BRIEF CONTENTS

Part I Conceptual Foundations of Accounting Information Systems 23

CHAPTER 1 Accounting Information Systems: An Overview 24

CHAPTER 2 Overview of Business Processes 48

CHAPTER 3 Systems Development and Documentation Techniques 82

CHAPTER 4 Relational Databases 124

Part II Control and Audit of Accounting Information Systems 161

CHAPTER 5 Computer Fraud and Abuse 162

CHAPTER 6 Control and Accounting Information Systems 218

CHAPTER 7 Information Systems Controls for Systems Reliability—Part 1: Information Security 270

CHAPTER 8 Information Systems Controls for Systems Reliability—Part 2: Confidentiality, Privacy, Processing Integrity, and Availability 314

CHAPTER 9 Auditing Computer-Based Information Systems 350

Part III Accounting Information Systems Applications 385

CHAPTER 10 The Revenue Cycle: Sales to Cash Collections 390

CHAPTER 11 The Expenditure Cycle: Purchasing to Cash Disbursements 438

CHAPTER 12 The Production Cycle 482

CHAPTER 13 The Human Resources Management and Payroll Cycle 518

CHAPTER 14 General Ledger and Reporting System 550

Part IV The REA Data Model 581

CHAPTER 15 Database Design Using the REA Data Model 582

CHAPTER 16 Implementing an REA Model in a Relational Database 616

CHAPTER 17 Special Topics in REA Modeling 642

Part V The Systems Development Process 674

CHAPTER 18 Introduction to Systems Development and Systems Analysis 678

CHAPTER 19 AIS Development Strategies 726

CHAPTER 20 Systems Design, Implementation, and Operation 772

CONTENTS

Part I Conceptual Foundations of Accounting Information Systems 23

CHAPTER 1 Accounting Information Systems: An Overview 24

Introduction 26
Systems, Data, and Information 26
What Is an AIS? 28
Why Study Accounting Information Systems? 29
Study of the AIS Is Fundamental to Accounting 29
AIS Skills Are Important to Your Career Success 30
The AIS Course Complements Other Systems Courses 30
AIS Topics Are Tested on the New CPA Exam 31
The Impact of the AIS on Corporate Strategy and Culture 31
The Role of the AIS in the Value Chain 32
How an AIS Can Add Value to an Organization 34
Providing Information for Decision Making 35
Decision Structure 36
Decision Scope 36
The AIS and Corporate Strategy 37
Strategies and Strategic Positions 37
Information Technology and Business Strategy 38
Summary and Case Conclusion 39 ■ Key Terms 39
AIS IN ACTION: Chapter Quiz 40 ■ Discussion Questions 41 ■ Problems 42
Case 1-1 *Any Company, Inc. An Ongoing Comprehensive Case 45*
Case 1-2 *Ackoff's Management Misinformation Systems 45*
AIS IN ACTION SOLUTIONS: Quiz Key 45

CHAPTER 2 Overview of Business Processes 48

Introduction 50
Information Needs and Business Activities 51
Information Needs 51
Interaction with External and Internal Parties 52
Business Processes 52
Transaction Processing: The Data Processing Cycle 56
Data Input 57
Data Storage 58
Data Processing 65
Information Output 66
Role of the AIS 70
Summary and Case Conclusion 70 ■ Key Terms 71
AIS IN ACTION: Chapter Quiz 71 ■ Discussion Questions 72 ■ Problems 73
Case 2-1 *Bar Harbor Blueberry Farm 77*
AIS IN ACTION SOLUTIONS: Quiz Key 79

CHAPTER 3 Systems Development and Documentation Techniques 82

Introduction 84

Data Flow Diagrams 85

Elements in a Data Flow Diagram 85

Subdividing the DFD 88

Flowcharts 92

Flowchart Symbols 92

Document Flowcharts 94

System Flowcharts 95

Program Flowcharts 99

Summary and Case Conclusion 99 ■ Key Terms 100

AIS IN ACTION: Chapter Quiz 100 ■ Comprehensive Problem 102 ■ Discussion Questions 102 ■ Problems 102

Case 3-1 *Dub 5 116*

AIS IN ACTION SOLUTIONS: Quiz Key 117 ■ Comprehensive Problem Solution 119

CHAPTER 4 Relational Databases 124

Introduction 126

Files Versus Databases 126

The Importance and Advantages of Database Systems 127

The Importance of Good Data 128

Database Systems 129

Logical and Physical Views of Data 129

Schemas 129

The Data Dictionary 131

DBMS Languages 131

Relational Databases 133

Types of Attributes 134

Designing a Relational Data Base for S&S, Inc. 134

Basic Requirements of a Relational Database 136

Two Approaches to Database Design 139

Creating Relational Database Queries 139

Database Systems and the Future of Accounting 145

Summary and Case Conclusion 147 ■ Key Terms 148

AIS IN ACTION: Chapter Quiz 148 ■ Comprehensive Problem 149 ■ Discussion Questions 149 ■ Problems 151

Case 4-1 *Research Projects 155*

AIS IN ACTION SOLUTIONS: Quiz Key 156 ■ Comprehensive Problem Solution 157

Part II Control and Audit of Accounting Information Systems 161

CHAPTER 5 Computer Fraud and Abuse 162

Introduction 164

AIS Threats 164

Introduction to Fraud 167

Misappropriation of Assets 167

Fraudulent Financial Reporting 168

SAS No. 99: The Auditor's Responsibility to Detect Fraud 169

Who Perpetrates Fraud and Why It Occurs 169
The Fraud Triangle 170
Computer Fraud 175
The Rise in Computer Fraud 175
Computer Fraud Classifications 177
Computer Fraud and Abuse Techniques 180
Computer Attacks 182
Social Engineering 187
Malware 190
Preventing and Detecting Computer Fraud and Abuse 195
Summary and Case Conclusion 197 ■ Key Terms 198
AIS IN ACTION: Chapter Quiz 198 ■ Discussion Questions 200 ■ Problems 201
Case 5-1 *David L. Miller: Portrait of a White-Collar Criminal 209*
Case 5-2 *Lexsteel Corporation 211*
Case 5-3 *Shadowcrew 213*
AIS IN ACTION SOLUTIONS: Quiz Key 214

CHAPTER 6 Control and Accounting Information Systems 218
Introduction 220
Why AIS Threats Are Increasing 220
Why Control and Security Are Important 221
Overview of Control Concepts 222
The Sarbanes-Oxley and Foreign Corrupt Practices Acts 223
Levers of Control 224
Control Frameworks 225
COBIT Framework 225
COSO's Internal Control Framework 226
COSO's Enterprise Risk Management Framework 226
The ERM Framework Versus the Internal Control Framework 229
The Internal Environment 229
Management's Philosophy, Operating Style, and Risk Appetite 230
The Board of Directors 230
Commitment to Integrity, Ethical Values, and Competence 231
Organizational Structure 231
Methods of Assigning Authority and Responsibility 232
Human Resources Standards 232
External Influences 235
Objective Setting 236
Event Identification 236
Risk Assessment and Risk Response 238
Estimate Likelihood and Impact 240
Identify Controls 240
Estimate Costs and Benefits 240
Determine Cost/Benefit Effectiveness 241
Implement Control or Avoid, Share, or Accept the Risk 241
Control Activities 241
Proper Authorization of Transactions and Activities 242
Segregation of Duties 243
Project Development and Acquisition Controls 246

Change Management Controls 247
Design and Use of Documents and Records 247
Safeguard Assets, Records, and Data 248
Independent Checks on Performance 249
Information and Communication 250
Monitoring 251
Perform ERM Evaluations 251
Implement Effective Supervision 251
Use Responsibility Accounting 251
Monitor System Activities 251
Track Purchased Software and Mobile Devices 252
Conduct Periodic Audits 252
Employ a Computer Security Officer, a Chief Compliance Officer, and Computer Consultants 253
Engage Forensic Specialists 253
Install Fraud Detection Software 253
Implement a Fraud Hotline 254
Summary and Case Conclusion 254 ■ Key Terms 255
AIS IN ACTION: Chapter Quiz 256 ■ Discussion Questions 258 ■ Problems 258
Case 6-1 *The Greater Providence Deposit & Trust Embezzlement 266*
AIS IN ACTION SOLUTIONS: Quiz Key 267

CHAPTER 7 Information Systems Controls for Systems Reliability—Part 1: Information Security 270

Introduction 272
The COBIT and Trust Service Frameworks 273
Three Fundamental Information Security Concepts 275
1 Security Is a Management Issue, Not a Technology Issue 275
2 The Time-Based Model of Security 278
3 Defense-in-Depth 279
Understanding Targeted Attacks 279
Preventive Controls 280
Authentication Controls 281
Authorization Controls 281
Training 283
Controlling Physical Access 284
Controlling Remote Access 286
Host and Application Hardening 291
Encryption 293
Detective Controls 299
Log Analysis 299
Intrusion Detection Systems 300
Managerial Reports 301
Security Testing 301
Corrective Controls 301
Computer Emergency Response Team 302
Chief Information Security Officer (CISO) 302
Patch Management 303
Summary and Case Conclusion 303 ■ Key Terms 304

AIS IN ACTION: Chapter Quiz 305 ■ Discussion Questions 306 ■ Problems 306
Case 7-1 *Costs of Preventive Security* 310
Case 7-2 *Developing an Information Security Checklist* 310
AIS IN ACTION SOLUTIONS: Quiz Key 311

CHAPTER 8 Information Systems Controls for Systems Reliability—Part 2: Confidentiality, Privacy, Processing Integrity, and Availability 314

Introduction 316
Confidentiality 316
Privacy 318
Processing Integrity 321
Input Controls 322
Processing Controls 325
Output Controls 326
Example: Credit Sales Processing 327
Availability 331
Minimizing Risk of System Downtime 331
Disaster Recovery and Business Continuity Planning 332
Change Management Controls 337
Summary and Case Conclusion 337 ■ Key Terms 338
AIS IN ACTION: Chapter Quiz 339 ■ Discussion Questions 340 ■ Problems 340
Case 8-1 *The State Department of Taxation* 346
AIS IN ACTION SOLUTIONS: Quiz Key 347

CHAPTER 9 Auditing Computer-Based Information Systems 350

Introduction 352
The Nature of Auditing 352
Internal Auditing Standards 353
Types of Internal Auditing Work 353
An Overview of the Auditing Process 353
The Risk-Based Audit Approach 356
Information Systems Audits 356
Objective 1: Overall Security 357
Objective 2: Program Development and Acquisition 359
Objective 3: Program Modification 359
Objective 4: Computer Processing 362
Objective 5: Source Data 366
Objective 6: Data Files 368
Computer Software 368
Operational Audits of an AIS 371
Summary and Case Conclusion 372 ■ Key Terms 373
AIS IN ACTION: Chapter Quiz 373 ■ Discussion Questions 374 ■ Problems 375
Case 9-1 *Preston Manufacturing Company* 381
AIS IN ACTION SOLUTIONS: Quiz Key 382

Part III Accounting Information Systems Applications 385

CHAPTER 10 The Revenue Cycle: Sales to Cash Collections 390

Introduction 392
Revenue Cycle Business Activities 394

Sales Order Entry 395
Shipping 401
Billing 404
Cash Collections 409
Information Processing Procedures 411
Control Objectives, Threats, and Procedures 413
Sales Order Entry 413
Shipping 415
Billing and Accounts Receivable 416
Cash Collections 417
General Control Issues 418
Revenue Cycle Information Needs 419
Summary and Case Conclusion 422 ■ Key Terms 423
AIS IN ACTION: Chapter Quiz 424 ■ Discussion Questions 425 ■ Problems 425
Case 10-1 *Elite Publishing Company 435*
Case 10-2 *Frontier Floors 435*
AIS IN ACTION SOLUTIONS: Quiz Key 436

CHAPTER 11 The Expenditure Cycle: Purchasing to Cash Disbursements 438

Introduction 440
Expenditure Cycle Business Activities 441
Order Goods 442
Receive and Store Goods 447
Pay for Goods and Services 449
Information Processing Procedures 453
Control Objectives, Threats, and Procedures 455
Order Goods 456
Receive and Store Goods 460
Approve and Pay Vendor Invoices 461
General Control Issues 464
Expenditure Cycle Information Needs 465
Summary and Case Conclusion 467 ■ Key Terms 467
AIS IN ACTION: Chapter Quiz 468 ■ Discussion Questions 469 ■ Problems 469
Case 11-1 *Blackwell Industries 478*
Case 11-2 *Boone Company 479*
AIS IN ACTION SOLUTIONS: Quiz Key 480

CHAPTER 12 The Production Cycle 482

Introduction 484
Production Cycle Activities 486
Product Design 486
Planning and Scheduling 488
Production Operations 492
Cost Accounting 493
Information Processing Procedures 495
Raw Materials Usage Data 496
Direct Labor Costs 496
Machinery and Equipment Usage 497
Manufacturing Overhead Costs 497

Control Objectives, Threats, and Procedures 497
Product Design 499
Planning and Scheduling 499
Production Operations 500
Cost Accounting 501
General Threats 501
Production Cycle Information Needs 502
Criticism 1: Inappropriate Allocation of Overhead Costs 503
Criticism 2: Misleading Reports 506
Summary and Case Conclusion 507 ■ Key Terms 508
AIS IN ACTION: Chapter Quiz 508 ■ Discussion Questions 510 ■ Problems 510
Case 12-1 *The Accountant and CIM 514*
AIS IN ACTION SOLUTIONS: Quiz Key 516

CHAPTER 13 The Human Resources Management and Payroll Cycle 518
Introduction 520
Overview 521
Payroll Cycle Activities 523
Update Payroll Master File 523
Update Tax Rates and Deductions 524
Validate Time and Attendance Data 524
Prepare Payroll 527
Disburse Payroll 530
Calculate Employer-Paid Benefits and Taxes 530
Disburse Payroll Taxes and Miscellaneous Deductions 531
Outsourcing Options: Payroll Service Bureaus and Professional Employer Organizations 531
Control Objectives, Threats, and Procedures 532
Employment Practices 532
Payroll Processing 533
General Control Issues 536
Key Decisions and Information Needs 537
Summary and Case Conclusion 538 ■ Key Terms 539
AIS IN ACTION: Chapter Quiz 539 ■ Discussion Questions 541 ■ Problems 541
Case 13-1 *Research Report: HRM/Payroll Opportunities for CPAs 547*
Case 13-2 *Fargo Publishing 547*
AIS IN ACTION SOLUTIONS: Quiz Key 548

CHAPTER 14 General Ledger and Reporting System 550
Introduction 552
General Ledger and Reporting System Activities 553
Update General Ledger 554
Post Adjusting Entries 555
Prepare Financial Statements 555
Produce Managerial Reports 556
XBRL: Revolutionizing the Reporting Process 556
Control Objectives, Threats, and Procedures 561
Threat 1: Errors in Updating the General Ledger and Generating Reports 562
Threat 2: Financial Statement Fraud 564

Threat 3: Loss or Unauthorized Disclosure or Alteration of Financial Data 564
Threat 4: Poor Performance 565
Supporting Management's Information Needs 566
The Balanced Scorecard 566
Using Data Warehouses for Business Intelligence 567
Principles of Graph Design 570
Summary and Case Conclusion 573 ■ Key Terms 573
AIS IN ACTION: Chapter Quiz 574 ■ Discussion Questions 575 ■ Problems 575
Case 14-1 *Keeping Current with XBRL Developments 578*
Case 14-2 *Evaluating a General Ledger Package 578*
AIS IN ACTION SOLUTIONS: Quiz Key 579

Part IV The REA Data Model 581

CHAPTER 15 Database Design Using the REA Data Model 582
Introduction 584
Database Design Process 584
Entity-Relationship Diagrams 585
The REA Data Model 587
Three Basic Types of Entities 587
Structuring Relationships: The Basic REA Template 588
Developing an REA Diagram 590
Step 1: Identify Relevant Events 590
Step 2: Identify Resources and Agents 593
Step 3: Determine Cardinalities of Relationships 594
Summary and Case Conclusion 601 ■ Key Terms 601
AIS IN ACTION: Chapter Quiz 601 ■ Comprehensive Problem 604 ■ Discussion Questions 604 ■ Problems 605
Case 15-1 *REA Data Modeling Extension 608*
AIS IN ACTION SOLUTIONS: Quiz Key 609 ■ Comprehensive Problem Solution 612

CHAPTER 16 Implementing an REA Model in a Relational Database 616
Introduction 618
Integrating REA Diagrams Across Cycles 618
Rules for Combining REA Diagrams 620
Merging Redundant Resource Entities 621
Merging Redundant Event Entities 622
Validating the Accuracy of Integrated REA Diagrams 623
Implementing an REA Diagram in a Relational Database 623
Step 1: Create Tables for Each Distinct Entity and M:N Relationship 623
Step 2: Assign Attributes to Each Table 624
Step 3: Use Foreign Keys to Implement 1:1 and 1:N Relationships 627
Completeness Check 628
Using REA Diagrams to Retrieve Information from a Database 629
Creating Journals and Ledgers 629
Generating Financial Statements 631
Creating Managerial Reports 632
Summary and Case Conclusion 632 ■ Key Terms 633
AIS IN ACTION: Chapter Quiz 633 ■ Comprehensive Problem 634 ■ Discussion Questions 635 ■ Problems 635

Case 16-1 *Practical Database Design 637*
AIS IN ACTION SOLUTIONS: Quiz Key 637 ■ Comprehensive Problem Solution 640

CHAPTER 17 Special Topics in REA Modeling 642

Introduction 644
Additional Revenue Cycle Modeling Topics 644
Additional Events 644
Attribute Placement 645
New REA Feature—Employee Roles 647
Sale of Services 647
Digital Assets 648
Rental Transactions 648
Additional Expenditure Cycle Modeling Topics 649
Additional Events 649
Attribute Placement 649
New REA Feature—M:N Agent-Event Relationships 650
New REA Feature—Locations 652
New REA Feature—Relationships Between Resources and Agents 652
Acquisition of Intangible Services 652
Rental Transactions 653
Production Cycle REA Model 653
Additional Entities—Intellectual Property 654
Production Cycle Events 656
New REA Feature—Relationships Between Agents 657
Combined HR/Payroll Data Model 657
HR Cycle Entities 658
Tracking Employees' Time 658
Financing Activities Data Model 659
Summary and Case Conclusion 660
AIS IN ACTION: Chapter Quiz 664 ■ Discussion Questions 666 ■ Problems 666
Case 17-1 *Practical Database Assignment 671*
AIS IN ACTION SOLUTIONS: Quiz Key 671 ■ Extending the REA Model to Include Information About Policies 675

Part V The Systems Development Process 677

CHAPTER 18 Introduction to Systems Development and Systems Analysis 678

Introduction 680
Systems Development 683
The Systems Development Life Cycle 683
The Players 685
Planning Systems Development 686
Planning Techniques 687
Feasibility Analysis 689
Calculating Economic Feasibility Costs and Benefits 690
Capital Budgeting 691
Behavioral Aspects of Change 692
Why Behavioral Problems Occur 693
How People Resist AIS Changes 693
Preventing Behavioral Problems 695

Systems Analysis 696
Initial Investigation 696
Systems Survey 697
Information Needs and Systems Requirements 700
Systems Analysis Report 703
Summary and Case Conclusion 703 ■ Key Terms 705
AIS IN ACTION: Chapter Quiz 706 ■ Comprehensive Problem 707 ■ Discussion Questions 708 ■ Problems 709
Case 18-1 *Audio Visual Corporation 719*
AIS IN ACTION SOLUTIONS: Quiz Key 720 ■ Comprehensive Problem Solution 722

CHAPTER 19 AIS Development Strategies 726
Introduction 728
Purchasing Software 728
Purchasing Software and the SDLC 729
Selecting a Vendor 730
Acquiring Hardware and Software 730
Evaluating Proposals and Selecting a System 731
Development by In-House IS Departments 733
End-User-Developed Software 734
Appropriate End-User Development and Use 735
Benefits of End-User Computing 736
Risks of End-User Computing 736
Managing and Controlling End-User Computing 737
Outsourcing the System 738
The Growth in Outsourcing Applications 738
The Benefits of Outsourcing 739
Risks of Outsourcing 740
Business Process Reengineering 741
Challenges Faced by Reengineering Efforts 743
Prototyping 743
Steps in Developing a Prototype 744
When to Use Prototyping 745
Advantages of Prototyping 745
Disadvantages of Prototyping 747
Computer-Aided Software Engineering 747
Advantages and Disadvantages of CASE Technology 748
Summary and Case Conclusion 748 ■ Key Terms 749
AIS IN ACTION: Chapter Quiz 750 ■ Chapter Case—Freedom from Telemarketers—The Do Not Call List 751 ■ Discussion Questions 752 ■ Problems 753
Case 19-1 *Professional Salon Concepts 761*
AIS IN ACTION SOLUTIONS: Quiz Key 762 ■ Chapter Case Solution 765

CHAPTER 20 Systems Design, Implementation, and Operation 766
Introduction 768
Conceptual Systems Design 768
Evaluate Design Alternatives 768
Prepare Design Specifications 769
Prepare the Conceptual Systems Design Report 770

Physical Systems Design 770
Output Design 771
File and Database Design 772
Input Design 773
Program Design 774
Procedures Design 775
Controls Design 775
Physical Systems Design Report 777
Systems Implementation 777
Implementation Planning 777
Site Preparation 778
Select and Train Personnel 779
Complete Documentation 780
Test the System 780
Systems Conversion 781
Conversion Approaches 781
Data Conversion 781
Operation and Maintenance 782
Summary and Case Conclusion 783 ■ Key Terms 785
AIS IN ACTION: Chapter Quiz 785 ■ Chapter Case—Hershey's Big Bang ERP 787
Discussion Questions 787 ■ Problems 788
Case 20-1 *Citizen's Gas Company 795*
AIS IN ACTION SOLUTIONS: Quiz Key 796 ■ Chapter Case Solution 798
Glossary 801
Index 823