## Contents

Preface xi  
Acknowledgments xiii  
About the Author xv  
How to Use This Book and the Accompanying CD xvii

### Part 1  Getting Started

#### Chapter 1  Creating a Simple Report  3

1.1 Basic Syntax  4  
1.2 Routing Reports to ODS Destinations  6  
1.3 Other Reporting Tools: A Brief Comparison of Capabilities  7  
  1.3.1 PROC REPORT vs. PROC PRINT  8  
  1.3.2 PROC REPORT vs. PROC TABULATE  8  
  1.3.3 PROC REPORT vs. DATA _NULL_  8  
1.4 The PROC REPORT Process: An Overview  9  
  1.4.1 PROC REPORT Terminology  9  
  1.4.2 Processing Phases  11  
1.5 Chapter Exercises  12

#### Chapter 2  PROC REPORT: An Introduction  13

2.1 Introduction to the COLUMN Statement  16  
2.2 Defining Types of Columns  17  
  2.2.1 Default Define Types DISPLAY and ANALYSIS  18  
  2.2.2 Using Define Usage ORDER  19  
  2.2.3 Using Define Type GROUP  22  
  2.2.4 Using Define Type ACROSS (and GROUP)  24  
2.3 Doing More on the COLUMN Statement  25  
  2.3.1 Using the Comma to Form Nested Associations  26  
  2.3.2 Attaching Statistics with a Comma  26  
  2.3.3 Using Parentheses to Form Groups  28  
  2.3.4 Nesting Statistics under an ACROSS Variable  29  
2.4 Other DEFINE Statement Options  31  
  2.4.1 Specification of an Analysis Statistic  31  
  2.4.2 Formatting the Values  33  
  2.4.3 Controlling the Order of the Displayed Values  34  
  2.4.4 Using the N Statistic without an ANALYSIS Variable  36  
  2.4.5 Associating Statistics with DEFINE Statements  37
2.5 Adding Text 39
   2.5.1 Using the COLUMN Statement to Add Text 41
   2.5.2 Using the DEFINE Statement to Add Text 43
   2.5.3 Using the SPLIT= Option with Text 44
2.6 Compute Blocks 45
   2.6.1 Inserting a Blank Line 46
   2.6.2 Adding Lines of Text 47
   2.6.3 Writing Formatted Values 49
   2.6.4 Using SAS Language Elements 51
2.7 Sequencing of Step Events 52
2.8 Chapter Exercises 54

Chapter 3 Creating Breaks 57
3.1 Generating Breaks Using BREAK and RBREAK 57
3.2 BREAK Statement 59
   3.2.1 Skipping a Line between Groups 59
   3.2.2 Summarizing across a Group 61
   3.2.3 Suppressing the Summarization Label 65
   3.2.4 Generating a Page for Each Group Level 67
   3.2.5 Combining Summaries with Detail Reports 68
3.3 RBREAK Statement 69
   3.3.1 Using RBREAK in a Detail Report 69
   3.3.2 Using RBREAK with BREAK in a Detail Report 70
   3.3.3 Using RBREAK and BREAK in a Summary Report 71
3.4 Chapter Exercises 73

Chapter 4 Only in the LISTING Destination 75
4.1 Using the HEADLINE and HEADSKIP Options 76
4.2 Blank Lines, Overlines, and Underlines 78
4.3 Repeat Characters 79
   4.3.1 Adding Repeated Characters to Spanning Headers 80
   4.3.2 Repeat Characters with the SPLIT= Option 82
4.4 PROC REPORT Statement Options 83
   4.4.1 Creating Boxes on the Report 83
   4.4.2 Controlling the Centering of the Report 85
   4.4.3 Adjusting the Width of Numeric and Computed Columns 85
   4.4.4 Creating Multiple Panels on a Page 86
   4.4.5 Using the PSPACE= Option 87
   4.4.6 Controlling the Size of the Page 88
   4.4.7 Using the FORMCHAR Option 89
   4.4.8 Wrapping Data Lines 91
4.5 Other DEFINE Statement Options 92
  4.5.1 Specifying the Column Width 93
  4.5.2 Using the FLOW Option to Wrap Text 93
  4.5.3 Adding Spaces between Columns 94
4.6 Chapter Exercises 96

Chapter 5 Creating and Modifying Columns Using the Compute Block 97
  5.1 Coordinating with the COLUMN and DEFINE Statements 98
  5.2 Calculations Based on Statistics 99
  5.3 Calculating Percentages within Groups 101
  5.4 Using _PAGE_ with BEFORE and AFTER 103
  5.5 Using the OUT= Option to View Report Break Information 104
  5.6 Chapter Exercises 106

Part 2 Taking PROC REPORT Beyond the Basics

Chapter 6 Refining Our Understanding of the PROC REPORT Step 109
  6.1 Additional DEFINE Statement Options 110
    6.1.1 Changing Display Order with DESCENDING 110
    6.1.2 Specification of Column Justification 111
    6.1.3 Allowing the Use of Missing Classification Items 113
    6.1.4 Controlling the Use of Analysis Items with All Missing or Zero Values 115
    6.1.5 Using NOPRINT 118
    6.1.6 Identification Columns 119
    6.1.7 Creating Vertical Page Breaks 120
  6.2 Using Variable Aliases 121
  6.3 Nesting Variables 122
  6.4 Taking Full Advantage of Formats 123
    6.4.1 User-Defined Formats 123
    6.4.2 Preloading Formats 126
    6.4.3 Order Based on Format Definition 130
  6.5 Other PROC Statement Options 131
    6.5.1 Removing Headers 131
    6.5.2 Using NAMED Output 132
    6.5.3 Debugging with the LIST Option 134
    6.5.4 Including MISSING Classification Levels 134
Chapter 6 BY-Group Processing 136
6.6.1 Using the BY Statement 137
6.6.2 Creating Breaks with BY Groups 138
6.6.3 Using the #BYVAL and #BYVAR Options 139
6.6.4 BY Groups and the Output Delivery System 141

6.7 Calculations Using the FREQ Statement 144
6.8 A Further Comment on Paging Issues 145
6.9 Chapter Exercises 146

Chapter 7 Extending Compute Blocks 147
7.1 Understanding the Events of the Compute Block Process 149
7.1.1 Setup Phase: Generating the Computed Summary Information 150
7.1.2 Report Row Phase: Generating the Report 150
7.1.3 Process Example 151

7.2 Referencing Columns and Report Items in a Compute Block 154
7.2.1 Using Direct Variable Name References 156
7.2.2 Using Compound Variable Names 159
7.2.3 Using an Alias as a Column Reference 160
7.2.4 Using Absolute Column References: Referring to a Column by Its Number 161
7.2.5 Using the Automatic Temporary Variable _BREAK_ 164

7.3 Using BEFORE and AFTER 166

7.4 Changing the Grouping Variable Values on Summary Lines 169
7.4.1 Specifying Text in a Compute Block 170
7.4.2 Using a Formatted Value 171
7.4.3 Creating a Dummy Column 173

7.5 Introducing the CALL DEFINE Routine 174

7.6 COMPUTE Statement Options and Switches 179
7.6.1 Justification of LINE Statement Text 179
7.6.2 Creating Character Variables with the CHARACTER and LENGTH= Options 180

7.7 Using Logic and SAS Language Elements 182
7.7.1 Using the SUM Statement with Temporary Variables 183
7.7.2 Repeating GROUP and ORDER Variables on Each Row 185
7.7.3 Counting Items across Page Breaks in the LISTING Destination 187

7.8 Doing More with the LINE Statement 191
7.8.1 Creating Group Summaries 192
7.8.2 Adding Repeated Characters 194
7.8.3 Understanding LINE Statement Execution 197
### Chapter 7: Examples of Common Tasks

- **7.9 Examples of Common Tasks** 199
  - **7.9.1 Writing a Grand Total on Every Page** 200
  - **7.9.2 Combining Values into One Field or Column** 202
  - **7.9.3 Combining Values with Nested ACROSS Variables** 204
  - **7.9.4 Calculating a Weighted Mean** 206

### Chapter 8: Using PROC REPORT with ODS

- **8.1 Introduction to the STYLE= Option** 213
- **8.2 Using STYLE= to Change Attributes** 216
  - **8.2.1 Changing Text and Cell Attributes** 216
  - **8.2.2 Adding a Logo to Your Report** 219
  - **8.2.3 Controlling Report Size** 223
  - **8.2.4 Adding Horizontal and Vertical Spaces to Separate Data** 223
- **8.3 Using CALL DEFINE to Change Style Attributes** 227
  - **8.3.1 Using CALL DEFINE in a Simple Report** 228
  - **8.3.2 Creating Shaded Rows** 229
  - **8.3.3 Conditional Assignment of Attributes** 231
- **8.4 Creating Trafficlighting Effects** 232
  - **8.4.1 Building Trafficlighting Formats** 233
  - **8.4.2 Using Formats with the STYLE= Option** 233
  - **8.4.3 Controlling Trafficlighting with CALL DEFINE** 236
  - **8.4.4 Trafficlighting in the Presence of Computed Variables and Summary Lines** 236
  - **8.4.5 Trafficlighting When Differentiating between Columns** 240
  - **8.4.6 Differentiating between Columns on Group Summary Rows** 242
  - **8.4.7 Trafficlighting on the REPORT Summary Row** 245
  - **8.4.8 A Few Things to Remember When Using Formats for Trafficlighting** 249
- **8.5 Embedding Hyperlinks within Your Table** 249
  - **8.5.1 Linking Titles and Footnotes Using HTML Anchor Tags and the LINK= Option** 250
  - **8.5.2 HTML Anchor Tags as Data Values** 255
  - **8.5.3 Establishing Links Using CALL DEFINE** 257
  - **8.5.4 Forming Links Using STYLE=** 260
  - **8.5.5 Creating Links in a PDF Document** 262
  - **8.5.6 Creating Links in an RTF Document** 265
  - **8.5.7 Automation Using the Macro Language** 266
  - **8.5.8 Using Formats to Build a Link** 268
8.6 Using the Escape Character for In-Line Formatting 270
  8.6.1 Controlling Superscripts and Subscripts 271
  8.6.2 Displaying Page Numbers 273
  8.6.3 Generating a Dagger 277
  8.6.4 Using the Escape Character with S=\{ } and \{STYLE\} to Change Style Attributes 279
  8.6.5 Line Breaks and Wrapping 282
  8.6.6 Passing Raw Destination-Specific Codes 289

8.7 Using TITLE and FOOTNOTE Statement Options 292

8.8 Creating Tip or “Flyover” Text for HTML and PDF 293
  8.8.1 Using CALL DEFINE 293
  8.8.2 Placing Tip Text Using STYLE= 295
  8.8.3 Placing Tip Text Using ~S=\{ } 297

8.9 Specifying Multiple Columns for RTF and PDF 298

8.10 Adding Text through the TEXT= Option 300

8.11 RIGHTMARGIN: Aligning Numbers When Using CELLWIDTH 301

8.12 Chapter Exercises 304

Part 3 Extending PROC REPORT

Chapter 9 Reporting Specifics for ODS Destinations 309

  9.1 RTF 310
    9.1.1 Using the BODYTITLE Option 311
    9.1.2 Adding RTF Control Words 312
    9.1.3 Post-processing of RTF Files 313
  9.2 PDF 314
    9.2.1 Adding PDF File Descriptors 314
    9.2.2 Setting the Default Margins 315
  9.3 HTML and Other Markup Destinations 316
    9.3.1 Exporting a Report to Microsoft Excel 316
    9.3.2 Setting Tagset Attributes 322
    9.3.3 HTML Tags and Repeat Characters 323

Chapter 10 Solving Other Common Report Problems 325

  10.1 Creating Vertically Concatenated Tables 326
    10.1.1 A Simple Table 326
    10.1.2 Ordering the Generated Classifications 332
    10.1.3 Text and Number Alignment in Derived Columns 335
    10.1.4 Doing More in the PROC REPORT Step 338
A2.1.4 COLUMN Statement Options 420
A2.1.5 DEFINE Statement Options 420
A2.1.6 BREAK Statement Options 422
A2.1.7 RBREAK Statement Options 422
A2.1.8 COMPUTE Statement Options 422
A2.1.9 In the Compute Block 423
A2.1.10 Other PROC REPORT Step Statements 423

A2.2 Output Delivery System 423
A2.2.1 ODS Destinations 424
A2.2.2 ODS Statements and Options 424
A2.2.3 HTML Destination Options 425
A2.2.4 PDF Destination Options 425
A2.2.5 RTF Destination Options 426

A2.3 Attribute Control and Modification 426
A2.3.1 STYLE= Option 426
A2.3.2 CALL DEFINE Routine 427
A2.3.3 Attribute Modifiers 428

A2.4 System Options 429

Appendix 3 Example Locator 431

A3.1 Combination Detail and Summary Reports 431
A3.1.1 Transposing Rows and Columns 432
A3.1.2 Specifying and Calculating Statistics 432
A3.1.3 Enhancing Tables 432
A3.1.4 Controlling Pages 433
A3.1.5 Controlling the Order of the Report’s Rows 433

A3.2 Calculating Percentages 433
A3.3 Processing Weighted Means and Totals 433
A3.4 Understanding Processing Phases and Event Sequencing 434

References 435
Index 449