



CONTENTS

PART 1 **INFORMATION SYSTEMS FUNDAMENTALS 2**

1

THE INFORMATION RESOURCE 3

- 1.1 Introduction 3
- 1.2 Overview of Information 3
- 1.3 Information and the Organization 7
- 1.4 Key Organizational Factors 14
- 1.5 Information as a Competitive Weapon 17

2

THE FUNDAMENTALS OF BUILDING INFORMATION SYSTEMS 39

- 2.1 Introduction 39
- 2.2 Information System Building Blocks 40
- 2.3 Information System Design Forces 44
- 2.4 Information Systems Development Methodology: The Systems Analyst's Guiding Light 54

3

BUILDING INNOVATIVE INFORMATION SYSTEMS 64

- 3.1 Introduction 64
- 3.2 Opportunities for Building Innovative Information Systems 65
- 3.3 Information System Effectiveness and Efficiency Components 67
- 3.4 Self-Service Information Systems: An Innovative Design Twist 91

PART 2

INFORMATION SYSTEMS DIMENSIONS AND STRUCTURES 104

4

FUNCTION-SPECIFIC INFORMATION SYSTEMS 105

- 4.1 Introduction 105
- 4.2 Information Systems That Support Accounting 105

- 4.3 Information Systems That Support Manufacturing 117
- 4.4 Information Systems That Support Marketing 126

5

FULLY INTEGRATED INFORMATION SYSTEMS 146

- 5.1 Introduction 146
- 5.2 Analysis of the Integrating Force 147
- 5.3 A Fully Integrated Information System Model 150
- 5.4 Fully Integrated Information Systems for Nonmanufacturing Companies 158
- 5.5 Networking: The Key to FIIS 159
- 5.6 Network Topologies: Data Traffic Highways 161

PART 3

DESIGN OF INFORMATION SYSTEM BUILDING BLOCKS 174

6

INPUT 175

- 6.1 Introduction 175
- 6.2 Inputting and Processing Transactions 175
- 6.3 Forms Analysis and Design 178
- 6.4 Coding Considerations 189
- 6.5 Types of Code Structures 193
- 6.6 Input Methods 204

7

MODELS 223

- 7.1 Introduction 223
- 7.2 Logico-Mathematical Models 223
- 7.3 Decision Trees and Decision Tables 230
- 7.4 Structured English 232
- 7.5 Data Flow Diagrams (DFDs) 234
- 7.6 Structured Analysis and Design Technique 239
- 7.7 Traditional Flowcharts 240
- 7.8 Nassi-Shneiderman Charts 244
- 7.9 Hierarchy Plus Input Process Output 247
- 7.10 Structure Charts 249
- 7.11 Warnier-Orr Diagrams 250
- 7.12 Prototyping 252

8**OUTPUT 260**

- 8.1 Introduction 260
- 8.2 Designing Output for Users 260
- 8.3 Output Design Rules and Selected Examples 264
- 8.4 Saying it with Graphics 271
- 8.5 Selected Chart Examples 277
- 8.6 Output Devices 285

9**TECHNOLOGY: THE COMPUTER AND AUXILIARY STORAGE 301**

- 9.1 Introduction 301
- 9.2 The Central Processing Unit 301
- 9.3 Mainframes, Minis, and Micros 305
- 9.4 Auxiliary Storage Technology 308

10**TECHNOLOGY: TELECOMMUNICATIONS AND NETWORKING 326**

- 10.1 Introduction 326
- 10.2 Basic Telecommunication Components 327
- 10.3 Line Configurations and Utilization 331
- 10.4 Communication Media 335
- 10.5 Network Architectures, Standards, and Protocols 341
- 10.6 Networking with Emphasis on Local Area Networks 350

11**TECHNOLOGY: SOFTWARE APPLICATION AND DEVELOPMENT 367**

- 11.1 Introduction 367
- 11.2 Computer-Oriented Software 367
- 11.3 Software Languages 373
- 11.4 Human-Oriented Software 377
- 11.5 How to Increase Fluency at the User/System Interface 380
- 11.6 Computer-Aided Software Engineering Systems 388

12**DATA BASE: DATA MANAGEMENT AND ORGANIZATION CONCEPTS 396**

- 12.1 Introduction 396
- 12.2 Data Management Concepts 397
- 12.3 Computerized Data Management 399
- 12.4 Data Organization Alternatives 405

13**THE DATA BASE MANAGEMENT SYSTEM 419**

- 13.1 Introduction 419
- 13.2 Purpose of a Data Base Administrator and DBMS 420
- 13.3 Framework and Diagramming Techniques for Understanding Data Base Levels and Relationships 422
- 13.4 External Level of Data 427
- 13.5 Conceptual Level of Data 430
- 13.6 Internal Level of Data 437
- 13.7 Approaches to Data Analysis 440

14**CONTROLS 456**

- 14.1 Introduction 456
- 14.2 The Real-World Environment 457
- 14.3 Basic Computer System Controls 462
- 14.4 Security Controls 484
- 14.5 Controls in the PC Environment 501
- 14.6 Traditional Records and Accounting Controls 506
- 14.7 A Methodology to Determine an Optimum Mix of Controls 508

PART 4**STRATEGIC PLANNING, DEVELOPMENT, AND MANAGEMENT 530****15****STRATEGIC INFORMATION SYSTEMS PLANNING 531**

- 15.1 Introduction 531
- 15.2 Overview of Information Systems Policy and Planning 531
- 15.3 Steps in Strategic Information Systems Planning 540
- 15.4 Short Case 548
- 15.5 Total Systems Work in a Capsule 550
 - The NSU Tigers Event Center: Strategic Information Systems Planning 551

16**SYSTEMS ANALYSIS 560**

- 16.1 Introduction 560
- 16.2 Preliminary Systems Analysis 562
 - The NSU Tigers Event Center: Preparing the Proposal to Conduct Systems Analysis Report 567
- 16.3 Sources of Study Facts for Systems Analysis 574

- 16.4 Techniques for Gathering Study Facts 579
- 16.5 Concluding Systems Analysis 593
 - The NSU Tigers Event Center: Preparing the Systems Analysis Completion Report 596

17

GENERAL SYSTEMS DESIGN 615

- 17.1 Introduction 615
- 17.2 General Systems Design Overview 616
- 17.3 General Systems Design Process and Presentation of Design Alternatives 620
- 17.4 Sketching and Prototyping 624
- 17.5 Designers' Workbench 628
- 17.6 User/System Interface Design Hierarchy 630
- 17.7 Systems Options 636
- 17.8 General Systems Design Examples 640
 - The NSU Tigers Event Center: Preparing the General Systems Design Proposal Report 647

18

SYSTEMS EVALUATION 671

- 18.1 Introduction 671
- 18.2 Request for Proposal 672
- 18.3 Content of the RFP and Vendors' Proposal Evaluation 673
- 18.4 Evaluation Screen Number One: Desk-Checking Proposal Elements 679
- 18.5 Evaluation Screen Number Two: Technical Performance Criteria Comparisons 681
- 18.6 Evaluation Screen Number Three: General Performance Criteria Comparisons 686
- 18.7 Evaluation Screen Number Four: Benchmark and Simulation Tests 696
- 18.8 Evaluation Screen Number Five: Single Vendor Versus Multiple Vendors 699
- 18.9 Evaluation Screen Number Six: Price and Contract Negotiations 700
- 18.10 Evaluation Screen Number Seven: Acquisition and Financing Methods 703
- 18.11 Evaluation Screen Number Eight: Cost-Effectiveness Analysis of General Systems Design Alternatives 709
 - The NSU Tigers Event Center: Preparing the Final General Systems Design Report 720

19

DETAILED SYSTEMS DESIGN 745

- 19.1 Introduction 745
- 19.2 Evolution to Detailed Systems Design 746

- 19.3 Modular Design 749
- 19.4 Customized Versus Off-the-Shelf Designs 752
- 19.5 Interactive Design Methods 753
- 19.6 Detailed Output Design 767
- 19.7 Detailed Input Design 770
- 19.8 Detailed Data Base Design 775
- 19.9 Detailed Controls Design 785
- 19.10 Detailed Program and Personnel Procedures Design 791
- 19.11 Detailed Program Design 794
- 19.12 Detailed Hardware Design 794
- 19.13 Communicating the Detailed Systems Design 799
 - The NSU Tigers Event Center: Preparing the Final Detailed Systems Design Report 802

20

SYSTEMS IMPLEMENTATION 834

- 20.1 Introduction 834
- 20.2 Preparing to Implement 834
- 20.3 Technology Testing 836
- 20.4 Training and Educating Personnel 839
- 20.5 Programming 841
- 20.6 Programming Organization Structures 847
- 20.7 Program Testing 850
- 20.8 Input, Output, Data Base, and Controls Testing 860
- 20.9 Systems Conversion 864
- 20.10 Implementation Follow-up 869
 - The NSU Tigers Event Center: Preparing the Final Implementation Report 871

21

INFORMATION SYSTEMS MANAGEMENT 893

- 21.1 Introduction 893
- 21.2 Information Systems Upheaval 893
- 21.3 Looking for a Leader: Is the Chief Information Officer the Answer? 894
- 21.4 The End-User Era 898
- 21.5 The Controversy Milieu 899

INDEX 913