Chapter 1

Using This Book

Introduction

Overview

This chapter provides a preview of what you can expect to learn from this book. It briefly explains what the SAS System is and what this book will teach you about the SAS System. It also describes the type of audience for whom this book was designed. Finally, it describes the contents of each of the remaining chapters.

What You Will Learn from This Book

This book shows you the basics of how to use Version 8 of the SAS System for Windows. The **SAS System** is a modular, integrated, and hardware-independent system of software. It is used as an information delivery system by business organizations, governments, and universities worldwide. The SAS System is often used to perform statistical analyses, and this book will show you how to perform a few of the more elementary statistical procedures.

The heart of this book is a tutorial that illustrates how to use the SAS windowing environment. The **SAS windowing environment** is an application that allows you to perform a wide variety of information-management and information-delivery activities. Among other things, it allows you to write SAS programs that perform statistical analyses. Within the SAS windowing environment, you can submit SAS programs to be executed, review the resulting log file to see if there were any errors in your program, and review the resulting output file to see the results of the statistical analyses. By the time you have finished this tutorial, you will know how to use the SAS windowing environment to write SAS programs, save them on 3.5" diskettes, submit them for execution, debug them when they contain errors, and print the resulting log and output files.

Two additional chapters in this book teach the basics of data input and statistical analysis using the SAS System. There is also an appendix that discusses programming errors that are commonly made by new SAS users. The chapters and appendix that cover these topics are discussed in greater detail later in this chapter.

What You Will Not Learn from This Book

This book does not, however, provide instruction on how to use the SAS System to perform a *wide* variety of statistical analyses. By the time you have completed this book, you will have learned how to use just a few elementary procedures, mostly procedures that compute simple descriptive statistics. However, you will not learn how to perform *t*-tests, analysis of variance, or any other inferential statistical procedure. This is because this book was intended to be very narrow in focus: It was designed to be a brief guide on the basics of using the SAS windowing environment.

For instructions on how to use the SAS System to perform a wider variety of elementary statistical analyses, see Delwiche and Slaughter (1998) and Schlotzhauer and Littell (1997). For guidance on performing more advanced statistical procedures with the SAS System, see Hatcher (1994) and Hatcher and Stepanski (1994).

In addition, this book will not cover file management in any detail. The tutorial in Chapter 3 shows how to save SAS programs on removable media such as 3.5" diskettes. The SAS System does, of course, include powerful tools for more sophisticated file-management tasks, and readers who are interested in learning about these tools should consult Delwiche and Slaughter (1998) and Gilmore (1997; 1998).

Intended Audience

This book is intended for those using Version 8 of the SAS System for Windows (and later versions). Although it is primarily designed for students in statistics courses who will use the SAS System to perform statistical analyses, it should also be useful for those who want to use the SAS System for other purposes.

This book is designed for those who may have little or no experience with personal computers. The beginning of Chapter 3 reviews basic concepts in using Windows, such as using the mouse, selecting menus, double-clicking icons, and so forth. Those who already have experience with Windows will be able to skim through this elementary material quickly.

The only materials you will need to complete the activities described here are

- access to a personal computer on which the SAS System for Windows has been installed
- one (and preferably two) 3.5" diskettes formatted for PCs
- this book.

Contents of Each Chapter

Chapter 2 – Introduction to the SAS System

Chapter 2 explains what the SAS System is and where it is installed; it also describes some of the advantages associated with using the SAS System for data analysis. This chapter introduces you to the three types of files that you will work with when using the SAS System: the SAS program file, the SAS log file, and the SAS output file. It discusses the various components that constitute a simple SAS program, and it illustrates the log and output files that are produced by that program.

Chapter 3 – Tutorial: Writing and Submitting SAS Programs

Chapter 3 teaches you the basics of writing and submitting programs within the SAS windowing environment. Most of Chapter 3 is in tutorial format. This means that you will not simply read about how to perform these tasks—you will actually perform these activities yourself on a computer. You will write, edit, and submit SAS programs as a way of learning about the SAS windowing environment.

The tutorial section of Chapter 3 is divided into four parts. Part I introduces you to the basics of using the SAS windowing environment: how to start up the SAS System, how to work with various windows, how to type and submit a simple SAS program, how to save your SAS program on a diskette, how to review the log and output files at your computer monitor, and how to print your log and output files at a printer. Part II of the tutorial shows you how to open an existing SAS file from a diskette and edit the SAS program that it contains. In Part III of the tutorial, you will submit a SAS program that contains an error. This will introduce you to the procedure that you will follow when debugging a SAS program that does not run correctly. Finally, Part IV of the tutorial will give you the opportunity to practice the skills that you have learned.

Chapter 4 – Data Input

Chapter 4 teaches the basics of data input using the SAS System. **Data input** is the process of getting your data into the computer so that it can be analyzed. Chapter 4 teaches you how to enter the types of data sets that are most frequently encountered in research. It focuses on the **formatted input approach**—the approach in which each variable is assigned to a specific column (or set of columns) within the data set.

Chapter 4 begins with general guidelines for keying data (for example, right-justifying numeric variables, left-justifying character variables). It shows how to write the SAS System's INPUT statement for different types of variables and different arrangements of the data set. It shows how to enter data as part of the SAS program itself, as well as how to read in data that are contained in a separate computer file. It provides instructions on how to use correlation matrices and variance-covariance matrices as data sets. Finally, it shows how to use the SAS System's PRINT procedure to create a listing of your raw data.

Chapter 5 – Some Basic Statistical Procedures

The SAS System is a powerful tool for analyzing data. SAS System PROCs (procedures) enable you to perform virtually any type of descriptive or inferential statistical analysis. Chapter 5 introduces you to three SAS procedures that are useful for a wide variety of purposes. You will learn how to use PROC MEANS to compute means and standard deviations, how to use PROC UNIVARIATE to compute additional measures of central tendency and variability, and how to use PROC FREQ to create one-way frequency tables and two-way crosstabulation tables. The "Conclusion" section at the end of the chapter lists references that show how to use additional SAS statistical procedures.

Appendix – Common SAS Programming Errors That Beginners Make

The Appendix discusses some of the programming errors that are commonly made by students who are using the SAS System for the first time. It has two purposes. First, this appendix reviews 10 specific errors that new SAS users often make. It does this in order to minimize the likelihood that you will make these specific errors. Second, it shows how to review the log file produced by the SAS System to identify the likely cause of an error. By reviewing these log files, you will develop some generic skills in debugging your own SAS programs.

Conclusion

This chapter has provided a brief overview of what you can expect to learn from this book. The following chapter goes into greater detail in describing what the SAS System is and the types of activities for which it can be used. It also illustrates the three types of files that you will work with as you complete the tutorial in Chapter 3.