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2nd Edition

SAS

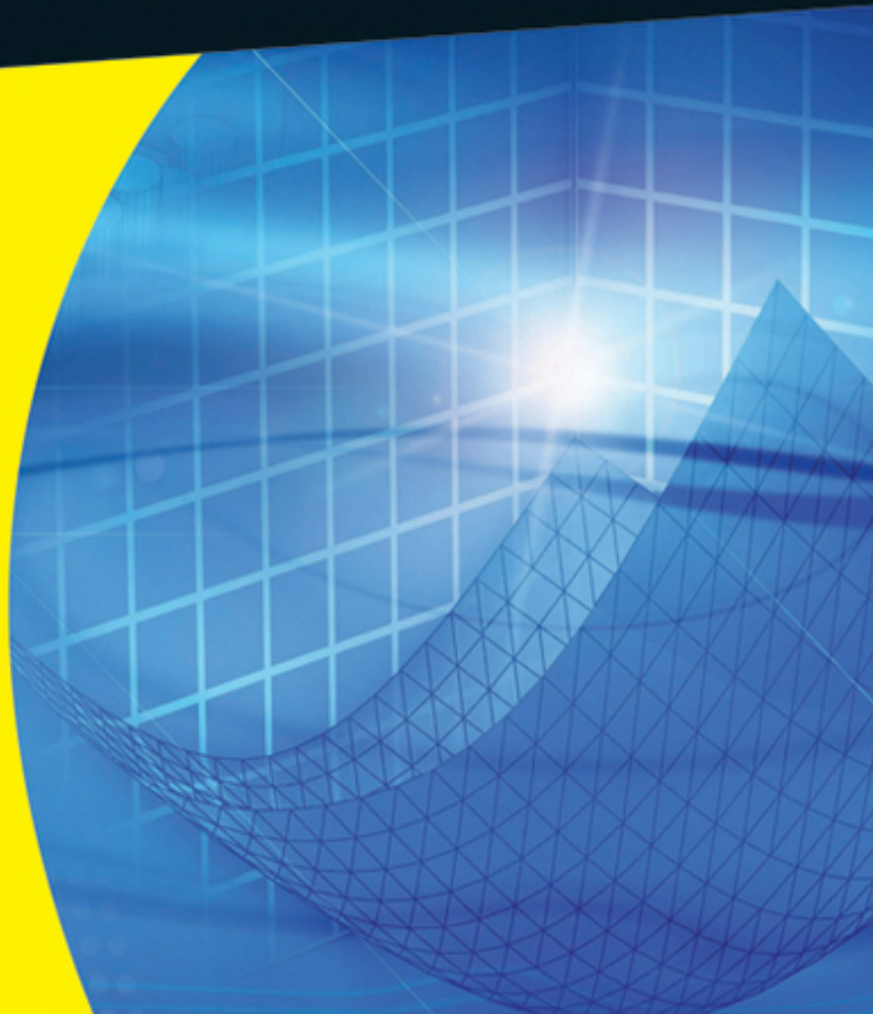
FOR

DUMMIES[®]

Learn to:

- Use SAS's statistical and analytical tools
- Get various types of data into the software
- Produce reports and use Web reporting tools
- Work with operational, financial, performance, and sales data

Chris Hemedinger
Stephen McDaniel



SAS[®] For Dummies[®], 2nd Edition

Table of Contents

[Introduction](#)

[About This Book](#)

[Conventions Used in This Book](#)

[What You're Not to Read](#)

[Foolish Assumptions](#)

[How This Book Is Organized](#)

[Part I: Welcome to SAS!](#)

[Part II: Gathering Data and Presenting Information](#)

[Part III: Impressing Your Boss with Your SAS Business Intelligence](#)

[Part IV: Enhancing and Sharing Your SAS Masterpieces](#)

[Part V: Getting SAS Ready to Rock and Roll](#)

[Part VI: The Part of Tens](#)

[Icons Used in This Book](#)

[Where to Go from Here](#)

[Part I: Welcome to SAS!](#)

[Chapter 1: Touring the Wonderful World of SAS](#)

[Isn't SAS Just for Gurus?](#)

[Data, Data Everywhere — But Not Where I Need It!](#)

[Data Summaries and Reporting](#)

[The Secret Sauce: Analytics to Optimize the Present and Predict the Future](#)

[Sharing the SAS Wealth](#)

[What the IT Department Needs to Know](#)

[Checking Out Real-World Success Stories](#)

[Chapter 2: Your Connection to SAS: Using SAS Enterprise Guide](#)

[Using SAS Enterprise Guide, the Swiss Army Knife of SAS](#)

[Using SAS Enterprise Guide for the first time](#)

[Changing what you see onscreen](#)

[Accessing and Managing Data](#)

[Opening SAS data sets](#)

[Filtering SAS data](#)

[Visualizing Success with Charts](#)

[Creating Reports for Even the Crankiest Manager](#)

[Creating a list report with totals](#)

[Getting your hands dirty with code](#)

[Putting it all together — no scissors or glue necessary](#)

[Chapter 3: Six-Minute Abs: Getting Miraculous Results with SAS](#)

[Knowing Where Your My Data Set Is Coming From and Going](#)

[Querying Your Way to Success](#)

[Understanding all this talk of joining](#)

[Joining data from multiple tables](#)

[Creating computed columns](#)

[Formatting your computed columns](#)

[Getting your hands dirty with SQL](#)

[Summarizing the Data](#)

[Summarizing specific numeric variables](#)

[Building a Forecast](#)

[Part II: Gathering Data and Presenting Information](#)

[Chapter 4: Accessing Data: Oh, the Choices!](#)

[Accessing the Data Hidden on Your PC: Microsoft Excel, Microsoft Access, and Text Files](#)

[Importing an Excel workbook](#)

[Accessing your data with OLE DB and ODBC](#)

[Supersizing with Server-Based Data](#)

[Make like a library and book](#)

[Administered data: One version of the truth](#)

[Chapter 5: Managing Data: I Can Do That?](#)

[Bringing Your Data Together and Making It Sing \(or at Least Hum\) with Queries](#)

[Joining table data](#)

[Filtering table data](#)

[Selecting specific columns of data](#)

[Creating a computed column](#)

[Recoding a column](#)

[Sorting data](#)

[Adding prompts to the query filter](#)

[Editing, Sorting, Ranking, Transposing, and Other Data Contortions](#)

[Editing data table values](#)

[Appending tables](#)

[Sorting data](#)

[Creating a format](#)

[Transposing data](#)

[Splitting columns](#)

[Stacking columns](#)

[Selecting a random sample of data](#)

[Ranking variables](#)

[Standardizing data](#)

[Summarizing data set attributes](#)

[Comparing data](#)

[Trying out the data management tasks](#)

[Chapter 6: Show Me a Report in Less Than a Minute](#)

[Discovering Your Reporting Options](#)

[Plain text reports](#)

[Adobe Acrobat \(PDF\) reports](#)

[Rich Text Format \(RTF\) reports](#)

[HTML format reports](#)

[SAS Report \(SRX\) format reports](#)

[Data Listings and Summaries for the Listless](#)

[The List Data task](#)

[The Characterize Data task: What did that guy in Accounting just give me?](#)

[The Summary Statistics task: Get to the point!](#)

[The Summary Tables \(cross-tabs\) task: Easier than crosswords!](#)

[Chapter 7: Graphs: More Value with SAS](#)

[Graphing Basics](#)

[Graphs for Every Occasion](#)

[Bar charts](#)

[Pie charts](#)

[Line plots](#)

[Scatter plots](#)

[Area plots](#)

[Bubble plots](#)

[Box plots](#)

[Donut charts](#)

[Contour plots](#)

[Radar charts](#)

[Map graphs](#)

[Tile charts](#)

[Creating Graphs with SAS](#)

[A box plot example: finding the extreme products](#)

[A line plot example: tracking regions](#)

[Part III: Impressing Your Boss with Your SAS Business Intelligence](#)

[Chapter 8: A Painless Introduction to Analytics](#)

[Analytic Concepts Useful for Everyone](#)

[It's variable](#)

[p-values](#)

[How confident are you?](#)

[What did your mother say about making assumptions?](#)

[Describing Your Data with Distribution Analysis](#)

[Analyzing Counts and Frequencies](#)

[Transforming Your Data for Further Use](#)

[Analyzing Basic Data with Correlation Techniques](#)

[Understanding ANOVA and Regression: No PhD Required!](#)

[Chapter 9: More Analytics to Enlighten and Entertain](#)

[Staying Alive with Survival Analysis](#)

[Providing Quality Control](#)

[Histograms](#)

[Q-Q plots and probability plots](#)

[Control charts](#)

[Pareto charts](#)

[Understanding Complex Relationships with Multivariate Analysis](#)

[Principal component analysis](#)

[Cluster analysis and discriminant analysis](#)

[Forecasting: Using the Crystal Ball](#)

[Chapter 10: Data Mining: Making the Leap from Guesses to Smart Choices](#)

[Mining for Jewels in Your Data](#)

[Mining for Data: The SAS Framework](#)

[Sample](#)

[Explore](#)

[Modify](#)

[Model](#)

[Assess](#)

[Score](#)

[Part IV: Enhancing and Sharing Your SAS Masterpieces](#)

[Chapter 11: Leveraging Work from SAS to Those Less Fortunate](#)

[Pulling Out Results without Pulling Teeth](#)

[Exporting results, duty-free](#)

[Exporting as a step](#)

[Getting content to channel surfers](#)

[Using Only the Good Bits: Assembling Reports in a Snap](#)

[Selecting your mix ingredients](#)

[Stacking it up for the Web with HTML Document Builder](#)

[Creating reports suitable for framing](#)

[Canning Your Work for Others to Use in Stored Processes](#)

[Cloning yourself — almost](#)

[Distilling the complex down to the simple](#)

[Chapter 12: Use OLAP and Impress Your Coworkers](#)

[Sweeter than Sugar Cubes?](#)

[Introducing OLAP Features](#)

[Seeing OLAP table interaction in action](#)

[Drilling and expanding your mind](#)

[Filtering out the weak and isolating members](#)

[Switching to graphs and maps](#)

[Understanding the percentages: It's all relative](#)

[Slicing data for further analysis](#)

[Discovering More OLAP Features](#)

[Bookmarking: Where was I?](#)

[Using calculated measures](#)

[Drilling down: Just the facts, please](#)

[Using conditional formatting: Isn't that special?](#)

[Adding details about your values](#)

[Speaking MDX with the OLAP cube](#)

[Chapter 13: Supercharge Microsoft Office with SAS](#)

[Using the Power of SAS from the Cozy World of Office](#)

[Understanding options for SAS Add-In for Microsoft Office](#)

[Knowing which Office applications are supported](#)

[Using the Add-In to Get the Most Out of Office Integration](#)

[Accessing and managing data of any size from almost anywhere](#)

[Accessing ad hoc analysis: Awesome!](#)

[Ascending beyond spreadsheet hell with stored processes](#)

[Refreshing results from the add-in](#)

[Sharing your work with others](#)

[Chapter 14: Web Reporting Fever: SAS Has That Covered](#)

[Self-Service Reporting for Everyone](#)

[Going beyond Basic Reporting](#)

[Getting More Details on SAS Web Report Studio](#)

[Securing reports](#)

[Printing smart](#)

[Exporting data to Microsoft Excel](#)

[Scheduling reports](#)

[Part V: Getting SAS Ready to Rock and Roll](#)

[Chapter 15: Setting Up SAS](#)

[Assessing Your Situation](#)

[Keeping It Local](#)

[Distributing SAS to the Masses](#)

[Drowning in tiers: Talking across boundaries](#)

[Configuring metadata: The keys to the kingdom](#)

[Plunging into Your Data](#)

[Taking a crash course in data plumbing](#)

[Trying an example: Project meets data, just in time](#)

[Chapter 16: SAS Programming for the Faint of Heart](#)

[Demystifying the SAS Program](#)

[Running \(a Program\) before Walking](#)

[Reading the Log: SAS Is Telling You Something](#)

[Dancing the DATA Step](#)

[Following Procedures](#)

[A Micro Look at Macro Programming](#)

[Dipping your toe in with macro variables](#)

[Going deeper with macro functions](#)

[Ask Your Data Questions Using SQL](#)

[Subsetting: Make your data smaller](#)

[Do the math: calculate and group](#)

[Joining the crowd: combine tables](#)

[Putting It All Together in a SAS Mashup](#)

[Chapter 17: The New World Meets the Old: Programmers and SAS Enterprise Guide](#)

[Getting Organized with Projects](#)

[Connecting the dots with links](#)

[Avoiding entropy with ordered lists](#)

[Generating project logs: Your work on record](#)

[Letting SAS Tasks Do the Heavy Lifting](#)

[Being Flexible with Project Prompts](#)

[Keeping Off-Limits: Stuff That Won't Work](#)

[X statements and SYSTASK \(tsk, tsk\)](#)

[DDE is DOA](#)

[Nowhere to show: SAS/AF and %WINDOW](#)

[Ending control with ENDSAS](#)

Part VI: The Part of Tens

Chapter 18: Ten SAS Enterprise Guide Productivity Tips

[Know the “Keys” to Success](#)

[Don’t Limit Yourself: Use More than One Session](#)

[See What’s Installed on Your Server](#)

[Change the Input Data for a Task](#)

[Watch the Log Grow](#)

[Copy Data from One SAS Server to Another](#)

[Expand Your Horizons with Custom Tasks](#)

[Submit a Selection](#)

[Don’t Wait for Data to Open](#)

[Schedule Your Project](#)

Chapter 19: Ten Tips for Administrators

[Determining When SASUSER Isn’t Usable](#)

[Managing Logins from SAS Enterprise Guide Explorer](#)

[Disarming Application Features](#)

[Using METALIB to Synchronize Metadata with Reality](#)

[Getting Better Performance from Information Maps](#)

[Making Your Database Work for You with Implicit Pass-Through](#)

[Publishing Reports from SAS Enterprise Guide](#)

[Catching and Killing a Runaway SAS Session](#)

[Telling One SAS.EXE from Another](#)

[Peering under the Covers with Process Logs](#)

Chapter 20: Ten (or More) Web Resources for Extra Information

[Where Do I Go For Support?](#)

[What Else Does SAS Offer and How Are Others Succeeding with SAS?](#)

[How Can I Connect with other SAS Users?](#)

[Where Can I Get More Info on Making Effective Charts and Graphs?](#)

[Where Can I Ask Questions?](#)

[Where Can I Discover More about Statistics and Analytics?](#)

[Where Can I Find Information That Didn't Fit in This Book?](#)

SAS[®] For Dummies[®], 2nd Edition

**by Stephen McDaniel
and Chris Hemedinger**



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Previously, Stephen was the senior manager in charge of the SAS Enterprise Guide development team and the SAS Add-In for Microsoft Office development team at SAS. Stephen has been a SAS user for more than 20 years and has experience with more than 50 organizations as a statistician, statistical programmer, product manager, and manager of data warehousing and business intelligence. You can reach him at www.Freakalytics.com.

Chris Hemedinger is a senior software manager in the Research and Development division of SAS. Chris began his career at SAS in 1993 as a technical writer, creating such hits as *SAS Companion for the OS/2 Environment* (remember OS/2?) and *SAS Companion for the Microsoft Windows Environment*. In 1997, he became involved in a prototype project to make SAS easier to use for nonprogrammers, and that project evolved into the

hugely popular SAS Enterprise Guide, a product that Chris has worked with ever since. Chris can be found performing entertaining SAS tricks at blogs.sas.com/sasdummys.

Dedication

I want to thank my wonderful wife and business partner, Eileen, for her patience, support, insights, and encouragement throughout the writing process!—
Stephen McDaniel

For my beautiful (and patient) wife, Gail, and our inquisitive three daughters: Maggie, Evelyn, and Gwen. Listen up, girls: Despite what you hear from me, it's usually *not* polite to call somebody a “dummy.”—Chris Hemedinger

Authors' Acknowledgments

The first edition of *SAS For Dummies* took years to assemble, even with the help of dozens of people. It proved popular beyond our wildest expectations. With such momentum, you might think that this second edition would be a piece of cake and practically write itself. Think again.

We, the humble authors, could not have planned and completed this book without the tremendous help of our editors at Wiley and at SAS Press. From Wiley, we relied on Jodi Jensen and Katie Feltman for their coordination

and Susan Pink for her thoughtful editing. At SAS Press, Stacey Hamilton served as our acquisitions editor, with help and guidance from Stephenie Joyner and Julie Platt.

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We're proud of this book; please send us your comments at <http://dummies.custhelp.com>. For other comments, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

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Introduction

Unless you're a hermit, chances are good that your life is touched by SAS (pronounced "sass") almost every day.

Have you ever received an offer for a credit card in the mail? The bank might have used SAS to select you for the particular offer you received. Remember a recent news article that cited demographic trends in the United States? The Census Bureau uses SAS to crunch its numbers. Were you tempted to buy that new gadget in a big-name retail store? The corporate office might have used SAS to calculate the best price to set for that specific item on that specific week.

The rate you pay for life insurance, the analysis behind pharmaceutical drug trials, the quality of parts used to assemble your automobile — all these are determined by people who use SAS. You don't see SAS directly from day to day — but, like gravity, it's an invisible force that affects your life.

This book offers a prolonged glimpse into the multifaceted world of SAS software. Read on to discover how people use SAS to influence the world around you. Perhaps you'll see how to grab the reins yourself and use SAS to affect your own sphere of influence.

About This Book

Although this book is titled *SAS For Dummies*, 2nd Edition, you absolutely need some smarts to get solid results using SAS. However, the overarching message of

this book is that you don't need to be an expert at using software. You just need to know what questions to ask, what data is needed to provide an answer, and how to interpret the results.

This book covers a variety of SAS products. We take a high-level look at some and dive deeply into those that you're most likely to use. The amazing fact is that SAS offers hundreds of software products covering dozens of industries and disciplines. No single person could possibly use them all and still have time for essential activities, such as sleep and personal hygiene. (Hmm, maybe that explains the smell around here.)

Like most software products, SAS products look and work differently from version to version. We describe SAS 9.2 and version 4.2 of the applications that we discuss most, including SAS Enterprise Guide, SAS Add-In for Microsoft Office, and SAS Web Report Studio. If you have a different version of these SAS applications, many of the instructions and figures in the book will differ from what you see in your installation.

And, hey! Here's something cool about this book: You don't have to read it from stem to stern. Feel free to skip around, reading the sections that cover what you need to know.

This book does *not* address two popular SAS topics:

How to program in SAS: SAS software has been around for more than 30 years, and you can find plenty of books about SAS programming. Indeed, one goal of this book is to show you how much you can do with SAS without having to become a SAS programmer. However, we provide several

examples of SAS programs throughout the book, especially in Chapter 16, so you can at least recognize a SAS program if you meet one on the street.

Life at SAS Institute Inc., the makers of SAS software: SAS, the company (along with its founder, Jim Goodnight), has had more than its 15 minutes of fame on TV shows (such as *60 Minutes* and *Oprah*) plus a big dose of coverage in business magazines (such as *Fortune* and *Forbes*). The stories are overwhelmingly positive (not featuring anyone trying to blot out the camera view with his palm). SAS is famous for being a great place to work. One of the authors holds a day job at SAS — and he really likes that job. That’s all we’ll say about that.

Conventions Used in This Book

This book contains lots of descriptive information about SAS software. Because a picture is worth — well, you know — this book has lots of figures of the software in action. (*Action* is a relative term; after all, this *is* business and analytical software, not *World of Warcraft*.)

You’ll find plenty of step-by-step instructions to accomplish specific tasks. You can follow along with these if you have the software handy; otherwise, you can use your imagination and pretend how much fun it is.

When we show a URL, filename, path, data set, or code within regular text, we set it off in a monofont type, like `this`.

When we want you to type something, we bold the characters you type (such as, **type this**).

If you get the munchies while reading this book, it's because most of the examples refer to data with a candy theme.

The data files discussed in the book actually ship with *SAS Enterprise Guide*, which is a SAS application that features prominently in this book.

What You're Not to Read

Occasionally, you'll see some sidebar topics or Technical Stuff icons in the margin that indicate an historical or a technical side point. You can skip those if you want, but reading them will give you that extra edge when SAS comes up in the discussion at the next cocktail party you attend. Study up and impress your friends!

Foolish Assumptions

To better manage the task of writing this book, we had to begin with some assumptions about you, the reader. Here they are:

SAS software runs on many types of computer systems, but the majority of people experience it under Microsoft Windows. So, the examples are presented as if you're using a PC. We assume that

you know your way around a PC, clicking the mouse, selecting menus, and so on.

As we stated, we don't assume that you are a SAS programmer or that you even aspire to be one. However, if you are or if you do, you'll still find this book useful to round off your SAS knowledge.

How This Book Is Organized

Yes, this book *is* organized; the chapters don't simply appear in random order. There are six major parts, each of which includes some self-contained chapters. Don't feel as though you need to read them in order, though. Please, make yourself at home and read whichever chapters interest you the most. (Really, it's okay; we won't be offended.)

Part I: Welcome to SAS!

SAS, meet reader. Reader, meet SAS. In Part I, you get to know each other in this overview of what SAS software is about and what it can do for you. You'll find an introduction to SAS Enterprise Guide and some examples for getting quick results without having to be an expert.

Part II: Gathering Data and Presenting Information

Data is everywhere, but information is scarce. Part II shows how you can use SAS to take data and turn it into information you can use. And even better, you can see how to turn it into information that others will use and thank you for. You'll find out how to build basic reports and graphs that actually convey useful information.

Part III: Impressing Your Boss with Your SAS Business Intelligence

Part III is a whirlwind tour through the concepts of statistics and analytics. You get an overview of the basics, as well as some examples of how you can apply analytics to understand and predict behavior, as represented in data. Correlations, causality, forecasting — those topics and others are discussed here.

Part IV: Enhancing and Sharing Your SAS Masterpieces

Part IV could be titled "SAS: It's Everywhere You Want to Be" or "SAS: It's Not Just for Programmers Anymore." You'll see how you can use SAS from your desktop, on the Web, in Microsoft Excel, and even in Microsoft PowerPoint!

Part V: Getting SAS Ready to Rock and Roll

Part V provides a high-level view of how to install and configure SAS software. You might come away with an enhanced appreciation for the person who performs that task for you. You'll find a gentle introduction to the concepts and structure of SAS programs. And for the experienced SAS programmers in the audience, you can find a candid overview of SAS Enterprise Guide, your new friend.

Part VI: The Part of Tens

Part VI is where we stored the nuggets of knowledge that you can count on both hands (or feet!). Even if you already consider yourself a SAS expert, we promise that you will discover something new here. Check out Part VI for ten productivity tips for SAS Enterprise Guide users, ten must-know items for SAS administrators, and links to more resources.

Icons Used in This Book

All the information in this book is special; we wouldn't have included it otherwise. But some information that we provide is more special than the rest. To draw attention to its "specialness," we tagged it with some eye-catching little icons.



The Tip icon calls out a sentence or two that might prove to be a timesaver in your work. (You're welcome.)



Got a mind like a steel sieve? Well, you might want to reserve some space in your memory bank for the content next to the Remember icon. We use this icon as a way to emphasize an important point or concept.



Hear the voice in your head yelling “Danger Will Robinson! Danger!”? Is your “spidey sense” tingling? Well, there is little danger, really, as long as you heed the advice shown near the Warning icon.



This book contains many little gems of technical information. You can still use SAS if you don't read and understand this stuff, just like you can still enjoy watching hockey if you don't know what *icing* means. But, as any fan will tell you, it's more fun knowing what it all means.

Where to Go from Here

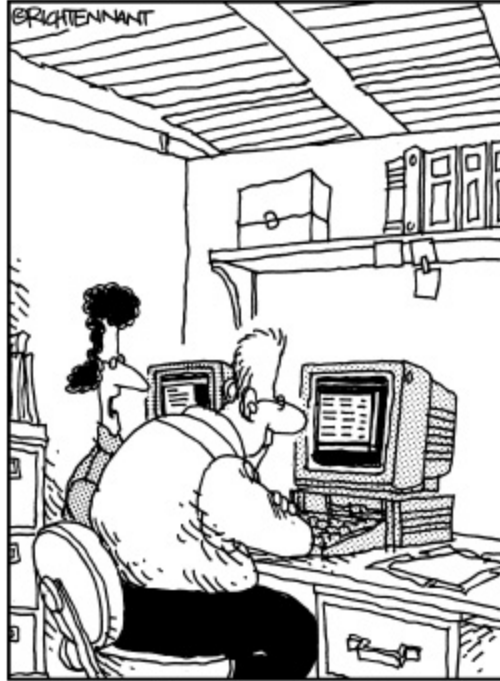
After you read through this book, you might crave more details about specific areas that we cover. (Or maybe those cravings are related to the candy-themed examples.) The best starting place for more information is the SAS support Web site at <http://support.sas.com>.

If this book transforms you into a card-carrying SAS user, your next step might be to seek out others like you. That will be easy because millions of people around the globe use SAS. And do you know what? They like to get together every so often in SAS user groups. User group meetings and conferences provide a great way to find out more from your peers about how to use SAS in practical and creative ways. User group information is available from SAS at <http://support.sas.com>.

Part I

Welcome to SAS!

The 5th Wave By Rich Tennant



"This isn't a quantitative or a qualitative estimate of the job. This is a wish-upon-a-star estimate of the project."

In this part . . .

What exactly is SAS anyway? Is it really a Scandinavian airline (wrong SAS), or do those letters mean something else?

In this part, you discover how to see the world for what it is: a huge bucket of data. And we show you how you can use SAS software to pull some of that

data together and draw useful information from it. We introduce you to some of the basic tools that will become your companions as you begin your journey toward SAS savviness.