## Contents

Pretace xi	
Acknowledgments xv	
Chapter 1: Introduction	1
Defining Fraud Anomalies versus Fraud Types of Fraud Assess the Risk of Fraud Conclusion	1 2 2 4 6
Notes	6
Chapter 2: Fraud Detection	7
Recognizing Fraud Data Mining versus Data Analysis and Analytics Data Analytical Software Anomalies versus Fraud within Data Fraudulent Data Inclusions and Deletions Conclusion Notes	7 10 11 12 14 14
Chapter 3: The Data Analysis Cycle	17
Evaluation and Analysis Obtaining Data Files Performing the Audit File Format Types Preparation for Data Analysis Arranging and Organizing Data Conclusion Notes	17 19 22 24 24 33 35 35
Chapter 4: Statistics and Sampling	37
Descriptive Statistics Inferential Statistics	37 38

Foreword ix

## vi ■ Contents

Magazira of Dianarajan	38
Measure of Dispersion	39
Measure of Variability	40
Sampling	41
Conclusion	65
Notes	65
Chapter 5: Data Analytical Tests	67
Benford's Law	68
Number Duplication Test	77
Z-Score	81
Relative Size Factor Test	84
Same-Same Test	93
Same-Same-Different Test	94
Even Amounts	98 99
Conclusion Notes	100
Chapter 6: Advanced Data Analytical Tests	101
Correlation	101
Trend Analysis	104
GEL-1 and GEL-2	109
Conclusion	121
Note	122
Chapter 7: Skimming and Cash Larceny	123
Skimming	123
Cash Larceny	124
Case Study	124 124
Case Study	124
Case Study Conclusion	124 131
Case Study Conclusion  Chapter 8: Billing Schemes	124 131 <b>133</b>
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization	124 131 <b>133</b> 134
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score	124 131 <b>133</b> 134 138
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts	124 131 <b>133</b> 134 138 139 140
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test	124 131 <b>133</b> 134 139 140 141
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test Same-Same-Different Test	124 131 <b>133</b> 134 139 140 141 144
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test Same-Same-Different Test Payments without Purchase Orders Test	124 131 <b>133</b> 134 138 139 140 141 144 145
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test Same-Same-Different Test Payments without Purchase Orders Test Length of Time between Invoice and Payment Dates Test	124 131 <b>133</b> 134 138 139 140 141 144 145 146
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test Same-Same-Different Test Payments without Purchase Orders Test Length of Time between Invoice and Payment Dates Test Search for Post Office Box	124 131 <b>133</b> 134 138 139 140 141 144 145 146 151
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test Same-Same-Different Test Payments without Purchase Orders Test Length of Time between Invoice and Payment Dates Test Search for Post Office Box Match Employee Address to Supplier	124 131 <b>133</b> 134 139 140 141 144 145 146 151
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test Same-Same-Different Test Payments without Purchase Orders Test Length of Time between Invoice and Payment Dates Test Search for Post Office Box Match Employee Addresses in Vendor Master	124 131 <b>133</b> 134 139 140 141 144 145 146 151 152
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test Same-Same-Different Test Payments without Purchase Orders Test Length of Time between Invoice and Payment Dates Test Search for Post Office Box Match Employee Address to Supplier Duplicate Addresses in Vendor Master Payments to Vendors Not in Master	124 131 <b>133</b> 134 139 140 141 144 145 146 151 152 155
Case Study Conclusion  Chapter 8: Billing Schemes  Data and Data Familiarization Benford's Law Tests Relative Size Factor Test Z-Score Even Dollar Amounts Same-Same-Same Test Same-Same-Different Test Payments without Purchase Orders Test Length of Time between Invoice and Payment Dates Test Search for Post Office Box Match Employee Addresses in Vendor Master	124 131 <b>133</b> 134 139 140 141 144 145 146 151 152

Chapter 9: Check-Tampering Schemes	163
Electronic Payments Fraud Prevention Check Tampering Data Analytical Tests Conclusion	164 165 166 171
Chapter 10: Payroll Fraud	173
Data and Data Familiarization Data Analysis The Payroll Register Payroll Master and Commission Tests Conclusion Notes	175 181 193 194 195 196
Chapter 11: Expense Reimbursement Schemes	197
Data and Data Analysis Conclusion and Audit Trail Notes	201 219 220
Chapter 12: Register Disbursement Schemes	221
False Refunds and Adjustments False Voids Concealment Data Analytical Tests Conclusion	221 222 222 222 222 233
Chapter 13: Noncash Misappropriations	235
Types of Noncash Misappropriations Concealment of Noncash Misappropriations Data Analytics Conclusion	235 237 238 240
Chapter 14: Corruption	243
Bribery Tender Schemes Kickbacks, Illegal Gratuities, and Extortion Conflict of Interest Data Analytical Tests Concealment Conclusion	243 244 245 246 247 250 250
Chapter 15: Money Laundering	253
The Money-Laundering Process Other Money Transfer Systems and	254
New Opportunities Audit Areas and Data Files Conclusion	256 257 259

vii

Contents

## viii ■ Contents

Chapter 16: Zapper Fraud	261
Point-of-Sales System Case Study Quantifying the Zapped Records Additional POS Data Files to Analyze Missing and Modified Bills The Markup Ratios Conclusions and Solutions Notes	265 294 296 297 299 300 302
Chapter 17: Automation and IDEAScript	303
Considerations for Automation Creating IDEAScripts Conclusion	304 306 316
Chapter 18: Conclusion	319
Financial Statement Fraud IDEA Features Demonstrated Projects Overview Data Analytics: Final Words Notes	319 321 323 325 326
About the Author	327
About the Website	329
Index	333