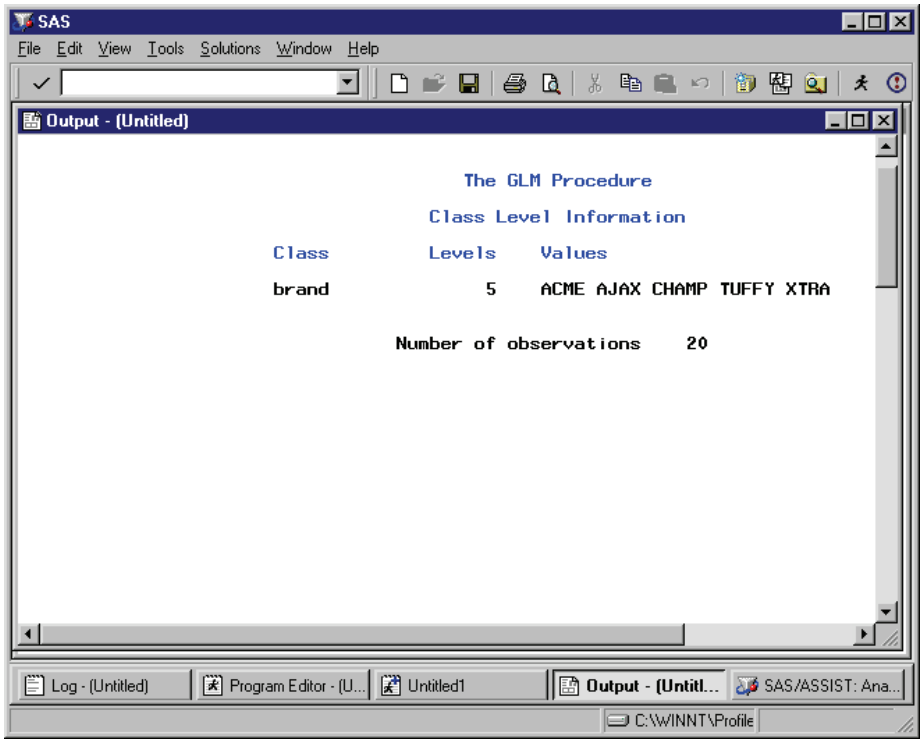
4 Use the **Classification** button to select **BRAND** as the classification column.

The classification columns identify analysis groups. The variation in the dependent column values is analyzed within and across the classification groups to determine whether or not the classification columns are significant sources of variation. The Select Table Variables window displays all the columns in the VENEER table except for any columns selected as BY or dependent columns.

Each classification column is treated as a main effect in the model. You can modify the ANOVA model to add interactions, nested effects, covariates, and random effects by using the **Additional options** item in the Analysis of Variance window.

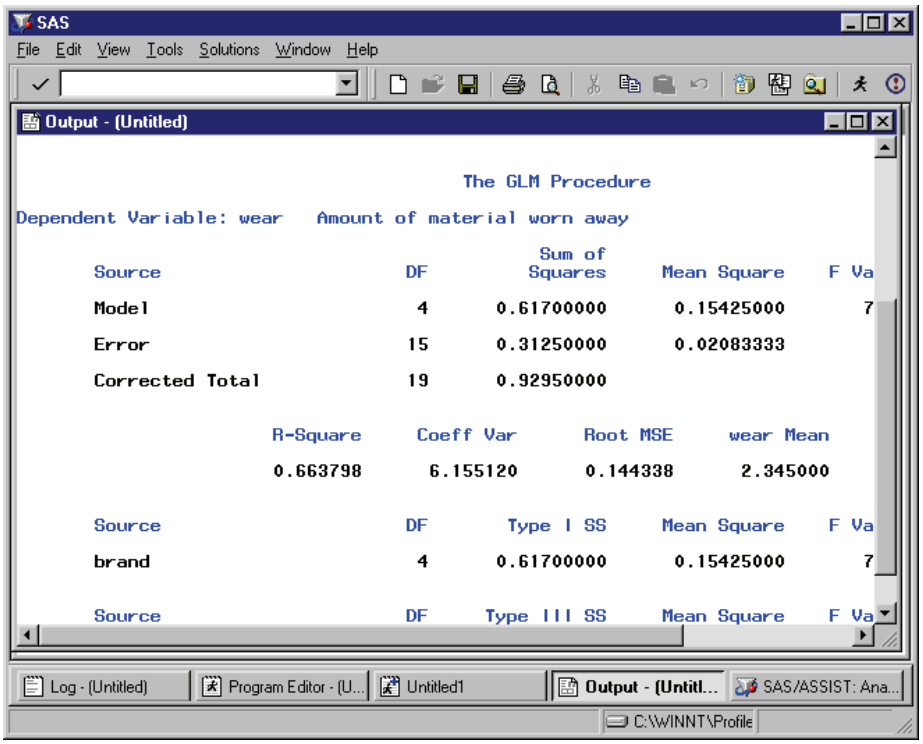
5 Follow this selection path:**Run ▶ Submit**The first page of the analysis appears showing the class level information.

Display 7.10 Analysis of Variance Output



6 Use the scroll bars or the FORWARD command or function key to display the next page of the analysis.

Display 7.11 Analysis of Variance Output (continued)



Refer to the GLM and ANOVA procedures in the *SAS/STAT User's Guide, Volumes 1, 2, and 3* for information about interpreting the statistics in this report.

7 Return to SAS/ASSIST software from the Output window. See "Returning to SAS/ASSIST Windows from the Output Window" on page 9 for more information.

Performing a Repeated Measures ANOVA

Repeated measures designs are characterized by recording several measurements over time or space on the same experimental unit. This section shows how to perform a repeated measures ANOVA with SAS/ASSIST software. The first part of the process is data entry. For this particular example, you apply a logarithmic function to the data and then you perform the repeated measures ANOVA.

This example uses the data from Example 7 in "The GLM Procedure" chapter of *SAS/STAT User's Guide, Volumes 1, 2, and 3*.

Entering the Data

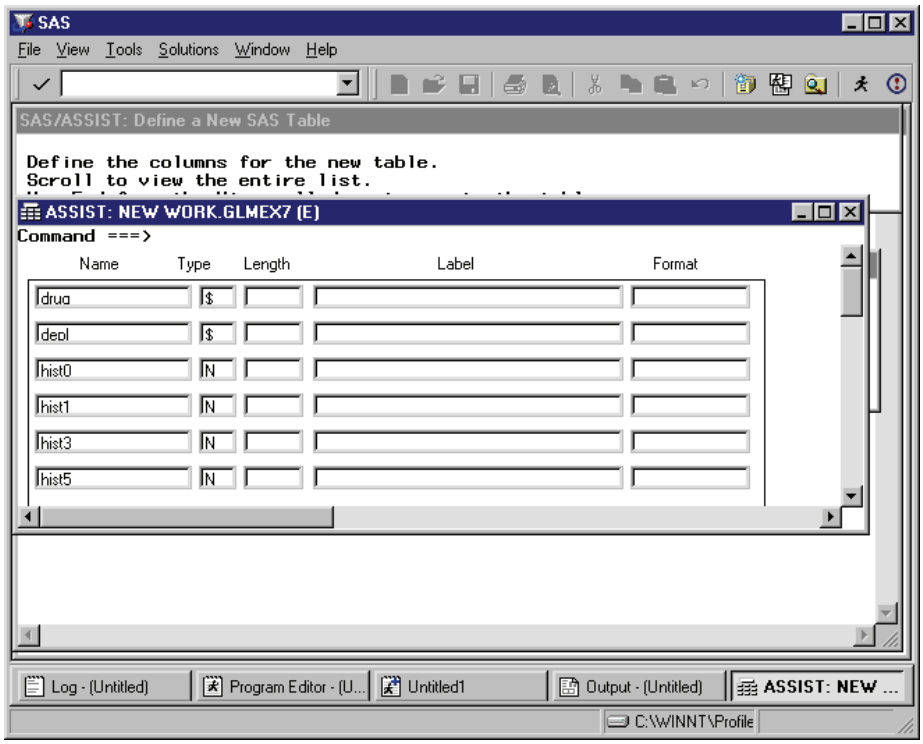
In this section, you enter the raw data using the **`Create Data`** task. For more information on this task, refer to the "Entering Data Interactively" chapter in *Getting Started with SAS/ASSIST*.

1 Follow this selection path:**Tasks ▶ Data Management ▶ Create data ▶ Interactively ▶ Enter data in tabular form** The Select a New SAS Table to Create window appears.

2 In the **`Table`** field, type **`GLMEX7`**. If desired, select **`Permanent`**, select a library in which to store the table, and select **`OK`** twice. The Define a New SAS Table window appears.

3 Define the columns in the new table by editing this window so that it looks like the following display.

Display 7.12 Define a New SAS Table Window With Columns Defined



You might need to resize the window to see all six rows.

4 Follow this selection path: **File ▶ Close**If prompted, select **`Yes`** to save the changes. The FSEDIT window appears.

5 Type the following data into the table. Note that the **`hist5`** column has a missing value for row 6 (**`drug=Morphine, depl=N`**).

Table 7.1 Data for Repeated Measures ANOVA Example

Row (Obs)	drug	depl	hist0	hist1	hist3	hist5
1	Morphine	N	0.04	0.20	0.10	0.08
2	Morphine	N	0.02	0.06	0.02	0.02
3	Morphine	N	0.07	1.40	0.48	0.24
4	Morphine	N	0.17	0.57	0.35	0.24
5	Morphine	Y	0.10	0.09	0.13	0.14
6	Morphine	Y	0.12	0.11	0.10	
7	Morphine	Y	0.07	0.07	0.06	0.07
8	Morphine	Y	0.05	0.07	0.06	0.07
9	Trimethaphan	N	0.03	0.62	0.31	0.22
10	Trimethaphan	N	0.03	1.05	0.73	0.60

Row (Obs)	drug	depl	hist0	hist1	hist3	hist5
11	Trimethaphan	N	0.07	0.83	1.07	0.80
12	Trimethaphan	N	0.09	3.13	2.06	1.23
13	Trimethaphan	Y	0.10	0.09	0.09	0.08
14	Trimethaphan	Y	0.08	0.09	0.09	0.10
15	Trimethaphan	Y	0.13	0.10	0.12	0.12
16	Trimethaphan	Y	0.06	0.05	0.05	0.05

6 Follow this selection path to exit the FSEDIT window:**File ▶ Close**If prompted, select **Yes** to save the changes.

Calculating Logarithms

In order to minimize correlation between the mean and the variance of the data, the logarithm of the data needs to be calculated.

1 Follow this selection path:**Tasks ▶ Data management ▶ Subset/Copy** The Subset or Copy a Table window appears.

2 If the active table is not GLMEX7, use the **Table** button to select it from the WORK library, or, if you chose to save the table permanently, the permanent library where you saved the table.

3 Use the **Output Table** button. In the Output Table or View window, specify GLM7OUT as the name of the output table. Select **Temporary** or **Permanent**, as desired, before selecting **OK**.

4 Select **Define new columns**. The Define or Modify a Column window appears.

5 In the **Column** field, type **LHIST0**.

6 Select **Initialize**. The Enter Numeric Expression window appears. Select **Function**, then **Mathematical functions**. The Select Data window appears.

7 Select **LOG(n)**. The **Specify Arguments to a Function** window appears.

8 In the **Value for parameter** field, type **HIST0** and select **OK**,

9 Select **OK** twice. The Define New Columns window appears.

10 Select **Add new column**.

Repeat steps 5 through 10 to create the LHIST1, LHIST3, and LHIST5 columns, using the HIST1, HIST3, and HIST5 columns, respectively, as parameters. When finished, select **OK** (instead of **Add New Column**) from the Define New Column to return to the Subset or Copy a Table window.

11 Select **Submit** from the **Run** menu. If desired, select **OK**, then **Goback** to view the table; otherwise, select **Cancel**, then **Goback**.

Performing the Analysis

You are now ready to perform the repeated measures ANOVA.

1 Follow this selection path:**Tasks ▶ Data Analysis ▶ Anova ▶ Analysis of Variance** The Analysis of Variance window appears.

2 If the active table is not GLM7OUT, use the **Table** button to select the GLM7OUT table.

3 Use the **Dependent** button to select the LHIST0, LHIST1, LHIST3, and LHIST5 columns.

4 Use the **Classification** button to select the DRUG and DEPL columns.

5 Follow this selection path: **Additional options ▶ Model effects ▶ Interactions** The Interactions window appears.

6 Select **DRUG**, then *****, then **DEPL** to construct the **DRUG*DEPL** interaction. Select **OK**, then **Goback**.

7 Select **Analysis type**, then **Repeated measures**, then **Factor names and levels**. The Repeated measures Factors window appears.

8 In this window, you specify the repeated factor and the number of levels associated with that factor. In the first row, type **TIME** for **Factor Name** and **4** for **Number of Levels**. Select **OK**.

9 Select **Factor Values**. The Repeated measures Factor Levels window appears.

10 In this window, you specify the intervals for the repeated factor. In the four active spaces under **Level Values**, type **0**, **1**, **3**, and **5**. Select **OK**.

11 Select **Factor Transformations**. The Repeated Measures Transformations window appears. In this window, you specify a single-degree-of-freedom contrast. For descriptions of each transformation, select **Help**.

12 Select **Polynomial**, then **OK**.

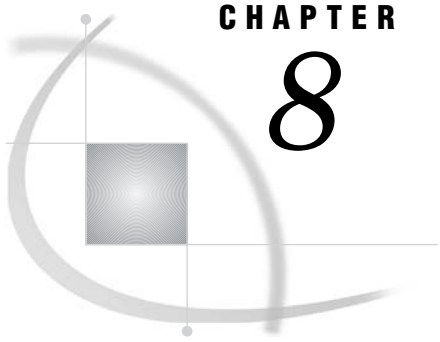
13 Select **Options**. The Repeated Measures Options window appears.

14 Select **Test within-subject effects** to produce an analysis-of-variance table for each contrast defined by the within-subject factors. Select **OK**.

15 Select **Goback** three times to return to the Analysis of Variance window.

16 Select **Submit** from the **Run** menu. The results of the analysis appear in the Output window.

17 If desired, compare these results to those in Example 7 in "The GLM Procedure" chapter of *SAS/STAT User's Guide, Volumes 1, 2, and 3*.



CHAPTER

8

Doing More with Remote Connect

Introduction **135**
Additional Information **135**
Assigning Librefs on Remote SAS Sessions **135**
Setting Up SAS/ASSIST Tasks On Remote Data **137**
Instructions **137**
Behind the Scenes: Anatomy of a Remote Connect Session **139**
Remote Configuration Management **140**
Adding, Editing, and Deleting Remote Configurations **140**
Setting the SASSCRIPT System Option **141**

Introduction

In the "Using Remote Connect" chapter of *Getting Started with SAS/ASSIST*, you learned how use SAS/ASSIST software to establish and terminate a remote connection, upload and download files, and run a SAS/ASSIST task on a remote host. The "SAS/ASSIST Software Setup" appendix in the same book contains instructions on setting up a remote configuration. This chapter describes some more capabilities of Remote Connect.

Additional Information

For additional information on using the Remote Connect capabilities of SAS, refer to *SAS/CONNECT User's Guide*.

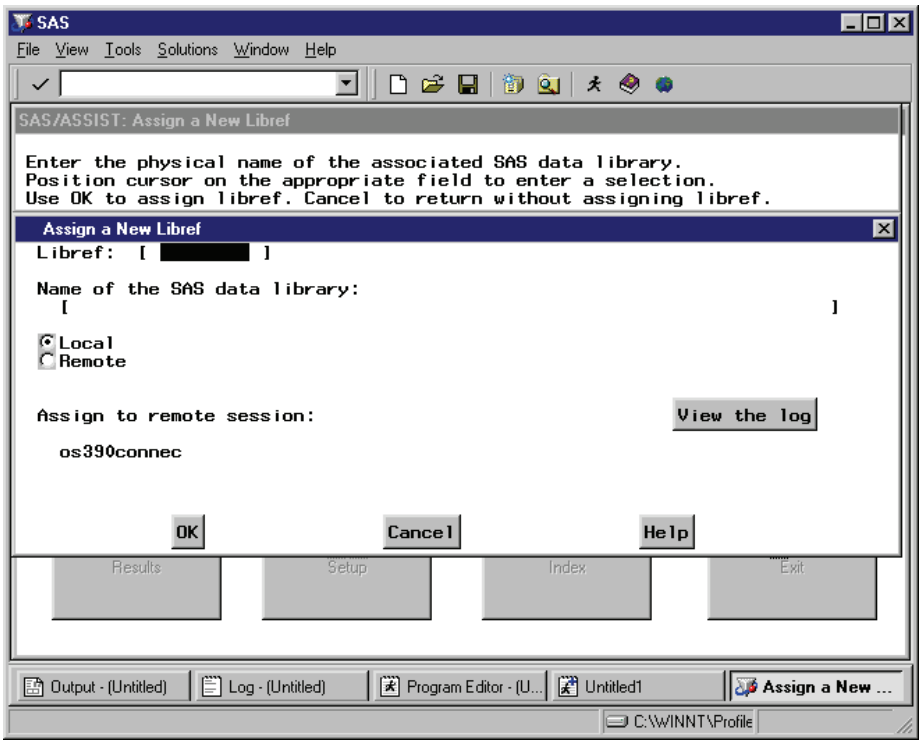
Assigning Librefs on Remote SAS Sessions

When you establish a connection to a remote host, the remote host invokes a SAS session. The remote SAS session has the automatically-defined libraries associated with it (WORK, SASUSER, and so on), as well as any libraries and options that are defined by the SAS session's AUTOEXEC file. See the SAS companion documentation for your operating environment for more information on AUTOEXEC files.

You might want to assign librefs to libraries on the remote host other than the ones automatically assigned. You can assign librefs on a remote host using SAS/ASSIST software by following these directions.

1. Establish the remote connection.
2. Follow this selection path:**Tasks ▶ Remote Connect ▶ Transfer Data ▶ Utilities ▶ Assign libref**The Assign a New Libref window appears.

Display 8.1 Assign a New Libref Window



3 In the **Libref** field, type the libref you want to use to reference the library.

4 In the **Name of the SAS data library** field, type the path to the library, using the naming conventions of the remote operating environment.

5 Select **Remote**. If more than one remote connection is open, select the remote connection to the host on which you want to assign this libref.

6 Select OK.

7 If the libref assignment is successful, a message appears to inform you of this fact; select **Goback** to return to the WorkPlace menu. If the assignment is not successful, select **View the log** to read the error messages and diagnose the problem. If you do not understand the error messages, contact the SAS Support Consultant at your site.

If you find that you are frequently using this method to access the same library, or if assigning librefs on your remote host requires special options, you should consider having that library automatically assigned upon startup of the remote SAS session by adding appropriate LIBNAME statements to the remote host's AUTOEXEC file. Contact your SAS Support Consultant for details.

If you are going to download table information (as in the following section) to set up SAS/ASSIST tasks for remote execution, you must have a library on your local SAS session that has the same libref as the remote library containing the desired table. You can assign a libref on the local SAS session by following this selection path:**Tasks ▸ Setup ▸ File Management ▸ SAS Data Libraries ▸ Assign a new libref** Give your new library the same libref as the remote library, and assign it to any library on the local host.

Note that SAS/ASSIST software will not download table information for a remote *libref.table-name* if a table with the same *libref.table-name* already exists on the local host. This feature prevents overwriting an existing table. If you need to download table information for a remote table that has the same libref and table name as an existing

table on the local host, you can temporarily clear the libref on the local host and then re-assign it when you are finished. To clear a local libref, follow this selection path:**Tasks ▶ Setup ▶ File Management ▶ SAS Data Libraries ▶ Clear a libref**Select the libref to be cleared in the Select a Library window and select **OK**. Alternatively, you can use the Explorer to change the libref or rename the table.

Setting Up SAS/ASSIST Tasks On Remote Data

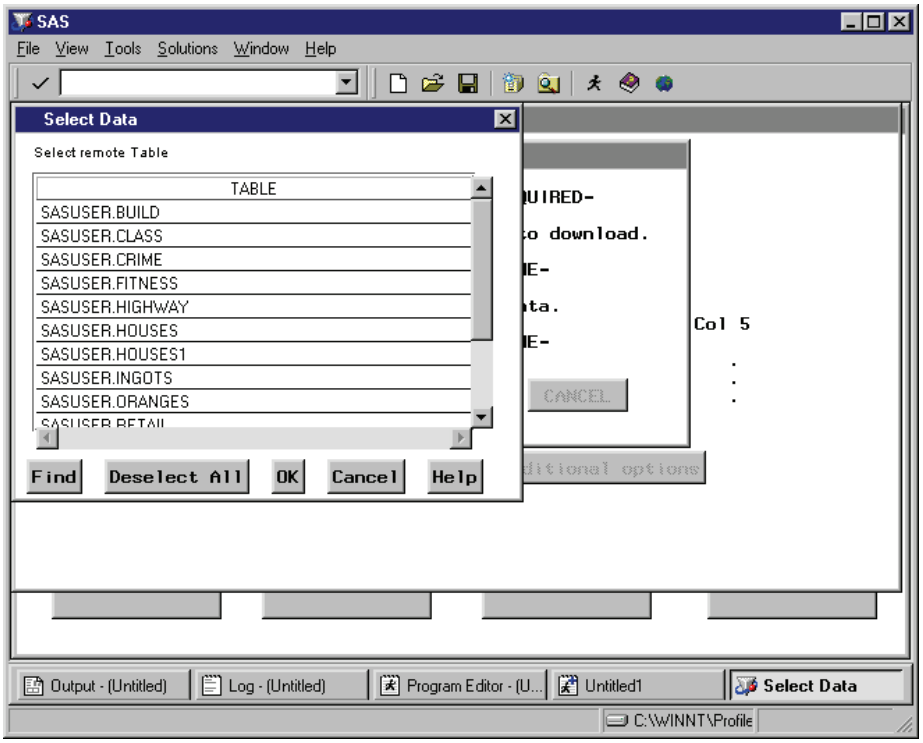
The "Using Remote Connect" chapter of *Getting Started with SAS/ASSIST* showed you how to use task window selections in a local SAS/ASSIST session and run the task on a remote host using remote data. However, that process works only if you have a copy of the remote table on the local host because you need information about the table stored locally in order to make task window selections. If the table you wish to use is very large, it may not be practical to download a copy to your local host.

The process described in this section addresses this problem. Using this process, you can download information about the table (such as column names, types, and formats), without downloading any data, so that you can make task window selections. Alternatively, you can download a small portion of the data (a few rows or a subset based on a WHERE clause) to test the task. Then you can run the task on the remote host using **Remote submit** on the **Run** menu.

Instructions

1. Ensure that you have a remote connection established.
2. Use the **Tasks** menu to access the desired SAS/ASSIST task window.
3. Instead of using the **Table** button to select a table, follow this selection path:**Run ▶ Select Remote Data**The Get Remote Data window appears.
4. Select **Table**. A list of tables on the remote host appears.

Display 8.2 Select Remote Table Window



This list includes all tables on all libraries which are assigned on startup of the remote SAS session. If a particular library you are looking for does not appear, the library is not assigned in the remote SAS session. To assign a libref on a remote host, follow the instructions in "Assigning Librefs on Remote SAS Sessions" on page 135, then begin this procedure again from step 1.

Note: If you have more than one remote connection open, the Remote Data window displays only the libraries from the connection most recently established. If you want to select data from a different remote host, terminate and then re-establish a connection with the desired remote host. △

5 Select the desired table. The Get Remote Data window reappears.

6 By default, this process downloads information about the table only, without downloading any rows. If you want to download some rows, perform one of these steps:

- Select **`Number of Rows`**. The Get remote data OBS window appears. Select **`All`** to download all rows, or select **`Or type number`** and type a number of rows to download. Select **`OK`**.
- Select **`Subset Data`**. The **`Build a WHERE Clause to Subset the Current Data`** window appears. Use this window to construct a WHERE clause. This window is described in detail in the "Report Writing" chapter in *Getting Started with SAS/ASSIST*.

7 Select **`OK`**. The table information and rows, if any, are downloaded and the table name appears as the active table.

8 Proceed with the task window selections and run the task by following this selection path:**Run ▶ Remote submit**

Behind the Scenes: Anatomy of a Remote Connect Session

The following table provides a look at what is going on when you establish a Remote Connect session, set up and submit a task for remote execution, and terminate the session. Included are technical details on the statements being passed from the local SAS/ASSIST session to the remote SAS session.

Table 8.1 Anatomy of a Remote Connect Session

	Local SAS/ASSIST session actions: What you do	Remote SAS session actions: What the remote host does	Technical details
1	Invoke SAS/ASSIST software	n/a	n/a
2	Establish remote connection (**`Establish Connection`** under **`Remote`** on the **`Tasks`** menu)	Invokes SAS session	SAS/ASSIST software submits a SIGNON statement using SAS/CONNECT script
3	Open task window with **`Tasks`** menu	n/a	n/a
4	Select **`Remote Data`** from the **`Remote`** menu. *Note:* See "Assigning Librefs on Remote SAS Sessions" on page 135 for details on remote and local library requirements. △	Sends information on contents of all tables in all libraries to local SAS/ASSIST session	SAS/ASSIST software submits a program in an RSUBMIT block to the remote SAS session. The program creates a table containing information on tables in libraries assigned on the remote session (except SASHELP, LIBRARY, MAPS, and WORK). Table is downloaded to local SAS session.
5	Select **`Table`** in Get Remote Data window; list of tables appears	n/a	n/a
6	Select desired table, then select desired number of rows and **`OK`** in Get Remote Data window	Downloads table with user-selected number of rows (default is 0 rows) or subset	SAS/ASSIST software submits a PROC DOWNLOAD statement with appropriate options in an RSUBMIT block to the remote host.
7	Make task window selections	n/a	n/a

	Local SAS/ASSIST session actions: What you do	Remote SAS session actions: What the remote host does	Technical details
8	Select **Remote Submit** from the **Run** menu	Executes task and returns any output or messages to the local SAS session	SAS/ASSIST software submits task code to remote host in an RSUBMIT block.
9	Select **Terminate Connection** under **Remote** on the **Tasks** menu	Terminates SAS session and closes connection	SAS/ASSIST software submits a SIGNOFF statement.

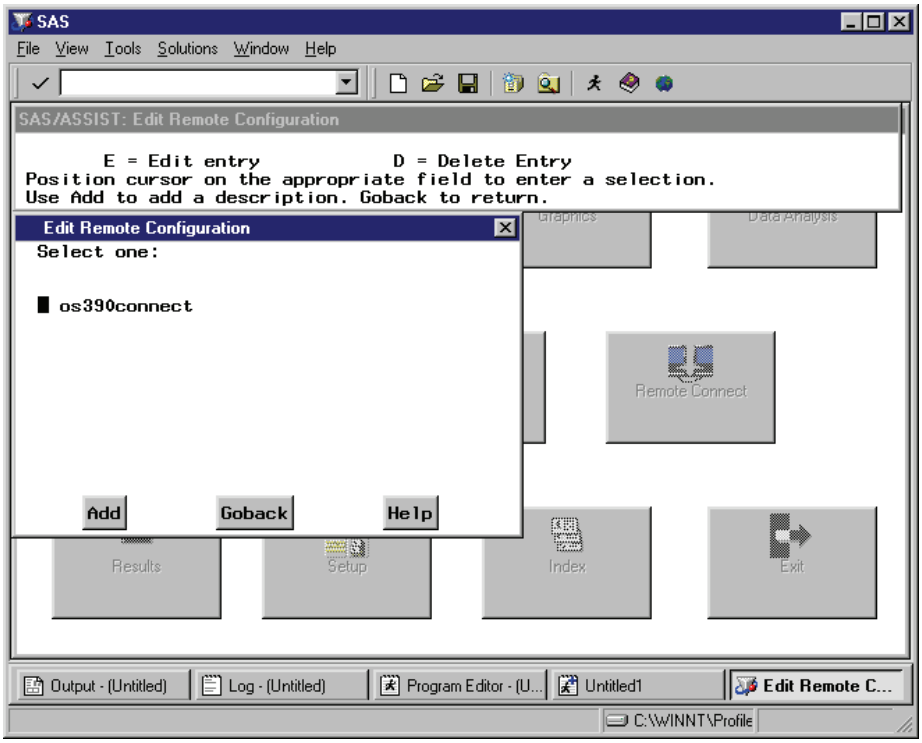
Remote Configuration Management

This section describes how to make changes to an existing remote configuration, how to delete a remote configuration you no longer need, and how to set the SASSCRIPT system option.

Adding, Editing, and Deleting Remote Configurations

To add, edit, or delete a remote configuration, follow this selection path:**Tasks ▸ Remote Connect ▸ Edit Remote Configuration**The Edit Remote Configuration window appears.

Display 8.3 Edit Remote Configuration Window



- To add a new configuration, select **Add**; the Create a New Configuration window appears. Follow the instructions earlier in the "SAS/ASSIST Software Setup" appendix in *Getting Started with SAS/ASSIST* to create a new configuration.
- To edit an existing configuration, type **E** next to the configuration you want to edit and press ENTER.
- To delete an existing configuration, type **D** next to the configuration you want to delete and press ENTER. When prompted, select **OK** to delete the configuration.

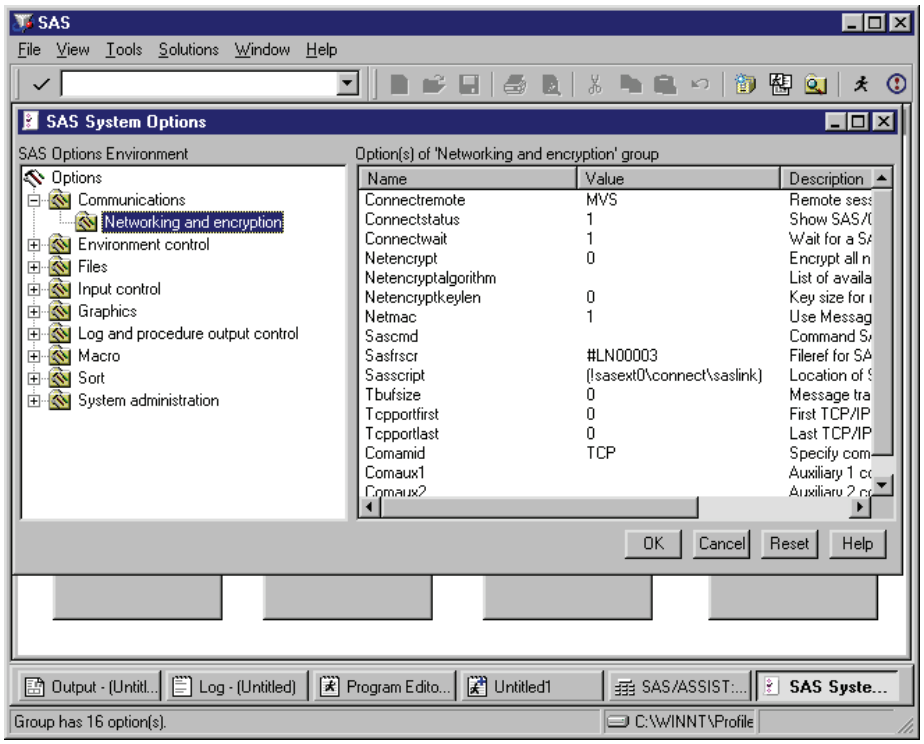
Select **Goback** to exit the Edit Remote Configuration window.

Setting the SASSCRIPT System Option

When you create or edit a remote configuration, you are asked to select a SAS/CONNECT script file. SAS/CONNECT script files are normally stored in a location (directory, folder or data set, depending on the operating environment) specified by the SASSCRIPT SAS system option. If you have SAS/CONNECT script files stored in a different location, you might want SAS to search there for SAS/CONNECT scripts. To set or change the SASSCRIPT system option, follow these directions:

1. Follow this selection path:**Tools ▸ Options ▸ System**The SAS System Options window appears
2. Select the ⊞ symbol next to **Communications** in the left pane, then select **Networking and encryption**. A list of communication-related options appears in the right pane.

Display 8.4 SAS System Options Window With Networking and Encryption Options



Look in the **Value** field for the **Sasscript** option to see where the option points.

3. To assign a new value, select **Sasscript**. (For desktop operating environments, double-click the **Sasscript** name.) The Modify Value window appears. Type a new

value in the **New Value** field and select **OK**. If you do not know the value to enter, contact your SAS Software Consultant.

4 Select **OK** to exit the SAS System Options window. Select **ASSIST** from the **Solutions** menu to return to SAS/ASSIST software.

CHAPTER

9

Doing More with Results

Chapter Overview **143**
Additional Information **143**
Doing More with the Result Manager **143**
Opening and Using the Result Manager Window **144**
Using Commands to Manipulate Entries **145**
Saving Source Code to an External File **149**
Instructions **149**
Browsing an External File **150**
Instructions **150**
Creating and Executing a Script File **152**

Chapter Overview

In the "Using the Result Manager" chapter of *Getting Started with SAS/ASSIST*, you learned how to use the Result Manager to access, edit, and execute saved tasks. This chapter goes into more detail on the things you can accomplish with the Result Manager. In addition, this chapter describes how to save a program to an external file, browse an external file, and use a script file to execute multiple saved tasks in succession.

By using the Result Manager, you can view saved programs that are generated by SAS/ASSIST software and learn how SAS statements are used to create programs. You can edit these programs to customize them for your needs. You can also save multiple programs in the history file and edit the programs to create applications.

Additional Information

For additional information on saving programs and using the Result Manager, refer to the "Saving Source Code for Editing and Re-execution" and "Using the Result Manager" chapters in *Getting Started with SAS/ASSIST*.

Doing More with the Result Manager

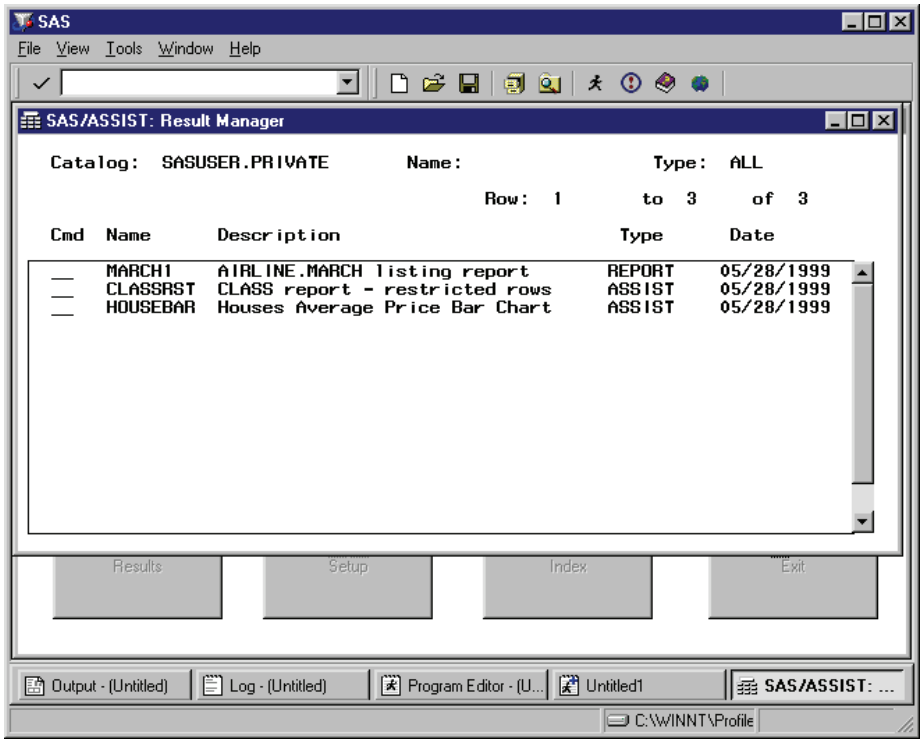
The "Using the Result Manager" chapter in *Getting Started with SAS/ASSIST* introduced some of the capabilities of the Result Manager. This section describes the Result Manager in more depth. You can use the Result Manager window to display and manage your saved results, such as SAS/ASSIST tasks, SAS output, programming code, logs, and reports, and SQL code and queries. For example, you can customize the order and type of entries displayed in the Result Manager window, and you can edit, rename,

print, copy, file, and delete entries. You can browse and execute program code. You can build scripts to combine a series of SAS/ASSIST tasks into a single job stream for processing.

Opening and Using the Result Manager Window

To open the Result Manager window, follow one of these selection paths:**Tasks ▶ Results ▶ Result ManagerTools ▶ Result Manager**The Result Manager window appears, as shown in the following display. It lists all of the entries that you have named and saved to your default catalog.

Display 9.1 Result Manager Window



Note: On some operating environments, the SASUSER.PRIVATE catalog is not created until a task, source code, output, or other entry is saved. In this case, instead of the Result Manager window, the Select Member window appears. Select **`Cancel`** (twice, if necessary) and select **`Goback`** to exit any warning messages. Perform a task and save it by selecting **`Save`** from the **`File`** menu before starting this procedure again from step 1. △

The fields in the Result Manager window are described in the following table.

Table 9.1 Fields in the Result Manager Window

Field	Description
Catalog	Specifies the current catalog name. To change it, type a two-level name. Alternatively, type a **?** to list all possible catalogs, then make a selection from the resulting Select a Member window.
Name	By default, this field at the top of the display is empty. To search for and limit the listing to certain entries, type the complete name of an entry or type a portion of a name with the pattern-matching character %, *, or _. See the "Using the Result Manager" chapter in *Getting Started with SAS/ASSIST* for details on using the pattern-matching characters.
Type	Lists the type of the entry. The default value is **ALL**. Type a **?** to list all possible selections or type a value directly in the field to limit the display to certain types of entries. You can specify any particular type, such as OUTPUT, which shows all the entries of type OUTPUT. Valid types include QUERY, REPORT, SCRIPT, SQL, ASSIST, OUTPUT, LOG, SOURCE, MANAGER, GRSEG, PROFILE, and ALL.
Row	Specifies the starting and ending rows of the total rows displayed. You can edit the value of the starting number to specify which row will be the first row in the display.
Cmd	Enables you to manage your entries. Type a **?** to list all possible commands that you can enter in this field. For further details on the commands, see the next section.
Name	In the window's listing, **Name** displays the names of your entries. You can edit these values using the **Rename** command as described in the next section.
Description	Describes your entries. You can edit these values using the **Rename** command as described in the next section.
Type	Lists the entry type.
Date	Lists the date when the entry was created.

Using Commands to Manipulate Entries

To use the following commands, type the appropriate letter in the **Cmd** field next to the entry you want to manipulate and press ENTER.

?
displays a list of commands for the **Cmd** field. You can then select from the list to issue a command.

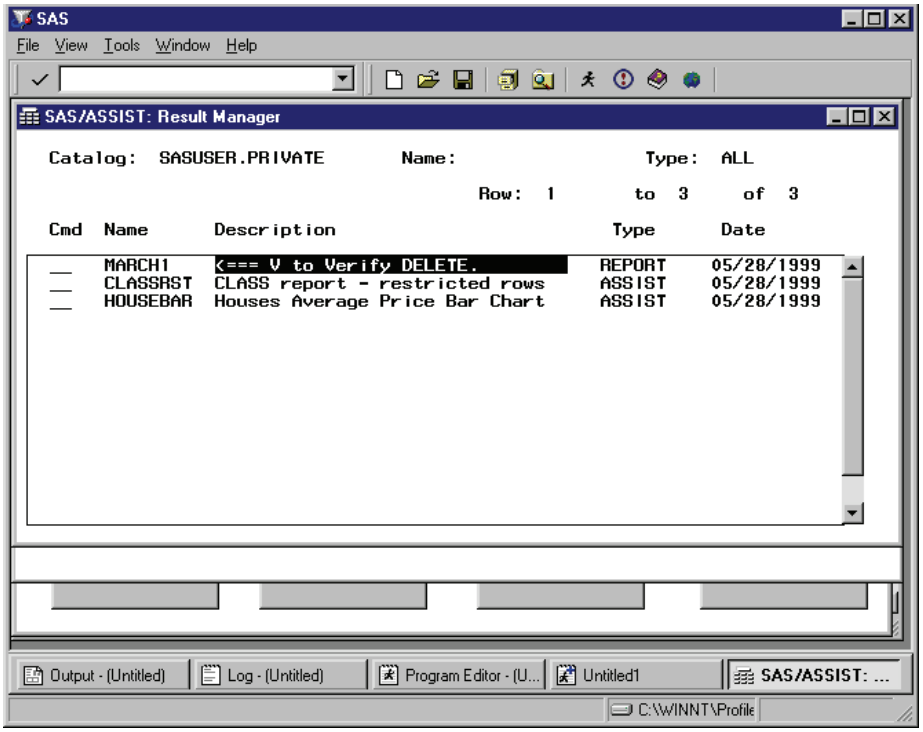
E (Edit)
opens an entry for editing. The results of this command depend on the type of entry. For example, selecting the entry FLY, which has the type QUERY, opens the Query window with the FLY query loaded. Selecting the entry BONUS, which has the type REPORT, opens the Report Engine window with the report BONUS loaded. An entry type of ASSIST can be modified and executed within the edit. Entries of type MANAGER or PROFILE cannot be edited.

B (Browse)
displays the generated source code or the output of the entry for browsing. The type of entry determines what you browse. Entries of type of MANAGER or PROFILE cannot be browsed.

X (Execute)
executes a saved task entry interactively. **X** is not valid with entries of type LOG, MANAGER, OUTPUT, PROFILE, or GRSEG. The results vary with the type of task executed.

D (Delete)
deletes an entry. When you press ENTER, **<=== V to Verify DELETE** appears in the **Description** field as shown in the following display.

Display 9.2 Marking an Entry for Deletion

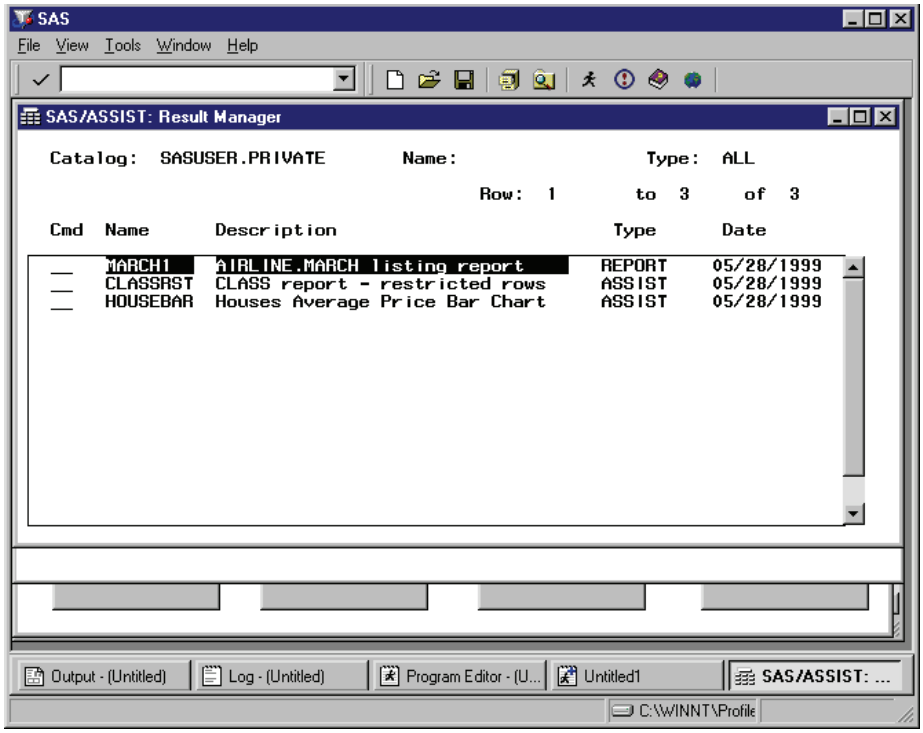


Type **V** and press ENTER again to verify that you want to proceed with the deletion. If you want to cancel the delete operation, press ENTER without typing **V**.

V (Verify delete)
verifies that you want to delete the entry. When you press ENTER, the DELETE operation proceeds and the entry is deleted.

R Rename
highlights the name and description fields of an entry for editing, as shown in the following display.

Display 9.3 Renaming an Entry



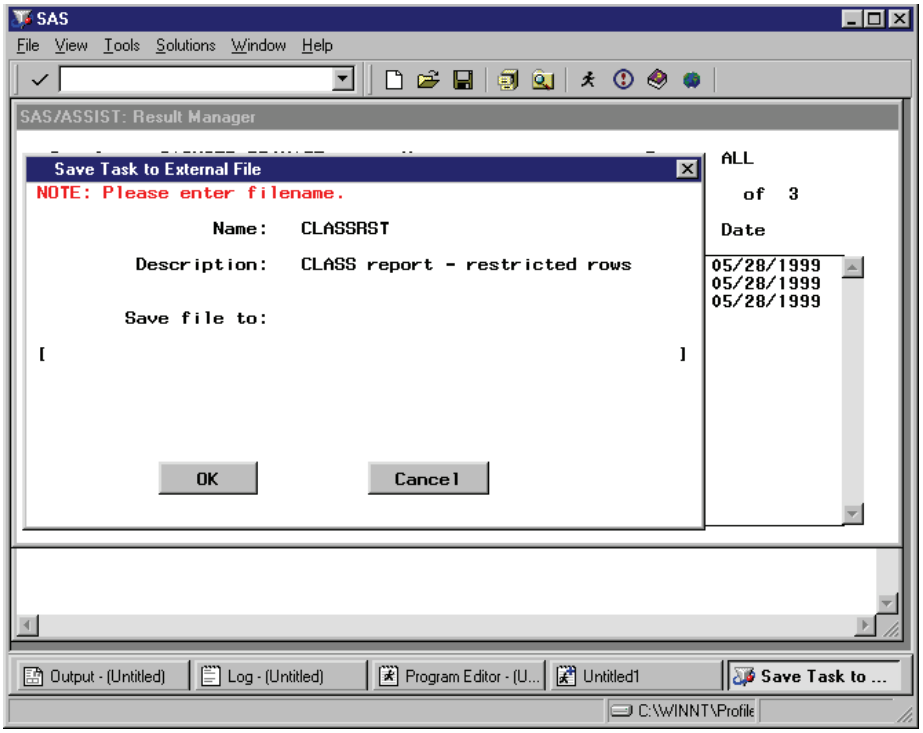
After the fields are highlighted, you can type a new name, a new description, or both. The name must be no more than eight characters long and must begin with a letter or underscore (_). To change only the description, move the cursor to the **`Description`** field and begin typing. A description can be up to 32 characters long and can contain any combination of characters, numbers, and symbols.

Note: Entries of type PROFILE cannot be edited from the Result Manager. △

`L` (Batch execution)
under z/OS, submits a job for batch processing. Entries of type LOG, MANAGER, OUTPUT, PROFILE, or GRSEG cannot be executed in batch. For further information on batch processing, see Appendix 3, “Batch Processing with the Result Manager (z/OS Only),” on page 243.

`F` (File)
saves an entry to an external file. Entry types of GRSEG, MANAGER, or PROFILE cannot be saved to an external file. When you press ENTER, the Save Task to External File window appears with the name and the description of the selected entry already filled in, as shown in the following display.

Display 9.4 Save Task to External File Window

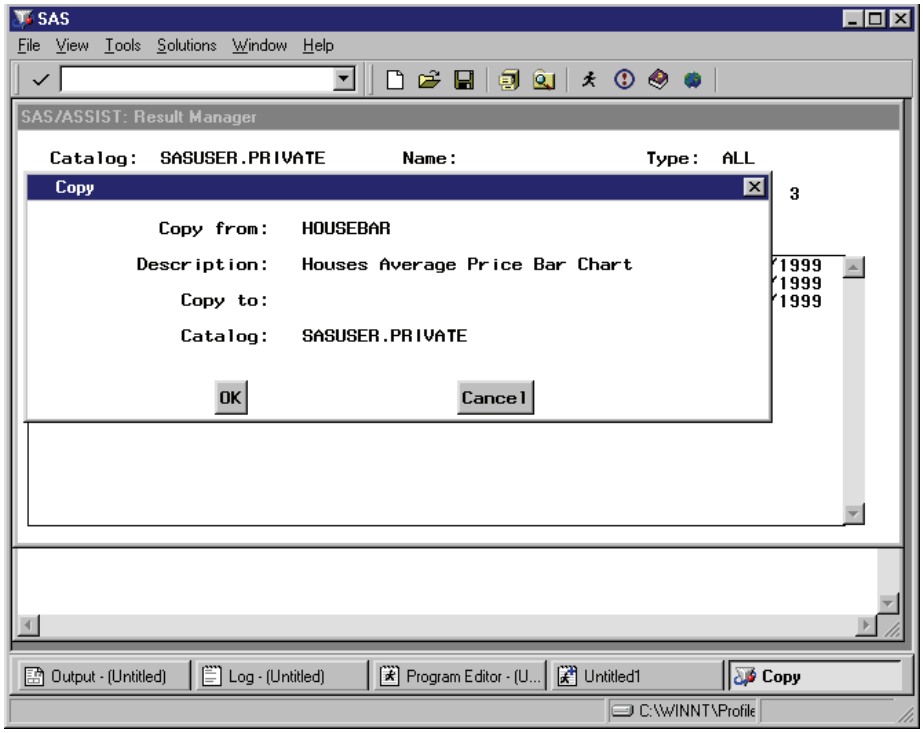


Type a complete pathname in the **Save file to** field. Then select **OK** to process the operation or select **Cancel** to cancel it.

P (Print)
prints an entry. Entry types of MANAGER or PROFILE cannot be printed.

C (Copy)
copies an entry to the catalog entry you specify, using the description from the Result Manager window, as shown in the following display. You cannot copy an entry of type GRSEG or PROFILE.

Display 9.5 Copying an Entry



S (Select)
opens an entry for editing. The functionality of Select is the same as that for Edit.

Saving Source Code to an External File

SAS/ASSIST software creates source code, with descriptive comments, each time you perform a task. In the "Saving Source Code for Editing and Re-execution" chapter of *Getting Started with SAS/ASSIST*, you learned how to save source code to a SAS catalog. This section describes how to save source code to an external file.

Instructions

1. Use the **Tasks** window to access the desired SAS/ASSIST task.
2. Make task window selections. You do not need to run the task in order to save the source code.
3. Follow this selection path:**View ▶ View source**The View SAS Program window appears with the source code for the report.
4. Follow this selection path to save the source code to an external file:**File ▶ Save As File**The Save As window appears.
5. If appropriate to your operating environment, select a folder or directory in which to save the file. Type the filename in accordance with the conventions of your operating environment.
6. Select **OK**. If the external file already exists, a message appears prompting you to type **R** to replace the existing file with the new file, to type **A** to append the new file

to the existing file, or to type **C** to cancel and not save the program to the external file. Type the letter corresponding to the desired action and press ENTER.

7 The View SAS Program window reappears with a message indicating the number of lines written to the external file.

Note: If you have saved a task (catalog type ASSIST) using **Save** from the task window's **File** menu, you can write the saved program to an external file by typing **F** in the **Cmd** field to left of the task in the Result Manager window and pressing ENTER. △

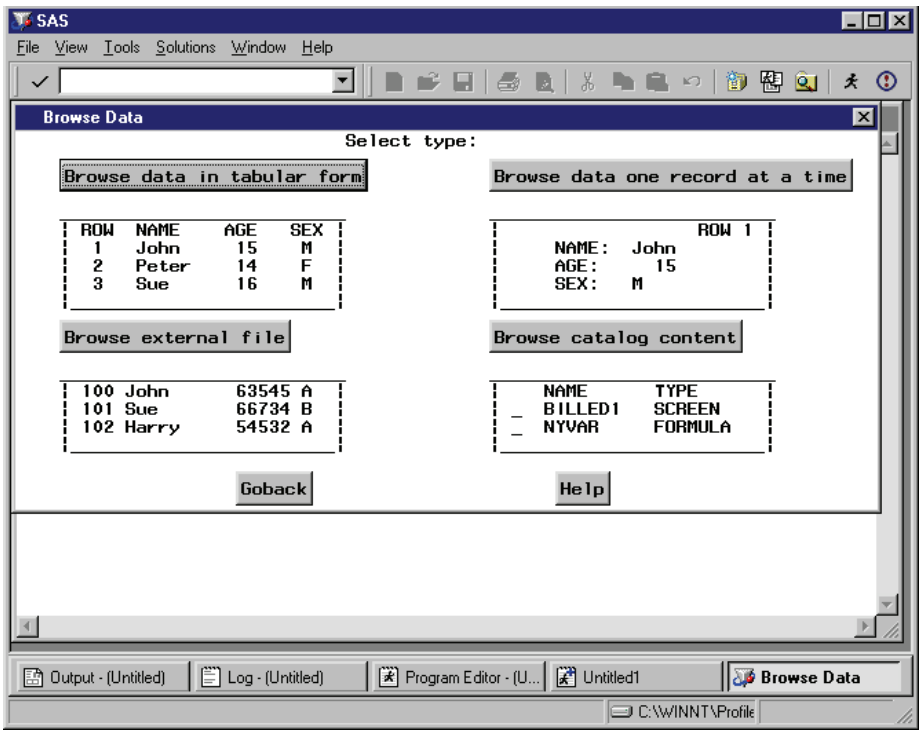
Browsing an External File

This section describes how to browse external files using **Edit/Browse** on the **Data Management** menu. You can browse external files by specifying the filename or fileref of the external file. To browse the external file, you must have SAS/FSP software installed.

Instructions

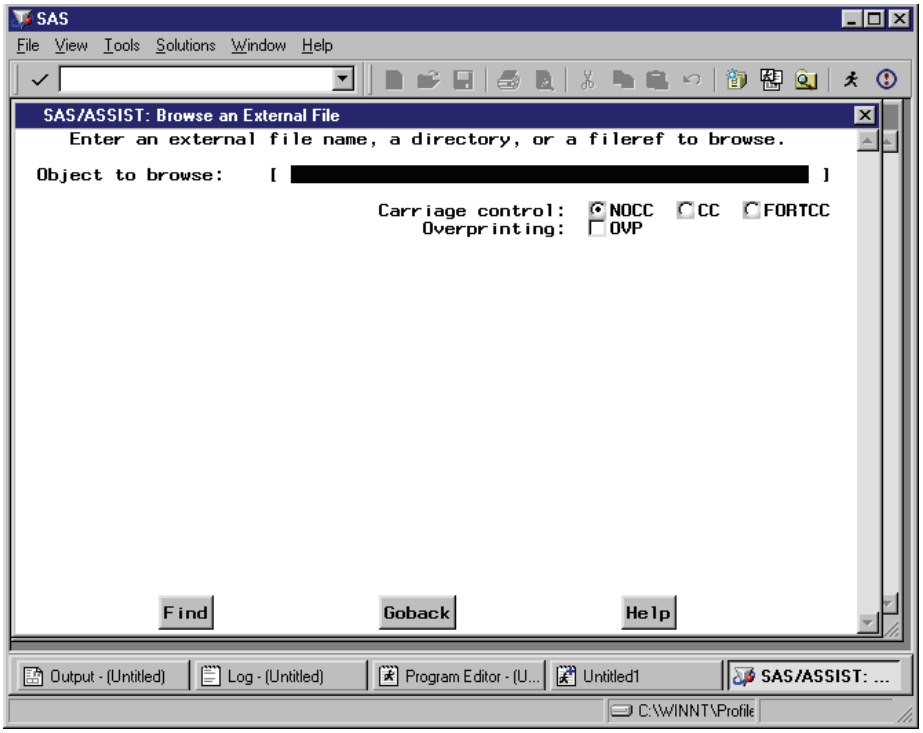
1 To display the Browse Data window, follow this selection path:**Tasks ▶ Data Management ▶ Edit/Browse ▶ Browse data**

Display 9.6 Browse Data Window



2 Select **Browse external file**. The Browse an External File window appears.

Display 9.7 Browse an External File Window



3 In the **Object to browse** field, type the full name, according to your operating environment specifications, of the external file that you want to browse.

   If you have previously associated a fileref with the desired file or directory, you can type the fileref in the **Object to browse** field instead of the complete pathname. If you type a directory name in the **Object to browse** field, a list of files and subdirectories in the directory appears. You can then select the external file you want to browse or select a subdirectory to display files in the subdirectory.

   You can select carriage-control options to display the external file with carriage-control characters assumed in the first position of each record and overprinting options as described.

   - Select **NOCC** to treat carriage-control characters as regular text.
   - Select **CC** to use the native carriage-control characters of the operating environment.
   - Select **FORTCC** to use FORTRAN-style carriage control.
   - Select **OVP** to indicate that the carriage-control code for overprinting is to be honored.

4 Press ENTER. The external file appears in the FSLIST window.

5 When you are finished browsing the file, follow this selection path to return to the WorkPlace menu:**File ▶ Close ▶ Goback ▶ Goback**

Note: You can also access the Browse an External File window by following this selection path:**Tasks ▶ Setup ▶ File management ▶ External files ▶ Browse an external file** △

Creating and Executing a Script File

You may want to execute two or more saved SAS/ASSIST tasks in succession. For example, you may want to run a query and then generate one or more reports. The Result Manager offers you this convenience.

Use a script file to execute several entries in one jobstream. Scripts can be executed interactively or, under z/OS, in batch. A script describes what entries you process and the order of the processing. A script file can be used to execute entries of the types QUERY, SQL, REPORT, SOURCE, and ASSIST.

To create a new script, use the Create Script window to specify the entry names in the following form. The entry names are preceded by the entry types as labels.

ASSIST: name

QUERY: name

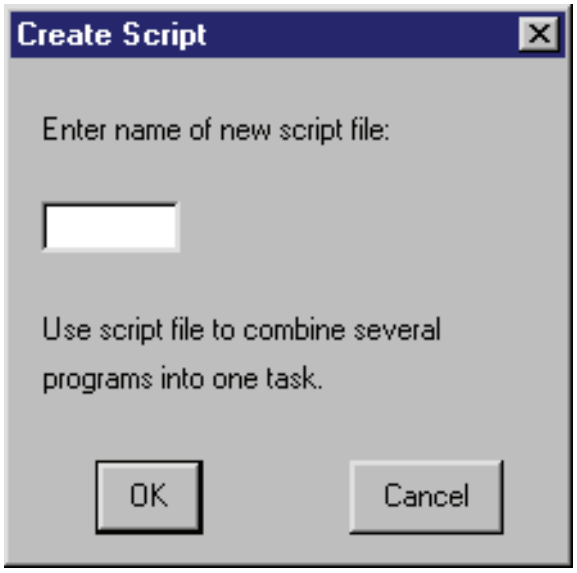
SQL: name

REPORT: name

SOURCE: name

1 From the Result Manager window, follow this selection path:**Tools ▸ Create script**The Create Script dialog box appears.

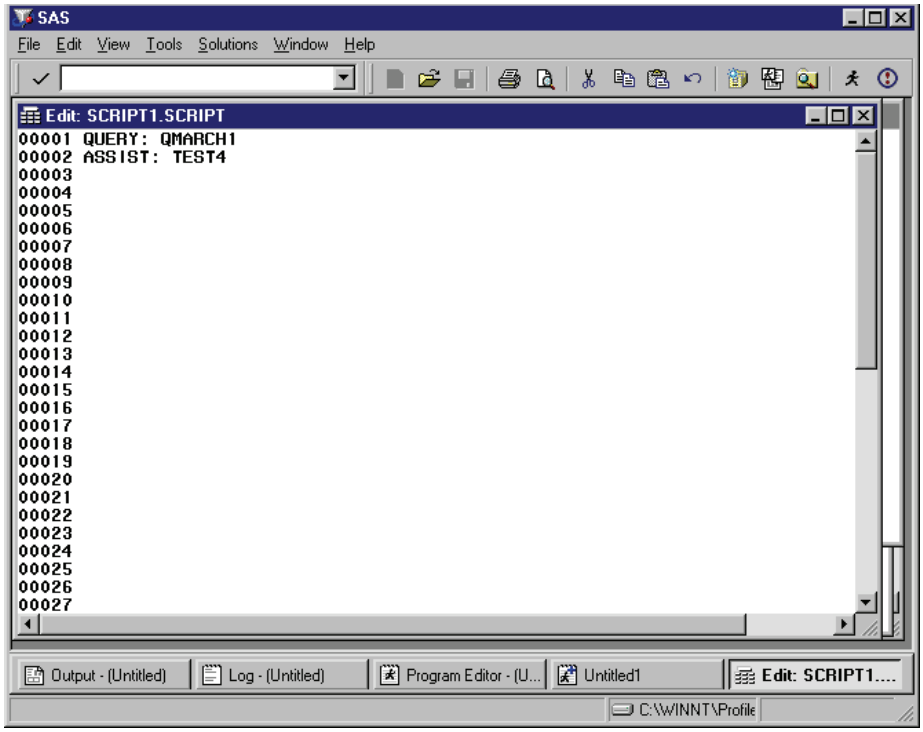
Display 9.8 Create Script Dialog Box



2 Type the name of the script in the text field. The first character must be alphabetic.

3 Select **OK** to open the script editor. Type the name of the entries you want to execute, preceded by their types. The example in the following display specifies that the entry QMARCH1 of type QUERY is to be executed first, followed by the entry TEST4 of type ASSIST.

Display 9.9 Typing the Contents of a Script



Note that the above display is for example purposes only; use your own saved tasks in your script file.

4 Select **Close** from the **File** menu. A prompt appears, asking if you want to save the changes. Select **Yes** to save the entry and return to the Result Manager window. The script appears listed in the Result Manager window.

5 To execute the script, type **X** in the **Cmd** field next to the script entry.

Note: For z/OS only, you can use the L command to execute the script in batch. See Appendix 3, "Batch Processing with the Result Manager (z/OS Only)," on page 243 for additional information. △

CHAPTER

10

Query and Reporting

Introduction to Query and Reporting **156**
Additional Information **156**
Querying Data **156**
Opening the Query Window **157**
Selecting a Query Manager **158**
Opening and Using the Select Window **159**
Typing Names into the Fields **160**
Using Commands to Manipulate the Listings **162**
Expanding a List to Get More Information **163**
Selecting Tables and Columns for Queries **166**
Using the View Menu to Manipulate Columns **166**
Browsing or Editing the Selected Table **167**
Updating a Query Manager **168**
Building a Query **169**
Customizing Your Query **171**
Using the Cmd Field **171**
Using the No Field **171**
Using the Order Field **172**
Using the Usage Field **172**
Retrieving a Subset of Data **173**
Using the Prompt Facility **174**
Defining an Expression **176**
Viewing the SQL Code, Running the Query, and Refining the Output **178**
Viewing the SQL Code **178**
Running the Query **178**
Refining the Output **180**
Limiting the Report's Output **180**
Saving a Query **181**
Resetting the Query Window **182**
Performing a COUNT(*) on a Table **182**
Creating New Tables **182**
Creating a New SAS Table or View **183**
Creating a New DB2 Table (z/OS Only) **183**
Joining Tables **184**
Introducing Table Joins **184**
Joining Tables Manually **186**
Joining Tables Without Defined Relations **186**
Joining Three Tables **189**
Joining Tables with Outer Joins **191**
Defining Relations on Tables **193**
Modifying and Deleting Relations **194**

Joining Tables Automatically **195**
Joining Tables with Multiple Relations **196**
Additional Considerations for Joining DB2 Tables **198**
Referential Integrity **199**
Query and Reporting Setup Options **199**
Query migration **200**
Forms migration **200**
Administration **200**

Introduction to Query and Reporting

This chapter introduces Query and Reporting, a menu-driven interface that is part of SAS/ASSIST software. You use this interface to query and report on both SAS data and DB2 data from SAS. Query and Reporting (Q & R) consists of these windows:

- Query window, which includes an intelligent Query Manager
- SQL Editor window
- Report Engine window
- Result Manager window
- Setup window.

Note: The Setup window is titled Query and Reporting: Setup when you access it through Query and Reporting. It is titled Setup when you access it from the WorkPlace menu or a task window. The two Setup windows contain different options. △

The Report Engine and the Result Manager are discussed elsewhere in this document and in *Getting Started with SAS/ASSIST*. This chapter and the next chapter describe the capabilities of the other windows.

Additional Information

For more information on performing queries with SQL, refer to "The SQL Procedure" in *Base SAS Procedures Guide*.

Query and Reporting provides access to DB2, IBM's relational database management system. You must license SAS/ACCESS software and the SAS/ACCESS interface to DB2 to use this feature. For more information on DB2, refer to either *SAS/ACCESS Supplement for DB2 under z/OS (SAS/ACCESS for Relational Databases)* or *SAS/ACCESS Supplement for DB2 under UNIX and PC Hosts*, depending on your operating environment. For general information on relational databases, see *SAS/ACCESS for Relational Databases: Reference*.

Querying Data

The Query and Reporting Query window is a menu-driven interface that enables you to query SAS or DB2 data. You can create queries that access one or more tables or views. It is not necessary to know your system's SQL syntax. In the Query window you can

- create queries on one or more tables or views that you select

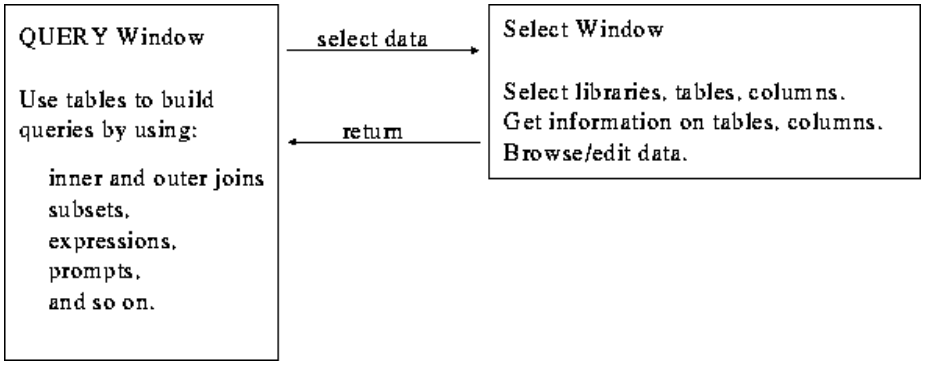
- view, browse, and save the SQL statements that are automatically generated by the queries
- save and run the queries
- create SAS tables, DB2 tables, tables from other DBMSs, or flat files from the queries' output
- perform inner and outer (left, right, and full) joins that retrieve matching and non-matching rows from the contributing tables.

The Query window supports subsetting data, arithmetic expressions, and column functions, as well as group processing and ordering. Queries can contain an unlimited number of prompts. A prompt displays a window that asks users for values when the query is executed.

The output from queries can be saved as SAS tables (that is, SAS data files or data views), as DB2 tables, as tables in any other database for which you have SAS/ACCESS software licensed, or as external files. The generated SQL code can be browsed, and queries can be saved for editing in the SQL Editor window.

To select data for your queries, you use the Select window, which is accessed from the Query window. You select the tables, views, and columns that you use to create your queries. Then in the Query window, you can customize your queries further. The following figure illustrates this process.

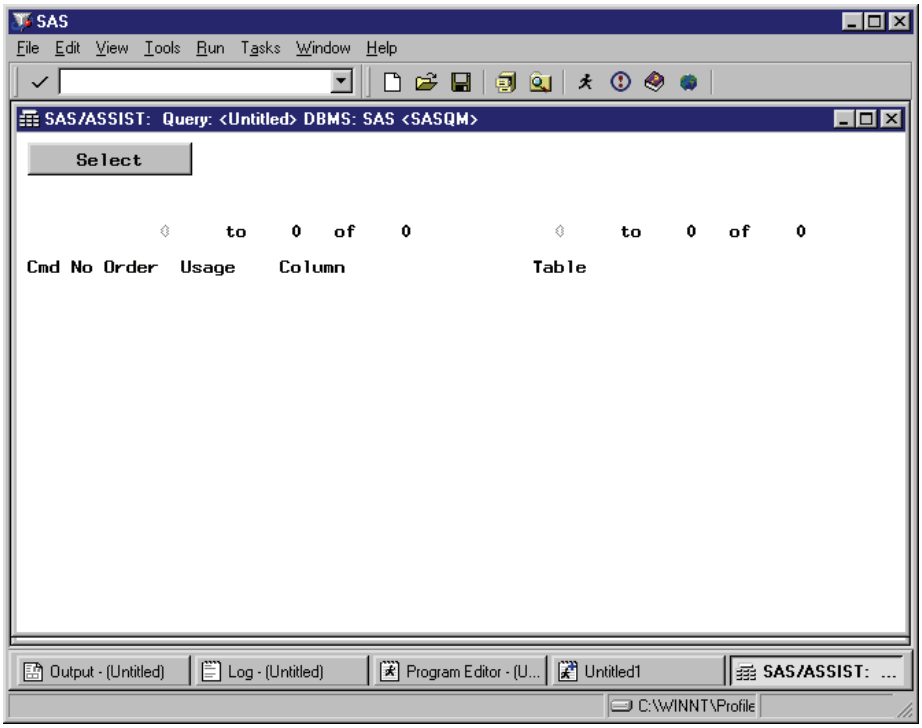
Figure 10.1 The Query Process



Opening the Query Window

To open the Query window, follow this selection path:
Tasks ▸ Data Management ▸ Query ▸ Query and Reporting... ▸ Query
The following display shows the Query window.

Display 10.1 Query Window



The Query window may contain columns and tables that you selected the previous time that you used the Select window. To clear the window for selecting different tables or columns, select **`New`** from the **`File`** menu.

The data that is available to you from the Query window and that is presented in the Select window is based on which Query Manager has been chosen and how that Query Manager is set up, as described in the next section.

Selecting a Query Manager

A Query Manager controls access to your databases. Different Query Managers can be used to access different databases or different parts of the databases. For example, different Query Managers can be used to access different SAS libraries or different DB2 subsystems. A Query Manager defines a group of tables or views (SAS or DB2). The Query Manager maintains information such as the table and column names, indexes, column types, and relationships. The Query Manager also determines which tables, views, and columns you can use to build a query in the Select window.

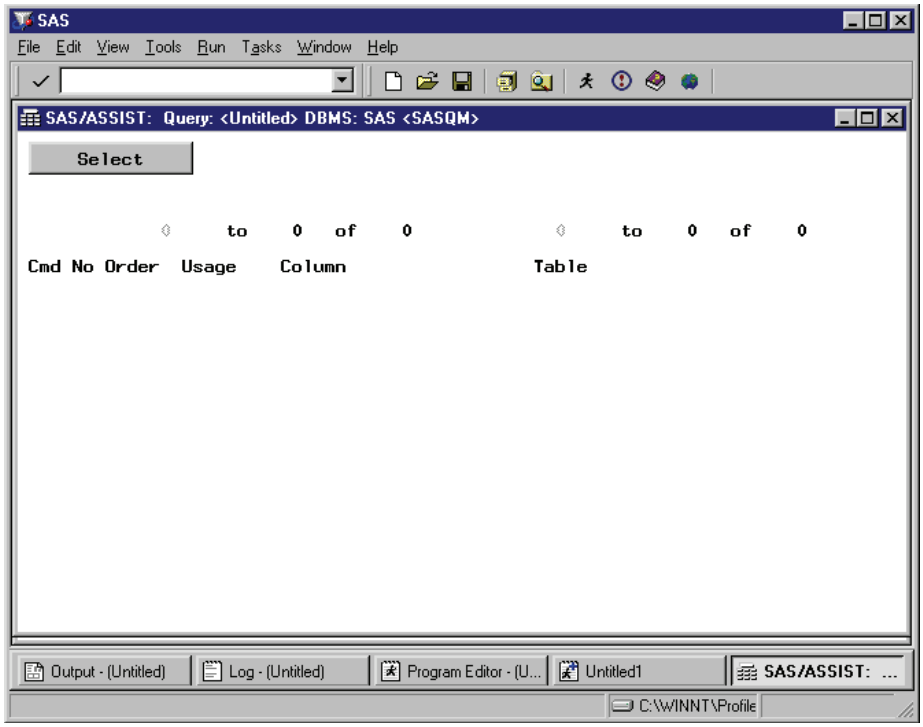
By default, a personal SAS Query Manager, SASQM, is created the first time you enter the Query window. The default personal Query Manager uses all available SAS data libraries in the current SAS session except SASHELP and MAPS.

To choose a Query Manager, follow this path from the Query window to display a list of available Query Managers.

Tools ▶ Select Query Manager

The following display shows a list of Query Managers.

Display 10.2 Query Manager List



Select the Query Manager you want to choose. For this chapter, the SASQM Default SAS Query Manager is used. The list of Query Managers shows the Query Manager name, description, and type. The type of Query Manager can be **M** for Master, **G** for Group, or **U** for User. In the title of the Query window, the **DBMS** field shows the type of Query Manager in use, SAS or DB2, and the name of the Query Manager, for example, SASQM.

Opening and Using the Select Window

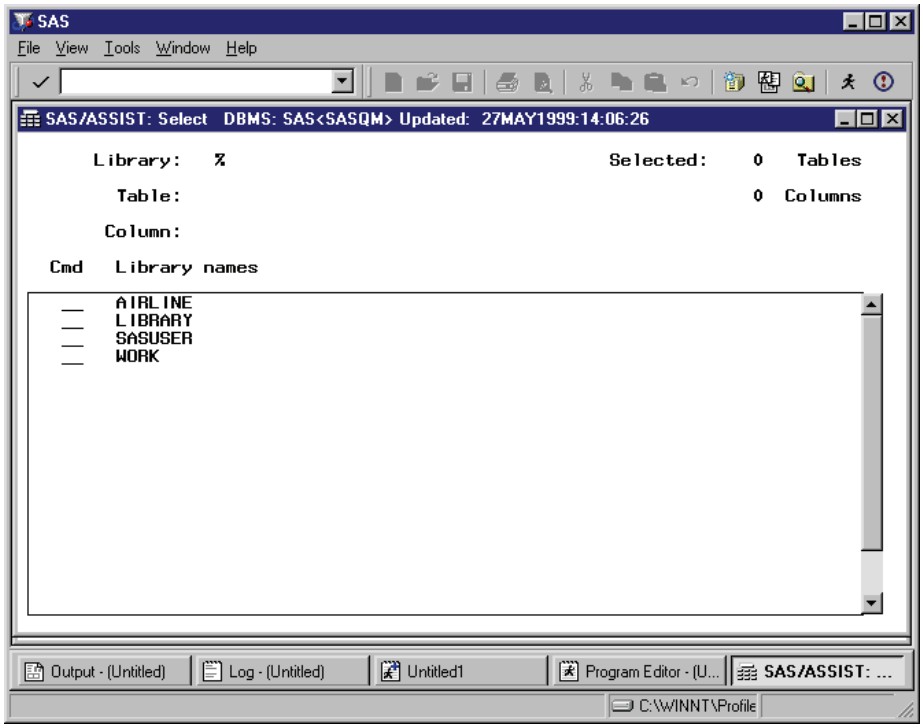
The Select window is part of theQuery window. In this window, you can select the tables and columns that you want to use to build queries. You can get more information about the tables and columns in this window, including

- table and column attributes (column labels, lengths, and so on)
- indexes and key columns
- relations between database tables.

This information is gathered from database systems and additional sources (for example, third-party vendor data dictionaries) and stored in SAS files for fast access. This information is used to generate selection lists and to provide additional information about table and column descriptions, indexes, relations, and so on, between database tables. These relations are used to join tables in the Query window. Furthermore, you can browse or edit data interactively.

To open the Select window from the Query window, choose **Select**. The following display shows the Select window. In this window, you specify the SAS data libraries or DB2 authorization identifiers (called *creators*), tables, and columns that you use to create your queries.

Display 10.3 Select Window



The data presented in the Select window is based on which Query Manager has been chosen and how that Query Manager is set up, as described in the previous section.

You can list your libraries (in DB2, creators), tables, and columns in this window using one of the following methods:

1. Type names or use pattern-matching characters in fields at the top of the window.
2. Manipulate a vertical listing of libraries, tables, and columns with commands.

Typing Names into the Fields

The Select window has three fields where you can type names or pattern-matching characters: **`Library`**, **`Table`**, and **`Column`**.

The pattern-matching character (%) appears in **`Library`** by default and causes the library names to be listed below the fields. You can use the following pattern-matching characters as shown in the following display:

`_` (underscore)
matches any single character

`%` (percent)
matches any sequence of zero or more characters.

You can use pattern-matching characters before or after the characters that you want to match. You can use one or more pattern-matching characters in a field.

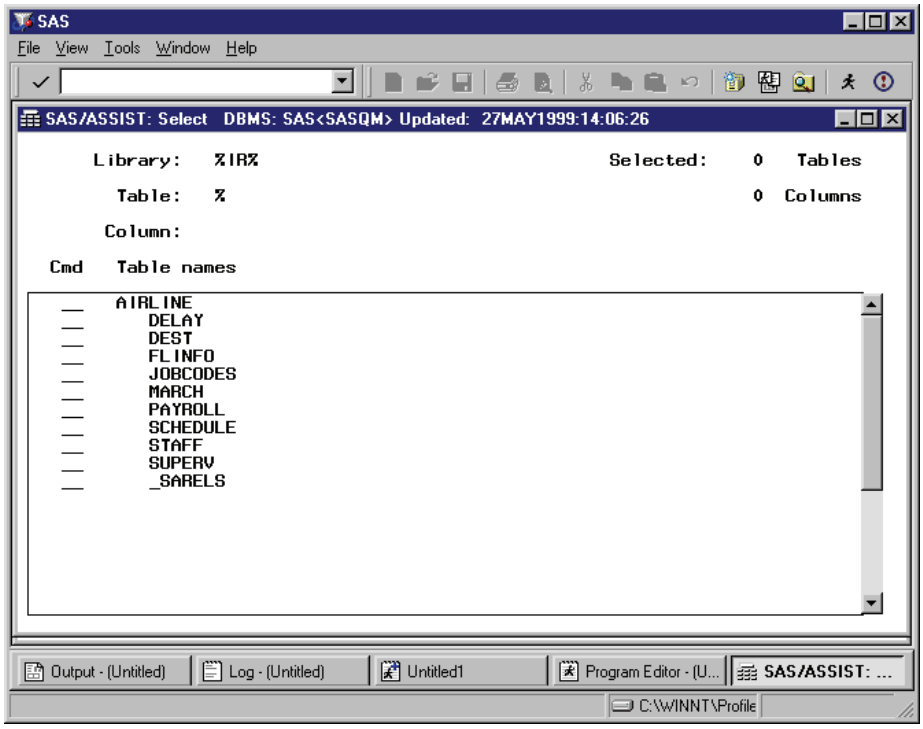
Table 10.1 Pattern-Matching Examples

Field Entry	Displays
`%`	all the libraries, tables, or columns, depending on the field where it is typed
`AIRLINE`	one specific library
`AI%`	one or more libraries that start with AI
`%NE`	one or more libraries that end with NE
`%IR%`	one or more libraries that contain IR
`AIR_INE`	a seven-letter library name that starts with AIR and ends with INE and can have any value in the fourth position.

Searches for the names of the libraries, tables, and columns are fast because this information is stored in the Select window.

In the following display, **`AIRLINE`** is typed in the **`Library`** field and a **`%`** is typed in the **`Table`** field, so that all the tables for the AIRLINE library are shown.

Display 10.4 Select Window With Pattern-Matching Character



The following table shows other ways to combine the pattern-matching characters and object names.

Table 10.2 Examples of Ways to Use the Fields

Action	Results
Type the name of a library	The library name is listed.
Type the names of a library and table	Both the library and table names are listed.

Action	Results
Type the name of a library and `%` in **`Table`**	The library name and all the tables in that library are listed.
Type the name of a library and `%` in **`Table`** and **`Column`**	The library name, all the tables, and all of the columns in those tables are listed.
Type `%` in all three fields	All the library, table, and column names are listed.
Type `%` in **`Library`** and a table name in **`Table`**	The library name(s) for the table are listed, and duplicates of the tables are listed.
Type `%` in **`Library`** and a column name in **`Column`**	All library and table names for that column are listed.

Using Commands to Manipulate the Listings

Specifying commands in the **`Cmd`** field next to the listed libraries, tables, and columns enables you to

- expand or collapse the list of libraries, tables, and columns
- display more information about the tables and columns
- browse or edit the data
- select or deselect tables and columns for your queries.

The following table summarizes the Select window commands that give you more information about your objects. Examples and more information follow this table.

Table 10.3 Select Window Commands

Cmd	Action	Description
`?`	List commands	Lists all possible commands.
`+`	Expand	Shows the tables of a specific library or the columns of a specific table. When columns are listed, any indexes defined on those columns are indicated in the **`Index`** field.
`-`	Collapse	Returns to the previous level; for example, returns from listing the columns to listing just the table names.
`S`	Select	For a table or column, selects it for inclusion in a query. Specify **`S`** to select individual columns in a table (rather than selecting the entire table and then deselecting columns that you do not want).
`D`	Deselect	Removes a table or column from the query; it has no effect on the table itself.
`I`	Info	Provides detailed information about a table or column, including its indexes, relations, and so on.
`EL`	Edit List	Edits multiple rows in a table by using the SAS FSVIEW procedure in edit mode. **`EL`** requires UPDATE privileges and SAS/FSP software.
`E`	Edit Rows	Edits a table one row at a time by using the SAS FSEDIT procedure. **`E`** requires UPDATE privileges and SAS/FSP software.

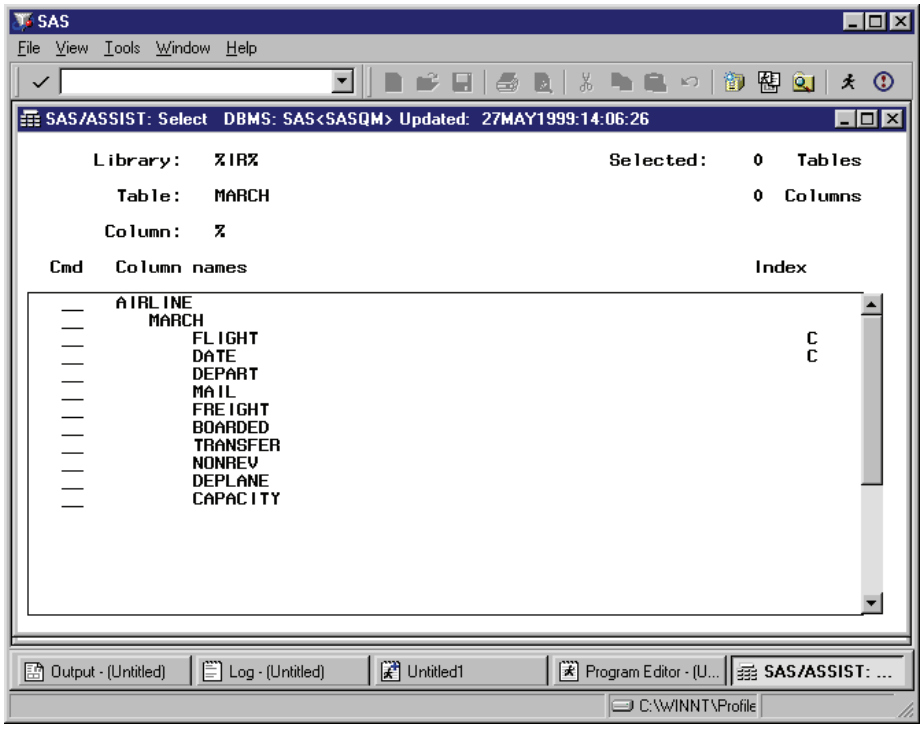
Cmd	Action	Description
BL	Browse List	Browses multiple rows of data in a table by using the SAS FSVIEW procedure. **BL** requires SAS/FSP software.
B	Browse Rows	Browses the data in a table one row at a time by using the SAS FSBROWSE procedure. **B** requires SAS/FSP software.

Note: You can type as many commands as you want before you press ENTER. For example, you can type ten **S** commands to select ten columns and then submit all of them by pressing ENTER once. △

Expanding a List to Get More Information

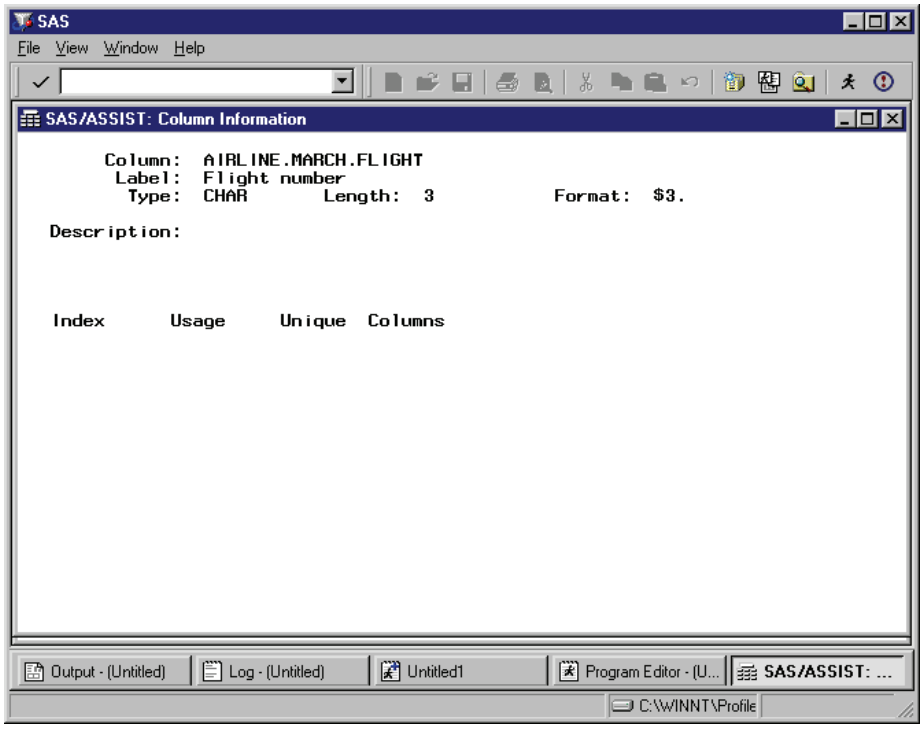
To expand the AIRLINE.MARCH table shown in Display 10.4 on page 161 to list the columns, type **+** in the **Cmd** field next to **MARCH** and press ENTER. The following display shows the expanded table. Notice that the fields at the top of the display change, and that columns with composite indexes are indicated.

Display 10.5 Select Window With Expanded List



Type **I** next to the FLIGHT column to open the Column information window, as shown in the following display. **I** can also be used with tables or columns listed in the Query window and its subwindows.

Display 10.6 Column Information Window



In this example, the Column Information window displays the full column name, its label, and other column attributes.

The following table gives more information about each field in the Column information window:

Table 10.4 Column Information Fields

Field	Description
Column	Fully qualified name for the column.
Label	Label for the column.
Type	Data type for the column.
Length	Width of the column.
Format	(SAS only.) Column format.
Nulls	(DB2 only.) **N** means that the column cannot contain NULL values. **Y** means that the column can contain NULL values.
Description	Additional information about the column.
Index	Name(s) of the index(es).
Usage	(SAS only.) **Simple** means an index based on a single column. **Composite** means an index based on two or more columns.
Cluster	(DB2 only.) **Y** means that the index is a cluster index. **N** means that the index is not a cluster index.

Field	Description
Unique	Whether the index is unique. **Yes** (SAS only) means that the index is unique. **D** (DB2 only) means that duplicates are allowed. **U** (DB2 only) means that the index is unique. **P** means that the index is primary key and unique.
Order	(DB2 only.) **A** means ascending, **D** means descending.
Columns	Columns that contribute to the index.

If information does not apply to a field, the field is left blank. Some fields do not apply to views. If a **>** sign appears in a field, select it to see additional information. Select **Close** from the **File** menu to return to the Select window.

From the Select window, type **I** next to a table name to open the Table information window. This opens a window that is similar to Display 10.6 on page 164. The following table lists information about each field in the Table information window.

Table 10.5 Table Information Fields

Field	Description
Table	Name of the table or view.
Label	Description of the contents of the table.
Created	(SAS only.) Date when the table was created.
Modified	(SAS only.) Date when the table was last modified.
Primary Key	(DB2 only.) Column(s) that make up the table's primary key, if the key is defined.
Description	Additional information about the table.
Database	(DB2 only.) Name of the DB2 database where the table resides.
Tablespace	(DB2 only.) Name of the DB2 table space within the database where the table resides.
Columns	(SAS only.) Number of columns in the table.
Pages	(DB2 only.) Number of pages (typically of 4Kb) that the table uses. This value is -1 if no statistics have been gathered or if it is a DB2 view.
Rows	Number of rows in the table. For DB2 only, **Rows** is -1 if no statistics have been gathered using the DB2 RUNSTATS utility.
Type	For SAS, **DATA** or **VIEW**. For DB2, **T** means table, **V** means view.
Relation	Names of referential constraint(s) in the table.
References	Column(s) in the current table that reference the columns of the referenced table.
Foreign key(s)	(DB2 only.) Column(s) in the current table that reference the primary key of the referenced table.

If information does not apply to a field, the field is left blank. Some fields do not apply to views. If a **>** sign appears in a field, select it to see additional information.

Note: The Information windows are data specific and may vary depending on the data being queried. △

Depending on the setup at your site, you may be able to access additional information about a column or table by selecting **Additional Information** from the **View** menu. Select **Goback** to return to the Column Information or Table Informationwindow from the Additional Information window. The ability to retrieve additional information is controlled by the **Additional Information** User Profile option. See Appendix 2, "Customizing SAS/ASSIST Software," on page 237 for details.

Select **Close** from the **File** menu to return to the Select window.

Selecting Tables and Columns for Queries

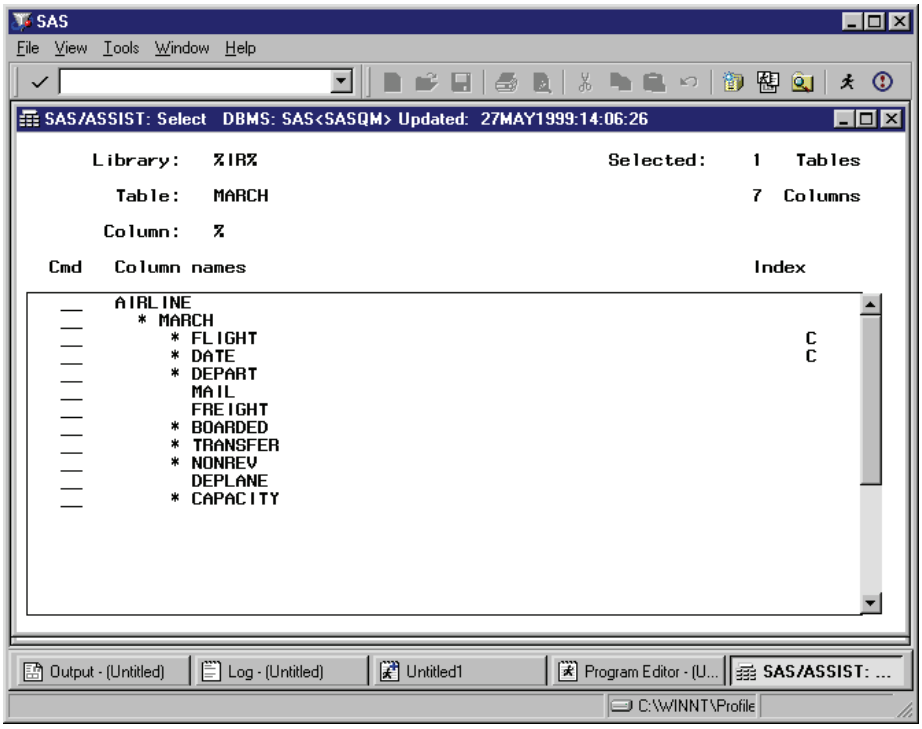
To select tables and columns for inclusion in your queries, type **S** next to the table or column name or names in the Select window. You can type as many commands as you want before you press ENTER.

When you select a table name, you automatically select all of the columns in that table. Asterisks (*) appear next to the table name and all of the columns.

If you want only a subset of the columns, type **D** (for deselect) next to the previously selected columns that you want to omit. The asterisk next to the name is removed. You can also use **D** to deselect a table. Or you can specify **S** to select individual columns in a table (rather than selecting the entire table and then deselecting columns that you do not want).

The following display shows the AIRLINE.MARCH table after it has been selected and some of its columns have been deselected.

Display 10.7 Columns Selected for the Query



Using the View Menu to Manipulate Columns

You can use the items on the **View** menu in the Select window to display all the columns or just selected columns, and to deselect columns. You can also use this menu to display the column names or column labels. You can use these menu items instead of the commands.

Show ▶ All
Displays all the columns in the table(s).

Show ▶ Selected
Displays only selected columns in the table(s).

Deselect All Columns
deselects the table(s) and all the columns.

Show Column ▶ Labels
Displays the columns' labels instead of the names.

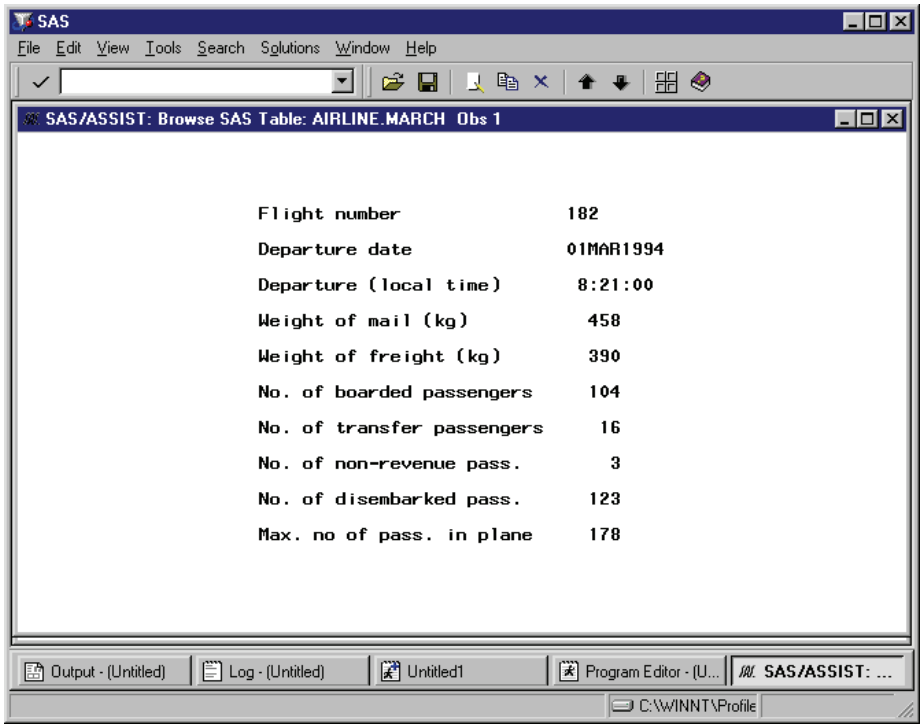
Show Column ▶ Names
Displays the columns' names instead of the labels.

The **Show** item has two choices that act as a toggle. If you choose **Selected**, only the columns you have selected are displayed. The search fields are shown in another color or are "grayed out." Choose **All** to show all columns and to be able to type names in the **Library** and other fields at the top of the window.

Browsing or Editing the Selected Table

If you have SAS/FSP software installed at your site, the Select window also enables you to display the data that you have selected. To browse the data, in the **Cmd** field next to a table name, type **B** (to browse one row at a time) or **BL** (to browse multiple rows). The following table shows the AIRLINE.MARCH table that is displayed by using **B**. All of the table's columns are displayed, not just the columns selected for the query.

Display 10.8 Browsing the AIRLINE.MARCH Table



Note: For z/OS only, settings of the Table Browse and Table Edit options in your User Profile can affect your ability to browse or edit DB2 tables in the Select window (see Appendix 2, "Customizing SAS/ASSIST Software," on page 237) . △

To display a subset of the data, from the Browse window, select **Where** from the **Search** menu, specify a WHERE clause, and select **OK**. Select **Where** again and **OK** without a where clause in the Where window to clear the clause. To edit or update the data in a table that you have selected, type **E** (to edit one row) or **EL** (to edit multiple rows) beside the table name in the Select window. You must have UPDATE access to the table to open it with these commands. Select **Close** from the **File** menu to exit the EDIT or BROWSE window.

After you have selected the tables and columns for queries, you can build your queries, customize them, and run the queries.

Updating a Query Manager

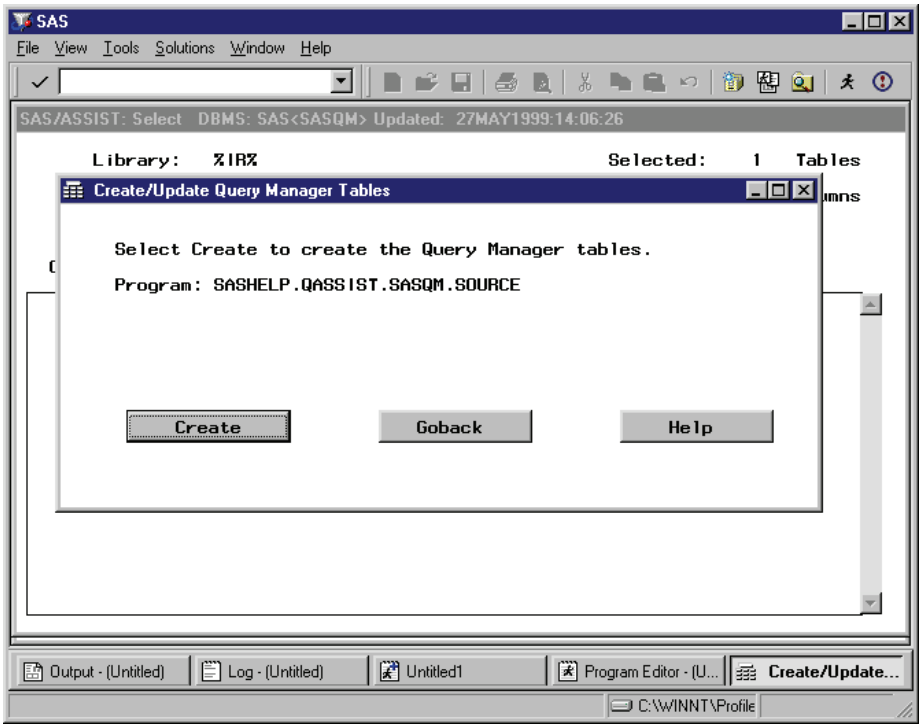
A Query Manager can be static or dynamic. A static Query Manager gives you quick access to information about the structure of your SAS or DB2 tables. However, a static Query Manager requires that you update the Query Manager tables when the structure of the tables changes, for example, when new tables are added to your SAS data libraries or when new columns are added to the tables.

A dynamic Query Manager always reflects the most current structure of the SAS or DB2 tables to which you have access in your SAS session. For example, if you add new tables (SAS data sets) to your SAS data libraries or add new columns to your tables, these changes are automatically reflected by the dynamic Query Manager. However, information about the structure of the tables is displayed more slowly when you use a dynamic Query Manager.

If you use a static Query Manager, you should update your Query Manager periodically to reflect the most current structure of your tables. The time stamp in the title line of the Select window shows when the static Query Manager tables were last updated.

To update the Query Manager, select **Update Query Manager** from the **Tools** menu of the Select window. The Create/Update Query Manager Tables window appears.

Display 10.9 Create/Update Query Manager Tables Window



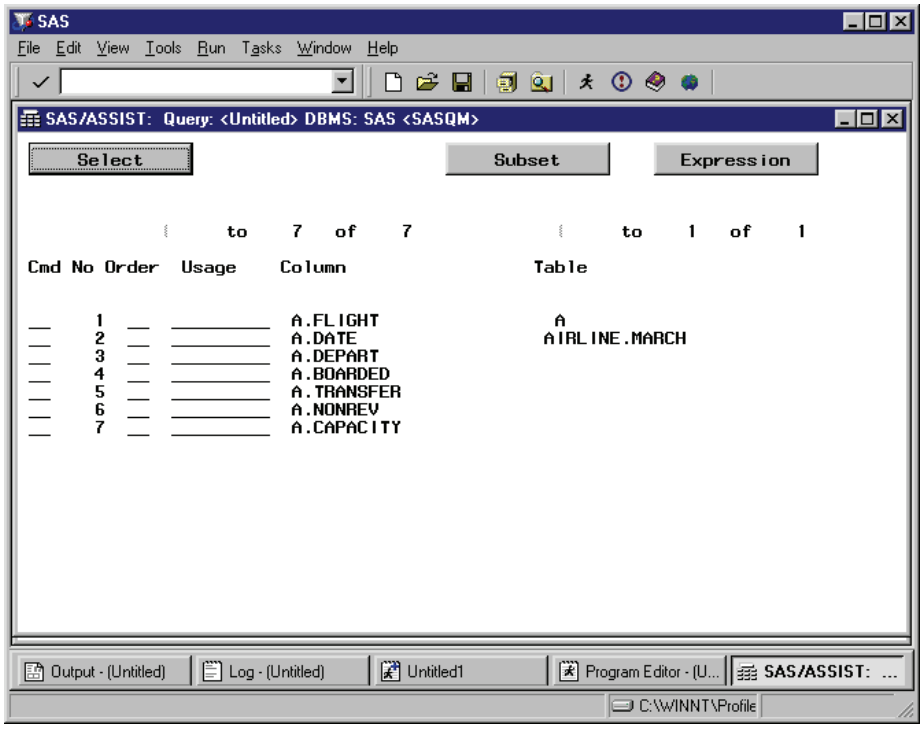
If a Query Manager creation program has been defined, you can select **Create** to execute this program. The program updates your Query Manager to reflect the current structure of your tables. The name of the program that is used to update the Query Manager tables is shown in the Create/Update Query Manager Tables window.

The decision to make a Query Manager static or dynamic is normally made by the designer of the Query Manager, usually a system administrator. Contact your SAS Support Consultant for details.

Building a Query

To build a query on the table that you have selected, you must first return to the Query window; from the Select window, choose **Close** from the **File** menu. Any tables that you have selected in the Select window are displayed in theQuery window, as shown in the following display. **<UNTITLED>** appears in the Query window name because you have not given your query a name yet (you do so later in "Saving a Query" on page 181).

Display 10.10 Query Window With AIRLINE.MARCH Table



The Query window assigns aliases to the tables and columns. An *alias* is a temporary, alternate name for a table. If you select two tables that have columns with the same name, the aliases are used so that you can distinguish them. In the previous display, the AIRLINE.MARCH table is assigned an alias of **A**.

If you chose one table in the Select window, **Subset** and **Expression** are displayed. If you select multiple tables, **Join** is also displayed in the window.

If your query has many columns or several tables so that the list of columns extends beyond one display of this window, you can see the other columns in one of two ways:

- Scroll forward (down) or backward (up) by using the **View** menu items.
- Change the numbers in the ranges above the listed columns and tables. For example, the AIRLINE.MARCH table in the previous display shows this range:

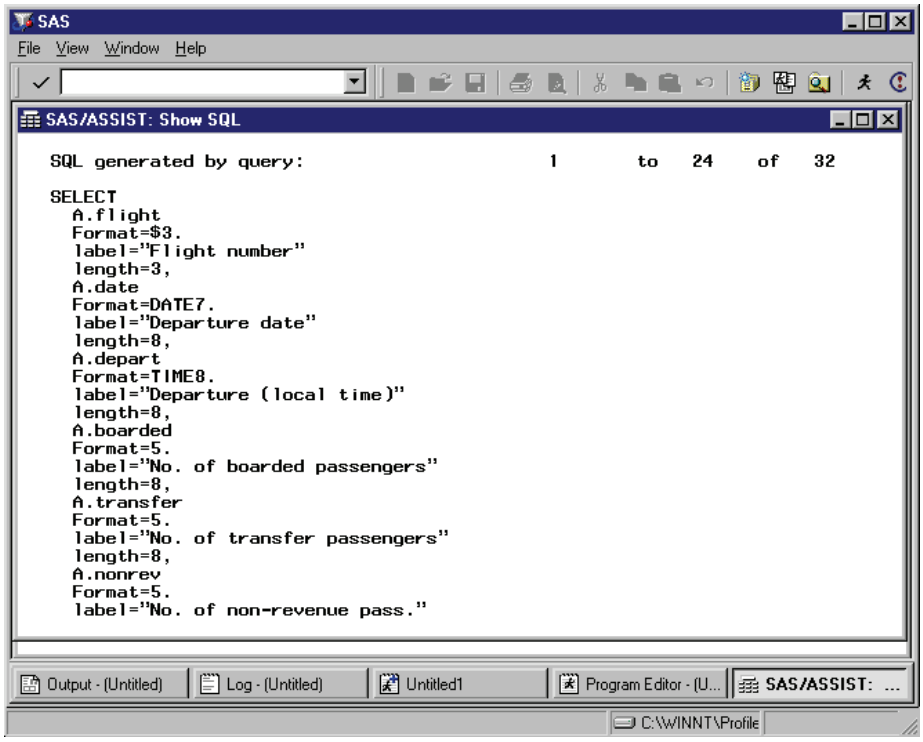
```
1 to 7 of 7      1 to 1 of 1
```

The range on the left refers to the columns in the table. This example shows selected columns for the query on AIRLINE.MARCH. However, if you had many columns in your table, you could specify the first number of the range in the first field. For example, if you have 27 columns in the table, and you change the first number in the left range to 5 and press ENTER, the range changes to **`5 to 20 of 27`**. Columns 5 to 20 are displayed in the window. The total number of columns in the table does not change.

The range on the right refers to the number of tables in the query. Again, you can specify the first number of the range that you want to see. The total number of tables does not change.

To see the SQL that has been created by selecting columns from the AIRLINE.MARCH table, select **`Show SQL`** from the **`View`** menu. The first page of the SQL code is shown in the following display.

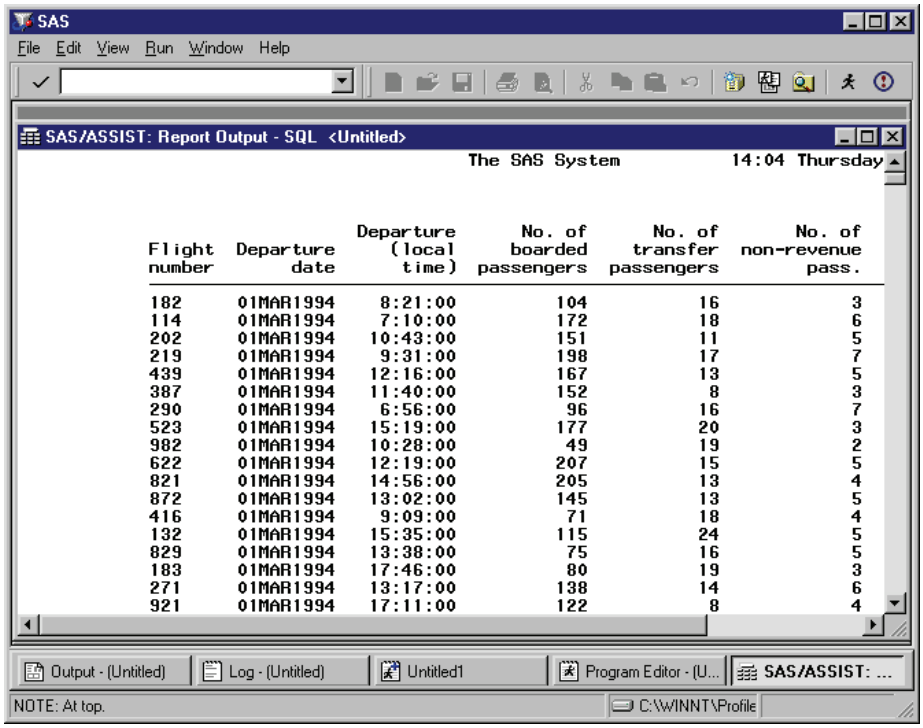
Display 10.11 Show SQL Window



This window also has a range so that you can scroll to a particular line of code. Select **`Close`** from the **`File`** menu to return to the Query window.

To run this query, within the Query window, select **`Submit`** from the **`Run`** menu. The following display shows the results.

Display 10.12 Query Results



When you return to the Query window, a message indicates how many rows were retrieved.

Note: You can use the Report Engine window to enhance the report, as described in Chapter 5, "Doing More with the Report Engine," on page 61. Select **`Report Engine`** from the **`View`** menu to go directly to the Report Engine window. △

Customizing Your Query

You can customize your query by re-ordering the columns, applying aggregate (summary) functions to the columns, retrieving a subset of the data, setting up a prompt for queries, or adding fields that include arithmetic expressions to the selection list.

Using the Cmd Field

The **`Cmd`** field accepts these commands:

`I`	Displays information about the column, as described in "Expanding a List to Get More Information" on page 163.
`D`	Permanently deselects (excludes) one or more columns from your query.
`R`	Repeats the row, adding the duplicate after the row to be repeated.
`?`	Displays a list of available commands.

Using the No Field

Although the **`No`** field (abbreviated from "Number") does not accept commands, you can use it to perform these actions:

1 Blanking out or "erasing" a number in this field omits the column temporarily from the query. The omitted column moves to the bottom of the column list. You can retype the number to select the column again.

2 Typing a new number over a current number reorganizes the column order accordingly. For example, if you want **A.NONREV** to be the first column in Display 10.10 on page 169, type **1** in the **No** field next to **A.NONREV** and a different number for **A.FLIGHT** (the previous Column 1). When you press ENTER, the columns are reordered.

Using the Order Field

The **Order** field accepts these commands:

A	Organizes the data within each column in ascending order, that is, in numeric order or alphabetic order from A to Z.
D	Organizes the data within each column in descending (reverse) order, such as the highest miles traveled to the lowest miles traveled.
?	Displays a list of available commands.

You can designate one column as **A** and another as **D** within the same query. If you want the sorting order (ascending or descending) to be different from the column order, you can combine a letter (**A** or **D**) with a number in the **Order** field. This affects only the query's output and not the ordering of any columns in the Query window.

For example, to list the dates and departure times in the AIRLINE.MARCH table in ascending order, you specify **A1** next to the **A.DATE** and **A2** next to **A.DEPART**. This would have the same effect as if you wrote the following SQL query:

```
select a.depart, a.date
   from airline.march a
   order by a.date asc, a.depart asc;
```

Using the Usage Field

The **Usage** field accepts several commands that apply summary (aggregate) functions on the values in the designated column as shown in the following table.

Table 10.6

Command	Function
GROUP	Groups data by the values in the column
SUM	Computes the sum of values in the column
MIN	Lists the lowest value (minimum)
MAX	Lists the highest value (maximum)
MEAN	Averages or finds the mean of values in the column; equivalent to AVG
AVG	Averages or finds the mean of values in the column
COUNT	Counts the number of distinct, nonmissing values
N	Counts the number of distinct, nonmissing values
CSS	Reports the corrected sum of squares
CV	Returns the coefficient of variation (percent)

Command	Function
NMISS	Reports the number of missing values
PRT	Reports the probability of a greater absolute value of Student's *t*
RANGE	Reports a range of values
STD	Shows the standard deviation
STDERR	Returns the standard error of the mean
SUMWGT	Returns the weighted sum
T	Returns the Student's *t*
USS	Returns the uncorrected sum of squares
VAR	Returns the variance

When you use summary functions in queries, columns with no usage are treated as if they have GROUP usage. With SAS data, use the **Grouping in summary** User Profile option to specify which action to take when using summary functions in queries. If you set this option to **Pop-up**, you are prompted whether or not to apply the GROUP usage to all columns. If you set this option to **Yes**, the GROUP usage is automatically applied to all columns. If you set this option to **No**, the GROUP usage is not applied to any columns. See Chapter 9, "Doing More with Results," on page 143 and Appendix 2, "Customizing SAS/ASSIST Software," on page 237 for additional information. Note that in DB2 queries, the GROUP usage is always applied to all columns.

Retrieving a Subset of Data

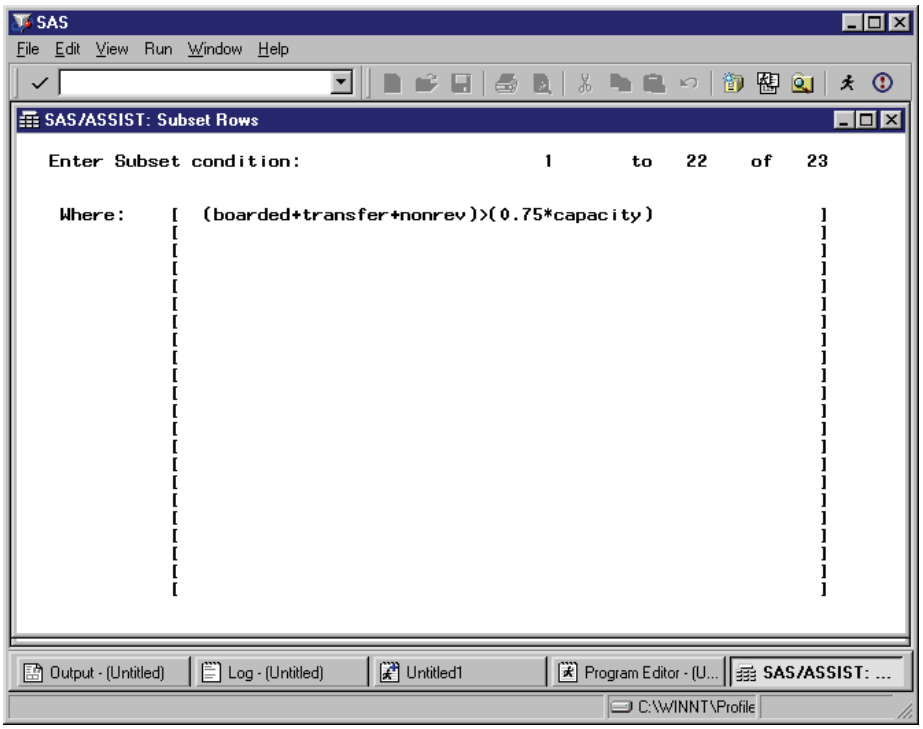
To retrieve some but not all rows of data in a query, apply subsetting criteria to the data. In this example, you apply a subsetting criterion that retrieves information about flights that were filled to at least three-quarters capacity.

1. Select **Subset** from the Query window to open the Subset Rows window. In this window, you specify your subsetting criteria (also called WHERE predicates). Do not include the word WHERE.
2. On the first line, type the following:

```
(boarded+transfer+nonrev)>=(0.75*capacity)
```

   The following display shows the edited Subset Rows window.

Display 10.13 Subset Rows Window



Note that if only one table is selected for the query, the alias is not required for identifying columns in the Subset Rows window.

3 Follow this selection path to save your subset criteria and return to the Query window:**File ▶ Close**The word **`Specified`** appears under **`Subset`**, so you know that selection criteria have been applied to this query.

If you do not remember the name of a column, you can choose it from a selection list. Position your cursor in your subsetting criteria where you want the column name. Select **`Add Column Name`** from the **`Edit`** menu. A list of columns in the current tables appears. First select a table from the list, and then select a column name. The column name is added to your subsetting criteria.

Using the Prompt Facility

You can use prompts to run the same query several times on different subsets of data. When you run a query with a prompt, a window opens where you type a subset value. The rest of the query is then run with this value. Prompts give you more flexibility in customizing your program.

The following steps show you how to create a prompt window. In this example, you create a prompt that asks for a time value. The prompt is used to return only rows with a departure time of or earlier than the user-supplied time value.

1 Re-open the Subset Rows window.

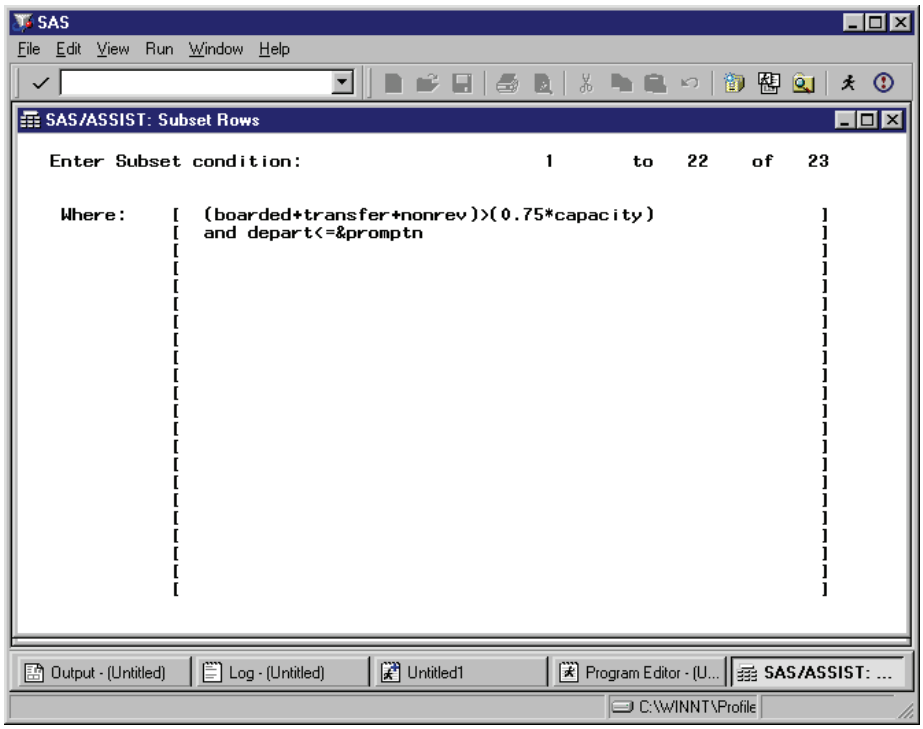
2 On the second line, type the following:

```
and depart<=&promptn
```

- **`and`** is a logical operator that specifies that both of the criteria must be met for the row to be included in the output. Other logical operators are **`or`** and **`not`**.
- **`&promptn`** is the name of the prompt. The prompt name must be seven characters or fewer and must be preceded by an ampersand (**`&`**).

The following display shows the edited Subset Rows window.

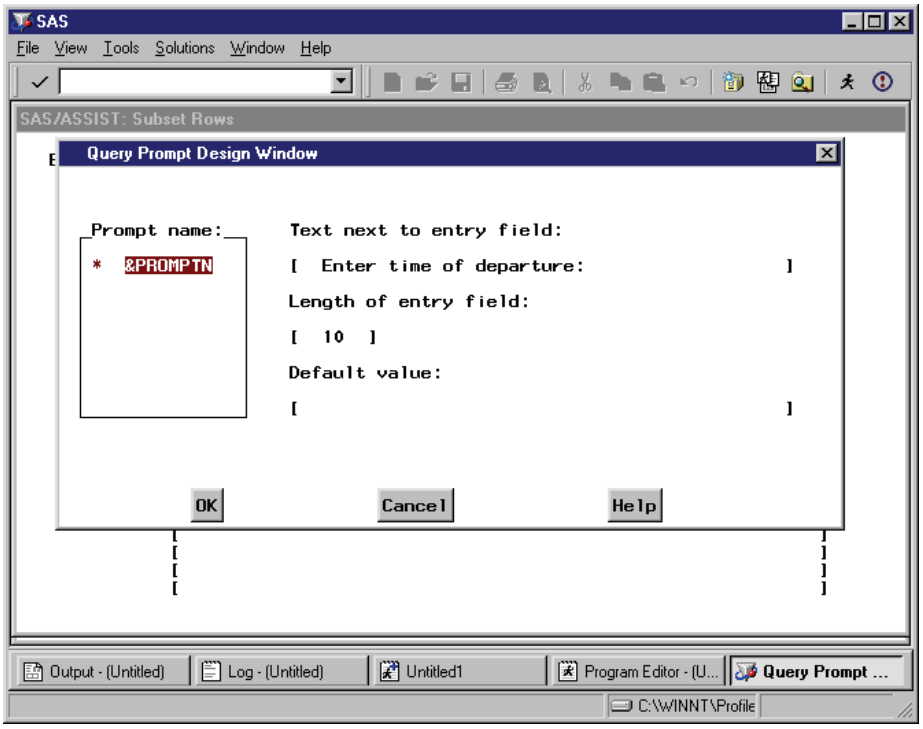
Display 10.14 Adding a Prompt to the Subset Rows Window



3 Select **Prompt** from the **Run** menu. The Query Prompt Design window appears.

4 Fill in the fields as shown in the following display.

Display 10.15 Query Prompt Design Window



The **Default value** field is optional; if used, this value appears in the prompt window for the user to either accept or overwrite.

5 Select **OK** to return to the Subset Rows window.

6 Select **Close** from the **File** menu to return to the Query window.

You can create an unlimited number of prompts for a query. You can use a prompt to substitute any part of the subsetting criteria, such as a logical operator (AND, OR, NOT), and you can use SAS macro functions.

Note: The prompt facility is also available from the SQL Editor window and from the Query Expression window. △

Defining an Expression

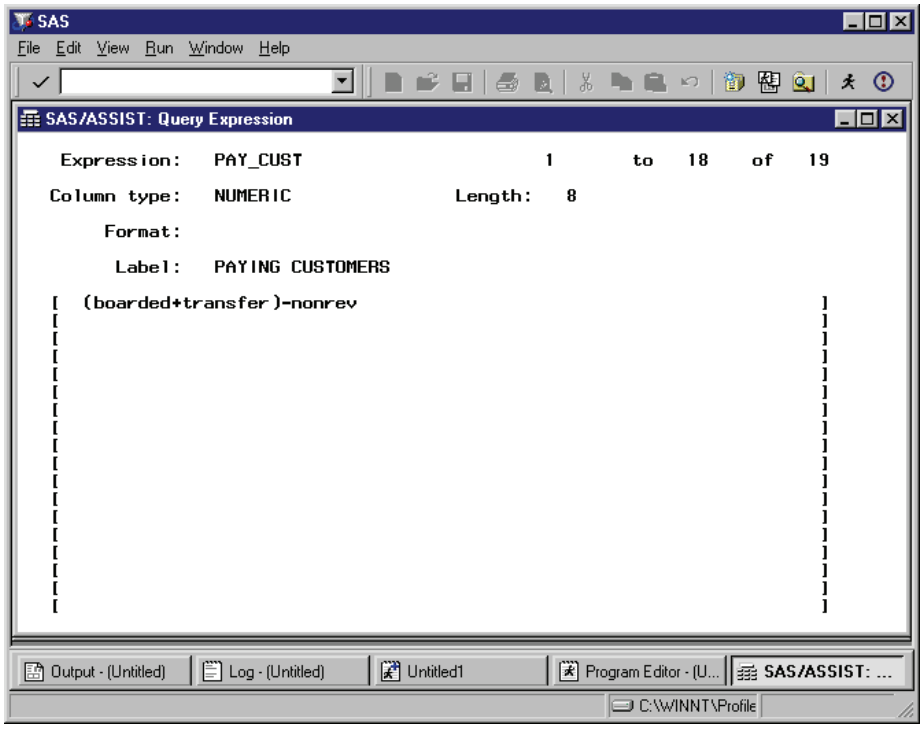
An expression uses column names, functions, or constants to compute a result. The expression creates a new column in the query. In this example, you create a column that contains the number of paying customers on each flight.

1 Select **Expression** from the Query window. The Query Expression window appears.

2 The expression is called EXP_*nnn* by default. If desired, change it by typing over the name in the **Expression** field. You can change the data type in the **Column type** field by typing over the default value or by typing a **?** in the field to display a selection list of data types. You can also supply values for the **Format** and **Label** fields.

Add your expression below the **Label** field as shown in the following display.

Display 10.16 Query Expression Window



Note that if only one table is selected for the query, the alias is not required when identifying columns in the Query Expression window.

The previous display shows the Query Expression window filled in, with the name changed to PAY_CUST, the column type as NUMERIC, a LENGTH of 8, and the label "PAYING CUSTOMERS" assigned. An expression to calculate the number of paying customers is added after the label.

If you do not remember the name of a column, you can choose it from a selection list. Position your cursor in your expression where you want the column name. Select **`Add Column Name`** from the **`Edit`** menu. A list of columns in the current tables appears. First select a table from the list and then select a column name. The column name is added to the expression.

3 Select **`Close`** from the **`File`** menu to return to the Query window. The word **`Specified`** appears under **`Expression`** to indicate that an expression has been applied to this query, and the new column, PAY_CUST, appears in the list of columns.

The next time you select **`Expression`** from the Query window, a list of expressions appears; select an expression to modify or select **`<NEW>`** to create a new expression. Alternatively, you can edit an expression by typing **`I`** in the **`Cmd`** field next to the expression name.

You can add unlimited expressions to a query. To delete an expression, select **`Expression`** from the Query window and select the expression to be selected. From the Query Expression window, select **`Clear`** from the **`Edit`** menu. Alternatively, delete the column in the Query window by typing **`D`** in the **`Cmd`** field next to the expression name.

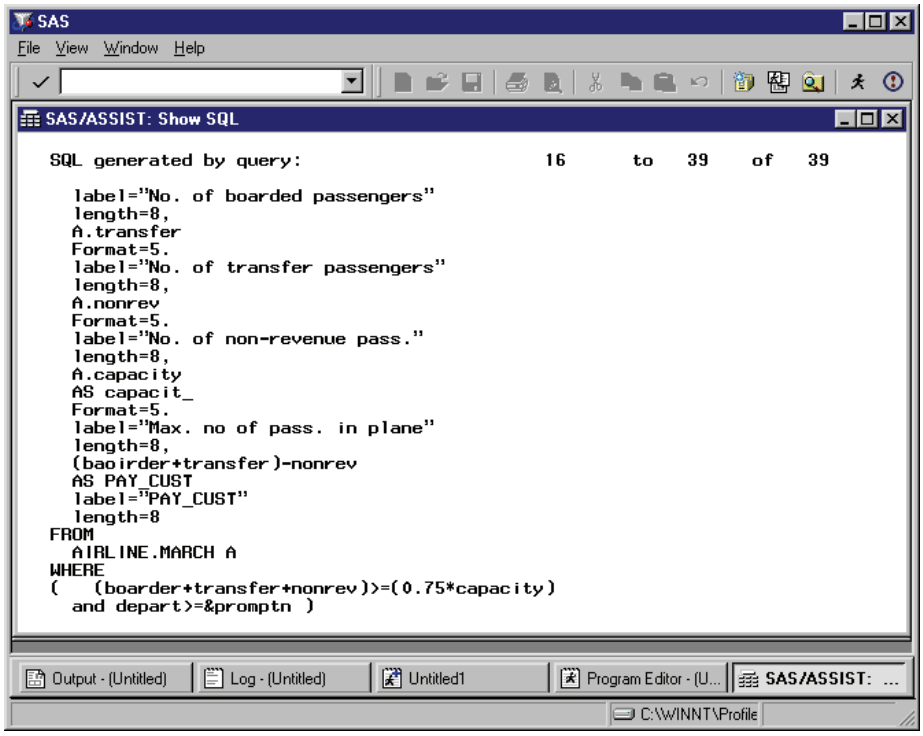
Viewing the SQL Code, Running the Query, and Refining the Output

Viewing the SQL Code

As you make changes to a query, the SQL code changes. You can browse the code by selecting **`Show SQL`** from the **`View`** menu in the Query window, the Subset Rows window, the Query Expression window, or the Join Manager window.

The SQL code in the following display is based on the query on the AIRLINE.MARCH table constructed in the previous sections. Scroll down to see the changes.

Display 10.17 Show SQL Window

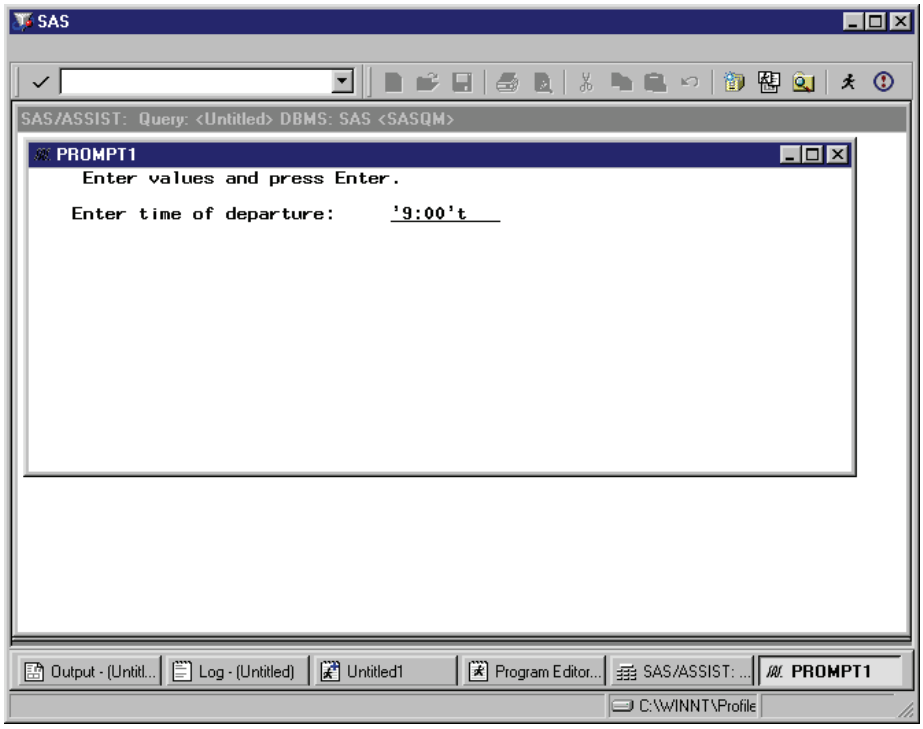


Select **`Close`** from the **`File`** menu to return to the Query window.

Running the Query

1 To run the query, follow this selection path from the Query window: **Run ▶ Submit**The Prompt window appears.

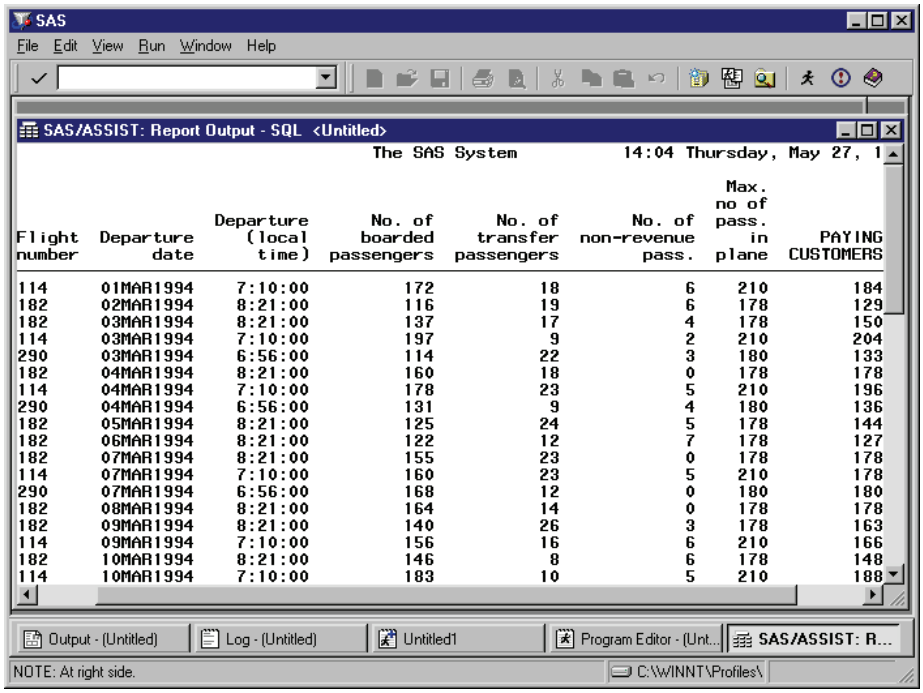
Display 10.18 Prompt Window



For this report, specify **'9:00't**, Make sure to use single quotation marks (') around the date value, and include the **t** after the closing quote to convert the time to a SAS time value.

2 Press ENTER. The query returns your output.

Display 10.19 Query Results



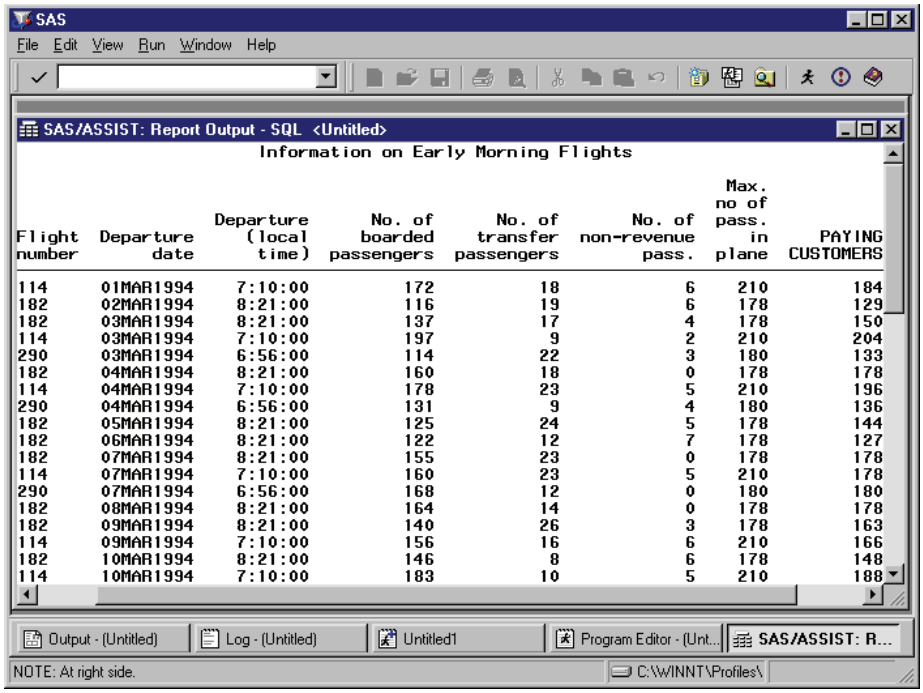
Refining the Output

To enhance the appearance of your report, make the following changes:

1. From the Report Output window, select **Titles** from the **Edit** menu. Add the title **Information on Early Morning Flights**. Select **Close** from the **File** menu; when prompted, select **Yes** to save the changes to the Titles window.
2. Select **Page Layout** from the **Edit** menu. If the **Date** value is **YES**, set it to **NO** to remove the date and time listing in your report. Set the **Center** value to **YES**, which centers the title. Select **OK**.

Select **Close** from the **File** menu to return to the Query window, then re-run the query by selecting Submit from the **Run** menu. The following display shows the modified report output.

Display 10.20 Query Results With Refinements



Flight number	Departure date	Departure (local time)	No. of boarded passengers	No. of transfer passengers	No. of non-revenue pass.	Max. no of pass. in plane	PAYING CUSTOMERS
114	01MAR1994	7:10:00	172	18	6	210	184
182	02MAR1994	8:21:00	116	19	6	178	129
182	03MAR1994	8:21:00	137	17	4	178	150
114	03MAR1994	7:10:00	197	9	2	210	204
290	03MAR1994	6:56:00	114	22	3	180	133
182	04MAR1994	8:21:00	160	18	0	178	178
114	04MAR1994	7:10:00	178	23	5	210	196
290	04MAR1994	6:56:00	131	9	4	180	136
182	05MAR1994	8:21:00	125	24	5	178	144
182	06MAR1994	8:21:00	122	12	7	178	127
182	07MAR1994	8:21:00	155	23	0	178	178
114	07MAR1994	7:10:00	160	23	5	210	178
290	07MAR1994	6:56:00	168	12	0	180	180
182	08MAR1994	8:21:00	164	14	0	178	178
182	09MAR1994	8:21:00	140	26	3	178	163
114	09MAR1994	7:10:00	156	16	6	210	166
182	10MAR1994	8:21:00	146	8	6	178	148
114	10MAR1994	7:10:00	183	10	5	210	188

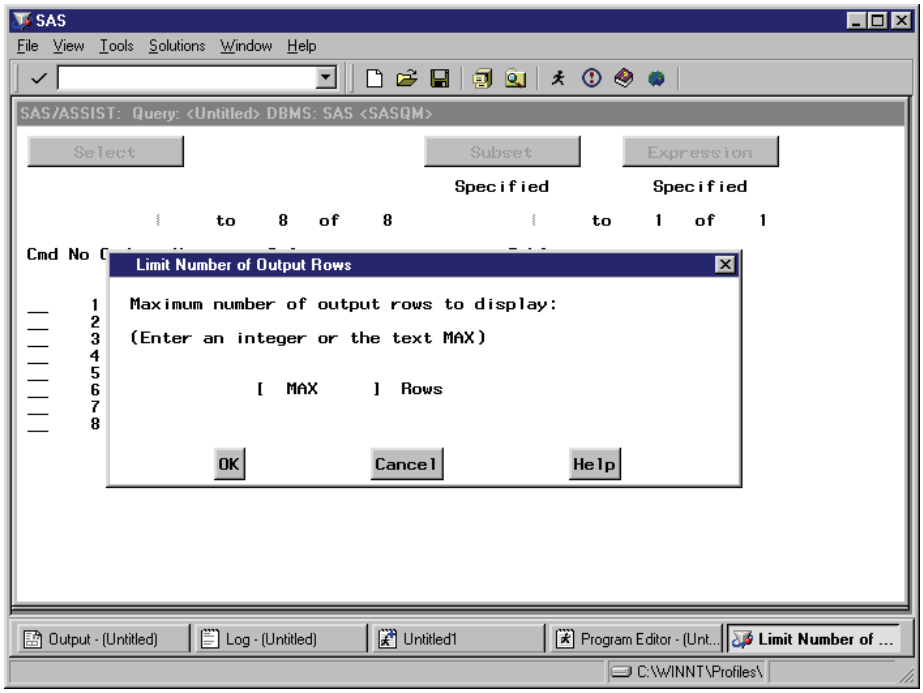
Select **Close** from the **File** menu to return to theQuery window.
To save your output as a SAS or DB2 table, see “Creating New Tables” on page 182

Limiting the Report’s Output

If you anticipate that your report may have many rows of output and you need to see only some of them, you can limit the number of rows processed. Doing so might also shorten the time the query runs, unless you have used summary (aggregate) functions that must be computed on every row in the query.

To limit the number of rows in your output before you run the query, select **Limit Output Rows** from the **Edit** menu of the Query window. The Limit Number of Output Rows window appears.

Display 10.21 Limit Number of Output Rows Window



The default value is **MAX**. Type the number of rows that you want to display and select **OK**.

When you exit the window, be aware that the specified limit always limits the number of rows displayed in the Report Output window. It also limits SAS or DB2 processing unless the query contains summary functions that force processing of all rows of the table(s) before returning the output to SAS.

If a limit has been placed on the number of output rows in your User Profile, you might be prompted when a query is run. A prompt window appears, verifying that you want to limit the number of rows to be output when this option has been selected in your profile. Type **S** to stop at the specified number of rows, or **C** to ignore the limit, and press ENTER. This feature is controlled by the User Profile options **Limit output rows** and **Limit Rows Pop-up Window** (see Appendix 2, "Customizing SAS/ASSIST Software," on page 237).

Saving a Query

The Query window remains untitled until you save a query by using **Save** or **Save As** from the **File** menu. When you save a query, you give it a name and, optionally, a description. After the query is named, its name appears as part of the Query window title. To save and name your query, select **Save As** from the **File** menu in the Query window. The Save As window opens. Type the name of the query and a short description. Change the default catalog if you want and select **OK**. When you return to the Query window, the name of your query is displayed after the window title.

Saved queries can be used to create reports with the Report Engine. See Chapter 5, "Doing More with the Report Engine," on page 61 for more information.

Resetting the Query Window

To reset the Query window in order to build another query, select **New** from the **File** menu. Doing so clears all existing data and specifications from the Query window. To start another query, choose **Select** to open the Select window.

Performing a COUNT(*) on a Table

In order to display the number of rows returned by a query (that is, to perform a COUNT(*) on the table), follow these instructions:

1. Use the Select window to select tables and columns for the query.
2. Modify the query with subsets, expressions, repeated and deleted columns, and usages as desired.
3. Follow this selection path:**Edit ► Count(*)**Query and Reporting creates an expression called **COUNT(*)** with a usage of *****. This expression appears in the Query window.
4. Select **Submit** from the **Run** menu. If you have not applied a usage to all columns, a prompt appears asking you if you want to apply a GROUP usage to all columns. Select **Yes** or **No**. The output includes a count of the returned rows.
5. Select **Close** from the **File** menu to return to the Query window.

To perform a COUNT DISTINCT(*) on a table:

1. Use the Select window to select table for the query.
2. From the Query window, select **Expression** and specify ***** as your expression. Give the expression a name and select **Close** from the **File** menu to return to the Query window.
3. Delete the numbers in the **No** column for all columns, except the new expression, to remove them from the output.
4. Select **Submit** from the **Run** menu. The output shows the number of distinct nonmissing rows for the entire table.
5. Select **Close** from the **File** menu to return to the Query window.

To perform a COUNT(*) within a group:

1. Use the Select window to select tables and columns for the query.
2. From the Query window, select **Expression** and specify ***** as your expression. Give the expression a name and select **Close** form the **File** menu to return to the Query window.
3. Specify the GROUP usage for the column of interest. Delete the numbers in the **No** column for all columns except the new expression and the column of interest.
4. Select **Submit** from the **Run** menu to run your query. The output shows the number of distinct values (groups) in the column of interest.
5. Select **Close** from the **File** menu to return to the Query window.

See Chapter 5, “Doing More with the Report Engine,” on page 61 for more information on the **Usage** field.

Creating New Tables

You can create a table from a query using the SQL Editor window or the Query window.

In all operating environments, you can create SAS tables and views. In z/OS, you can also create DB2 tables. In some cases you must be granted certain access or privileges to create new tables. If you do not have these privileges, contact your SAS Support Consultant or database administrator.

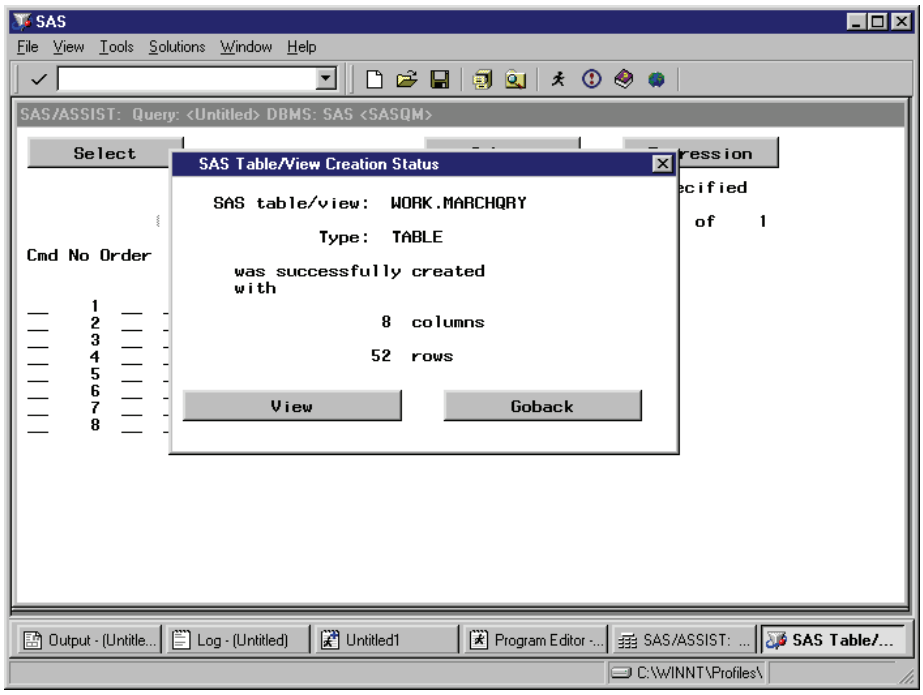
To create a table from your query results, run your query, then return to the Query window by selecting **Close** from the **File** menu. Follow the instructions in one of the following two sections, depending on which type of table you want to create.

Creating a New SAS Table or View

Follow these steps to create a new SAS table or view from your query results:

1. Follow this selection path from the Query window:**Tools ▸ Create Table ▸ SAS**The Create SAS Table/View window appears.
2. In the **Name** field, type the name of the table or view. Use a two-level name in the form *libref.table-name* if you want to store the table or view permanently.
3. Select **Table** or **View**. **Table** creates a SAS data file; **View** creates a PROC SQL view.
4. When you select **OK**, the query is processed and a window verifies the SAS table's creation, as shown in the following display.

Display 10.22 SAS Table/View Creation Status Window



5. Select **View** to display the new SAS table, or select **Goback** to return to the Query window.

Creating a New DB2 Table (z/OS Only)

In z/OS, to save the results of your query to a DB2 table, do the following:

1 Follow this selection path from the Query window:**Tools ► Create Table ► DB2**The Create DB2 Table window appears.
2 In the **Name of DB2 table** field, type the name of the table.
3 Select **OK** SAS/ASSIST software verifies whether or not the table exists; if it does, you are prompted to append or replace it. The new table is created, and its authorization ID is automatically set to your userid.

Note: If you plan to use DB2 data in several SAS programs, you usually get better SAS performance if you save the DB2 data to a SAS table or SAS view. △

Joining Tables

You often need data that are stored in separate tables. For example, you may want to produce a report that gets information about flight delays from one table and boarding capacity from another. Information from separate tables can be combined by matching values in columns that relate the tables. This is called *joining* tables. You can join a maximum of 32 tables (including views) in one query. Note that some limitations apply when you join DB2 tables. For more information, see "Additional Considerations for Joining DB2 Tables" on page 198.

Introducing Table Joins

A join combines two or more tables side by side. If you do not specify how to join the tables, you get a *Cartesian product*. This means that SQL combines each row from the first table with every row from the second table, the second row of the first table is then matched with every row of the second table, and so on. Therefore, two tables with 100 rows each produce 100 * 100, or 10,000, rows. You seldom want all this information, and it often causes you to exceed the available disk space.

To avoid a Cartesian product, you must specify how the tables should be combined. Typically, you want to pair rows based on matching values in one or more key columns of each table. The following example uses the tables in the following figure to illustrate a join.

Figure 10.2 Joining Two Tables

Table A

ID	NAME
1	Elisabeth
2	Jens
3	Michael
4	Marie

Table B

ID	SALARY
1	2000
2	900
4	3000
5	500
6	750

Pair the SALARY information in Table B with the NAME of the person in Table A by matching the values in the ID columns. Therefore, your join criterion is **A.ID=B.ID**. In SQL, the code is:

```
select name, salary
   from  a, b
   where a.id = b.id;
```

Only rows with matching values of ID are output. This is known as an *inner join*. The following figure shows the results of this query.

Figure 10.3 Output from Joined Tables

OUTPUT

NAME	SALARY
Elisabeth	2000
Jens	900
Marie	3000

You can also join tables that have missing values. For example, ID **3** is missing from Table B. A *left join* outputs all the names in Table A (the left table) and matches them to the available salary information in Table B. If a row in Table B is missing, missing values are supplied in the joined output. In this case, **Michael** from Table A is output with a missing value for SALARY next to his name. The following figure shows the results of this query.

Figure 10.4 Output from Left Joined Tables

OUTPUT

NAME	SALARY
Elisabeth	2000
Jens	900
Michael	.
Marie	3000

A *right join* works similarly. All the rows from Table B (the right table) are output, and any missing rows from table A are output as missing values (or blanks, if the values are character data). The following figure shows the results of this query.

Figure 10.5 Output from Right Joined Tables

OUTPUT

NAME	SALARY
Elisabeth	2000
Jens	900
Marie	3000
	500
	750

If you join two tables that both have missing rows, you can combine the effect of a left and a right join by using a *full join*. The following figure shows the results of this query.

Figure 10.6 Output from Fully Joined Tables

OUTPUT

NAME	SALARY
Elisabeth	2000
Jens	900
Michael	.
Marie	3000
	500
	750

Inner joins can be performed on up to 32 tables or views at a time, whereas outer joins (left, right, full) work on only two tables at a time.

Joining Tables Manually

If tables selected for joining have a relation defined between them, Query and Reporting joins them automatically; see "Joining Tables Automatically" on page 195 for more information. If the tables do not have a relation defined between them, or if they have more than one such relation defined, you have to join the tables manually. The following sections show examples of how to join tables manually in both cases, as well as an example of performing outer joins, which must be done manually.

Joining Tables Without Defined Relations

Follow these instructions to join two tables manually:

1 Choose **`Select`** to open the Select window.

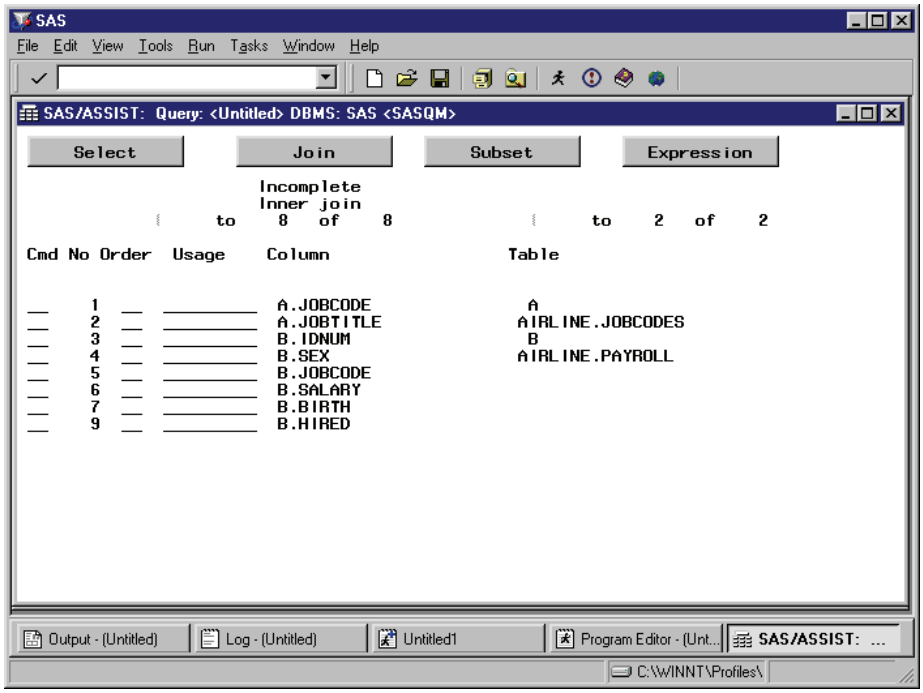
2 Select the AIRLINE.JOBCODES and AIRLINE.PAYROLL tables.

3 Select **Close** from the **File** menu to return to the Query window.

The **Incomplete Inner join** message appears under **Join**. The warning **Not all tables are joined** appears because the tables do not contain a relation defined on them. Therefore, Query and Reporting has not automatically joined the tables. The following display shows the Query window with the two tables to be joined.

Note: To clear previously-defined subsets or expressions, select **subset** or **Expression**. Select **Clear** from the **Edit** menu, then select **Close** from the **File** menu. △

Display 10.23 Query Window with Tables for Manual Join



CAUTION:

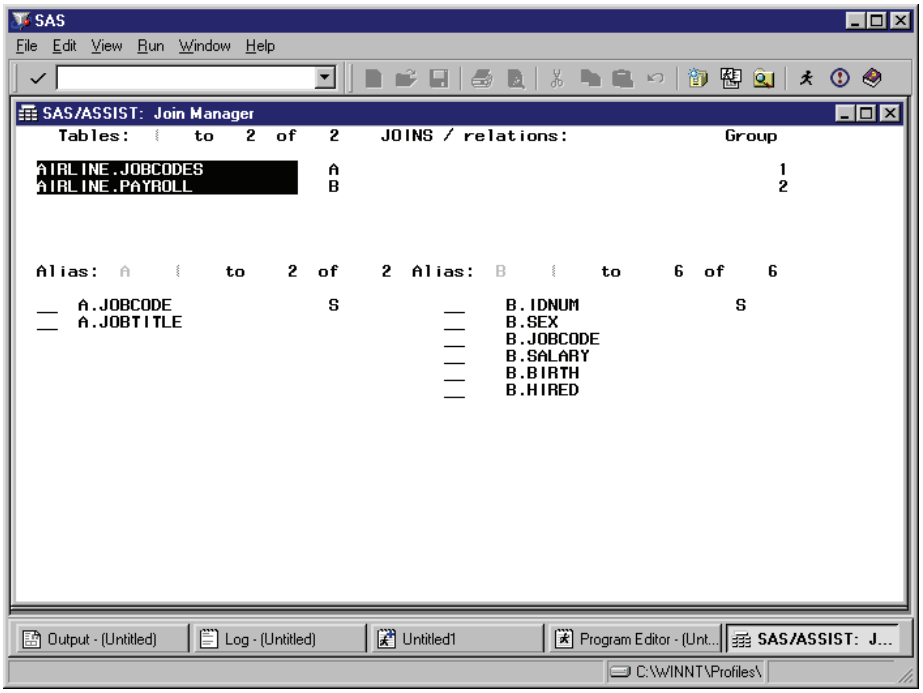
Interrupting Processing If you run a query with an incomplete join, you create a Cartesian product, as described in "Introducing Table Joins" on page 184. Depending on the setup at your site, either the query is rejected or a WARNING window appears, verifying whether or not you really want to run this query. If you select **Yes** to run the query, your query may take a long time to process, depending on the size of the tables. △

4 Select **Join** to open the Join Manager window. The Join Manager window shows the selected tables and all of their columns. Before the tables are joined, their names are highlighted.

Note: If you are joining more than five tables, not all of the table names appear in the Join window; overwrite the first number in the **Tables** field to see more tables. △

The following display shows the Join Manager window with AIRLINE.JOBCODES and AIRLINE.PAYROLL before they are joined. The **Group** field indicates whether groups of tables are joined. **1,2** indicates that this group is not joined.

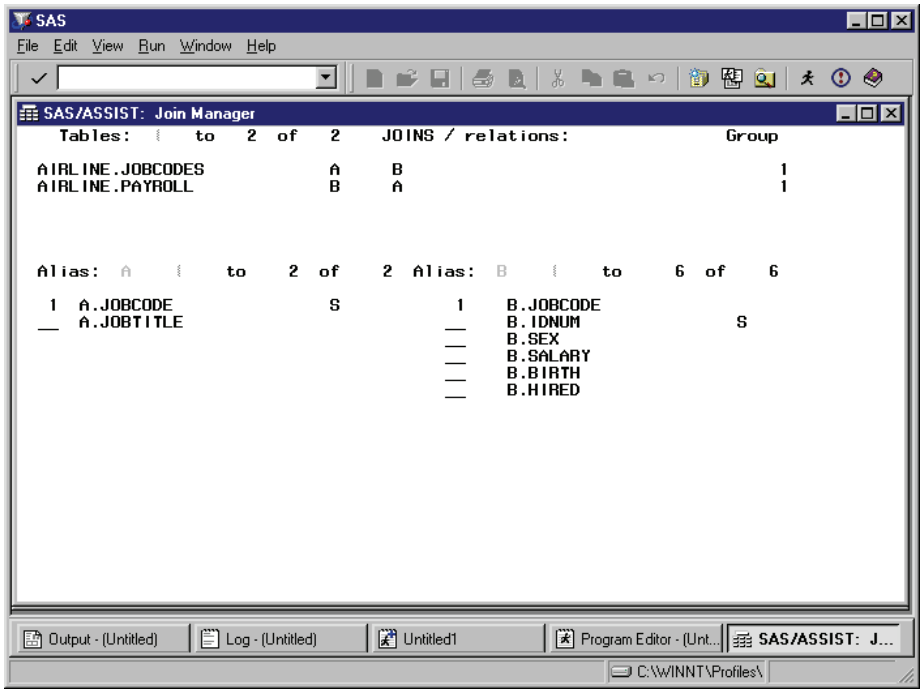
Display 10.24 Join Manager Window With Two Tables To Be Joined



5 Type **1** next to **A.JOBCODE** and **1** next to **B.JOBCODE** and press ENTER. Note that the column names for the two tables are the same in this example. The column names do not have to be the same, but their data types and values must match. You can select **Sort by** from the **Edit** menu to reorder columns in the tables by their names, join number, index, or matching names.

After you press ENTER and the tables are joined, the highlighting of the table names is removed, the **Group** field changes to **1,1** (indicating one group), and a message appears saying **All tables are joined**. The following display shows the Join Manager window after the tables have been joined.

Display 10.25 Join Manager Window With Two Joined Tables



6 Select **Close** from the **File** menu to return to the Query window. Note that the message under the **Join** button says **Complete inner join**.

Joining Three Tables

To add a third table to the joined AIRLINE.JOBCODES and AIRLINE.PAYROLL tables, follow these instructions:

1 Return to the Select window by choosing **Select** from the Query window.

2 Select one more table, AIRLINE.SCHEDULE

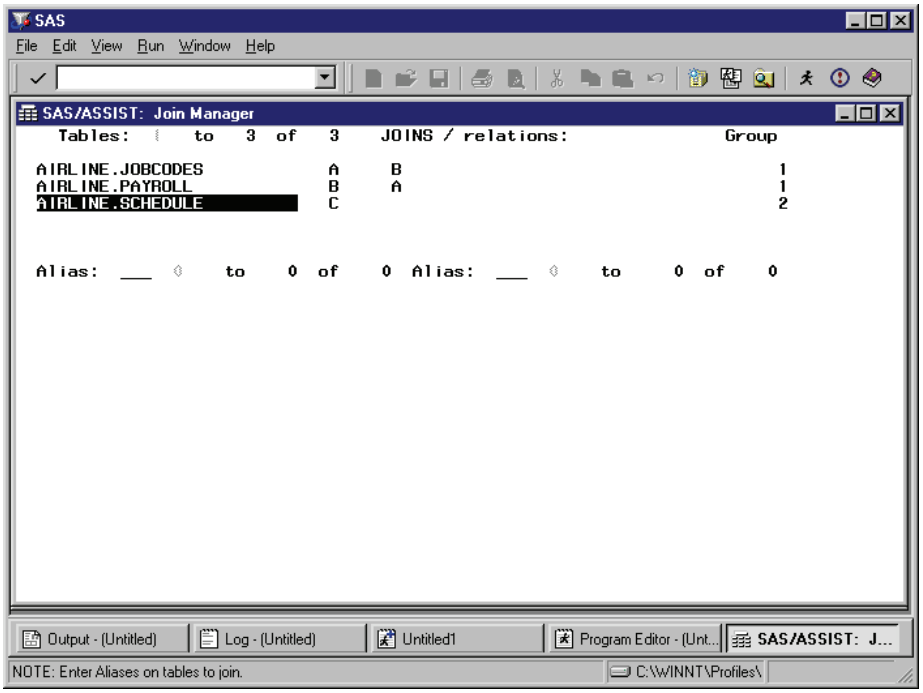
3 Select **Close** from the **File** menu to return to the Query window. The message **Incomplete Inner join** appears again.

4 Select **Join** to open the Join Manager window.

The table names are displayed at the top of the Join Manager window. AIRLINE.SCHEDULE is highlighted because it is not yet joined with another table. AIRLINE.SCHEDULE has no table alias under the **JOINS/relations** field for the same reason. This table is also listed as a separate group in the **Group** field.

The following display shows the Join Manager window before the third table AIRLINE.SCHEDULE is joined with AIRLINE.JOBCODES and AIRLINE.PAYROLL.

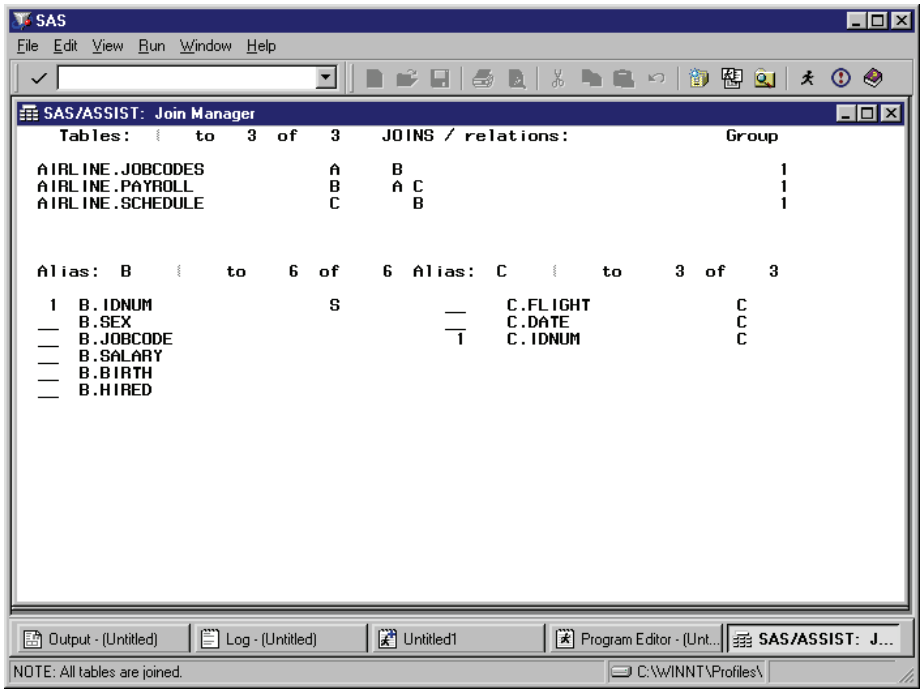
Display 10.26 Join Manager Window With Third Table Before Joining



5 Because the columns from only two tables can be listed at the same time in this window, the **Alias** fields are blank and no columns are listed. AIRLINE.PAYROLL and AIRLINE.SCHEDULE have a common column, IDNUM. Type the alias **B** in the first **Alias** field and the alias **C** in the second **Alias** field. When you press ENTER, the tables' columns are listed. Type **1** next to **B.IDNUM** and **C.IDNUM**, respectively, and press ENTER.

When the three tables are joined, the highlighting is removed, the **Group** field changes to **1,1,1** (indicating one group), and a message appears saying **All tables are joined**, as shown in the following display.

Display 10.27 Join Manager Table With Three Joined Tables



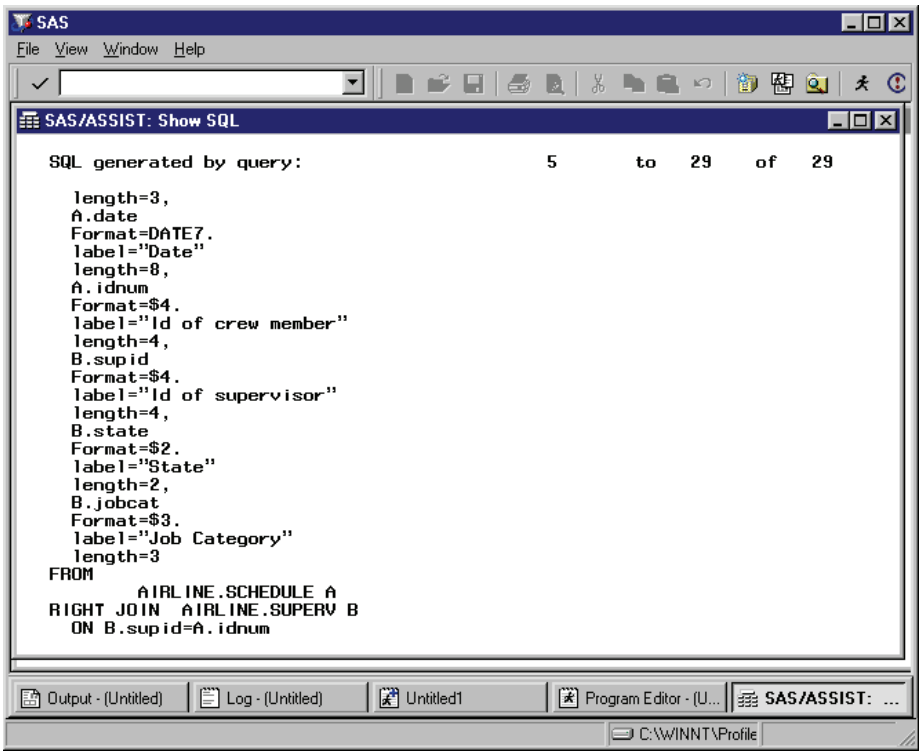
6 Select **Close** from the **File** menu to return to the Query window. Save or run your query. After you run your query, you can save your output to a table. See "Creating a New SAS Table or View" on page 183 for more information.

Joining Tables with Outer Joins

When you join tables, Query and Reporting uses an inner join by default. However, you can choose another type of join if you are joining only two tables. In DB2, outer joins are allowed on only two tables. Note that there may be other restrictions under DB2; for further information, see "Additional Considerations for Joining DB2 Tables" on page 198. Outer joins must be performed manually.

1 If desired, save the previous query using **Save** from the **File** menu.
2 Reset the Query window by selecting **New** from the **File** menu
3 Open the Select window and choose the AIRLINE.SCHEDULE and AIRLINE.SUPERV tables. These tables do not have a relation defined on them.
4 Return to the Query window, and note that the **Incomplete Inner Join** message appears under **Join**.
5 To change this query to a right join, select **Join Type** from the **Edit** menu.
6 Select **Right join** from the list of join types and **Goback**. When you return to the Query window, the **Incomplete Right join** message appears under the **Join** button.
7 Select **Join** to open the Join Manager window.
8 Type **1** in the **A.IDNUM** column and **1** in the **B.SUPID** column and press ENTER. (These steps are described earlier in "Joining Tables Without Defined Relations" on page 186.)
9 Return to the Query window.
10 If desired, reorder the columns of the query and then select **Show SQL** from the **View** menu. The following display shows the second display of the SQL for the right join query.

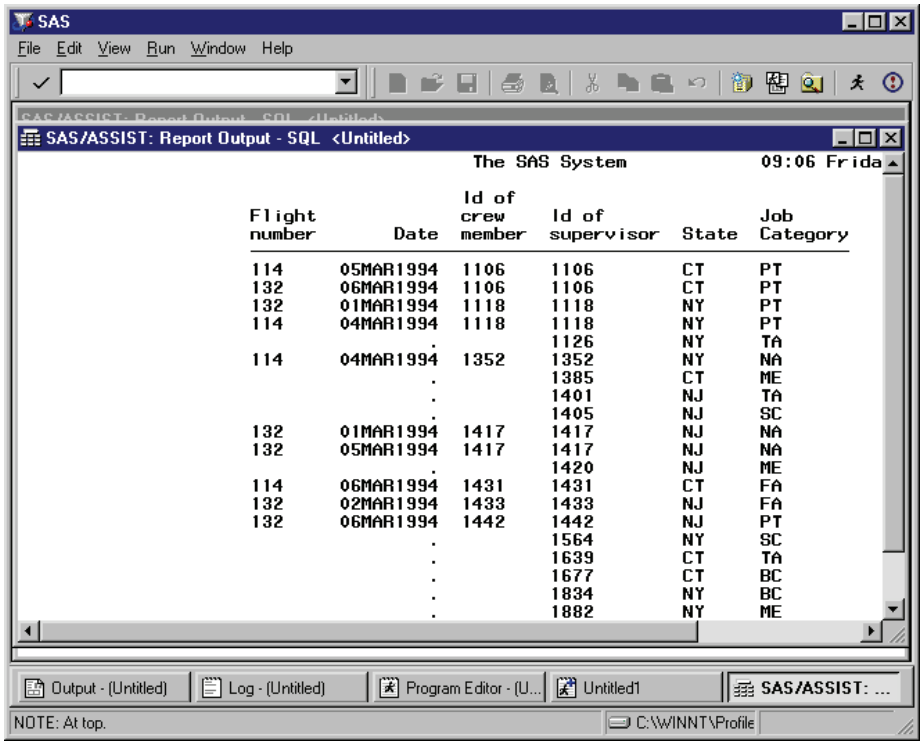
Display 10.28 Show SQL Window for Right Join



Exit the Show SQL window.

11 Select **Submit** from the **Run** menu to run the query. The following display shows the results. This query creates a list of supervisors who have been assigned to flights as well as supervisors who have not been assigned to flights.

Display 10.29 Results of Right Join



Defining Relations on Tables

When you query SAS tables, *relations* provide a way to identify rows and to relate (or join) rows in one table to rows in another table. You define a relation on one or more columns in a table. Relations are based on the database concept of primary and foreign keys; see *SAS/ACCESS for Relational Databases: Reference* for more information.

You define a relation on tables based on one or more columns that tables contain. For example, the SAS AIRLINE.PAYROLL table has a column named IDNUM that has the same attributes as the IDNUM column in AIRLINE.STAFF. Therefore, you would define and name a relation for IDNUM on the two tables.

Defining a relation between or among tables enables you to build intelligence into your query creation process. When one relation is defined on tables that you join in a query, Query and Reporting automatically generates a WHERE or ON clause for that query. This saves you from defining a WHERE predicate for each join query. (See "Joining Tables Automatically" on page 195 for more information.) You can, of course, still select **Subset** from the Query window to add other predicates to your WHERE clause; see "Retrieving a Subset of Data" on page 173 for more information.

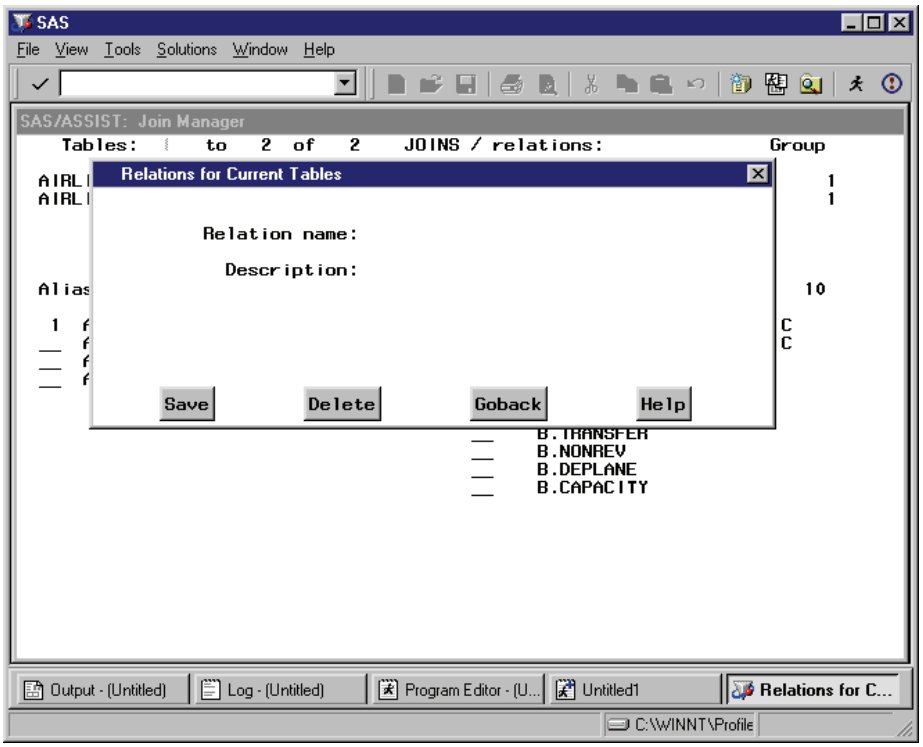
If no relations are defined or if more than one relation is defined for the tables in the join, you must join the tables manually, as described in "Joining Tables Manually" on page 186 and "Joining Tables with Multiple Relations" on page 196.

The examples in this section are used to demonstrate joining tables automatically and joining tables with multiple relations later in this chapter.

1. If desired, save the previous query by selecting **Save** from the **File** menu in the Query window.
2. Reset the Query window by selecting **New** from the **File** menu.

3 Go to the Select window and select the AIRLINE.MARCH and AIRLINE.FLINFO tables. Return to the Query window.
4 Select **Join** to open the Join Manager window.
5 Type a **1** next to the **A.FLIGHT** and **B.FLIGHT** columns and press ENTER. A message indicates that the tables are joined.
6 Follow this selection path to open the Relations for Current Tables window:**View ▶ Relations ▶ Current Tables**

Display 10.30 Relations for Current Tables Window



7 In the **Relation name** field, type **MARFLT**. A relation name can be up to eight characters long.
8 In the **Description** field, type **March - Flight Info Relation**. A description can be up to 32 characters long.
9 Select **Save** to save the relation, then **Goback** to return to the Join Manager window.
10 Return to the Query window.

Repeat steps 2 through 9 above to define a relation on the AIRLINE.DEST and AIRLINE.FLINFO tables. Define your relation on the A.DEST and B.DEST columns. Name this relation **FLDEST** and give it a description of **Destination Name Join**. Then, repeat steps 5 through 9 to define a second relation on the AIRLINE.DEST and AIRLINE.FLINFO tables. By typing **2** (instead of **1**) next to the columns, define this relation on the A.DEST and B.ORIG columns. Name this relation **FLORIG** and give it a description of **Origin Name Join**.

Modifying and Deleting Relations

In order to add, edit, or delete a relation, you must have the correct permissions to do so. Permission to modify relations is determined by the Query Manager in effect. Contact your SAS Support Consultant for details.

To modify a relation, follow these instructions:

1. Select the tables associated with that relation in the Select window
2. Select **`Join`** to open the Join Manager window.
3. If you want only to change the name or description of the relation, proceed to the next step. Otherwise, modify the join as desired.
4. Follow this selection path:**View ▶ Relations ▶ Current Tables**The Relations for Current Tables window appears, as shown in the previous display.
5. Type the name of the relation in the **`Relation name`** field. You can also type a **`?`** in the **`Relation name`** field and select the relation from the resulting list.
6. Select **`Save`**. When prompted, select **`Yes`** to overwrite the existing relation.

To delete a relation, follow these instuctions:

1. Select the tables associated with that relation in the Select window.
2. Select **`Join`** to open the Join Manager window.
3. Follow this selection path:**View ▶ Relations ▶ Current Tables**The Relations for Current Tables window appears, as shown in the previous display.
4. Type the name of the relation in the **`Relation name`** field. You can also type a **`?`** in the **`Relation name`** field and select the relation from the resulting list.
5. Select **`Delete`**, then **`Goback`** to return to the Join Manager window.

Joining Tables Automatically

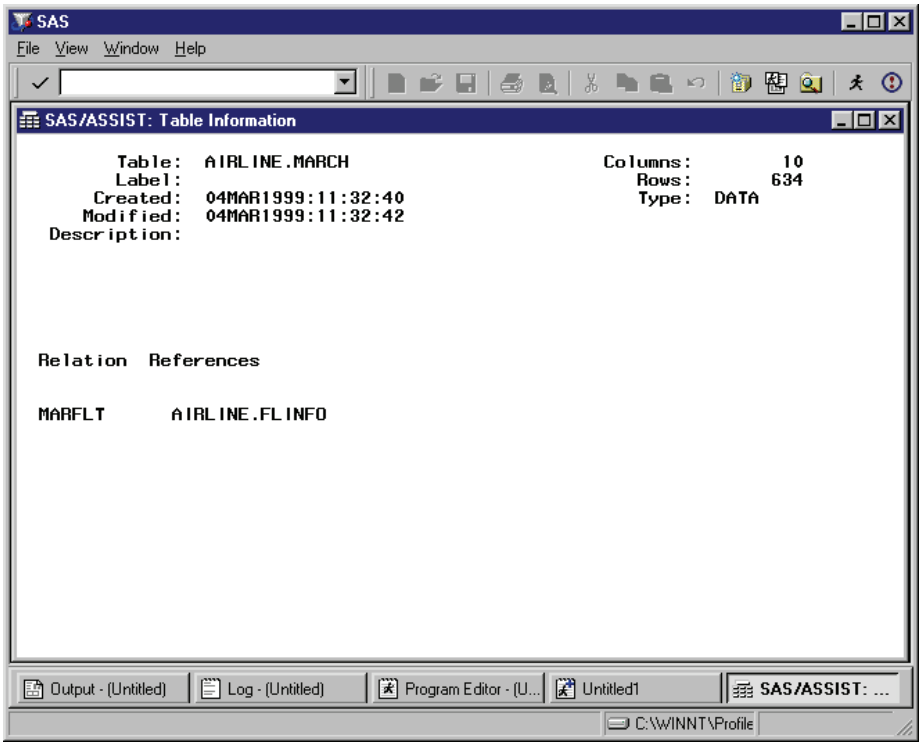
The Query window can join tables automatically if a relation is defined on the tables. In addition, as already discussed, relations can be defined either by a DBA or by a user. (Note that for DB2, if any referential constraints are defined, these constraints are used by the Query Manager to join tables automatically.)

Query and Reporting automatically joins tables that have exactly one relation defined on them. The default action is to create an inner join. (See “Joining Tables Manually” on page 186 for information on joining tables without a defined relation and for performing outer joins.)

In this section you join the AIRLINE.MARCH and AIRLINE.FLINFO tables on which you defined a relation in the previous section.

1. Reset the Query window by selecting **`New`** from the **`File`** window.
2. Open the Select window and select the AIRLINE.MARCH and AIRLINE.FLINFO tables. Return to the Query window.
3. By convention, relations are a property of the second of the two tables joined, in this case, AIRLINE.MARCH. To see this property, type **`I`** next to the table name in the Select window. The Table Information window appears, as shown in the following display.

Display 10.31 Table Information Window



4 Select **Close** from the **File** menu twice to return to the Query window. The message **All tables are joined** appears in the Query window, and the message **Complete Inner join** appears under the **Join** button.

At this point, you can customize your query, run it, and save it as described in "Saving a Query" on page 181. Alternatively, you can save the query's output to a table, as described in "Creating New Tables" on page 182. If you intend to access the joined data frequently, it is often more efficient to save the output to a SAS table and then specify the new SAS table in your SAS code.

Joining Tables with Multiple Relations

Tables with multiple relations must be joined manually because you have to decide which columns to use to join the tables. This example uses the relations you defined on the AIRLINE.DEST and AIRLINE.FLINFO tables in "Defining Relations on Tables" on page 193.

1 Reset the Query window by selecting **New** from the **File** menu.

2 Open the Select window and select AIRLINE.DEST and AIRLINE.FLINFO.

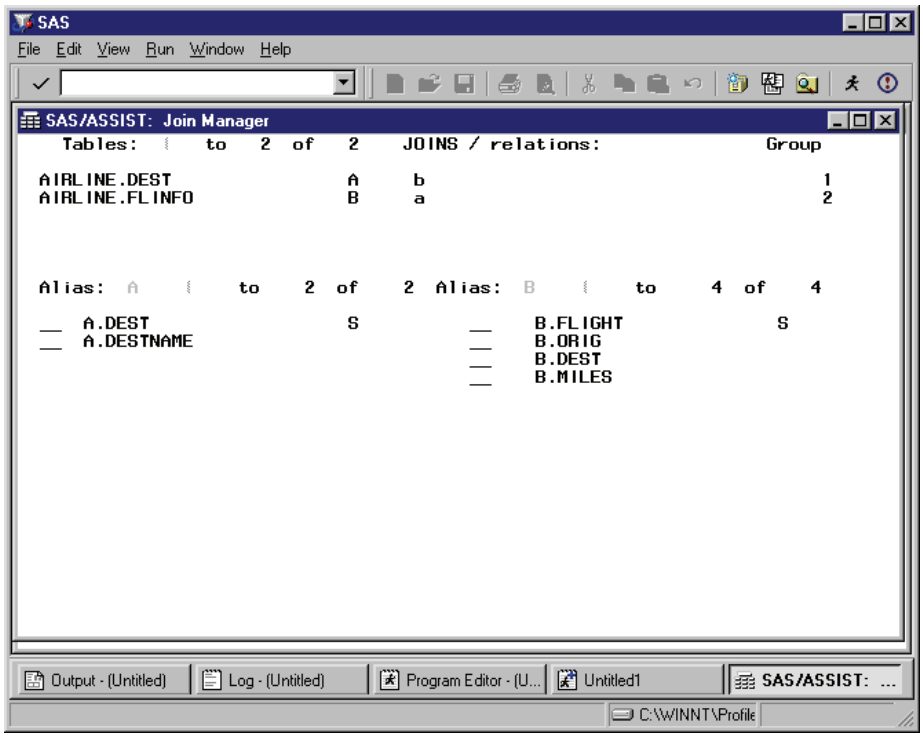
3 Open the Table Information window for the AIRLINE.FLINFO table to see the two relations defined on it.

4 Exit the Table information window and the Select window to return to the Query window. The **Not all tables are joined** message is displayed because you have not yet selected a relation.

5 Select **Join** to open the Join Manager window. The Join Manager window appears much as it does in Display 10.24 on page 188. The table aliases under the **JOINS/ relations** field are in lowercase letters. The aliases are lowercase to indicate that

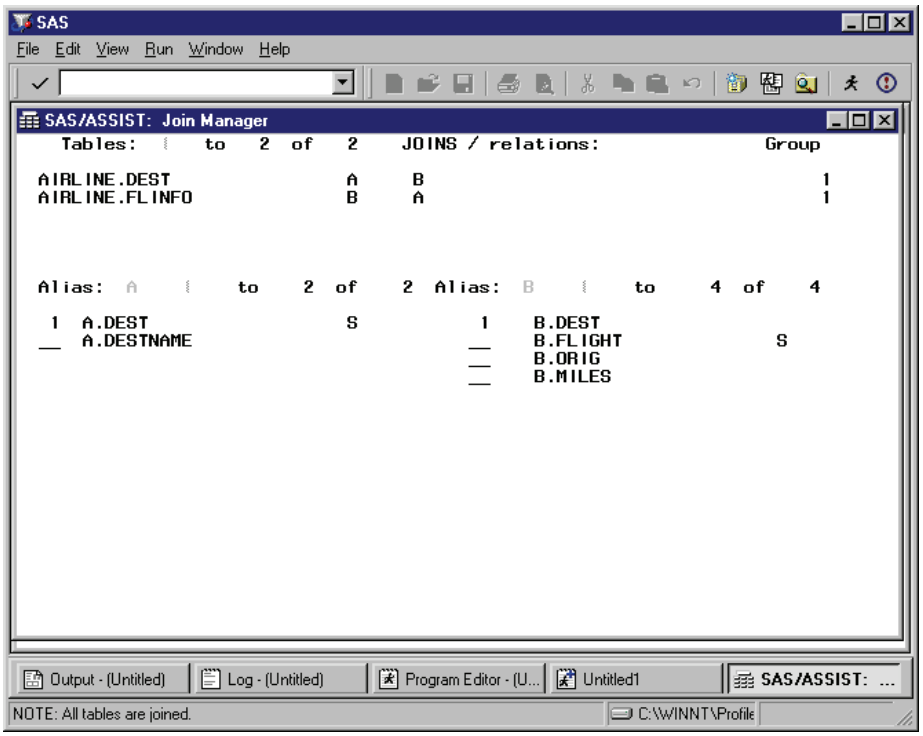
a relation exists between the tables but that it is not used yet. The following display shows the tables before they are joined.

Display 10.32 Join Manager Window With Multiple Relations



6 Choose **Select Relation** from the **Edit** menu, or select one of the lowercase aliases under the **JOINS/relations** field to select a relation with which to join. The relations for your tables are listed. Select **Destination Name Join**. The tables are joined and the lowercase aliases in **JOINS/relations** change to uppercase. Notice in the following display that a **1** automatically appeared in the **A.DEST** and **B.DEST** fields and the **Group** field changes to **1,1**.

Display 10.33 Join Manager Window With Multiple Relations After Joining



Return to the Query window to customize, save, or run your query.

Additional Considerations for Joining DB2 Tables

When you use the Query window, you can perform inner joins or outer joins (left, right, and full) on DB2 tables. If one primary key/foreign key relation is defined between the tables, Query and Reporting joins the related tables automatically. It generates a WHERE or ON clause that is based on the related column(s) in the tables, such as **`where payroll.idnum=staff.idnum`**.

If no primary key/foreign key relation is defined or if more than one relation exists between the contributing tables, you must specify manually which columns are used to join the tables (see "Joining Tables Manually" on page 186).

Versions 4 and later of DB2 includes outer join operators. Therefore, when you use the Query window and specify a left, right, or full join, Query and Reporting generates the WHERE or ON clause automatically.

DB2 versions prior to Version 4 lack outer join operators. You can still specify an outer join type in Query and Reporting. If relations are defined on the tables, a WHERE or ON clause is automatically generated. If no relations are defined, you have to join the tables manually. When you review your SQL code (by selecting **`Show SQL`** from the **`View`** menu), you see that DB2 SQL has used set operators (such as UNION) to produce an outer join result, instead of using outer join operators.

Because earlier versions of DB2 SQL do not have outer join operators, certain limitations apply to outer joins in Query and Reporting:

- Because you generate a WHERE or ON clause when you join the tables, you cannot specify *additional* WHERE predicates or expressions in the SELECT clause. For example, if you select **`Subset`** in the Query window, type a WHERE predicate, and exit the window, the Messages window appears with **`Subset is`**

`disabled due to outer join`. Then **`Disabled`** appears under **`Subset`**. It works the same way with **`Expression`**.

- Arithmetic expressions (such as those in a SELECT clause) are ignored.
- Results from outer joins cannot be stored in a new DB2 table. (However, you can save the results to a SAS table.)

The following table shows the default values in outer joins.

Table 10.7 Default Values for Data Types in Outer Joins

Data Type	Default Value
Character data	blank (' ')
Numeric Data	0
Date	January 1, 0001
Time	Midnight
Timestamp	January 1, 0001, midnight

Referential Integrity

Referential integrity is implemented in the DB2 database management systems by specifying conditions where all references from one database column to another column must be validated.

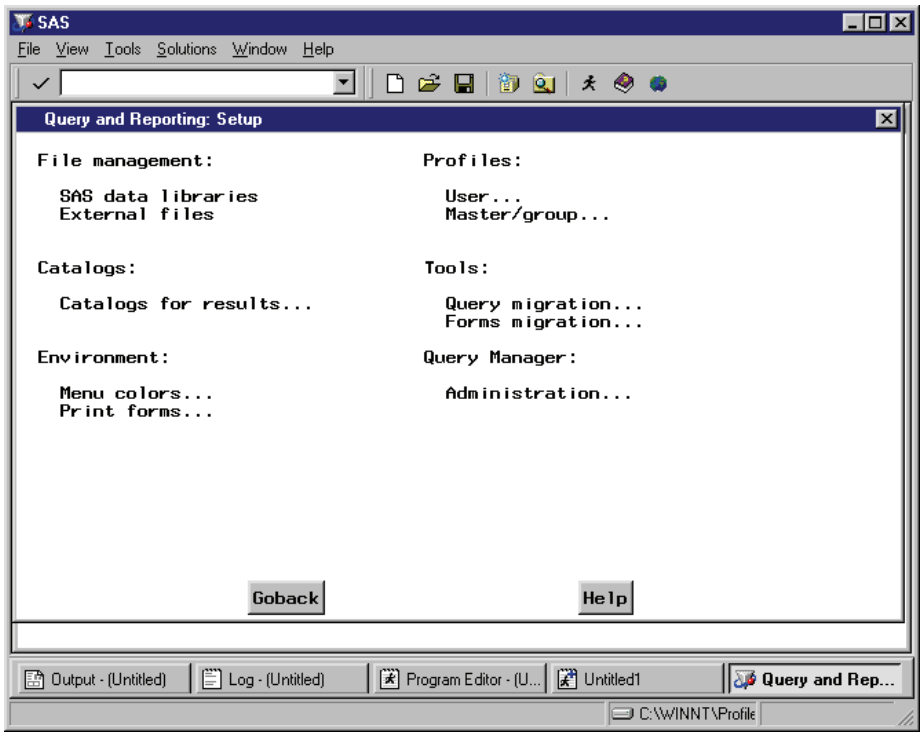
These referential constraints are established by defining *primary keys* and *foreign keys* for the columns in the relationship. A primary key defines a unique identifier for the rows of a table. A foreign key is a column where each value contains a value in the primary key of another defined table. After the relationship between a primary key and a foreign key has been established, DB2 enforces the referential integrity for you according to both the rules that DB2 has established and the referential constraints that you have specified.

If referential constraints have been established, the Select window uses them to generate automatic joins between tables. In the Query, Select, or Report Engine windows, you can type the **`I`** command next to a table or column name to open the Select Table information or Column information window. These windows display information on referential constraints for your convenience.

Query and Reporting Setup Options

This section describes the options available in the Query and Reporting: Setup window. To access this window, follow this selection path:**Tasks ▸ Data Management ▸ Query ▸ Query and Reporting ▸ Setup**

Display 10.34 Query and Reporting Setup Window



The items under **`File management`**, **`Profiles`**, **`Catalogs`**, and **`Environment`** have the same functions in the Query and Reporting: Setup window that they do in the main SAS/ASSIST Setup window. For details on these items, see Chapter 12, “Doing More with Setup,” on page 215.

Query migration

The **`Query migration`** item opens the Query Migration window, which enables you to import QMF queries to Query and Reporting. For more information, see Appendix 4, “Migrating from QMF to SAS/ASSIST Software,” on page 251.

Forms migration

The **`Forms migration`** item enables you to migrate QMF forms to SAS under the z/OS operating environment. You must have the forms migration utility installed to use this item. For more information, contact SAS Technical Support.

Administration

The **`Administration`** item opens the Query Manager Administration window, which enables you to define and edit static and dynamic Query Managers.

CHAPTER
11

Using the SQL Editor

Overview **201**
Opening the SQL Editor Window **202**
Entering SQL Statements Directly **202**
Entering an SQL Query **202**
Entering Non-SELECT SQL Code **203**
Creating Template SQL Programs **204**
Using a Stored Query or Statement **204**
Selecting Tables with the Select Window **205**
Choosing Tables with Select Table **206**
Using the Enhanced SQL Editor **207**
Including and Writing SQL Code to External Files **209**
Correcting Errors in SQL Code **210**
Running an SQL Query and Customizing the Output **211**
Saving SQL Code or Output **213**

Overview

This chapter describes how you use Structured Query Language (SQL) and the SQL Editor window to perform queries for both the SAS SQL procedure and DB2 SQL. This chapter is intended for users who are familiar with SQL statements and syntax, and who have worked with SQL programs.

This chapter shows examples based on SAS AIRLINE sample tables. See "Returning to SAS/ASSIST Windows from the Output Window" on page 9 for information on how to create these sample tables

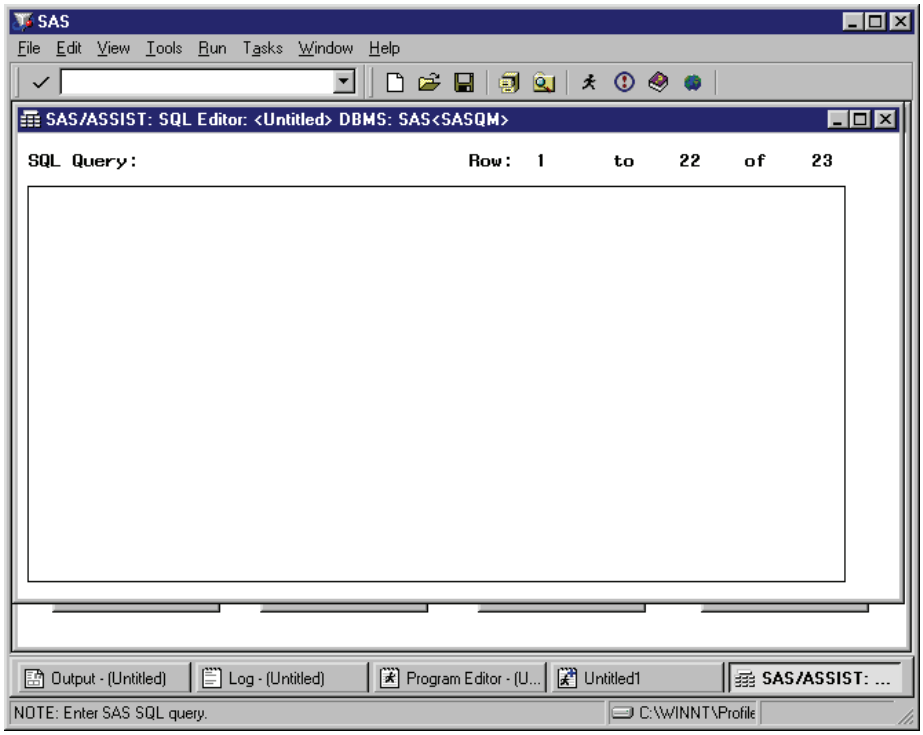
The SQL Editor window enables you to code and submit SQL SELECT statements (also called *queries*). You can also code and submit non-query SQL statements, such as CREATE or DROP. The SQL Editor window uses the Query Manager to get information about tables and views. Templates of SQL code are then generated based on these Query Manager selections.

You can also use the SQL Editor window to include queries that are generated from the Query window, queries that are stored in external files, or IBM QMF queries that have been migrated to Query and Reporting. Query results can be saved as SAS tables (that is, SAS data files or data views) or DB2 tables. For more information on migrating from QMF to Query and Reporting, see Appendix 4, "Migrating from QMF to SAS/ASSIST Software," on page 251.

Opening the SQL Editor Window

To open the SQL Editor window, follow this path:
Tasks ▶ Data Management ▶ Query ▶ Query and Reporting ▶ SQL Editor
The SQL Editor window appears.

Display 11.1 SQL Editor Window



If the window is filled when you open it, it contains a last query that was loaded into this window. To clear the window, select **`New`** from the **`File`** menu.

Entering SQL Statements Directly

Entering an SQL Query

The SQL you use in the SQL Editor window depends on the kind of Query Manager that you are using. If you have a SAS Query Manager, you use SAS's SQL procedure in the SQL Editor window. If you have a DB2 Query Manager, you use IBM's DB2 SQL.

A message appears at the top of the SQL Editor window to indicate which SQL is being used. If you need to use a different set of tables, you can create a new Query Manager or talk to your SAS Support Consultant or database administrator (DBA).

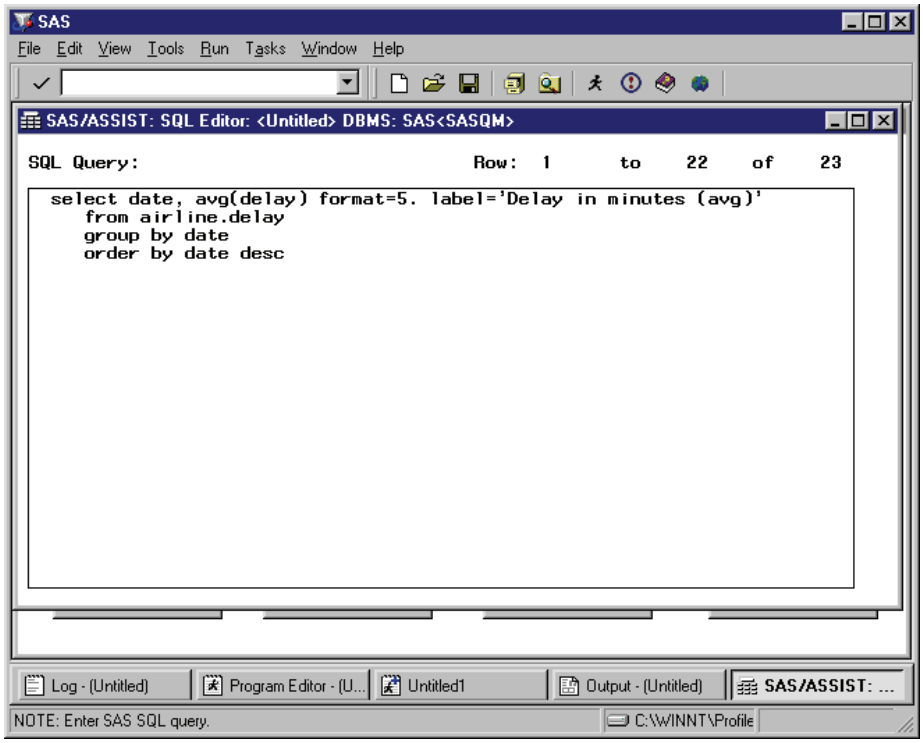
You can type an SQL query in the SQL Editor window if you already know the libref or creator, table, and column names that you want to use.* The SQL Editor window is a complete editor with the following rules:

- Type and submit only one SQL query at a time
- Type one or more non-SELECT statements at a time, separating them with semicolons (;)
- Do not submit both SQL queries and non-SELECT statements at the same time.

You can insert or delete lines in the window by using items in the **Edit** menu.

The query in the following display retrieves the average number of delayed flights each day.

Display 11.2 SQL Editor Window With Query



You can now edit the query further or run it by selecting **Submit** from the **Run** menu. If you run the query, you can save your output to a SAS or DB2 table, as described in "Creating New Tables" on page 182.

Entering Non-SELECT SQL Code

Occasionally you might want to submit SQL statements that are not queries, such as statements that drop tables or create indexes. These non-query, non-SELECT statements do not produce output.

You can type several non-SELECT SQL statements at one time, separated by semicolons. Do not end the final statement with a semicolon.

* For brevity, table means table or view unless otherwise noted. The "creator" refers to the SAS libname or your DB2 authorization identifier.

Note: Using more than one statement and semicolons applies only to non-SELECT SQL statements and not to SQL queries. △

Select **New** from the **File** menu to clear the SQL Editor window. Then type your SQL code into the window. For example,

```
create index jobcode on airline.jobcde2|jobcode);
drop table airline.temp
```

Select **Submit** from the **Run** menu to submit the code to SAS or to DB2.

The following list includes some non-Select SQL statements that you might want to submit to your database.

CREATE	creates a table, view, index, or other objects, depending on how the statement is specified.
DELETE	deletes one or more rows from a table.
DROP	deletes a table, view, index, or other objects, depending on how the statement is specified.
INSERT	adds one or more rows to a table.
UPDATE	modifies the data in columns of a row in a table.
GRANT	gives users the authority to access or modify objects such as tables or views. (DB2 SQL only)
REVOKE	revokes the privileges that were given to users by the GRANT statement. (DB2 SQL only)

For more information and restrictions on these and other SQL statements, see your SQL documentation.

You can use the prompt facility to display a prompt window when non-SELECT SQL statements are submitted. See “Using the Prompt Facility” on page 174 for more information. Non-SELECT SQL statements can be saved to and executed from the Result Manager window. See “Saving SQL Code or Output” on page 213 and Chapter 9, “Doing More with Results,” on page 143 for information.

Creating Template SQL Programs

Many times you might want to begin a new program by using part of another program. Or, you might want to begin a new program by using the tools that Query and Reporting offers to create a template program. The following sections show you how to use these tools to create a template that you can edit and customize for your purposes.

Using a Stored Query or Statement

You can include a query that you have previously created in the Query window or include a query or non-SELECT statement that you previously created in the SQL Editor window. From the SQL Editor window, select **Open** from the **File** menu. The Open window appears with a list of your saved queries or non-SELECT statements (of types QUERY and SQL). Type an **S** (for Select) next to the query or statement that you want to include.

The Open window has the fields shown in the following table.

Table 11.1 Fields in the Open Window

Field	Description
Catalog	Specifies the current catalog name. To change it, type a two-level name or **?** to list all possible catalogs. Then make a selection from the resulting Select a Member window.
Name	At the top of the display, the **Name** field is empty, by default. To search for and limit the listing to certain entries, type the complete name of an entry, or type a portion of a name with a pattern-matching character (such as **%** or **_**). For example, specifying **JOB%** retrieves all of the queries that begin with **JOB**. Type **%** for a list of all the saved entries.
Cmd	Type **S** or an asterisk (*) to select the query or non-SELECT statement.
Row	Displays the number of queries and non-SELECT statements. You can edit the value of the starting number to change the number of the rows displayed.
Name	In the window's listing, **Name** displays the names of your queries or non-SELECT statements.
Description	Describes your queries or non-SELECT statements.
Type	Lists whether the entry was saved from the SQL Editor window (SQL) or from the Query window (QUERY).
Date	Lists the date when the query or non-SELECT statement was created or last edited.

You can also sort the contents of the window by **Name**, **Description**, **Date**, or **Type** by selecting **Sort By** from the **View** menu.

After you type **S** in the **Cmd** field and press ENTER, the query or non-SELECT statement is loaded into the SQL Editor window and a message is displayed to indicate that the query has been loaded. Select **Goback** to return to the SQL Editor window.

If you load a query of type QUERY, changes that you make to your SQL code in the SQL Editor window are not reflected in the query that you display with the Query window. However, you can save your changed SQL code, as described in "Saving SQL Code or Output" on page 213.

You can now edit or run your SQL code. You can edit it in the SQL Editor window or select **Enhanced Editor** from the **Edit** menu. The Enhanced Editor enables you to make more significant changes to your code. See "Using the Enhanced SQL Editor" on page 207 for more information.

Selecting Tables with the Select Window

You can use the Query and Reporting Select window to include tables in the SQL Editor. Select **Query Manager** from the **Tools** menu to open the Query and Reporting Select window. Choose one or more tables and columns, as described in "Selecting Tables and Columns for Queries" on page 166.

Note: Selections made from the Query and Reporting Select window replace non-SELECT SQL statements in the SQL Editor window and append SQL queries in the SQL Query window. If you want to append table selections to non-SELECT SQL code, or want to replace SQL queries, do not use the Query and Reporting Select window; instead, use the SQL Select Table window as described in the next section. △

After you select your columns and select **Close** from the **File** menu, you return automatically to the SQL Editor window. SQL code that is based on your selections is displayed in the SQL Editor window.

Under DB2 SQL, if a column name has special or national characters (such as FLIGHT#), the column automatically appears in quotation marks.

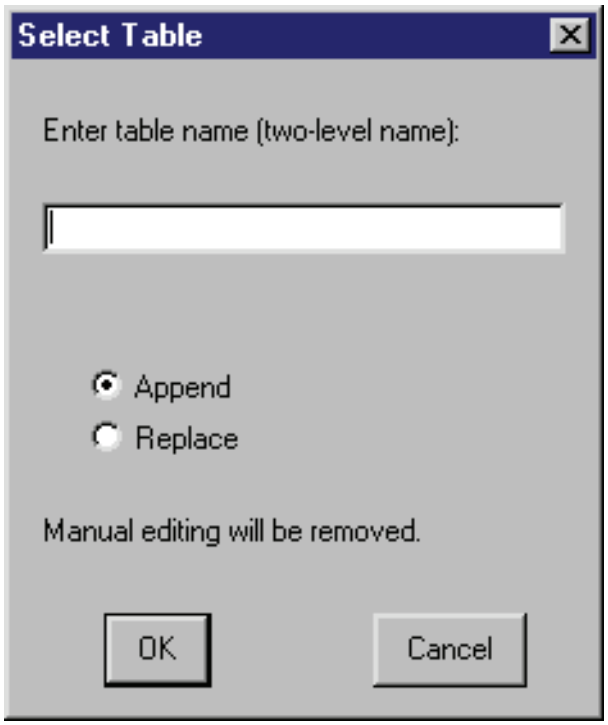
If relations are defined on the tables, the tables are joined automatically; a WHERE clause is automatically generated in the SQL code. If relations are not defined, edit the SQL code to add a WHERE clause to complete the join.

Choosing Tables with Select Table

Another way to begin a template program is to follow these instructions:

1 Choose **Select Table** from the **Edit** menu. The SQL Select Table window appears.

Display 11.3 SQL Select Table Window

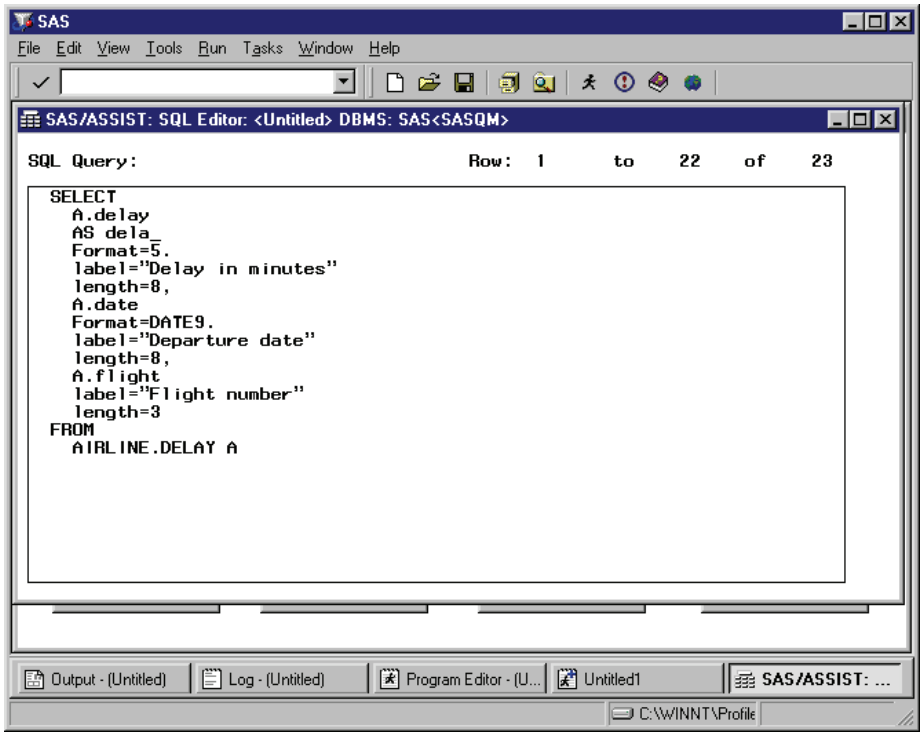


2 Type the two-level name of a table that you want as the basis of your query.

3 Select **Append** to append the table to the query currently in the SQL Editor window, or select **Replace** to replace it.

4 Select **OK**. The SQL template program appears in the SQL Editor window. In this example, all the columns are selected from the AIRLINE.DELAY table, as shown in the following display. Table and column aliases, formats, labels, and lengths are automatically generated for the table(s) that you include.

Display 11.4 SQL Editor Window With AIRLINE.DELAY Table Selected



5 To join the AIRLINE.DELAY with the AIRLINE.FLINFO table, choose **`Select Table`** again and type the table name AIRLINE.FLINFO. Select **`Append`** to append the two tables. Select **`OK`**. If relations are defined on the tables, a WHERE clause is automatically generated in the SQL code and the join is complete.

In this example, no relations are defined on the AIRLINE.DELAY and AIRLINE.FLINFO tables. For a join to work efficiently, it must have a WHERE (or ON) clause, and so you must edit the SQL code.

You can do minor editing in the SQL Editor window by using the **`Edit`** menu's **`Insert Line`** and **`Delete Line`** items. For more substantial editing, use the SQL Enhanced Editor, as described in the following section.

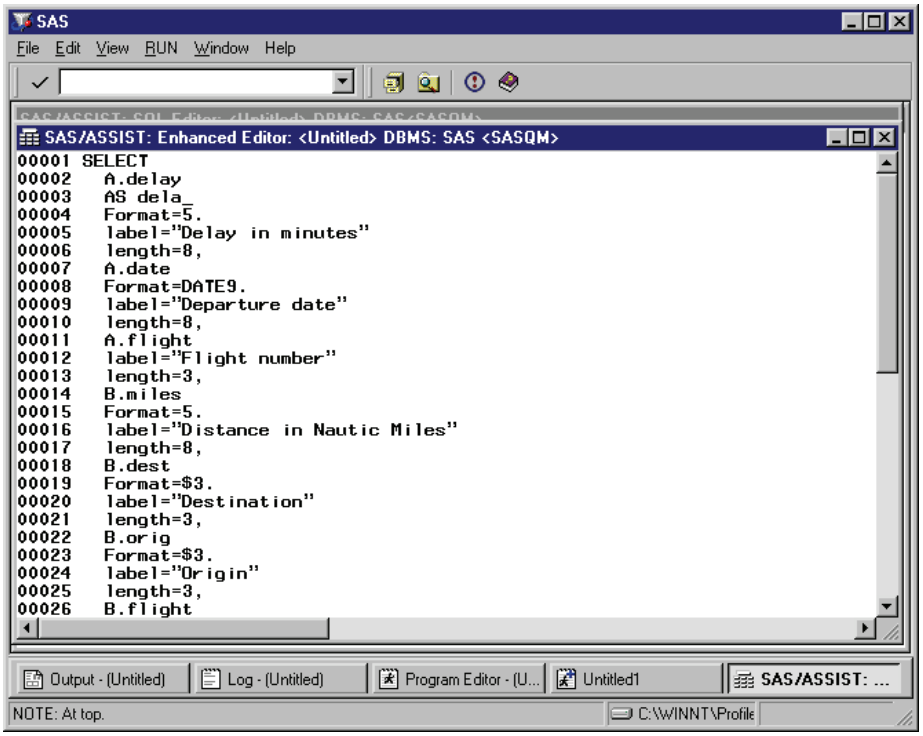
Note: If you decide that you do not want to join AIRLINE.DELAY with AIRLINE.FLINFO and instead want only AIRLINE.FLINFO, choose **`Select Table`** again. Type the name AIRLINE.DELAY and select **`Replace`**. The SQL template program for the join is then replaced by a template program for AIRLINE.FLINFO. △

Using the Enhanced SQL Editor

The Enhanced Editor window is useful when you want to make changes in the SQL code. You can open the Enhanced Editor window from the SQL Editor window at any time. Any code in the SQL Editor appears in the Enhanced Editor window. In this example, you edit the join between the AIRLINE.DELAY and AIRLINE.FLINFO tables that you selected in the previous section.

1 Follow this selection path:**Edit ▶ Enhanced Editor** The Enhanced Editor window appears with the SQL statements from the SQL Editor window.

Display 11.5 Enhanced Editor Window

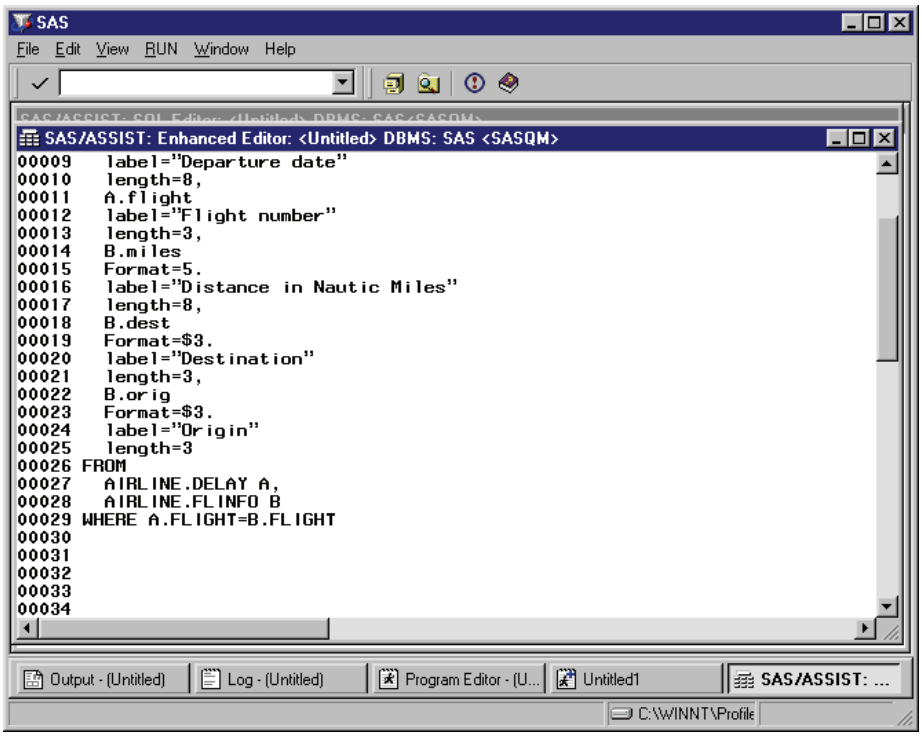


2 Edit the SQL code as follows. For a complete explanation of commands for using the Enhanced Editor, refer to the window's online help.

- Add a WHERE clause (**`WHERE A.FLIGHT=B.FLIGHT`**) at the end of the SQL code to complete the join.
- Edit the SELECT clause to remove the duplicate B.FLIGHT column along with its format, length, and label.
- Delete the comma after **`length=3`** at the end of the B.ORIG column description.

The edited query is shown in the following display. The display is scrolled forward so that you can see the WHERE clause.

Display 11.6 Edited SQL Query



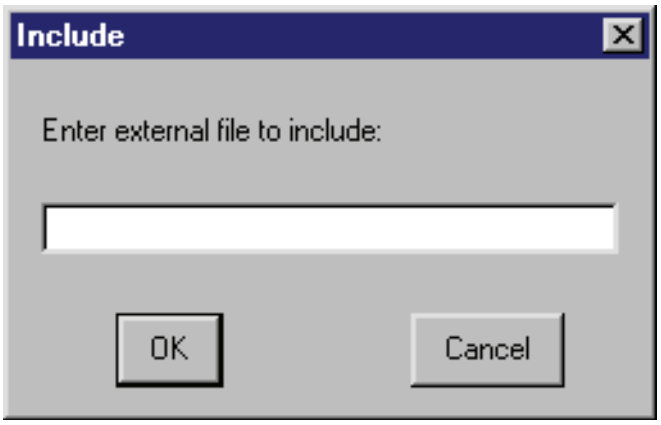
3 Select **Close** from the **File** menu to return to the SQL Editor window. You can perform further modifications to your query, run your query, or save it.

Note: You can also run your query from the Enhanced Editor window by selecting **Run** from the **RUN** menu. △

Including and Writing SQL Code to External Files

In the Enhanced Editor window, you can include an external file that contains SQL code. Select **Include** from the **File** menu. The Include... window appears and prompts you to type a filename, as shown in the following display.

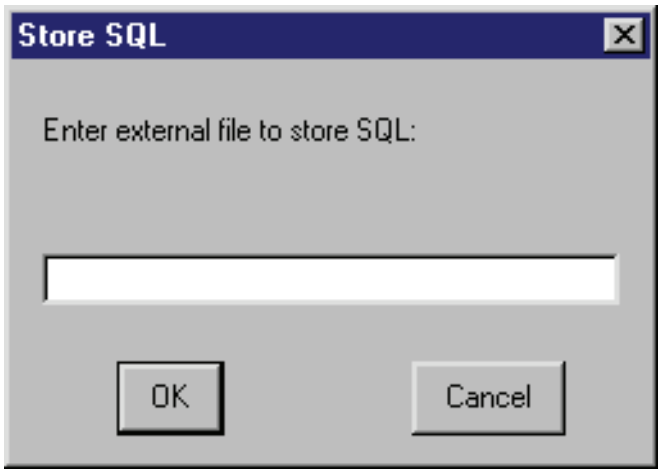
Display 11.7 Include Window



Type an external file name and select **OK** to copy the SQL code into the SQL Editor window.

To write your SQL code to an external file, select **Store SQL** from the **File** menu. The Store SQL...window prompts you for the external file name, as shown in the following display.

Display 11.8 Store SQL Window



Type an external file name and select **OK** to write the SQL code to your external file.

Note: You can include IBM QMF queries in the SQL Editor window if you convert them for use in Query and Reporting. See Appendix 4, "Migrating from QMF to SAS/ ASSIST Software," on page 251 for more information. △

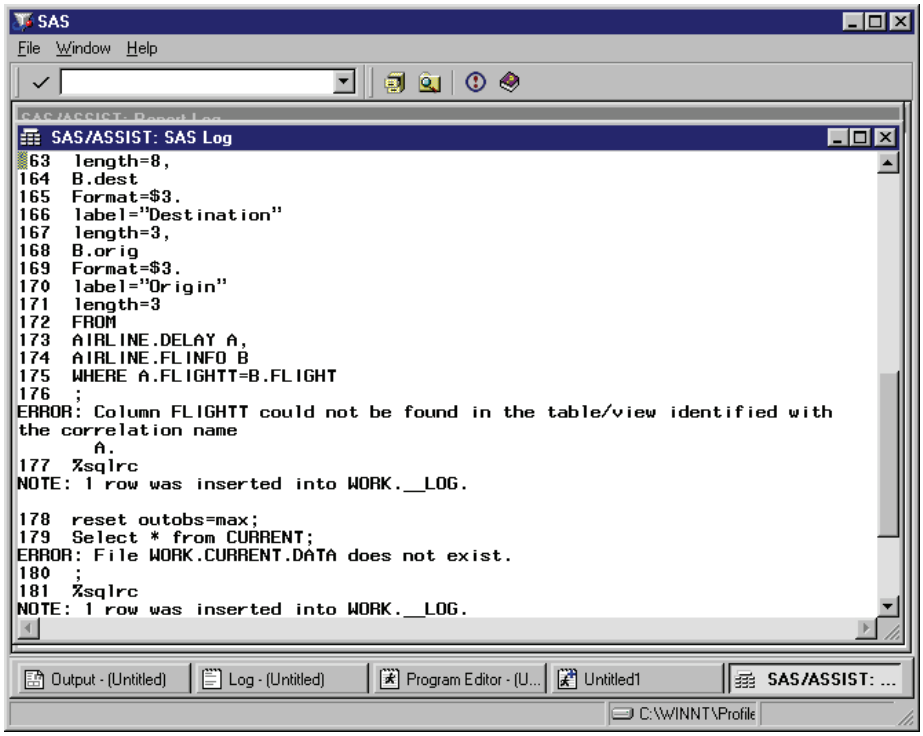
Correcting Errors in SQL Code

It is usually difficult to create perfectly correct SQL code the first time. If you run incorrect SQL code, you will get errors. The SQL Editor window has a SAS log for you to review so that you can correct your code.

Using the example from earlier in this chapter, if you incorrectly type the A.FLIGHT column name as A.FLIGHTT in the WHERE clause and you run the program, the Report Log window appears, informing you that an error has occurred.

Select **View SAS Log** from the **Run** menu to open a SAS log that is customized for SAS/ASSIST software. The following display indicates that the A.FLIGHTT column was not found in the AIRLINE.DELAY table.

Display 11.9 SAS Log Window



Select **Close** from the **File** menu twice to return to the SQL Editor window. Correct your code and run it again.

When you run your SQL code successfully, your output appears in the Report Output window (or in the output window that is defined for your system). From the SQL Editor window, you can select **Report Log** from the **View** menu to see the most recent SAS log for your output.

Running an SQL Query and Customizing the Output

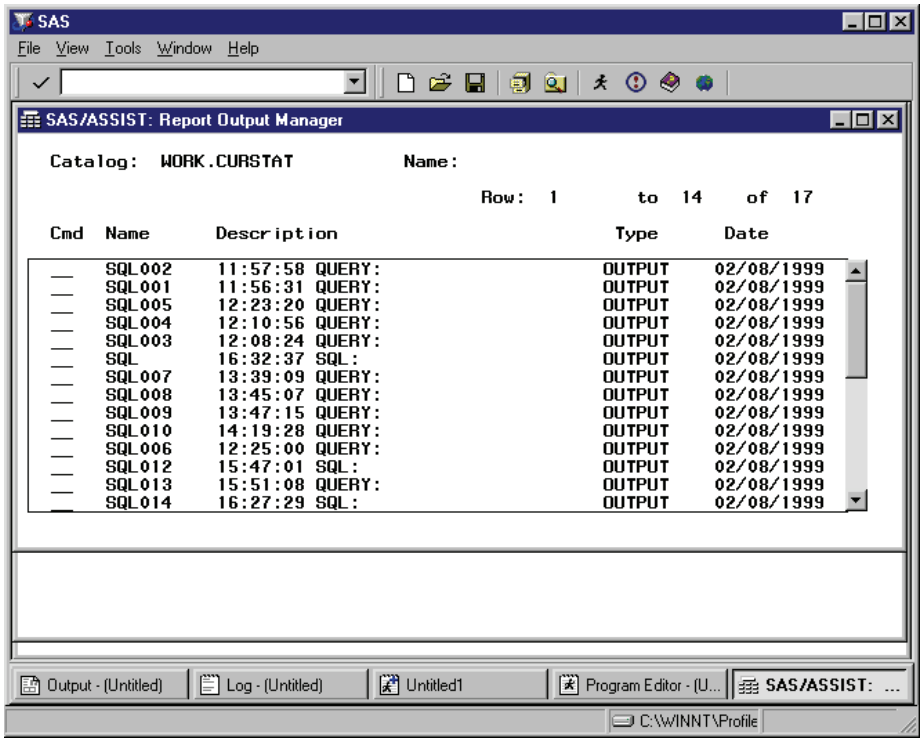
When your SQL query is ready, you can run the query immediately or you can add a title, change its options, limit its output, and so on, to make the report look better. See "Viewing the SQL Code, Running the Query, and Refining the Output" on page 178 for more information.

To run your report immediately, select **Submit** from the SQL Editor window's **Run** menu. Your output is displayed in the Report Output window (or in the output window that is defined for your system).

In some cases, you might want to edit your output to make your report look better or to correct minor errors, such as a mistyped name. It is more efficient to change the output for a report rather than to run the query again, especially if the tables used to create the report are very large.

To edit your output directly, select **Report Output Manager** from the **View** menu. The Report Output Manager window opens, as shown in the following display.

Display 11.10 Report Output Manager Window



The Report Output Manager lists every run of your queries in a temporary catalog, WORK.CURSTAT (current status). Type **E** or **S** in the **Cmd** field next to the output that you want to edit. This opens a window with the same text editing capabilities and commands as the Enhanced Editor window. You can edit any of the data or text in the output.

To save your changes, you must save the edited output either to an external file or to a SAS catalog entry.

- To save the edited output temporarily in the WORK.CURSTAT catalog, select **Save** from the **File** menu. When prompted, select **R** to overwrite the original OUTPUT entry in the WORK.CURSTAT catalog.
- To save your edited output permanently, select **Save As** from the **File** menu. Specify a name, description, and catalog and select **OK**.

  CAUTION:
  If a new entry has the same name as an existing ASSIST entry, you might not receive a prompt that warns about overwriting an existing entry. If you last saved from one of the three windows that has a different type than the one you are currently saving, you might not receive the warning prompt and your entry will be overwritten. △

- To save your output to an external file, select **Save As File** from the **File** menu. Specify an external file name in the Save As window and select **OK**.

From the Edit window, select **Close** from the **File** menu to return to the Report Output Manager window.

When you exit from the Report Output Manager and return to the Report Output window, you see that the changes you made are not shown in your output. The Report Output window does not automatically update to include your changes.

Note: If you do not save your changes to a permanent catalog or external file, the changes will be lost when you exit from SAS because WORK.CURSTAT is a temporary catalog. △

Select **Close** from **File** to return to the SQL Editor window.

Saving SQL Code or Output

The previous section describes how to run your query and to make minor editing changes to the output. After you have run your query, you have several options for saving your work.

- You can create a new SAS, DB2, or other database management system table from your output; see "Creating New Tables" on page 182 for details
- You can save the SQL query to a catalog entry of type SQL.
- You can save the output to a catalog entry or external file, as described in the previous section.
- save non-Select SQL statements to a catalog entry. From the SQL Editor window, select **Save** from the **File** menu.

Your saved SQL queries (type SQL) can be used to make reports with the Report Engine. See Chapter 5, "Doing More with the Report Engine," on page 61.

CHAPTER

12

Doing More with Setup

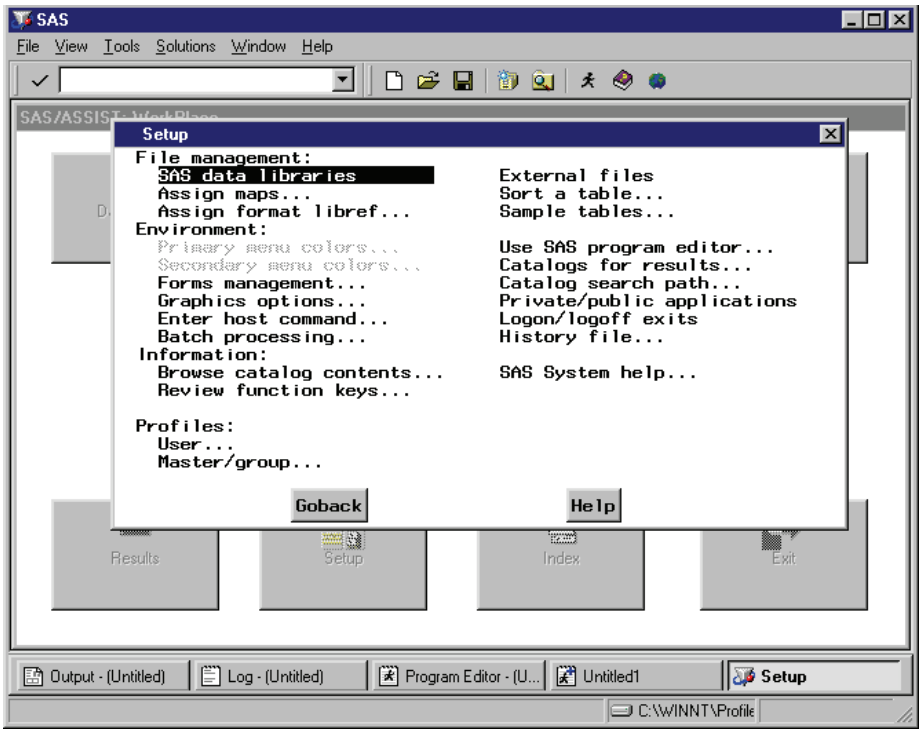
Introduction **215**
File Management Items **216**
SAS data libraries **216**
Assign maps **216**
Assign format libref **217**
External files **217**
Sort a table **217**
Sample tables **217**
Environment Items **217**
Primary and Secondary menu colors **217**
Forms management **217**
Graphics options **218**
Enter host command **218**
Batch processing **218**
Use SAS program editor **218**
Catalogs for results **218**
Catalog search path **218**
Private/public applications **218**
Logon/logoff exits **218**
History file **219**
Information items **219**
Browse catalog contents **219**
Review function keys **219**
SAS System help **219**
Profiles items **219**
User **219**
Master/group **219**
Using the Catalog Search Path **220**
Using Logon and Logoff Exits and an Alternate Main Menu **221**
Specifying a Logon Application **221**
Specifying a Logoff Application **222**
Specifying an Alternate Main Menu **222**

Introduction

This chapter describes in detail the setup options in SAS/ASSIST software. There are two sets of setup options associated with SAS/ASSIST software: the main setup options and the Query and Reporting setup options. The Query and Reporting setup options are discussed in “Query and Reporting Setup Options” on page 199.

There are three ways of accessing the main SAS/ASSIST setup options: The **Setup** button on the WorkPlace menu or by following either of these selection paths:**Tasks** ▶ **SetupTools** ▶ **Setup**The first selection path presents the options in a cascading menu. The second selection path opens the Setup window, containing all the setup options, as shown in the following display.

Display 12.1 Setup Window



This chapter describes how to use **Setup** to create a new library, delete and create the sample SAS/ASSIST tables, use the SAS windowing environment in SAS/ASSIST software, change the catalog search path, and use logon and logoff exits and an alternate main menu.

File Management Items

SAS data libraries

The **SAS data libraries** setup item enables you to assign, list, and de-assign librefs. For more information, see the "Setting Up SAS Files" chapter in *Getting Started with SAS/ASSIST*.

Assign maps

The **Assign maps** setup item opens the Map Data Set Libref window, enabling you to assign the MAPS libref to a SAS data library of your choosing. The Maps task searches this library for SAS/GRAPH map tables to generate map reports.

Assign format libref

The **`Assign format libref`** setup item opens the Assign Libref window, which enables you to assign the LIBRARY libref to a SAS data library of your choosing. SAS searches this library for permanently-stored user-defined formats. For more information on defining and storing formats, refer to “Creating a Format” on page 28 and “The FORMAT Procedure in *Base SAS Procedures Guide*.

External files

The **`External files`** setup item enables you to assign, list, and de-assign filerefs, and to browse external files. For more information, see “Browsing an External File” on page 150. **`External files`** is also described in Appendix 3, “Batch Processing with the Result Manager (z/OS Only),” on page 243.

Sort a table

The **`Sort a table`** setup item opens the SAS/ASSIST Sort a Table window. For more information on the Sort a Table window, see the “Sorting Data” chapter in *Getting Started with SAS/ASSIST*.

Sample tables

The **`Sample tables`** setup item enables you to create, delete, edit, and browse the SAS/ASSIST sample tables. For more information, see the “Familiarizing Yourself with SAS and SAS/ASSIST Software ”chapter in *Getting Started with SAS/ASSIST*.

Environment Items

Primary and Secondary menu colors

The **`Primary menu colors`** and **`Secondary menu colors`** items enable you to customize the color scheme of the Version 6 block-style SAS/ASSIST menus. They have no effect on the WorkPlace menu.

Forms management

The **`Forms management`** setup item enables you to create and edit printer forms and select the catalog for storing and retrieving saved printer forms. Printer forms determine how hardcopy output appears. For more information on how printer forms are used, refer to the SAS companion documentation for your operating environment. To create or edit a printer form, type the name of the form in the **`Form name`** filed and press ENTER. See the online help for information on the various forms windows.

Graphics options

The **Graphics options** setup item enables you to select and customize graphics device drivers for display, hardcopy, and file output. You can also specify other graphics options such as font style, size, and color. **Graphics Options** is also used in "Changing the Background Color for Graphs" on page 115.

Enter host command

The **Enter host command** setup item enables you to send a command to your operating environment without exiting your SAS session.

Batch processing

The **Batch processing** setup item enables you to set up files and commands for batch processing. For more information, see Appendix 3, "Batch Processing with the Result Manager (z/OS Only)," on page 243.

Use SAS program editor

The **Use SAS program editor** item raises the Program Editor window. This option has the same effect as selecting **Program Editor** from the **View** menu.

Catalogs for results

The **Catalogs for results** item is used with the Version 6.06 interface style of SAS/ASSIST software (User Profile option **SAS/ASSIST Style** set to **Block**, **Menu Style** set to **Old**). In the Version 6.06 interface, you can use **Catalogs for Results** to specify a separate catalog for saved tasks, output and logs, graphics and forms. All results are now saved to the SASUSER.PRIVATE catalog by default.

Catalog search path

The **Catalog search path** item enables you to specify up to four catalogs in which to search for catalog entries before searching the default catalogs. For more information, see "Using the Catalog Search Path" on page 220.

Private/public applications

The **Private/public applications** item is used to specify what applications are run from the **Run public applications** and **Run private applications** items on the EIS task menu

Logon/logoff exits

Logon and logoff exits are programs that run automatically when you invoke and exit SAS/ASSIST software. You can also set up an alternate main menu. For more

information, see "Using Logon and Logoff Exits and an Alternate Main Menu" on page 221.

History file

The **`History File`** item is used in the Release 6.06 SAS/ASSIST interface to collect the source code from the SAS/ASSIST tasks into one file. While this function can still be used in later releases, using a script file is generally more useful. For more information on script files, see "Creating and Executing a Script File" on page 152.

Information items

Browse catalog contents

The **`Browse catalog contents`** item enables you to browse the contents of a catalog of your choosing. For more information, see "Browsing an External File" on page 150.

Review function keys

The **`Review function keys`** item opens the KEYS window. For more information, refer to the "Familiarizing Yourself with SAS and SAS/ASSIST Software" chapter in *Getting Started with SAS/ASSIST*.

SAS System help

The **`SAS system help`** setup item invokes the SAS online help system.

Profiles items

User

The **`User`** item opens the User Profile window. For more information, see Appendix 2, "Customizing SAS/ASSIST Software," on page 237.

Master/group

The **`Master/group`** item opens the Master/Group Profile window. Master and Group Profiles are used to set SAS/ASSIST software options for entire sites or groups within sites. Master and Group Profiles are usually set up by system administrators.

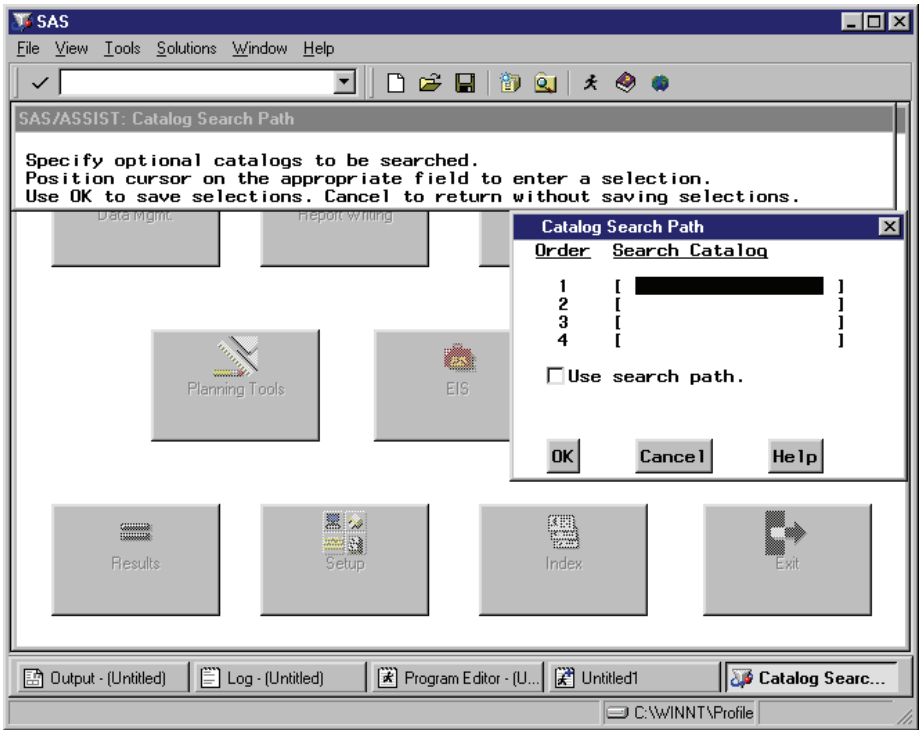
Using the Catalog Search Path

If you have programs, FRAME entries, or other SAS/AF catalog entries that you want SAS/ASSIST software to use, you can use the **Catalog search path** item to specify the names of the catalogs you want SAS/ASSIST software to search. SAS/ASSIST software searches the specified catalogs first whenever it is called on to run a SAS/AF program, FRAME entry, or other catalog entries. If SAS/ASSIST software does not find the requested entry, SAS/ASSIST software then searches its default catalogs.

Use the following instructions to set up a catalog search path.

1 Follow this selection path:**Tasks ▶ Setup ▶ Environment ▶ Catalog search path**The Catalog Search Path window appears.

Display 12.2 Catalog Search Path Window



2 In the numbered fields, type the names of the catalogs that you want SAS/ASSIST software to search first for programs, FRAME entries, and other catalog entries, before searching the default catalogs. Use two-level catalog names in the form of *libref.catalog*. SAS/ASSIST software searches the catalogs you indicate in the order you type them (from the top down). To display a list of available catalogs, type **?** in the first position of the catalog field and press ENTER. Select the catalog you want to use.

3 To enable the search path, select **Use search path**. This feature allows you to turn the search path on and off without having to retype the catalogs each time.

4 Select **OK**.

Using Logon and Logoff Exits and an Alternate Main Menu

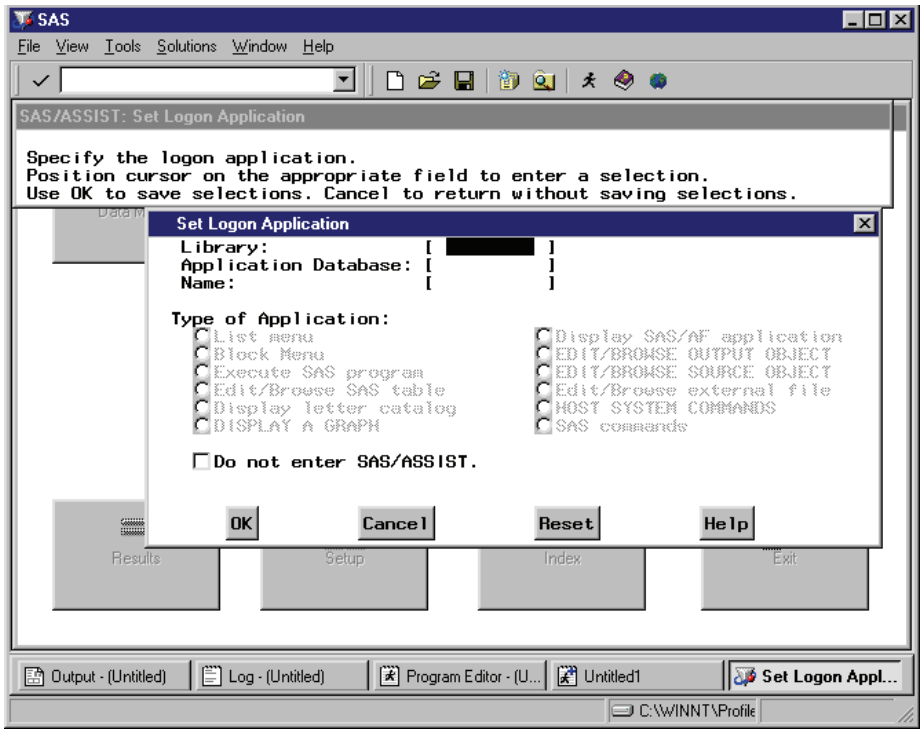
When you access SAS/ASSIST software, you can use the **Logon exit** item to specify an application that you want to initiate when you enter SAS/ASSIST software. Additionally, by using **Alternate main menu**, you can specify that you want to display an alternate menu instead of, or in addition to, the WorkPlace menu or the Version 6 block-style menu. When you exit SAS/ASSIST software, you can specify an application you want to invoke upon exiting by using **Logoff exit**.

This section discusses the use of **Logon/logoff exits**, including using **Alternate main menu**. As an alternative to using these windows, you can set the **SAS/ASSIST start program**, **Type of start program**, **SAS/ASSIST stop program**, and **Type of stop program** User Profile options. See "Setting User Profile Options" on page 237.

Specifying a Logon Application

1 To display the Set Logon Application window, follow this selection path:**Tasks ▸ Setup ▸ Logon/logoff exits ▸ Logon Exit**

Display 12.3 Set Logon Application Window



2 In the **Library** field, type the name of the library that contains the applications database, for example, SASUSER.

3 In the **Applications Database** field, specify the applications database that contains the desired application. The applications database must reside in the library specified in the **Library** field and must be of type SASAPPL. The default applications database is SASUSER.SASAPPL.

4 In the **Name** field, type the name of the application.

5 Select the type of application from the list shown in the window.

6 To bypass SAS/ASSIST software, select **Do not enter SAS/ASSIST**.

7 Select **OK** to return to the WorkPlace menu window.

The next time you invoke SAS/ASSIST software, your logon exit application is initiated first. When you exit the logon exit application, the WorkPlace menu appears.

You also can invoke a logon exit with the LOGON= command-line option. The syntax of this command is

ASSIST LOGON='*libref.applds.applname.appltype*'

The *libref.applds.applname.appltype* argument specifies a four-level name for the application. The default application database is SASUSER.SASAPPL. The LOGON= command-line option overrides **Logon exit**.

To disable the **Do not enter SAS/ASSIST** selection, bypass your logon exit application, and access SAS/ASSIST software, type **ASSIST LOGON=NO** on a command line or command window and press ENTER.

Specifying a Logoff Application

1 To open the Set Logoff Application window, follow this selection path:**Tasks ▶ Setup ▶ Environment ▶ Logon/Logoff Exits ▶ Logoff Exit**The Set Logoff Application window is similar to the Set Logon Application window, except that there is no **Do not enter SAS/ASSIST** option. Instead, there is an **Exit the SAS System** option.

2 Type information in the window using the guidelines given previously for the Set Logon Application window. If desired, select **Exit the SAS System** to specify that you want to end your SAS session when you exit SAS/ASSIST software.

3 Select **OK** to return to the WorkPlace menu.

When you exit SAS/ASSIST software, your logoff exit application is initiated. When you exit the logoff exit application, you return to the point from which you invoked SAS/ASSIST software, or exit SAS, depending on your selection for the **Exit the SAS System** option.

You can also initiate a logoff exit with the LOGOFF= command-line option. The syntax for this command is

ASSIST LOGOFF='*libref.applds.applname.appltype*'

The *libref.applds.applname.appltype* argument specifies a four-level name of the application. The default application database is SASUSER.SASAPPL.

To disable the **Exit the SAS System** selection and bypass your logoff exit application, type **ASSIST LOGON=NO** on a command line or command window and press ENTER.

The LOGOFF= command line option overrides **Logoff exit**.

Specifying an Alternate Main Menu

1 To open the Set Alternate Main Menu window, follow this selection path:**Tasks ▶ Setup ▶ Environment ▶ Logon/logoff exits ▶ Alternate main menu** The **Set Alternate Main Menu** window is similar to the Set Logon Application window.

2 Type information in the window using the guidelines given previously for the Set Logon Application window.

3 If desired, deselect **Do not enter SAS/ASSIST** to enter SAS/ASSIST software when you exit the alternate main menu. This item, which is selected by default, enables you to bypass SAS/ASSIST software.

4 Select **OK** to return to the WorkPlace menu.

The next time you access SAS/ASSIST software or return to the WorkPlace menu from a task window, your alternate menu appears instead. When you exit the alternate main menu, the SAS/ASSIST WorkPlace menu appears (if you have deselected **Do not enter SAS/ASSIST**).

If you have specified an alternate main menu application, and you want to disable the alternate main menu feature, access SAS/ASSIST software by typing **ASSIST PRIMARY=NO** on a command line or command window. This bypasses the specified alternate main menu application and displays the WorkPlace menu.

You can also invoke an alternate main menu with the PRIMARY= command line option. The syntax for this command is

ASSIST PRIMARY='*libref.applds.applname.appltype*'

The *libref.applds.applname.appltype* argument specifies a four-level name for the application. The default application database is SASUSER.SASAPPL.

The PRIMARY= command-line option overrides **Alternate main menu**.

APPENDIX

1

Tasks Menu Reference

Introduction **225**
- *Data Management* **225**
- *Report Writing* **227**
- *High Resolution Graphics* **228**
- *Low Resolution Graphics* **229**
- *Data Analysis* **229**
- *Planning Tools* **231**
- *EIS* **232**
- *Remote Connect* **232**
- *Results* **233**
- *Setup* **234**

Introduction

This chapter gives a complete picture of the items available on the SAS/ASSIST software **Tasks** menu. For each submenu of the **Tasks** menu, there is a short description of the item, the required software product, and a cross-reference to more information.

The following abbreviations are used in the "See" column:

- *GS* refers to *Getting Started with SAS/ASSIST*.
- *PG* refers to *Base SAS Procedures Guide*.
- *SAS/ETS UG* refers to *SAS/ETS User's Guide*
- *SAS/STAT UG* refers to *SAS/STAT User's Guide, Volumes 1, 2, and 3*.

Data Management

Table A1.1 Data Management Menu Items

Item	Sub-item	Description	Required product	See
Query	SQL Query	Opens SQL Query window	Base SAS software	SQL Query Window online help
	Query and Reporting	Accesses SAS/ASSIST Query and Reporting system	Base SAS software	Chapter 10, "Query and Reporting," on page 155 and Chapter 11, "Using the SQL Editor," on page 201

Item	Sub-item	Description	Required product	See
Edit/Browse	Edit Data	Enables editing of a SAS table	SAS/FSP software	"Editing and Browsing Data" chapter in *GS*; SAS/FSP software online help
	Browse Data	Enables browsing of a SAS table	SAS/FSP software	
Import Data	n/a	Enables import of an external file to a SAS table	Base SAS software	"Importing and Exporting Data" chapter in *GS*
Export Data	n/a	Enables export of a SAS table to an external file	Base SAS software	
Create Data	Interactively	Data entry in single-line or table format	SAS/FSP software	"Entering Data Interactively" chapter in *GS*
	For X-Y Plots	Data entry for creating an X-Y plot	SAS/FSP software	SAS/ASSIST software online help
	For Charts	Data entry for creating bar or pie charts	SAS/FSP software	SAS/ASSIST software online help
	For Mapping	Data entry for creating maps	SAS/FSP software	SAS/ASSIST software online help
	For Calendar	Data entry for creating a calendar	SAS/FSP software	SAS/ASSIST software online help
	For Time Series	Data entry for time-series analysis	SAS/FSP software	SAS/ASSIST software online help
	Using SQL	Opens SQL Query window	Base SAS software	SQL Query Window online help
DBMS Access	n/a	Opens Explorer window	Base SAS software	Explorer online help
Subset/Copy	n/a	Subset or copy a SAS table	Base SAS software	"Defining a New Column" chapter in *GS*
Combine	All methods	Opens Combine Tables window	Base SAS software	For all of these methods, see "Combining Data Using a Cartesian Product Match Merge" on page 22
	Concatenate	Combine tables by concatenation	Base SAS software	
	Merge	Combine tables by merging	Base SAS software	
	Interleave	Combine tables by interleaving	Base SAS software	
	Match Merge	Combine tables by match merging	Base SAS software	
Design Format	n/a	Create formats and informats	Base SAS software	"Creating a Format" on page 28
Sort	n/a	Sort a SAS table	Base SAS software	"Sorting Data" chapter in *GS*

Item	Sub-item	Description	Required product	See
Utilities	Contents of a Table	Browse or edit SAS table properties	Base SAS software	"Altering the Properties of a SAS Table" on page 30
	Table	Select an active table with the Select Table window	n/a	"Select Table Window" on page 12
	Convert to CPORT Format	Prepare a SAS table for transport to another operating environment	Base SAS software	"Transporting SAS Files Across Operating Environments" on page 34
	Convert from CPORT Format	Convert a transport file to SAS format	Base SAS software	"Transporting SAS Files Across Operating Environments" on page 34
	Convert Frequency of Time Series Data	Edit time series data	SAS/ETS software	SAS/ASSIST software online help
	Rearrange Repeated Measures Table	Expand repeated measures data into one measure per row	Base SAS software	SAS/ASSIST software online help
	Transpose Table	Make rows into columns	Base SAS software	"Transposing a Table" on page 37

Report Writing

Table A1.2 Report Writing Menu Items

Item	Sub-item	Description	Required Software	See
Listing	n/a	List Data task	Base SAS software	"Report Writing" chapter in *GS*
Tabular Report	All styles, Statistics, Simple Group 1, Simple Group 2, Two-dimensional Group, Multiple Group, Advanced	Create tabular reports	Base SAS software	"Report Writing" chapter in *GS*; "Doing More with Tabular Reports" on page 49

Item	Sub-item	Description	Required Software	See
Report Engine	Use Report Engine facility	Base SAS software	"Using the Report Engine" chapter in *GS*; Chapter 5, "Doing More with the Report Engine," on page 61	
Utilities	Create Labels	Design printed labels	Base SAS software	SAS/ASSIST software online help
	Create banner	Design printed banners	Base SAS software	SAS/ASSIST software online help
	Produce Calendar	Create a calendar application	Base SAS software	SAS/ASSIST software online help
	Create Calendar Data	Data entry for calendars	Base SAS software	SAS/ASSIST software online help
	Summary Statistics	Generate summary statistics on a SAS table	Base SAS software	"Data Analysis" chapter of *GS*; Chapter 7, "Doing More with Data Analysis," on page 119
	Contents of a Table	Browse or edit SAS table properties	Base SAS software	"Altering the Properties of a SAS Table" on page 30
	Design Formats	Create formats and informats	Base SAS software	"Creating a Format" on page 28

High Resolution Graphics

For all bar charts, pie charts, plots, and maps, see the "Graphics" chapter in *GS* and Chapter 6, "Doing More with Graphics," on page 85. SAS/GRAPH software is required for all High Resolution Graphics tasks.

Table A1.3

Item	Sub-item	Description	Required Product	See
Bar Chart	n/a	Create vertical and horizontal bar charts	SAS/ GRAPH software	
Pie Chart	n/a	Create pie charts	SAS/ GRAPH software	

Item	Sub-item	Description	Required Product	See
Plots	Simple X * Y Plot	Create simple plots	SAS/ GRAPH software	
	X * Y Plots by Category	Create categorical plots	SAS/ GRAPH software	
	Multiple Plots per Axes	Create advanced plots	SAS/ GRAPH software	
Maps	n/a	Create maps	SAS/ GRAPH software	
Utilities	Replay graphs	Redisplay saved graphics	SAS/ GRAPH software	SAS/ASSIST software online help
	Generate Test Patterns	Test graphics display	SAS/ GRAPH software	SAS/ASSIST software online help
	Create Data for X * Y Plots	Data entry for plots	SAS/FSP software	SAS/FSP software online help
	Create Data for Charts	Data entry for charts	SAS/FSP software	SAS/FSP software online help
	Create Data for Mapping	Data entry for maps	SAS/ GRAPH software, SAS/FSP software	SAS/FSP software online help

Low Resolution Graphics

Low-resolution graphics are available only if you are using the Version 6 block-style menu or if you are using a non-graphics terminal device. No additional products are required to use low-resolution graphics. For more information on low-resolution graphics, refer to the SAS/ASSIST software online help.

Data Analysis

For general information on performing data analysis, see the "Data Analysis" chapter in *Getting Started with SAS/ASSIST* and Chapter 7, "Doing More with Data Analysis," on page 119.

Table A1.4

Item	Sub-item	Description	Required Product	See
Elementary	Summary Statistics	Generate summary statistics on a SAS table	Base SAS software	"Data Analysis" chapter in *GS*; Chapter 7, "Doing More with Data Analysis," on page 119
	Correlation	Compute correlations	Base SAS software	"The CORR Procedure" in *PG*
	Confidence Intervals for Means	Compute confidence intervals	Base SAS software	"The MEANS Procedure" in *PG*
	Frequency Tables	Generate or analyze frequency tables	Base SAS software	"The FREQ Procedure" in *PG*
Regression	Linear	Perform linear regression analysis	SAS/STAT software	"The REG Procedure" in *SAS/STAT UG*
	Logistic	Perform logistic regression analysis	SAS/STAT software	"The LOGREG Procedure" in *SAS/STAT UG*
	With Correction for Auto-correlation	Perform regression with correction for autocorrelation	SAS/ETS software	SAS/ETS software online help
Anova	Analysis of Variance	Perform analysis of variance	SAS/STAT software	"The ANOVA Procedure" in *SAS/STAT UG*
	Nonpara-metric ANOVA	Perform nonparametric ANOVA	SAS/STAT software	"The NPAR1WAY Procedure" in *SAS/STAT UG*
	T-tests	Perform *t*-tests	SAS/STAT software	"The TTEST Procedure" in *SAS/STAT UG*
Multivariate	Principal Components	Perform principal components analysis	SAS/STAT software	"The PRINCOMP Procedure" in *SAS/STAT UG*
	Canonical Correlation	Perform canonical correlation analysis	SAS/STAT software	"The CANCORR Procedure" in *SAS/STAT UG*
Quality Ctrl	n/a	Access quality control analysis functions	SAS/QC software	SAS/QC software online help
Interactive	Guided Data Analysis	Interactively analyze data	SAS/LAB software	SAS/LAB software online help
	Data Exploration	Graphically analyze and display data	SAS/ INSIGHT software	SAS/INSIGHT software online help

Item	Sub-item	Description	Required Product	See
Time Series	Seasonal Adjustment	Perform seasonal adjustment of time series data	SAS/ETS software	"The X11 Procedure" in *SAS/ETS UG*
	Regression	Perform regression with correction for autocorrelation	SAS/ETS software	"The AUTOREG Procedure" in *SAS/ETS UG*
Utilities	Compute Percentiles	Perform univariate analysis	Base SAS software	"The UNIVARIATE Procedure"in *PG*
	Compute Ranks	Perform rank analysis	Base SAS software	"The RANK Procedure" in *PG*
	Standardize Columns	Standardize data	Base SAS software	"The STANDARD Procedure" in *PG*
	Convert Frequency of Time Series Data	Expand repeated measures data into one measure per row	SAS/ETS software	"The EXPAND Procedure" in *SAS/ETS UG*
	Create Time Series Data	Data entry for time series analysis	SAS/FSP software	SAS/FSP software online help

Planning Tools

Table A1.5

Item	Sub-item	Description	Required Product	See
Loan Analysis	n/a	Loan calculator	SAS/ETS software	SAS/ETS software online help
Design of Exp	n/a	Experiment designer	SAS/QC software	SAS/QC software online help
Project Mgmt	n/a	Project management	SAS/OR software	SAS/OR software online help
Spreadsheet	n/a	Spreadsheet application	SAS/CALC software	SAS/CALC software online help
Forecasting	n/a	Financial forecasting application	SAS/ETS software	SAS/ETS software online help

Item	Sub-item	Description	Required Product	See
Utilities	Produce a Calendar	Calendar creation application	n/a	SAS/ASSIST software online help
	Create Calendar Data	Data entry for calendar creation	SAS/FSP software	SAS/FSP software online help
	Convert frequency of time series data	Edit time series data	SAS/ETS software	SAS/ETS software online help
	Create time series data	Data entry for time series analysis	SAS/FSP software	SAS/FSP software online help

EIS

Table A1.6

Item	Sub-item	Description	Required Product	See
Run 6.06 private applications	n/a	Access private applications from Release 6.06 SAS/EIS software	n/a	SAS/ASSIST software online help
Run 6.06 public applications	n/a	Run public applications from Release 6.06 SAS/EIS software	n/a	SAS/ASSIST software online help
SAS/EIS	n/a	Invoke SAS/EIS software	SAS/EIS software	SAS/EIS software online help

Remote Connect

All Remote Connect items require SAS/CONNECT software.

Table A1.7

Item	Sub-item	Description	See
Establish Connection	n/a	Establish remote connection	"Using Remote Connect" chapter in *GS*
Run	n/a	Run a saved program locally or remotely	SAS/ASSIST software online help

Item	Sub-item	Description	See
Transfer Data	Upload	Send data to remote host	"Using Remote Connect" chapter in *GS*
	Download	Get data from remote host	SAS/ASSIST software online help
	Download Graphics Output	Get graphics output files from remote host	SAS/ASSIST software online help
	Utilities	Access utility functions	SAS/ASSIST software online help
Terminate connection	n/a	Terminate connection to remote host	"Using Remote Connect" chapter in *GS*
Edit remote connection	n/a	Edit remote connect configuration	"Adding, Editing, and Deleting Remote Configurations" on page 140
Results	Result Manager	Access Result Manager window	"Using the Result Manager" chapter in *GS*
	Access saved programs, output, logs, graphs		
	Batch Submit	Submit a batch job locally or remotely	Appendix 3, "Batch Processing with the Result Manager (z/OS Only)," on page 243

Results

No further products are required for the Results items.

Table A1.8

Item	Description	See
Result Manager	Opens Result Manager window	"Using the Result Manager" chapter in *GS*; "Doing More with the Result Manager" on page 143
Access saved programs, output, logs, graphs	The "Access saved..."items are not used in SAS/ASSIST software Release 6.08 and later. They are retained for compatibility with earlier releases.	SAS/ASSIST software online help for all "Access saved..." items
Batch submit	Submit a batch job locally or remotely	Appendix 3, "Batch Processing with the Result Manager (z/OS Only)," on page 243

Setup

Table A1.9

Item	Sub-item	Description	Required product	See
File Management	SAS Data libraries	Manage librefs	Base SAS software	"Setting Up SAS Files" chapter in *GS*
	Assign maps	Assign MAPS libref	Base SAS software	SAS/ASSIST software online help
	Assign format libref	Assign LIBRARY libref	Base SAS software	SAS/ASSIST software online help
	External files	Manage filerefs	Base SAS software	SAS/ASSIST software online help
	Sort a table	Sort data in a SAS table	Base SAS software	"Sorting Data" chapter in *GS*
	Sample tables	Create, browse, edit, or delete SAS/ASSIST sample tables	SAS/FSP software (to edit and browse)	"Using the SAS System and SAS/ ASSIST Software" chapter in *GS*

Item	Sub-item	Description	Required product	See
Environment	Primary menu colors	Change color scheme for Version 6 block-style menu	Base SAS software	SAS/ASSIST software online help
	Secondary menu colors	Change color scheme for Version 6 block-style menu	Base SAS software	SAS/ASSIST software online help
	Forms management	Create an edit printer forms	Base SAS software	SAS/ASSIST software online help
	Graphics options	Select and customize graphics device drivers and other graphics options	SAS/ GRAPH software	SAS/ASSIST software online help
	Enter host command	Send a command to operating environment	Base SAS software	SAS/ASSIST software online help
	Batch processing	Set up batch jobs	Base SAS software	Appendix 3, "Batch Processing with the Result Manager (z/OS Only)," on page 243
	Use SAS program editor	Opens Program Editor window	Base SAS software	SAS/ASSIST software online help
	Catalogs for results	This option is used only in the Release 6.06 SAS/ ASSIST software interface style. It is not used with the interfaces for later releases.	n/a	SAS/ASSIST software online help
	Catalog search path	Specify catalog to search for programs an FRAME entries	Base SAS software	"Using the Catalog Search Path" on page 220
	Private/ public applications	Specify private and public applications for use with EIS task menu	Base SAS software	SAS/ASSIST software online help
	Logon/logoff exits	Specify applications to run before and after running SAS/ASSIST software	Base SAS software	"Using Logon and Logoff Exits and an Alternate Main Menu" on page 221
	History file	Create history file (Release 6.06 interface style)	n/a	SAS/ASSIST software online help

Item	Sub-item	Description	Required product	See
Information	Browse catalog contents	Browse contents of a SAS catalog	Base SAS software	SAS/ASSIST software online help
	Review function keys	Open KEYS window	Base SAS software	"Using the SAS System and SAS/ ASSIST Software" chapter in *GS*
	SAS System help	Invoke SAS online help system	Base SAS software	"Using the SAS System and SAS/ ASSIST Software" chapter in *GS*
Profiles	User	Open User Profile window	Base SAS software	"Setting User Profile Options" on page 237
	Master/ Group	Open Master/Group Profile window	Base SAS software	SAS/ASSIST software online help

APPENDIX

2

Customizing SAS/ASSIST Software

Introduction **237**
Setting User Profile Options **237**
Creating an Alternate Menu Bar **239**

Introduction

This appendix describes how you can customize your SAS/ASSIST sessions. The main method for customizing aspects of your SAS/ASSIST environment is by manipulating the User Profile options as described in the following section. This appendix also describes how to create an alternate menu bar.

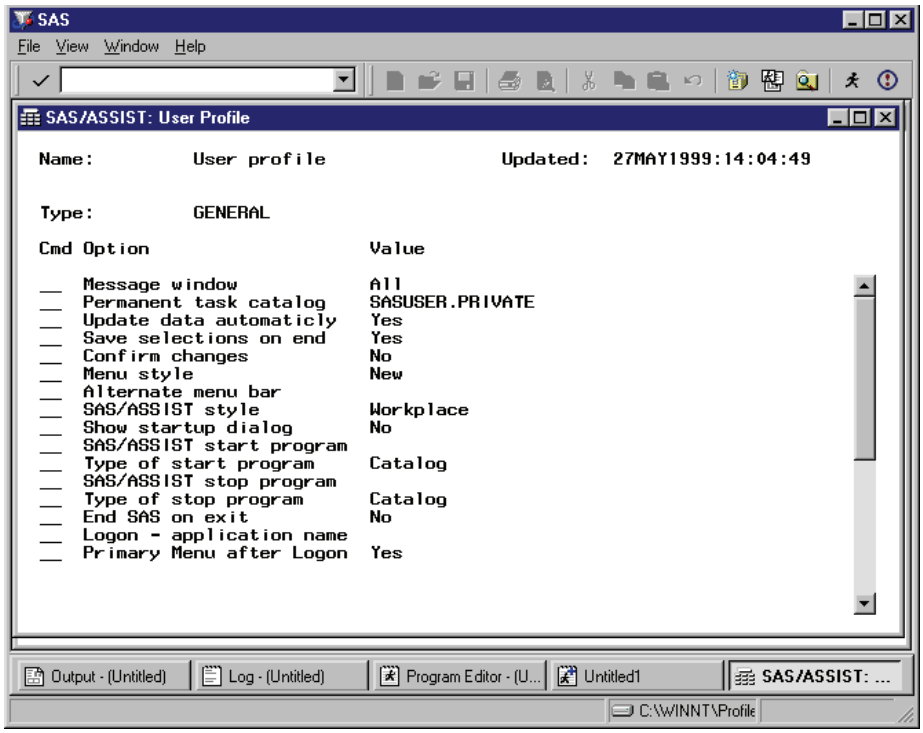
Setting User Profile Options

The User Profile window contains a set of options that is available for your personal use in SAS/ASSIST software. The user profile is automatically created the first time you access SAS/ASSIST software. Individual User Profiles are stored in the SAS catalog entry SASUSER.PROFILE.PASSIST.SLIST. You can use SAS/ASSIST software with the personal User Profile and the personal Query Manager that are set up for you by default. See “Selecting a Query Manager” on page 158 for more information about Query Managers.

To open the User Profile window, follow this selection path:**Tasks ► Setup ► Profiles ► User**

The following display shows the User Profile window.

Display A2.1 User Profile Window



The User Profile window contains all of the possible profile options. However, it displays only a subset of the available options when the **Type** field has any value other than **All**. The default value for the **Type** field is **General**.

To see other subsets of options, type a **?** in the **Type** field, press ENTER, and select a type from the list. Alternatively, you can type a different type in the **Type** field. The types of options include the following:

All
: Displays all possible options

Access to DB2 data
: Displays options related to DB2 access in Query and Reporting (z/OS only).

Access to SAS data
: Displays options related to SAS data access.

Batch
: Displays options related to batch processing (z/OS only).

General
: Displays general SAS/ASSIST software options.

Private menu
: Displays options related to the private menu.

Query
: Displays options related to Query and Reporting.

Query Manager
: Displays options related to Query Managers.

Report Engine
: Displays options related to the Report Engine.

Scroll the window forward as needed to see additional options. Most options have a default value. Type a **?** in the **Value** field for an option to list all of the possible values for that option. To change the value, select a new value from the list or type over the current value. You can also type **I** or **S** in the **Cmd** field to open the Option Information window and update values in that window. The following table lists the commands you can use in the **Cmd** field next to an option.

Table A2.1 Commands for the User Profile Window

Cmd	Action	Description
?	Lists commands	Displays a list of commands for the **Cmd** field.
I	Information	Opens the Option Information window, which provides information about the current option, including a description, a value, and the date altered. You can edit the value in this window by typing a new value in the **Value** field. Alternatively, you can type a **?** in the **Value** field to list all possible values for the option. Select a value from the list.
R	Resets value	Returns the option to the last saved option value.
S	Information	Is identical to the **I** command.

The User profile is controlled by a Master profile, if one exists, and may also be controlled by a Group profile. User profile options might be restricted by an administrator. When options are restricted, you cannot change the values for these options in your User profile. (If option values have been changed in a Master or Group profile, you may see a prompt indicating that changes have been made when you invoke SAS/ASSIST software.) Master and Group Profiles are usually set up by system administrators.

Creating an Alternate Menu Bar

You can use the PMENU procedure to create an alternate menu bar for your SAS/ASSIST session. For example, submitting the following SAS program in the Program Editor window creates a menu bar called CUSTMENU in a catalog called SASUSER.MENUS:

```
proc pmenu cat=sasuser.menus;
   menu custmenu;
   item 'File' menu=file;
   item 'Locals' menu=locals;

   menu file;
      item 'End';
      item 'Bye';

   menu locals;
      item 'RESULTMAN';
      item 'ACCESS';

run;
quit;
```

After you have submitted this program, invoke SAS/ASSIST software if it is not already running. Open the User Profile window as described earlier in this chapter. Change the following options:

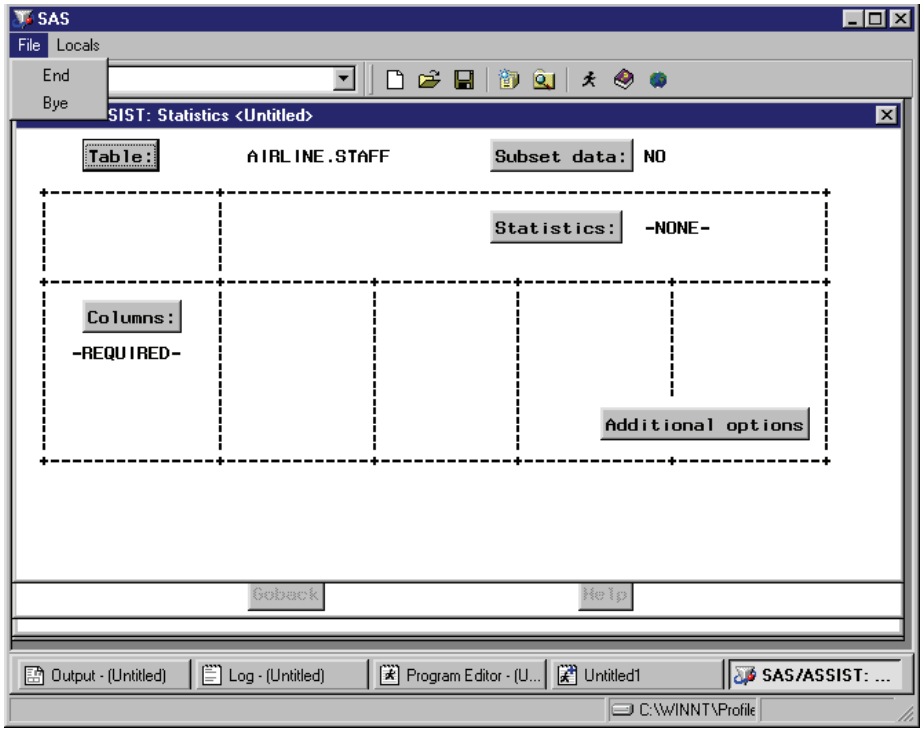
- Change the **Menu style** value to **ALTERNATE**.
- Change the **Alternate menu bar** value to the location of the alternate menu bar; in this example,

```
SASUSER.MENUS.CUSTMENU.PMENU
```

- Change the **SAS/ASSIST Style** value to **Block menu**

Select **Close** from the **File** menu to save your changes. Exit SAS/ASSIST software, then re-invoke it. When you open a task window, your alternate menu bar appears as shown in the following display.

Display A2.2 Alternate Menu Bar



To find the SAS/ASSIST commands that you can use when building an alternate menu, follow this selection path from the WorkPlace menu:**Help ▸ Using This Window**Select **Menu Bar** from the Help window for a list of menu bar items; select a menu bar item to find its associated command. Here are some additional useful commands:

COMMAND
toggles between the menu bar and the **Command ===>** prompt.

PREVWIND
raises the previous window.

NEXT
raises the next window.

POPCMD

lists the available commands for that window.

EXPORT
opens the Export Data to External File window after a query has been run. Used in the Query window only.

END ALL
closes all open Query and Reporting windows. Used in Query and Reporting windows only.

For more information on the PMENU procedure, refer to the *Base SAS Procedures Guide*.

APPENDIX

3

Batch Processing with the Result Manager (z/OS Only)

Introduction **243**
Additional Information **243**
General Batch Processing Information Under z/OS **243**
Submitting Batch Jobs **244**
Customizing the JCL Program **246**
Customizing the Batch Program Window **248**

Introduction

This appendix provides information about submitting batch jobs from SAS/ASSIST software. When you invoke SAS/ASSIST software under z/OS, you can use the Result Manager to execute saved queries, reports, and so on, in batch. To execute an entry in batch mode, you need a site-dependent Job Control Language (JCL) program. The JCL program can reside as a sequential file, a Partitioned Data Set (PDS) member, or as a source entry in a SAS catalog.

Note: This section describes basic information for batch processing using the Result Manger under the z/OS operating environment. Batch processing and JCL are specific for each site. Check with your z/OS system administrator for additional information. △

Additional Information

For additional information on submitting batch jobs under z/OS, see the *SAS Companion for z/OS*.

General Batch Processing Information Under z/OS

When you use the **L** command in the Result Manager window to batch submit an entry, the default JCL program in SASHELP.QASSIST.BATCHJOB.SOURCE is used for the batch submission. This program uses the prompt feature. That is, the user is asked to type the userid for batch processing. You can change this behavior to prompt the user for other JCL parameters (such as job class, time, and so on). See the next section for more information.

The site-dependent command for executing a batch job is specified in the User, Group, or Master profile's **Batch command** field. The default value is SUBMIT. If the profile's **Generate libnames** field is set to **Yes**, the user's SAS session is examined for allocated SAS libraries (librefs), and LIBNAME statements are inserted into the batch

job. This may be useful if the JCL does not allocate all of the SAS data libraries that are necessary to execute the programs. To view or change these profile options, open the User Profile window or the Master/Group Profile window and set the **Type** to **Batch**. See Appendix 2, "Customizing SAS/ASSIST Software," on page 237 for details.

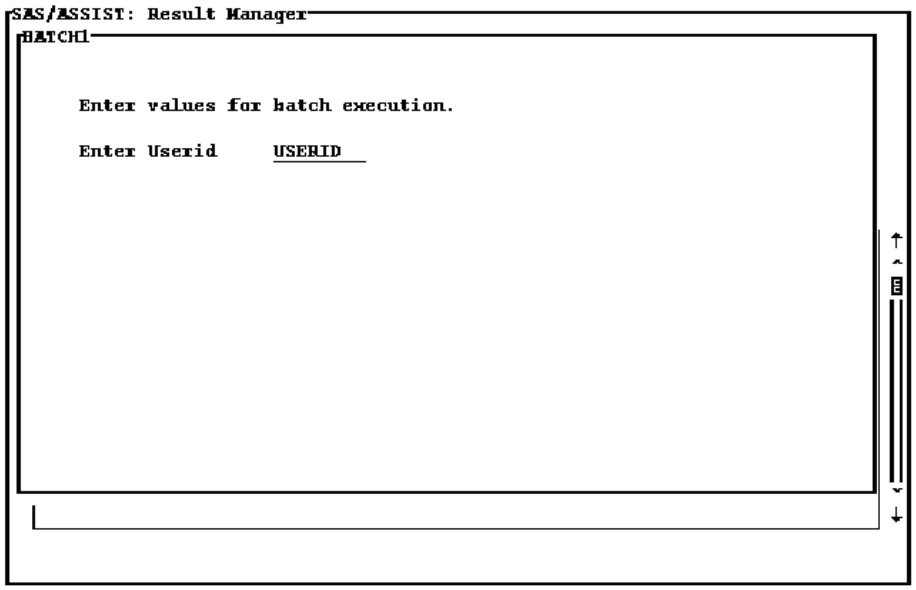
Note: If the batch job starts executing while the SAS data libraries are still allocated to your session or to another user's session in update mode, the batch job ends abnormally (abend) if the LIBNAME statements fail. To avoid this, you can delay the start of the batch job's execution until the other users have finished using the necessary SAS libraries. Or, make sure you de-allocate the libraries from interactive sessions. △

Submitting Batch Jobs

Follow these instructions to submit a SAS/ASSIST task as a batch job.

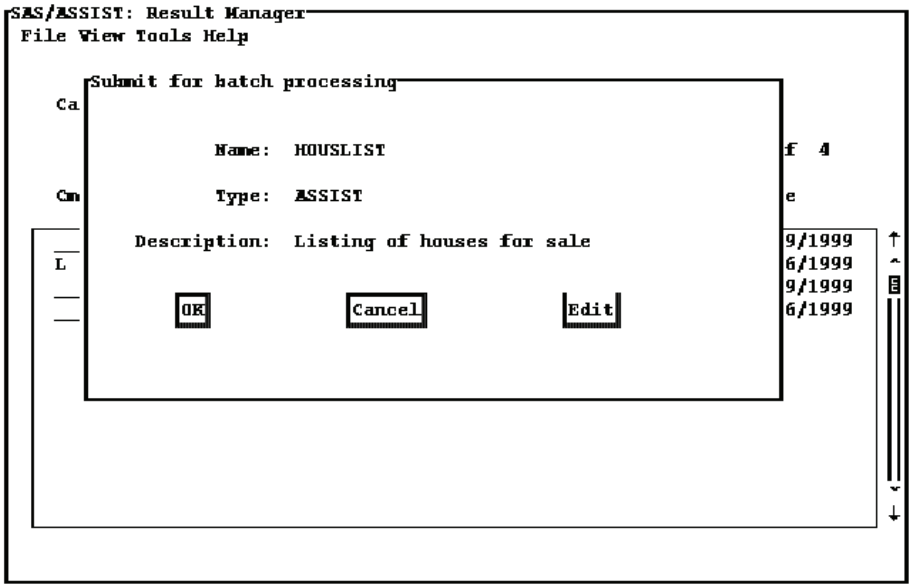
1. Open the desired task window and make the desired task window selections.
2. Save the task by selecting **Save** from the **File** menu. Type a name and description and select **OK** in the Save window.
3. Open the Result Manager window by following this selection path:**Tasks ▶ Results ▶ Result Manager**
4. Type an **L** in the **Cmd** field for the saved task and press ENTER. The BATCH1 window appears.

Display A3.1 BATCH1 Window



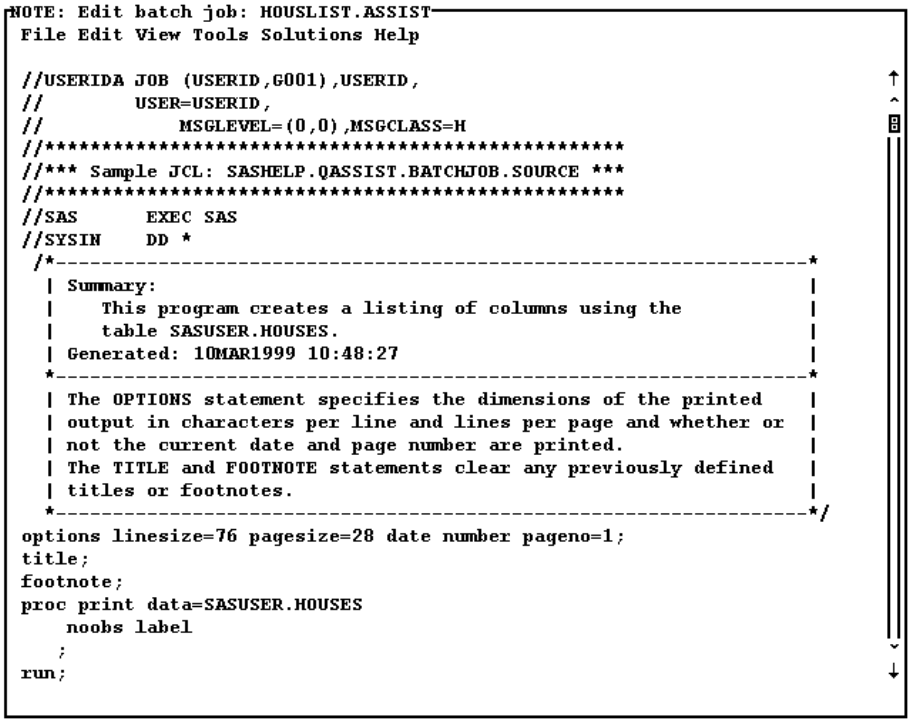
5. After you verify or change the values in the BATCH1 window, press ENTER. The Submit for Batch Processing window appears.

Display A3.2 Submit for Batch Processing Window



6 If desired, select **Edit** to edit the JCL generated after the symbolic parameters have been resolved, as shown in the following display.

Display A3.3 Edit Batch Job Window



After making your changes, select **Close** from the **File** menu. When prompted, select **Yes** to save the changes and return to the Submit for Batch Processing window.

7 Select **OK** to submit the job for batch processing.

Customizing the JCL Program

The following sample JCL is found in SASHELP.QASSIST.BATCHJOB.SOURCE.

```
//&userid("Enter Userid","&sysjobid","8")A JOB (&userid,G001),
//        &userid, USER=&userid,
//            MSGLEVEL=(0,0),MSGCLASS=H
//*********************************************
//*** Sample JCL: SASHELP.QASSIST.BATCHJOB.SOURCE ***
//*********************************************
//SAS      EXEC SAS
//SYSIN    DD *
```

This JCL executes when you submit a batch job by typing **L** in the **Cmd** field next to an entry in the Result Manager window. The JCL opens the BATCH1 window, enabling the user to type information as prompted. You can customize the prompts in the BATCH1 window by customizing a copy of the JCL program as follows:

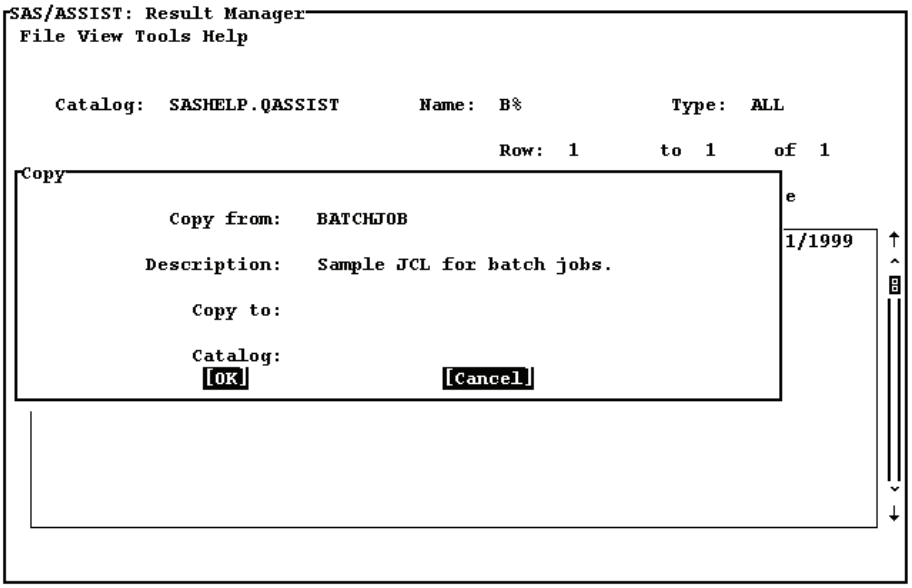
1 If it is not already open, open the Result Manager window by following this selection path:**Tasks ▶ Results ▶ Result Manager**

2 Type **SASHELP.QASSIST** in the **Catalog** field and press ENTER. A list of entries in the SASHELP.QASSIST catalog appears.

3 Type **B%** in the **Name** field and press ENTER to display only those entries that start with the letter B.

4 Type a **C** next to **BATCHJOB** SOURCE entry and press ENTER. The Copy window appears.

Display A3.4 Copy Window



Because you cannot edit entries in the SASHELP.QASSIST catalog, you must copy this entry to a location in which you have WRITE access. Later, you will change

the **Batch file** User or Master/Group Profile option to point to the copy of the JCL program.

5 In the **Copy to** field, type the name you want to assign to the copy and press TAB.

6 In the **Catalog** field, type the name of the desired catalog (in which you have WRITE access) over the existing value.

7 Select **OK**. The program is copied to the new location.

8 In the **Catalog** field of the Result Manager window, type the name of the catalog in which the copy was placed and press ENTER.

9 In the **Cmd** field for the copy of the program, type an **E** and press ENTER. The program appears in the Edit window.

You can use the prompt feature in your JCL in the same way as you would use the prompt feature in a query (see "Using the Prompt Facility" on page 174 for more information). For example, if you want to prompt the user to change the TIME for the batch job, you would put in a prompt for the TIME in the JCL. In the following JCL, the third line creates an "Enter Time" prompt with an eight-character field that contains the default time of (,5).

```
//&userid("Enter Userid","&sysjobid","8")A JOB (&userid,G001),
//        &userid, USER=&userid,
//        TIME=&time("Enter Time","(,5)","8"),
//            MSGLEVEL=(0,0),MSGCLASS=H
//*************************************************
//*** Sample JCL: SASHELP.QASSIST.BATCHJOB.SOURCE ***
//*************************************************
//SAS      EXEC SAS
//SYSIN    DD *
```

In the edited code,

USER=
is the JCL parameter that is added to your JCL source code.

&userid
is the macro variable that contains the USER parameter value.

"Enter Userid","&sysjobid","8"
are the parameters that are used to build the statement displayed in the BATCH window.

"Enter Userid"
is the descriptive text displayed in the window.

"&sysjobid"
is the macro variable for system job ID. It provides the default value for the macro variable (& userid).

"8"
is the length, in bytes, of the userid macro variable field.

TIME=
is the JCL parameter that you want added to your JCL source code.

&time
is the macro variable that contains the TIME parameter value.

"Enter Time","(,5)","8")
is the parameter that contains the components that are used to build the statement displayed in the BATCH window.

"Enter Time"
is the descriptive text displayed in the window.

(,5)
is the default value for the macro variable **&time**.

"8"
is the length, in bytes, of the time macro variable field.

When you are done editing the JCL, select **Close** from the **File** menu. When prompted, select **Yes** to save the changes. Select **Close** from the **File** menu to exit the Result Manager.

To use the new JCL program, you must change the **Batch file** User Profile option as follows:

1. Follow this selection path to open the User Profile window:**Tasks ▶ Setup ▶ Profiles ▶ User**If you are an administrator and you want to set up this option for a group or for all users at a site, open the Master/Group Profile window instead of the User Profile window.
2. In the **Type** field, type **BATCH** and press ENTER.
3. For the **Batch file** option, change the value to the location of the new JCL program. Use a four-level name in the form *libname.catalog.filename.type*.
4. If you have included prompts in the JCL, ensure that the **Batch prompt** option is set to **YES**. When the **Batch prompt** option is **Yes**, the batch file is scanned for prompts which start with ampersands (&). If the **Batch prompt** option is **No**, the batch file is submitted without being scanned for prompts. However, if you use ampersands in your JCL that are not intended to be prompts, make sure that the **Batch prompt** option is **No**. Otherwise, the ampersands are interpreted as prompts.
5. Save you changes by selecting **Close** from the **File** menu.

The next time you submit a saved task for batch processing, the BATCH1 window appears with your changes.

Customizing the Batch Program Window

After you verify the values in the BATCH1 window and press ENTER, the Submit for batch processing window appears. You can customize this window by editing a copy of the SASHELP.QASSIST.SAMPBATC.PROGRAM. Customizing the Batch Program window involves SAS Component Language (SCL) programming. You should not customize the Batch Program window unless you are a SAS administrator. To edit the batch program, you must have SAS/AF software licensed at your site.

1. The sample SCL program for customizing the Batch window is stored in SASHELP.QASSIST.SAMP_SCL.SOURCE. The only portion of the code in this entry that applies to this customization is the section labeled SASHELP.QASSIST.SAMPBATC.PROGRAM. Since you cannot directly copy the SOURCE entry into the SOURCE window of the PROGRAM entry, view the SOURCE entry, and use the FILE command to write the SOURCE entry to an external file.
2. Create a PROGRAM entry in a location where you have WRITE access. Use the INCLUDE command to include the SCL code into the SOURCE window of the PROGRAM entry. Delete the irrelevant portions of the SCL code. Design the display of the PROGRAM entry to your specifications.
3. Edit, compile, and save the associated SCL program.

See *SAS Component Language: Reference* for more information on customizing PROGRAM entries and SCL code.

In order to have SAS/ASSIST software use your customized window, change the value of the **`Batch Window`** option in the User, Group, or Master profile to point to the new program for the Submit for batch processing window.

APPENDIX

4

Migrating from QMF to SAS/ ASSIST Software

Introduction **251**
Generating a QMF Export Procedure **251**
Exporting Queries from QMF **253**
Importing QMF Queries into Query and Reporting **253**
Alternate Method to Import Queries **255**

Introduction

This appendix describes how to migrate IBM QMF queries to Query and Reporting. With the query migration tool, you can export your QMF queries and move them to Query and Reporting through a three-step process. You then can use the SQL queries in Query and Reporting just as you would use your other queries. Individual users or a system administrator can perform this migration process, depending on each site's setup. The migration process consists of three stages:

1. Generate an export procedure in SAS that can be run in QMF.
2. Run the export procedure in QMF.
3. Import the queries into SAS/ASSIST Query and Reporting.

Each of these steps can be executed independently.

Generating a QMF Export Procedure

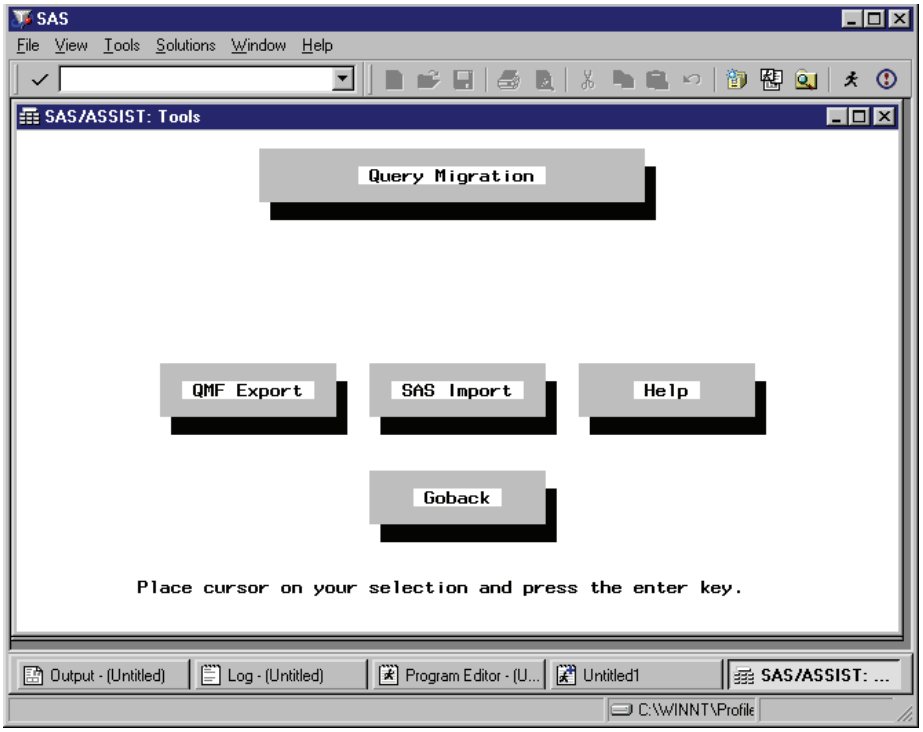
To generate a QMF export procedure, you need READ access to the DB2 table Q.OBJECT_DIRECTORY (or a view of it).* QMF stores information about stored objects in Q.OBJECT_DIRECTORY. Because system or database administrators have access to this file, they usually complete this stage. Users can complete the other steps themselves.

To generate an export procedure, follow these steps.

1. Follow this selection path:**Tasks ▸ Data Management ▸ Query ▸ Query and Reporting ▸ Setup**From the Query and Reporting: Setup window, select **`Query Migration`**. The following display shows the Query Migration main menu.

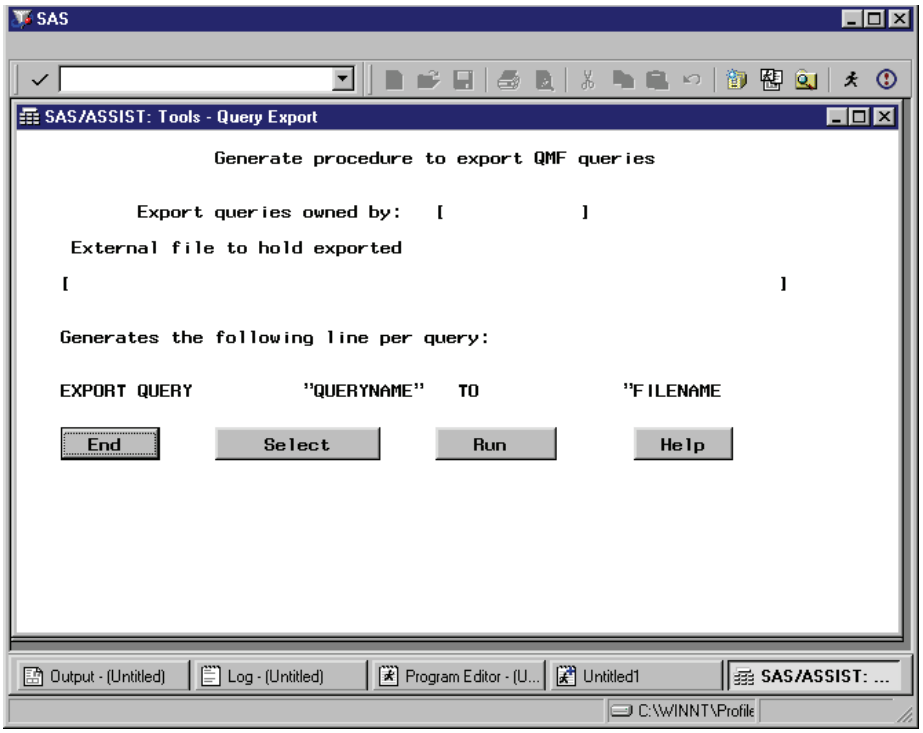
* If you create a DB2 SQL view of the Q.OBJECT_DIRECTORY table to export the QMF queries, make a source entry in the SASUSER.PROFILE catalog named QMFTABLE.SOURCE. On the first line of QMFTABLE.SOURCE, type the name of the new DB2 view that you created (such as SASQR.QMFOBJECT).

Display A4.1 Query Migration Window



2 Select **`QMF Export`** to generate an export procedure. The following display shows the Query Export window.

Display A4.2 Query Export Window



3 Queries are exported from one owner at a time. In the **Export queries owned by** field, type the user ID of the owner from whom you are exporting queries. Type **?** and press ENTER to list the available user IDs.

4 The Select Queries window opens with a list of all of the queries owned by the specified user ID. You can select all or some of the queries to export. Select **END** to return to the Query Export window.

5 In the **External file to hold exported queries** field, type the name of the external file that you want to hold your QMF export procedure and the exported queries.

The external file does not need to be previously allocated. If the external file does not exist, you are prompted to allocate it. This is the recommended method to allocate the external file because it ensures that the external file has the correct format.

If the external file exists and has the correct format but is not empty, you are prompted to choose whether to delete all of the external file's members or to specify another external file name.

6 Select **Run** to write the export procedure to the specified external file. A message appears that indicates the procedure has been successfully written. The message also indicates the procedure name, which is stored in the external file that you just specified.

Query and Reporting actually writes two members to this external file. One member is the export procedure. The other member is used internally by Query and Reporting.

7 When the two members have been written, exit your SAS session (if necessary) and invoke QMF to export the queries.

Exporting Queries from QMF

To export queries from QMF, follow these steps.

1 Invoke QMF.

2 Import the export procedure that you created by issuing this command from the PROGRAM EDITOR window:

```
IMPORT PROC FROM ' external_file_name(QMF2SAS)'
```

where *external_file_name* is the name of the external file that you specified in the Query Export window, as described in the previous section.

3 Run the export procedure and exit QMF.

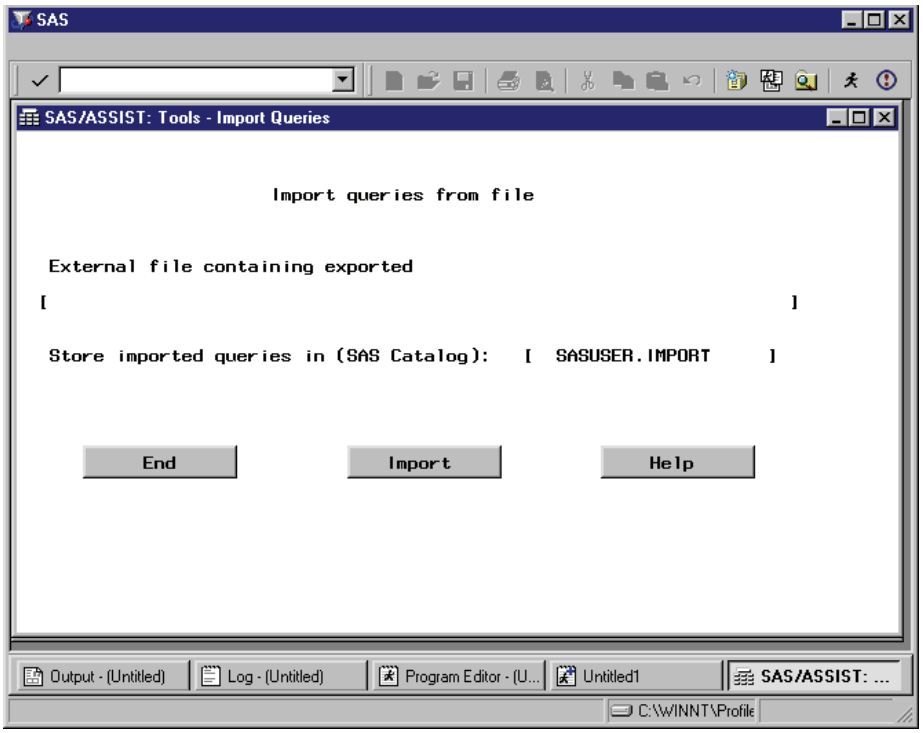
4 If necessary, invoke SAS and SAS/ASSIST software, and return to the Query and Reporting Setup window and the Query Migration tool.

Importing QMF Queries into Query and Reporting

You have now written an export procedure and exported your QMF queries. In this stage, you import the queries for use in Query and Reporting.

1 Select **SAS Import** from the Query Migration main menu to open the Import Queries window, as shown in the following display.

Display A4.3 Import Queries Window



2 Type the name of the external file that contains the exported queries.

3 Query and Reporting has a default catalog (SASUSER.IMPORT) to hold the imported queries. The first time you use this default catalog, it is automatically created. However, you can type the name of your own SAS catalog over the default catalog name.

   If the catalog does not exist, it is created. If queries with the same name already exist in the catalog, they are replaced by the imported queries.

4 Select **Import** to start importing the QMF queries into SAS. An Importing window appears to show the progress of the importing process.

After the importing process has been completed, you can access the SQL queries from either the Result Manager window or from the SQL Editor window (by selecting **Open** from the **File** menu). Notice that the queries are of type **SQL**, which indicates that they are SQL queries.

You can use any of the Result Manager window commands to select, edit, browse, or print the queries. You can then edit the DB2 SQL queries, save them, or create reports from them, just like any other query in Query and Reporting.

Alternate Method to Import Queries

If you want to import just a few queries, you can use the Enhanced Editor in the SQL Editor window instead of the Import Queries window. To open the Enhanced Editor, follow this selection path:

Tasks ▶ Data Management ▶ Query ▶ Query and Reporting ▶ SQL Editor ▶ Edit ▶ Enhanced Editor When you select **Include** from the **File** menu, the Include window opens and prompts you for the name of an external file. Type the name of the external file and query that you want to import. Enclose the external file in quotes if necessary.

Select **OK** to include the query in the Enhanced Editor. The query is "imported."

APPENDIX
5

Recommended Reading

Recommended Reading

Here is the recommended reading list for this title:

- *Getting Started with SAS/ASSIST*
- *SAS/ASSIST Administrator's Guide*
- *The Little SAS Book: A Primer*
- *SAS Language Reference: Dictionary*
- *SAS Language Reference: Concepts*
- *Base SAS Procedures Guide*
- The SAS Companion for your operating enviornment.

For a complete list of SAS publications, see the current *SAS Publishing Catalog*. To order the most current publications or to receive a free copy of the catalog, contact a SAS representative at

SAS Publishing Sales
SAS Campus Drive
Cary, NC 27513
Telephone: (800) 727-3228*
Fax: (919) 677-8166
E-mail: **sasbook@sas.com**
Web address: **support.sas.com/publishing**
* For other SAS Institute business, call (919) 677-8000.

Customers outside the United States should contact their local SAS office.

Glossary

active table
in SAS/ASSIST software, a SAS table that has been specified for a particular task.

analysis variable
a numeric variable that is used to calculate statistics. An analysis variable usually contains quantitative or continuous values, but this is not required.

arithmetic operator
in SAS software, any of the symbols (+, -, /, *, and **) that are used to perform addition, subtraction, division, multiplication, and exponentiation in SAS expressions.

base SAS software
software that includes a programming language that manages your data, procedures for data analysis and reporting, procedures for managing SAS files, a macro facility, help menus, and a windowing environment for text editing and file management.

batch mode
a method of executing SAS programs in which a file that contains SAS statements plus any necessary operating environment commands is submitted to the computer's batch queue. After you submit the program, control returns to your terminal or workstation, where you can perform other tasks. Batch mode is sometimes referred to as running in the background. The program output can be written to files or printed on an output device.

button
a component of a graphical user interface. A button is usually in the form of a rectangle or square that contains a label. The button is programmed to execute a command, to open a window, or to perform some other function when a user selects it. For example, many graphical user interfaces include buttons that have labels such as OK, Cancel, and Help.

BY variable
a variable named in a BY statement whose values define groups of observations to process.

character variable
a variable whose values can consist of alphabetic and special characters as well as numeric characters.

chart variable

the variable whose values you are charting.

check box
an item in a window that you can select without affecting any other items. You can deactivate a check box by selecting it again.

class variable
a variable that is used to group, or classify, data. Class variables can be either character or numeric. Class variables can have continuous values, but they typically have a few discrete values that define the classifications of the variable.

column
in relational databases, a vertical component of a table. Each column has a unique name, contains data of a specific type, and has certain attributes. A column is analogous to a variable in SAS terminology.

crosstabulation table
a frequency table that shows combined frequency distributions or other descriptive statistics for two or more variables. These tables are also referred to as two-, three-, or n - way tables; contingency tables; and stub-and-banner tables. See also frequency table.

cumulative frequency
the total number of observations in all ranges up to and including a given range.

cumulative percent
the percentage of observations in all ranges up to and including a given range.

DATA step
a group of statements in a SAS program that begins with a DATA statement and ends with either a RUN statement, another DATA statement, a PROC statement, or the end of the job. The DATA step enables you to read raw data or other SAS data sets and to create SAS data sets.

data value
a unit of character or numeric information in a SAS data set. A data value represents one variable in an observation.

dependent column
See response variable.

dialog box
a type of window that opens to prompt you for additional information or to ask you to confirm a request.

engine
a component of SAS software that reads from or writes to a file. Each engine enables SAS to access files that are in a particular format.

explanatory variable
a variable that is included in a regression model in order to explain the variation in the dependent (or response) variable. Explanatory variables, which are also called independent, input, predictor, or regressor variables, can be deterministic or probabilistic.

external file
a file that is created and maintained by a host operating system or by another vendor's software application. SAS can read data from and route output to external files. External files can contain raw data, SAS programming statements, procedure output, or output that was created by the PUT statement. An external file is not a SAS data set. See also fileref.

fileref
a name that is temporarily assigned to an external file or to an aggregate storage location such as a directory or folder. The fileref identifies the file or the storage location to SAS. In SAS/ASSIST software, you assign a fileref with the Setup task.

format
a pattern or set of instructions that SAS uses to determine how the values of a variable (or column) should be written or displayed. SAS provides a set of standard formats and also enables you to define your own formats.

frequency chart
a graphic illustration of the number of times a value or range of values for a given variable occurs.

frequency count
the number of times a value or range of values for a given variable occurs.

frequency table
a table that lists the values of a variable and the number of observations with each value. See also crosstabulation table, frequency count.

function key
a keyboard key that can be defined to have a specific action in a specific software environment.

independent column
See explanatory variable.

index
in SAS software, a component of a SAS data set that enables SAS to access observations in the SAS data set quickly and efficiently. The purpose of SAS indexes is to optimize WHERE-clause processing and to facilitate BY-group processing.

informat
a pattern or set of instructions that SAS uses to determine how data values in an input file should be interpreted. SAS provides a set of standard informats and also enables you to define your own informats.

interactive line mode
a method of running SAS programs in which you enter one line of a SAS program at a time at the SAS session prompt. SAS processes each line immediately after you press the ENTER or RETURN key. Procedure output and informative messages are returned directly to your display device.

label, variable
a descriptive label of up to 40 characters that can be printed in the output by certain procedures instead of, or in addition to, the variable name.

length, variable
the number of bytes used to store each of a variable's values in a SAS data set.

libref
a name that is temporarily associated with a SAS data library. The complete name of a SAS file consists of two words, separated by a period. The libref, which is the first word, indicates the library. The second word is the name of the specific SAS file. For example, in VLIB.NEWBDAY, the libref VLIB tells SAS which library contains the file NEWBDAY. You assign a libref with a LIBNAME statement or with an operating system command.

local session
a SAS session running on the local host. The local session accepts SAS statements and passes those that are remote-submitted to the remote host for processing. The

local session manages the output and messages from both the local session and the remote session.

logical operator
an operator used in expressions to link sequences of comparisons. The logical operators are AND, OR, and NOT.

menu bar
the primary list of items at the top of a window which represent the actions or classes of actions that can be executed. Selecting an item executes an action, opens a pull-down menu, or opens a dialog box that requests additional information. See also pop-up menu, pull-down menu.

message area
the area immediately beneath a window's command line or menu bar which displays messages from SAS.

metadata
a description or definition of data or information.

midpoint
a value that represents one data value or the middle of a range of data values. When a midpoint represents a range of values, the algorithm used to calculate it depends on the procedure.

missing value
in SAS, a term that describes the contents of a variable that contains no data for a particular row or observation. By default, SAS prints or displays a missing numeric value as a single period, and it prints or displays a missing character value as a blank space.

numeric variable
a variable that contains only numeric values and related symbols, such as decimal points, plus signs, and minus signs.

observation
a row in a SAS data set. All of the data values in an observation are associated with a single entity such as a customer or a state. Each observation contains one data value for each variable.

permanent SAS data set
a data set that remains after the current program or interactive SAS session terminates. Permanent SAS data sets are available for future SAS sessions.

pop-up menu
a menu that appears when it is requested. These menus are context- specific, depending on which window is active and on the cursor location. See also pull-down menu.

PROC SQL view
a SAS data set (of type VIEW) that is created by the SQL procedure. A PROC SQL view contains no data. Instead, it stores information that enables it to read data values from other files, which can include SAS data files, SAS/ACCESS views, DATA step views, or other PROC SQL views. A PROC SQL view's output can be either a subset or a superset of one or more files. See also view.

pull-down menu
the list of menu items or choices that appears when you choose an item from a menu bar or from another menu. See also pop-up menu.

raw data

data that has not been read into a SAS data set.

remote session
a SAS session running in a special mode on the remote host. No output or log messages are displayed on the remote host; instead, the results of a remote SAS session are transmitted back to the log and output files on the local host.

response variable
in regression analysis, the variable that you are interested in modeling for the purpose of seeing how it changes as a function of the factors. The response variable is also referred to as the dependent variable.

row
in relational database management systems, the horizontal component of a table. It is analogous to a SAS observation.

SAS catalog
a SAS file that stores many different kinds of information in smaller units called catalog entries. A single SAS catalog can contain several different types of catalog entries. See also SAS catalog entry.

SAS catalog entry
a separate storage unit within a SAS catalog. Each entry has an entry type that identifies its purpose to SAS. Some catalog entries contain system information such as key definitions. Other catalog entries contain application information such as window definitions, Help windows, formats, informats, macros, or graphics output.

SAS data file
a SAS data set that contains data values as well as descriptor information that is associated with the data. The descriptor information includes information such as the data types and lengths of the variables, as well as which engine was used to create the data. SAS data files are of member type DATA. See also SAS data set, SAS data view.

SAS data library
a collection of one or more SAS files that are recognized by SAS and which are referenced and stored as a unit. Each file is a member of the library.

SAS data set
a file whose contents are in one of the native SAS file formats. There are two types of SAS data sets: SAS data files and SAS data views. SAS data files contain data values in addition to descriptor information that is associated with the data. SAS data views contain only the descriptor information plus other information that is required for retrieving data values from other SAS data sets or from files whose contents are in other software vendors' file formats.

SAS data view
a type of SAS data set that retrieves data values from other files. A SAS data view contains only descriptor information such as the data types and lengths of the variables (columns), plus other information that is required for retrieving data values from other SAS data sets or from files that are stored in other software vendors' file formats. SAS data views can be created by the SAS DATA step and by the SAS SQL procedure.

SAS log
a file that contains a record of the SAS statements that you enter as well as messages about the execution of your program.

SAS name
a name whose construction follows certain rules and that can appear in a SAS statement (for example, names of variables and SAS data sets).

SAS procedure
a program that produces reports, manages files, or analyzes data and which is accessed with a PROC statement. Many procedures are included in SAS software.

SAS program
a group of SAS statements that guide SAS through a process or series of processes.

SAS statement
a string of SAS keywords, SAS names, and special characters and operators that instructs SAS to perform an operation or that gives information to SAS. Each SAS statement ends with a semicolon.

SAS Support Consultant
an individual at your computing installation who is designated as a support person for SAS software users at the installation. The consultant can help you with questions about using SAS software.

SAS table
another term for SAS data set. See SAS data set.

SAS windowing environment
an interactive windowing interface to SAS software. In this environment you can issue commands by typing them on the command line, by pressing function keys, or by selecting items from menus or menu bars. Within one session, you can perform many different tasks, including preparing and submitting programs, viewing and printing results, and debugging and resubmitting programs.

Sasuser library
a default, permanent SAS data library that is created at the beginning of your first SAS session. The Sasuser library contains a Profile catalog that stores the customized features or settings that you specify for SAS. You can also store other SAS files in this library.

scroll bar
a graphical window element that is used to bring the undisplayed contents of an associated object (such as a text box or a list box) into view. A scroll bar is shaped like a horizontal or vertical bar and has a scroll arrow at each end. If the associated object contains text that is not in view, the scroll bar contains a box that you can drag in order to move up or down in the viewing area. Alternatively, you can click on the arrows to move up or down in smaller increments.

selection field
the portion of a window (shown on the display as an underscore) where you can enter a short command to perform an action, such as B for browse.

selection-field command
a command that enables you to perform actions from a selection field in a SAS windowing environment. For example, entering D in the selection field beside the name of a SAS data set in the DIRECTORY window enables you to delete that SAS data set.

SQL (Structured Query Language)
a standardized, high-level query language that is used in relational database management systems to create and manipulate database management system objects. SAS implements SQL through the SQL procedure.

table
in general, a two-dimensional system of representing data in rows and columns.

temporary SAS data set

a data set that exists only for the duration of the current program or interactive SAS session. Temporary SAS data sets are not available for future SAS sessions.

variable
a column in a SAS data set or in a SAS data view. The data values for each variable describe a single characteristic for all observations.

view
a generic term (used by many software vendors) for a definition of a virtual data set (or table). The definition is named and stored for later use. A view contains no data; it merely describes or defines data that is stored elsewhere.

WHERE expression
a type of SAS expression that specifies a condition for selecting observations for processing by a DATA step or a PROC step. WHERE expressions can contain special operators that are not available in other SAS expressions. WHERE expressions can appear in a WHERE statement, a WHERE= data set option, a WHERE clause, or a WHERE command.

WHERE processing
a method of conditionally selecting observations for processing in a DATA or PROC step. WHERE processing involves using a WHERE expression in a WHERE statement, a WHERE= data set option, a WHERE clause, or a WHERE command. See also WHERE expression.

Work data library
a SAS data library that is automatically defined by SAS at the beginning of each SAS session or SAS job. The Work library contains SAS files that are temporary by default. When the libref User is not defined, SAS uses Work as the default library for SAS files that are created with one-level names.

Index

Numbers

2-D Group 2 style, tabular reports 52

A

Additional Options item 13
Advanced style, tabular reports 54
AIRLINE sample tables 3
analysis columns 50
ANOVA (analysis of variance) 127
  entering data 130
  repeated measures ANOVA 130
applications
  logoff applications 222
  logon applications 221
  private versus public 218
Assign format, setup item 217
Assign maps, setup item 216

B

backing out of tasks 8
bar charts 86
  customizing 88
  grouping with 95
  horizontal 97
  mean displayed on 86
  running 93
  setting up 86
  stacking with 95
  three-dimensional 94
  titles 88
batch processing 218
  Batch Program window 248
  JCL code for 246
  with Result Manager (z/OS) 243
block maps 111, 115
Browse catalog contents, setup item 219
browsing
  catalogs 219
  external files 150
  tables 167

C

Cartesian product 184
Cartesian product match merge 22
Catalog search path, setup item 218, 220
catalogs
  browsing 219
  saving reports to 77
Catalogs for results, setup item 218
character columns, converting to numeric 15
character dates and times, converting to SAS date and time values 22
charts
  See graphics
choices, displaying 11
classification columns 50
Cmd field
  commands for Report Engine window 65
  customizing queries 171
Column Information window 70, 164
columns
  analysis columns 50
  classification columns 50
  converting character to numeric 15
  information about 70
  manipulating with View menu 166
  modifying, in reports 66
  order of 66
  selecting, for queries 166
  selecting, from tables 12
  usages 68
combining data, with Cartesian product match merge 22
command line 10
commands
  Cmd field, Report Engine window 65
  entering host commands 218
  for Result Manager entries 145
  Select window 162
COUNT(*) 182

D

data analysis 119
  analysis of variance (ANOVA) 127
  linear regression 121
  one-way frequency tables 119
  Tasks menu 229
data management 15
  combining data, with Cartesian product match merge 22
  converting character columns to numeric columns 15
  formats, creating 28
  tables, altering properties of 30
  tables, transposing 37
  Tasks menu 225

transporting files across operating environments 34
date and time stamps
inserting into titles and footnotes 74
removing from output 2
DB2 tables
creating (z/OS) 183
joining 198
desktop environments, returning to SAS/ASSIST windows 10
donut pie charts 103
drilldown reports 79
dynamic reports, saving as SAS tables 79

E

editing
graphs 83
tables 167
EIS, Tasks menu 232
Enhanced Editor window 207
correcting SQL code errors 210
including and writing SQL code to external files 209
Enter host command, setup item 218
environment setup items 217
exiting SAS/ASSIST software 8
expressions 176
external files
browsing 150
including and writing SQL code to 209
saving reports to 78
saving source code to 149
setup item 217

F

file management setup items 216
footnotes, inserting date and time stamps 74
foreign keys 199
formats
creating 28
modifying 66
forms management 217
forms migration 200
frequency tables, one-way 119
function keys 219

G

grand totals 76
graphics 86
background color 115
bar charts 86
editing graphs interactively 83
high resolution 228
low resolution 229
maps 110
options for 218
pie charts 98
plots 106
grouping, with bar charts 95

H

headers 66
help 219
high resolution graphics 228
history files 219
horizontal bar charts 97
host commands, entering 218

I

information setup items 219
informats, creating 28
inner joins 185
interface 7
Additional Options item 13
backing out of tasks 8
choices, displaying 11
command line 10
exiting SAS/ASSIST software 8
moving between SAS/ASSIST windows and SAS System windows 8
returning to SAS/ASSIST windows from Output window 9
SAS/ASSIST software structure and 7
Select Table Variables window 12
Select Table window 12
Utilities menu 13

J

JCL code, for batch processing 246
joining tables 184
automatically 195
DB2 tables 198
inner joins 185
interrupting processing 187
manually 186
outer joins 191, 199
referential integrity 199
relations on tables 193
relations on tables, modifying and deleting 194
three tables 189
with multiple relations 196
without defined relations 186

L

librefs
assigning on remote SAS sessions 135
setup item 217
linear regression 121
logoff applications 222
logoff exits 218, 221
logon applications 221
logon exits 218, 221
low resolution graphics 229

M

main menu, alternate to 221, 222
mainframe environments, returning to SAS/ASSIST windows 9
maps 110
Additional Options 114
block maps 111, 115
legends 114
levels of 114
patterns 114
prism maps 112, 115
setup item 216

surface maps 113, 115
two-dimensional 110, 115
types of 110
Master/Group Profile window 219
match merge 22
mean, displayed on bar charts 86
menu bar, alternate 239
menu bars 11
menu colors 217
Multiple Group style, tabular reports 53

N

No (Number) field, customizing queries 171
numeric columns, converting to character 15

O

one-way frequency tables 119
Open window 204
Order field, customizing queries 172
outer joins 191, 199
output
for queries 180
for queries, customizing 211
for queries, limiting 180
removing date and time stamp 2
saving report output to SAS catalogs 77
SQL, saving 213
Output window, returning to SAS/ASSIST windows from 9

P

pie charts 98
Additional Options 99, 106
colors 100
creating 98
display options 103
donut pie charts 103
labeling 100
patterns 100
running 102
setting up 98
slice values 106
slices 100
star pie charts 103
three-dimensional 103
planning tools 231
plots 106
Aditional Options 109
multiple plots per axes 109
scatter plots 106
X * Y by category 109
primary keys 199
Primary menu colors, setup item 217
prism maps 112, 115
Private/public applications, setup item 218
profiles setup items 219
Program Editor window 218
Prompt Facility 174
properties of tables, altering 30

Q

QMF
exporting queries from 253
importing queries, alternate method 255
importing queries, into Query and Reporting 253
migrating to SAS/ASSIST software 251
QMF export procedure 251
queries 201
See also SQL Editor
building 169
COUNT(*), on tables 182
customizing 171
entering 202
exporting, from QMF 253
expressions, defining 176
importing, alternate QMF method 255
importing, into Query and Reporting 253
migrating 200, 251
output 180
output, customizing 211
output, limiting 180
prompts for 174
rows, number returned 182
running 178, 211
saving 181
selecting tables and columns for 166
SQL code, viewing 178
subsetting data 173
Query and Reporting 156
administration of 200
forms migration 200
importing queries into 253
query building 169
query migration 200
Query window 157
querying data 156
Select window 159, 205
setup options 199
tables, creating 182
tables, joining 184
Query Manager Administration window 200
Query Managers 158, 168
Query Migration window 200
Query window 157
resetting 182
Select window 159
selecting a Query Manager 158

R

referential integrity 199
regression analysis 121
regression lines 107
relations, on tables 193
remote configurations 140
adding 140
deleting 140
editing 140
SASSCRIPT system option, setting 141
script files 141
Remote Connect 135
librefs, assigning on remote SAS sessions 135
remote configuration management 140
SAS/ASSIST tasks, setting up on remote data 137
session anatomy 139
Tasks menu 232
Remote Connect sessions 139
repeated measures ANOVA 130

Report Engine 61
  Column Information window 70
  column order 66
  columns, modifying 66
  date and time stamps, inserting in titles and footnotes 74
  formats, modifying 66
  grand totals 76
  graphs, editing interactively 83
  headers, modifying 66
  opening existing reports 82
  options 75
  output rows, limiting 77
  Report Engine window 62
  report types 72
  reports, modifying 64
  reports, modifying with usages 68
  row title space 77
  saving reports 77
  selecting other data 83
  subsetting data 77
Report Engine window 62
  Cmd field commands 65
  fields 62, 64
  opening 62
report types 72
report writing 43
  rows, limiting number of 43
  tabular reports 49
  Tasks menu 227
  titles, adding more than four 46
Result Manager 143
  batch processing with (z/OS) 243
  browsing external files 150
  commands, for manipulating entries 145
  Result Manager window 144
  script files 152
  source code, saving to external files 149
  Tasks menu 233
Result Manager window 144
Review function keys, setup item 219
row title space 77
rows, limiting number of 43, 77
rows, number returned by queries 182

S

sample tables 3, 217
SAS/ASSIST interface
  See interface
SAS/ASSIST software 1, 2
  customizing 237
  exiting 8
  setup options 215
  structure of 7
SAS catalogs
  saving reports to 77
SAS data libraries, setup item 216
SAS date and time values, converting character dates and times to 22
SAS System help 219
SAS tables 183
  See also tables
  creating 183
  saving dynamic reports as 79
SAS views, creating 183
SASSCRIPT system option 141
Save Changes dialog box, disabling 2
saving reports 77
  dynamic reports, saving as SAS tables 79
  saving output to SAS catalogs 77
  to external files 78
  to SAS catalogs 77
scatter plots 106
  regression lines 107
  running 108
  setting up 106
  titles 107
script files 141, 152
Secondary menu colors, setup item 217
Select Table Variables window 12
Select Table window 12
Select window 159, 205
  column manipulation 166
  commands for 162
  expanding lists 163
  Query Manager 168
  selecting tables and columns for queries 166
  tables, browsing or editing 167
  typing names into fields 160
  View menu 166
setup items
  Tasks menu 234
setup options 215
  accessing 216
  Catalog search path item 218, 220
  environment items 217
  file management items 216
  information items 219
  logoff exits 221
  logon exits 221
  main menu alternate 221
  profiles items 219
Simple Group 1 style, tabular reports 50
Simple Group 2 style, tabular reports 51
Sort a Table window 217
source code, saving to external files 149
SQL code
  changing 207
  correcting errors in 210
  including and writing to external files 209
  non-SELECT, entering 203
  saving 213
  viewing 178
SQL Editor 201
  Enhanced Editor window 207
  non-SELECT SQL code, entering 203
  output, saving 213
  queries, customizing output 211
  queries, entering 202
  queries, running 211
  SQL code, saving 213
  SQL Editor window 202
  SQL statements, entering 202
  template SQL programs 204
SQL Editor window 202
SQL output, saving 213
SQL Select Table window 206
SQL statements, entering 202
stacking, with bar charts 95
star pie charts 103
Statistics style, tabular reports 50
Structured Query Language (SQL)

See SQL Editor
subsetting data 43, 77, 173
summaries, for tabular reports 55
surface maps 113, 115

T

Table Information window 165
table joins
See joining tables
tables 182
See also joining tables
See also SAS tables
altering properties of 30
browsing 167
creating 182
editing 167
relations on 193
sample tables 3, 217
saving dynamic reports as 79
selecting, for queries 166
selecting, for tasks 12
selecting columns from 12
sorting 217
transposing 37
tabular reports 49
2-D Group style 52
Advanced style 54
Multiple Group style 53
options for 58
Simple Group 1 style 50
Simple Group 2 style 51
Statistics style 50
summaries for 55
terminology 50
task windows, defined 2
tasks
backing out of 8
defined 2
selecting tables for 12
setting up on remote data 137
Tasks menu 225
data analysis 229
EIS 232
Remote Connect 232
report writing 227
Result Manager 233
template SQL programs 204
choosing tables with Select Table 206
selecting tables with Select window 205
stored queries or statements 204
three-dimensional bar charts 94
three-dimensional pie charts 103
titles
adding more than four to a report 46
bar charts 88
inserting date and time stamps 74
row title space 77
scatter plots 107
transport format 34
transporting files 34
transposing tables 37
typographical conventions 1

U

Usage field, customizing queries 172
usages, modifying reports with 68
Use SAS program editor, setup item 218
User Profile window 219, 237
Utilities menu 13

V

View menu, Select window 166
views, creating 183

W

windows
Additional Options item 13
moving between SAS/ASSIST windows and SAS System windows 8
returning to SAS/ASSIST windows from Output window 9

Z

z/OS environment
batch processing 243
creating DB2 tables 183

Your Turn

If you have comments or suggestions about *Doing More with SAS/ASSIST® 9.1*, please send them to us on a photocopy of this page, or send us electronic mail.

For comments about this book, please return the photocopy to

SAS Publishing
SAS Campus Drive
Cary, NC 27513
E-mail: **yourturn@sas.com**

For suggestions about the software, please return the photocopy to

SAS Institute Inc.
Technical Support Division
SAS Campus Drive
Cary, NC 27513
E-mail: **suggest@sas.com**

SAS® Publishing delivers!

Whether you are new to the workforce or an experienced professional, you need to distinguish yourself in this rapidly changing and competitive job market. SAS® Publishing provides you with a wide range of resources to help you set yourself apart.

SAS® Press Series

Need to learn the basics? Struggling with a programming problem? You'll find the expert answers that you need in example-rich books from the SAS Press Series. Written by experienced SAS professionals from around the world, these books deliver real-world insights on a broad range of topics for all skill levels.

support.sas.com/saspress

SAS® Documentation

To successfully implement applications using SAS software, companies in every industry and on every continent all turn to the one source for accurate, timely, and reliable information—SAS documentation. We currently produce the following types of reference documentation: online help that is built into the software, tutorials that are integrated into the product, reference documentation delivered in HTML and PDF—free on the Web, and hard-copy books.

support.sas.com/publishing

SAS® Learning Edition 4.1

Get a workplace advantage, perform analytics in less time, and prepare for the SAS Base Programming exam and SAS Advanced Programming exam with SAS® Learning Edition 4.1. This inexpensive, intuitive personal learning version of SAS includes Base SAS® 9.1.3, SAS/STAT®, SAS/GRAPH®, SAS/QC®, SAS/ETS®, and SAS® Enterprise Guide® 4.1. Whether you are a professor, student, or business professional, this is a great way to learn SAS.

support.sas.com/LE

sas | THE POWER TO KNOW®

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies. © 2008 SAS Institute Inc. All rights reserved. 474059_1US.0108