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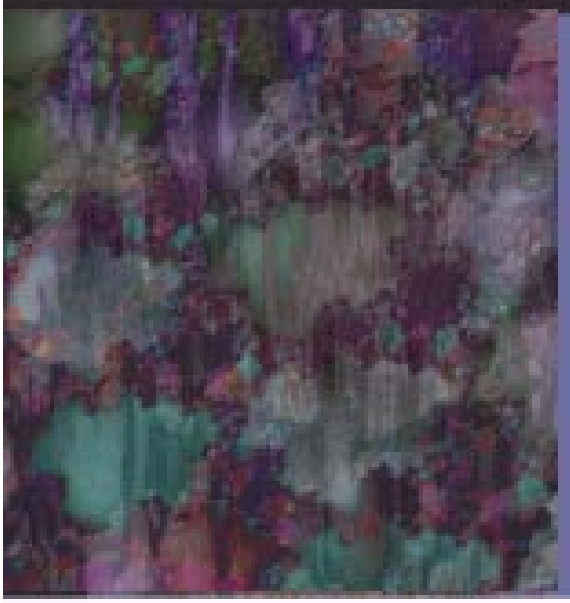

Kirk Paul Lafler

Foreword by Barrett R. Joyner,
Chairman of the Board, FullSeven Technologies
and former President, SAS North America

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Power SAS: A Survival Guide

KIRK PAUL LAFLER

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POWER SAS: A Survival Guide

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Contents at a Glance

Sample Chapter Contents

CHAPTER 1

SAS Basics

THIS CHAPTER COVERS valuable SAS software basics tips. Whether you're a SAS expert who is comfortable with the many features offered in the Base SAS product or someone just getting started, these tips will make your programming experience a more rewarding one. By taking the time to learn the Base SAS fundamentals—including terminology, library structures, programming concepts, user interface, SAS Explorer, and numerous other aspects—you'll get better results while using this powerful product. You'll learn about useful features step by step and in the simplest of terms to help you become a more knowledgeable SAS user.

In this chapter, you'll learn how to

- Begin using the Base SAS product
- Equate SAS terminology with other software and database languages
- Visualize the concept of a SAS data set
- Use the SAS Display Manager
- Access the built-in Help facility
- Display SAS System options
- Use SAS Explorer to access SAS files
- Access output in the Results window
- Customize toolbar settings
- Copy and move files from one library to another
- Control the size of icons
- Issue keyboard shortcuts

Getting Started

This section includes tips that will help you get acquainted with Base SAS software, how it works, and its various components. You'll learn essential concepts and terminology, what type of role the SAS Supervisor plays in directing processing activities, a brief introduction to important SAS keywords, and how to access the built-in Help facility.

1 Understanding what the SAS System is

In the early years of SAS, the name SAS was synonymous with statistics. It was said to stand for "Statistical Analysis System" for a short period. But over time, as the SAS software evolved into a dynamo of powerful programmer and end-user tools, this moniker was dropped, and references to the suite of products and tools became known simply as the SAS System or SAS software.

Today the SAS System is recognized as the world leader in enterprise and business intelligence software solutions. As an integrated software environment, SAS software provides

the tools that every enterprise needs to transform data into meaningful information.

End-users, programmers, statisticians, IT and database specialists, systems analysts, application developers, and other professionals throughout the world use SAS software for data access, data management, data analysis, and data presentation. For example, the Base SAS product, the heart of the SAS software, provides a vast array of tools for data-driven tasks, including

- A powerful fourth-generation DATA step language that promotes structured coding and best practices techniques
- Self-contained "canned" programs known as *procedures* to handle everyday tasks (such as the SORT procedure)
- A self-contained custom report writer
- Output and reporting capabilities to display results in visually appealing formats
- Built-in functions to simplify programming tasks such as arithmetic, array, character, date and time, financial, mathematical, probability, quantile, random number, statistical, state and ZIP code, trigonometric and hyperbolic, and truncation operations
- A Structured Query Language (SQL) processor
- A Macro processor to help minimize keystrokes and automate repetitive tasks
- A SAS viewer to enable viewing of SAS data sets and text-based files
- An enhanced text editor to make writing and modifying program code easy
- Import and Export wizards to make transferring data a snap between different sources including SAS data sets, comma- and tab-delimited files, user-defined formats
- Descriptive statistical and correlation routines
- Database access engines for leading DBMS packages
- Full-screen menus and data-capture capability
- Windowing for ease of use
- A built-in Help facility for 24/7 assistance
- And much more

2 Equating SAS terminology with other software and database languages

The SAS software's base-product consists of several different languages. It boasts a powerful DATA step language, a SQL, and a Macro language. It even has as a part of the Output Delivery System (described in Chapter 6) a Template language for customizing the way output looks. Like SQL, C, PL1, COBOL, BASIC, and other languages, the SAS software terminology that one should become acquainted with. Table 1-1 identifies a number of SAS terms with their corresponding non-SAS terminology.

Table 1-1. SAS and Non-SAS terms

SAS TERMINOLOGY	DATABASE OR NON-SAS TERMINOLOGY
Data set	Table <or> File
Variable	Column <or> Field
Observation	Row <or> Record

setting. This section includes tips on why options are needed in the first place, how to display and become familiar with default system options, and how to specify one or more options to control SAS System initialization and system behavior.

1 Controlling how a SAS session performs and behaves

System options control the way a SAS session performs, operates, and behaves. Users can accept the default option settings or specify one or more options that affect system initialization, reading and writing data, log and procedure output control, data set control, error handling, Macro facility, product interface, and host-specific options. When a SAS System option is specified, it remains in effect during the entire SAS job or until a new option value is entered.

2 Determining the settings of SAS System options at SAS invocation

At SAS invocation, default settings for all system options are set. To determine what these settings are, the **VERBOSE** system option is specified at SAS invocation. The default settings are then written to the SAS log.

This option must be specified at SAS invocation and cannot be specified as part of an OPTIONS statement during a SAS session.

3 Displaying SAS System option settings

SAS System options are written to the SAS log when invoking the **OPTIONS** procedure. The SAS log list includes options that were set at SAS invocation, options that can be changed during a SAS session, and options that are host specific. The following statement produces the default system options and their values.

Code:

```
PROC OPTIONS;
RUN;
```

4 Changing SAS System option settings

Many SAS System option settings can be changed in the OPTIONS window, by specifying the **OPTIONS** command, during SAS invocation, or in the configuration file. To view settings that can be altered after SAS invocation, enter **OPTIONS** on any command line in Display Manager.

5 Specifying frequently used SAS options in the Configuration file

Each time the SAS System is invoked, it checks for the existence of an external Configuration file (referenced by the **CONFIG=** system option). Any option settings found in this file are used instead of the default SAS System options used during initialization. The nice thing about using this Configuration file is that if you find yourself repeatedly specifying the same option settings often, it may be a time saver to place these option settings in the Configuration file. This way, these settings are automatically set in your SAS session.

6 Controlling SAS System initialization

A number of options affect the way the SAS System is initialized during the current session.

24 Specifying the SOURCE2 option for problem detection and resolution

The SOURCE2 system option should be specified to help in the identification and resolution of programming problems resulting from SAS source files included with a %INCLUDE statement. Verify that system defaults, program code, configuration option settings, or the OPTIONS window have not turned off this option prior to debugging a program.

25 Writing a subset of the performance statistics to the SAS Log

A subset of computer system performance statistics is written to the SAS Log when the **STIMER** system option is specified. Performance statistics can be suppressed by specifying the **NOSTIMER** option. The STIMER or NOSTIMER option can be specified in the OPTIONS statement, at SAS invocation, or in the configuration file. Refer to this section's tip #26 on the FULLSTIMER option.

26 Writing all performance statistics to the SAS Log

In contrast to writing a subset of the performance statistics with the STIMER system option, the **FULLSTIMER** system option writes a complete list of computer-system performance statistics to the SAS Log. Performance statistics can be suppressed by specifying the **NOFULLSTIMER** option. The FULLSTIMER or NOFULLSTIMER option can be specified in the OPTIONS statement, at SAS invocation, or in the configuration file. Refer to this section's tip #25 on the STIMER option for further comparisons.

27 Controlling what observation to begin reading in a data set

Being able to specify what observation to begin reading in a SAS data set can be a useful feature for greater data set control. By default, the SAS System begins reading with the first observation in a data set.

To override this default behavior, a **FIRSTOBS=**n system option can be specified (where *n* is some positive number) resulting in the observation corresponding to the number specified being read as the first observation in a data set.

When the FIRSTOBS= option is specified, it applies to every input data set used in a program. The FIRSTOBS= option can be specified in an OPTIONS statement, in the OPTIONS window, at SAS invocation, or in the configuration file.

28 Resetting the FIRSTOBS= system option back to the first observation

If the FIRSTOBS= system option was assigned a value other than 1 in a previous step, don't forget to reset it back to 1 to assure that all observations are processed. This will allow the SAS System to begin reading at the first observation for all succeeding data sets.

29 Specifying the most recently created data set to use in a read operation

By default, the **_LAST_=** system option is set to use the most recently created data set. This automatic feature is commonly found in procedure code when the DATA= option is omitted from a PROC. To override this built-in default, the _LAST_= system option can be

SAS Explorer

This section includes tips that will help you perform essential file-management tasks for program, log, output, and other file types. You'll learn how to view and manipulate SAS files using a Windows-like product called SAS Explorer, how to perform a variety of file-management tasks such as copying, renaming, and deleting files, and how to use SAS Explorer tools to make virtually every programming task much easier.

1 Invoking SAS Explorer

SAS Explorer is similar to Windows Explorer, in that it allows SAS files of all types (including libraries, data sets, catalogs, and host files) to be viewed and manipulated. It is invoked by clicking Explorer from the SAS View menu.

2 Creating a new library reference

You can create a new SAS library reference by pressing the **CTRL+N** keys. Once the New Library window is displayed, as shown in Figure 1-12, you'll need to enter a name consisting of 1 to 8 alphanumeric characters (using valid SAS naming conventions). Then add the requested information in the Library Information area.

*If unsure of the file location, click the **Browse…** button for navigational assistance. Once the required information is entered and complete, click **OK** to create the new library reference.*

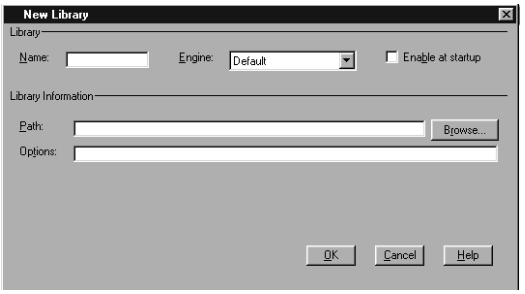

Figure 1-12. New Library window

3 Selecting one or more files

Explorer allows you to select one or more SAS files with a click of your mouse. Simply click the item you want selected with your primary mouse button. To select all files, click the **Edit** pull-down menu and choose **Select All**.

4 Viewing a file's properties

Properties provide pertinent information about a file. Displayed from the Properties window, a detailed image comprised of General Properties, Host/Engine Information, Columns, and Indexes can be viewed.

The properties for a file can be viewed by selecting the file you want with a right-click of your mouse and choosing Properties. With the Properties window opened, specific elements (including General Properties, Host/Engine Information, Columns, and Indexes) can be displayed using a selection list, as shown in Figure 1-13.

Table 1-9. SAS Explorer Keyboard Commands

COMMAND	DESCRIPTION
COPYITEM	Copies the selected item from one library or catalog to another.
DELETEITEM	Deletes the specified item from the library or catalog.
DESELECT_ALL	Deselects all selected items from the library or catalog.
DETAILS	Toggles the Details view between on and off.
LARGEVIEW	On some operating systems, icons are changed to large view.
LIBASSIGN	Invokes the New Library window.
MOVEITEM	Moves the selected item from one library or catalog to another.
NEWOBJ	Creates a new item in the selected folder.
REFRESH	Refreshes the window contents.
RENAMEITEM	Renames the selected item in a library or catalog.
SELECT_ALL	Selects all items in the library or catalog.
SMALLVIEW	On some operating systems, icons are changed to small view.
TREE	Toggles the folder list or Tree view between on and off.
UPLEVEL	Moves up one level in the selected folder hierarchy.

Summary

In this chapter, you learned how to use the Base SAS product, communicate with the SAS DMS, access the built-in Help facility to further your learning experience, use SAS Explorer to access SAS files and view your results in the Results window, customize toolbar settings to create a more productive environment for working in, copy and move files from one location to another, and use a variety of keyboard shortcuts, commands, and other useful goodies to make your overall SAS experience a more rewarding one.

In the next chapter, "Data Access," you'll continue learning in a step-by-step approach with an assortment of organized and logical tips. You'll come to know a variety of ways in which SAS can be used to read and process input files. So get ready to learn quick and simple methods to help you access your data.