
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

- 6.6 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

- 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
- 7.10 Chapter Exercises 209

Chapter 8 Using PROC REPORT with ODS 211

- 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

- 10.2 Automating the PROC REPORT Process 341
 - 10.2.1 Things to Think about When Automating 342
 - 10.2.2 Macro Variable Resolution Issues 343
- 10.3 Coordinating Graphics with PROC REPORT 345
 - 10.3.1 Using CALL DEFINE to Import Graphics 345
 - 10.3.2 Using GPRINT and GREPLAY 352
 - 10.3.3 Using the Annotate Facility to Generate Lines 355
- 10.4 Workarounds for Monospace-Only Options 357
- 10.5 Generating Separate Reports on the Same Page 360
 - 10.5.1 ODS LAYOUT 360
 - 10.5.2 HTML Reports 362
 - 10.5.3 RTF and PDF Reports: Using STARTPAGE=NEVER 363
 - 10.5.4 Aligning Columns across Reports 365

Chapter 11 Details of the PROC REPORT Process 367

- 11.1 Step Sequence Review 368
- 11.2 Building a Simple Table with Summary Lines 371
- 11.3 Compute Block Processing 372
 - 11.3.1 Creating a Computed Variable 372
 - 11.3.2 Multiple Compute Blocks 373
 - 11.3.3 Summary Lines and Compute Blocks in the Same Report 374
 - 11.3.4 Using Compute BEFORE and COMPUTE AFTER with Summary Lines 375
- 11.4 Using the ACROSS Define Usage 378

Appendix 1 Exercise Solutions 383

- A1.1 Solutions to Chapter 1 Exercises 383
- A1.2 Solutions to Chapter 2 Exercises 384
- A1.3 Solutions to Chapter 3 Exercises 389
- A1.4 Solutions to Chapter 4 Exercises 391
- A1.5 Solutions to Chapter 5 Exercises 394
- A1.6 Solutions to Chapter 6 Exercises 397
- A1.7 Solutions to Chapter 7 Exercises 402
- A1.8 Solutions to Chapter 8 Exercises 408

Appendix 2 Syntax and Example Index 417

- A2.1 PROC REPORT Step 418
 - A2.1.1 Primary Statements 418
 - A2.1.2 PROC REPORT Statement Options 418
 - A2.1.3 BY Statement Options 419

- 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