Second Edition

Statistics Made Simple
Do It Yourself on PC

K.V.S. Sarma
STATISTICS MADE SIMPLE
Do It Yourself on PC

SECOND EDITION

K.V.S. SARMA
Professor
Department of Statistics
Sri Venkateswara University
Tirupati

PHI Learning Private Limited
New Delhi-110001
2010
To

my mother—

the real motherboard in me
Contents

Preface xi
Preface to the First Edition xiii

1. The Role of Statistics in Research 1–27
   1.1 Statistics in Research 1
   1.2 Research in Statistics 2
   1.3 Common Statistical Issues in Research 3
   1.4 Data Collection 4
      1.4.1 Survey Method 5
      1.4.2 Experimental Method 7
   1.5 Coding of Data 8
   1.6 Tabulation and Presentation of Data 9
   1.7 Some Case Studies in Statistical Analysis 10
   1.8 The Statistics Toolkit 1 11
      1.8.1 Tabulation of Data—One-way Frequencies 11
      1.8.2 Cross Tabulations—Two-way Frequencies 13
      1.8.3 Histogram—The Graphic Way of Describing a Variable 15
      1.8.4 Bars, Lines and Pie Diagrams as Visual Aids 16
   1.9 The Statistics Toolkit 2 19
      1.9.1 Summary Statistics 19
      1.9.2 The Population and the Sample 23
      1.9.3 Sample Statistics and Their Formulae 24
   1.10 Role of Computer in Statistical Analysis 26

References 27
Suggested Readings 27
Do It Yourself 27

2. Basics of a Computer 28–37
   2.1 The Evolution of Computer 28
   2.2 The Personal Computer (PC) and Its Components 29
   2.3 Peripheral Devices for the Computer 32
   2.4 Getting Started with the PC 35
   2.5 Hard Disk Partitions, Files and Folders 36

References 37
Do It Yourself 37
CONTENTS

3. Windows and MS-Office for Research Studies 38–62
   3.1 About Windows XP/Vista 38
   3.2 Windows Desktop and Start Menu 39
   3.3 My Computer and Windows Explorer 43
   3.4 About MS-Office 2007 49
   3.5 About MS-Word 2007 51
   3.6 Opening MS-Word 51
   3.7 Creating a Document 53
   3.8 Saving and Printing the Document 56
   3.9 Editing Features 58
   3.10 Review and Proofing 60
References 61
Do It Yourself 61

4. Data Handling and Statistics through MS-Access 63–91
   4.1 Introduction 63
   4.2 Creating MS-Access Database 63
   4.3 Creating a Table 67
   4.4 Creating a Form for Data Entry 70
   4.5 Creating Queries 75
   4.6 Creating Reports 79
   4.7 Data File for Blood Bank Operations—A Case of Hospital Management 81
   4.8 Data File for Plant Growth Problem—A Case of Experimental Data 85
   4.9 Data File for the Tribal Food Problem 87
References 90
Suggested Readings 91
Do It Yourself 91

5. Data Handling in Excel 92–117
   5.1 Getting Started with Excel 2007 92
   5.2 The Excel Worksheet 93
   5.3 Data Entry on the Worksheet 98
   5.4 Some Important Editing Features of Excel 100
   5.5 Calculations on the Worksheet 103
   5.6 Built-in Functions for Quick Use 106
   5.7 Editing Data Using Excel Form 110
   5.8 Array Functions 111
   5.9 Printing the Data and Results 115
References 116
Do It Yourself 116
6. **Graphs and Charts in Excel** 118–137
   6.1 Excel Charts and Application Areas 118
   6.2 Construction of a Column/Bar Chart 120
   6.3 Improving the Chart 122
   6.4 Construction of a Histogram 129
   6.5 Construction of a PIE Chart 130
   6.6 Construction of a Line Chart 133
   6.7 Construction of a Scatter Chart 135
   References 136
   Do It Yourself 136

7. **Descriptive Statistics Using Excel** 138–153
   7.1 Constructing a Histogram 138
   7.2 Data Analysis Pak in Excel 140
   7.3 Descriptive Statistics 141
     7.3.1 Summary Statistics 142
     7.3.2 Frequency Distribution and Histogram 144
   7.4 Cross-Tabulations and Pivot Tables 146
   7.5 The Concept of Probability 150
   References 151
   Do It Yourself 151

8. **Inferential Statistics Using Excel** 154–185
   8.1 Estimation of Unknown Parameter Values 154
   8.2 Testing of Hypotheses 155
   8.3 Statistical Tests Concerning Means 159
     8.3.1 The One-sample Z-Test for Mean 159
     8.3.2 The One-sample t-Test for Mean 160
     8.3.3 The Two-sample Z-Test for Means 162
     8.3.4 The Two-sample t-Test for Means 164
     8.3.5 The Paired t-Test 166
   8.4 The F-Test for Variance 168
   8.5 Analysis of Variance 169
     8.5.1 One-way Anova 170
     8.5.2 Two-way Anova with Replication 174
     8.5.3 Two-way Anova without Replication 177
   8.6 The Chi-Square Test 178
     8.6.1 Chi-square Test for Goodness of Fit 178
     8.6.2 Chi-square Test for Independence 181
   References 182
   Do It Yourself 183

9. **Correlation and Regression Analysis** 186–206
   9.1 Correlation Analysis 186
   9.2 Simple Regression Analysis 190
9.3 Multiple Linear Regression 197
9.4 Diagnostic Analysis of Regression 201
References 204
Do It Yourself 204

10. Data Analysis Using Crystal Reports 207–230

10.1 Introduction 207
10.2 Salient Features of Crystal Reports 207
10.3 The Standard Report Wizard 209
   10.3.1 Connecting Data File to the Report 211
   10.3.2 Report Design 213
10.4 Editing the Report 214
10.5 Formula Fields 219
   10.5.1 Formula to Concatenate Fields 219
   10.5.2 Formula to Use a Condition 220
10.6 The Select Expert 221
10.7 Other Important Features of a Report 224
10.8 Cross Tab Expert 226
10.9 Chart Expert 228
References 230
Do It Yourself 230


11.1 Fitting a Trend Line to the Observed Data 231
11.2 Polynomial Trends 235
11.3 Logarithmic, Power and Exponential Trends 237
11.4 Moving Averages 239
11.5 Exponential Smoothing 242
11.6 Linear and Compound Growth Values 244
   11.6.1 The Forecast and Trend Functions 244
   11.6.2 The Growth Function 246
11.7 Financial Functions and Related Tools in Excel 248
   11.7.1 Simple Financial Functions 248
   11.7.2 Ranking of Data 249
   11.7.3 Random Number Generation 250
   11.7.4 Creation of Statistical Tables 251
References 254
Do It Yourself 254


12.1 The SPSS Software 256
12.2 Creating a Data File in SPSS 258
12.3 Editing Features of SPSS 262
12.4 Creating Frequency Tables 267
12.5 Cross Tabulations and Chi-square Tests 270
CONTENTS

12.6 Tests of Significance Using SPSS  273
12.7 Analysis of Variance       277
12.8 Multiple Comparison Tests  280
References                    285
Do It Yourself                285

Appendices                     287–299
A. Data of the File C:\STATMAN\TRIBAL.DBF  287
B. Data of the File C:\STATMAN\BLOOD.DBF  293
C. Data of the File C:\STATMAN\PLANT.DBF  295
D. Values of Student’s t-distribution for Different
   Degrees of Freedom (df) at Selected Level of
   Significance (α)  297
E. Cumulative Standard Normal Distribution
   Values from −∞ to z  298

Index                           301–303
The first edition of this book was based on the facilities available in Microsoft Office 2000. Nowadays the user is familiar with Microsoft Office 2007 and would probably shift to new versions that are likely to be available in the near future. The Operating Systems used for discussion in the first edition were DOS and Windows (98/2000), while most of the computers now operate with Windows XP/Vista.

Since one of the objectives of this book is to make the reader familiar with the software for statistics, it became necessary to revise the contents to fit into the Office 2007 environment. The revision has been made by effecting the following changes in the contents of the book.

1. The earlier Chapter 4 Windows and MS-Office for research studies has been changed to Chapter 3 with modified contents.
2. The earlier Chapter 3 Data handling and statistics through FoxPro has been removed and in its place the new Chapter 4 Data handling and statistics through MS-Access is introduced. Since FoxPro is not much in use, MS-Access has been introduced in this book. A detailed discussion of activities such as creating data files, manipulation through queries and making reports has been provided with the help of practical and live data sets. New examples have been introduced to enable understanding of Access data.
3. The earlier Chapter 10 FoxPro programming for quick statistics has been replaced with Data analysis using crystal reports. New software called Crystal Reports (CRP), which is currently used by software developers for making reports from databases, has been introduced in this edition. A large portion of data analysis in social science research can be carried out with CRP. It is a highly useful tool for producing reports from Access and Excel files.
4. The discussion in Chapter 12 is totally devoted to SPSS (with the title suitably changed). The formats used in the earlier versions of SPSS have been replaced with the contemporary versions, and the statistical aspects are thoroughly discussed with examples.
Statistics Made Simple Do It Yourself On Pc

Publisher: PHI Learning
ISBN: 9788120340176
Author: SARMA, K.V.S.

Type the URL: http://www.kopykitab.com/product/7698

Get this eBook
Why do we need statistics?

Example: Chemical may increase. Was there sampling error or bias? One way to be sure is to measure all 20,000 flies. Not feasible. So what do we do? Statistics. You say the flies are bigger. I say not. Statistics provide rules to help us find out. Statistics will help tell us if these are significant (real) differences. Is there bias?