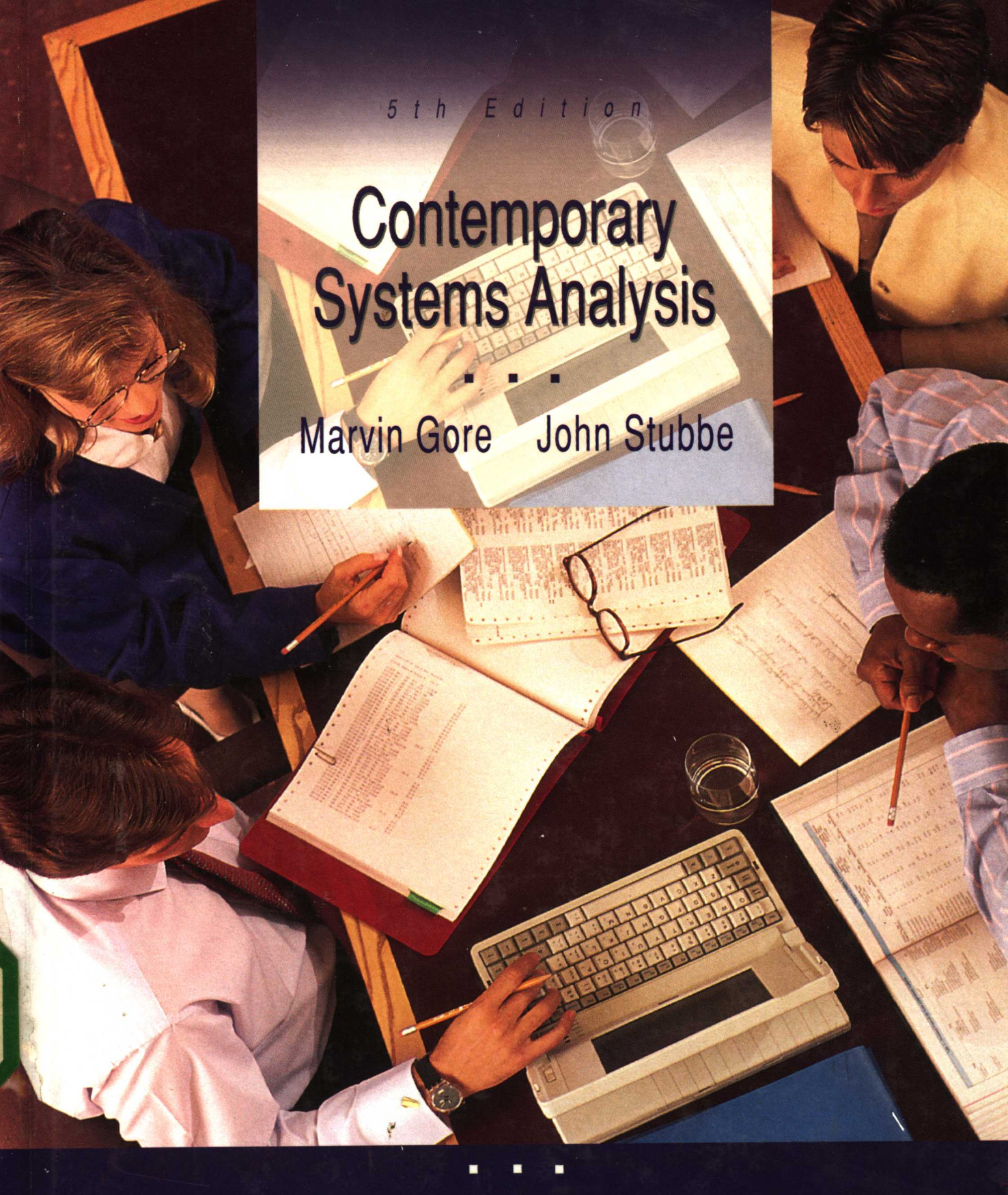


5th Edition

Contemporary Systems Analysis

Marvin Gore John Stubbe





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Preface

“Today’s supercomputer is tomorrow’s hundred-MIPS personal computer.”

Allen Kay, Apple Computer

“The “3G” workstation will become available in the 1990s. It will execute one giga-instruction per second, have a gigabyte of memory and include a gigabyte bus; it will cost less than \$10,000.”

Raj Reddy, Carnegie Mellon University

The Agile Enterprise

In the 1970s and 1980s we learned that information was a critical commodity upon which the productivity of our economy depended. This established the importance of the design and development of effective computer-related business systems and led to the recognition of systems analysis as an important and growing career field for information system professionals. The information systems designers of the 1990s face even greater challenges than did those of preceding decades. We have entered a period of accelerated change in the social, economic, political, legal, and technological environments in which our businesses and industries must excel in order to compete for local and global markets. In all areas change is occurring so rapidly that we have been propelled into the era of the *agile enterprise*, where “agile” means the ability to anticipate and to quickly react to an external environment that is event- and customer-driven.

Competition has made it clear that two necessary enterprisewide attributes for survival and success in the 1990s are flexible, very fast-response computer information systems and an unrelenting focus on quality as measured by customer satisfaction. The term *computer integrated enterprise (CIE)* is aptly applied to industries that possess the first attribute, and the term *total quality management (TQM)* describes the processes adopted by industries committed to an unrelenting focus on quality improvement and on goods or services that not only meet, but exceed customer expectations.

Because of these contemporary events we feel that it is appropriate to name this revision of *Elements of Systems Analysis*, our widely adopted textbook, *Contemporary Systems Analysis*. Computer information systems and the systems development life cycle (SDLC) process for developing these systems remain at the core of *Contemporary Systems Analysis*. Within the context of the SDLC, we emphasize tools and

techniques, such as *prototyping*, that is, developing and refining a model of an information system, that make possible the rapid development and modification of the information systems that enable an enterprise to respond to changes in the business environment.

Although the ultimate customer affected by computer-related business information systems is an external user of goods or services, our focus is on the internal customers for whose use these systems are developed. All of the principles of TQM apply toward ensuring that these users receive a quality system that meets or exceeds their expectations. Thus CIE and TQM are recurring topics in *Contemporary Systems Analysis*, where a principal theme is "agile systems for agile enterprises."

The continuing impact of change among the information technologies is manifest in the following key forecasts for the 1990s that appeared in a publication of the Computer Society of the Institute of Electrical and Electronic Engineers for which the theme was "The Promise of the Next Decade."¹ The forecasts are for

1. A rapid rate of performance growth in computer technology and architectures for all computers, from mainframe to microcomputer, with order of magnitude increases in reliability and extensive workload sharing among many processors operating in parallel.
2. Very large increases in storage capacities for directly addressable internal memory and for external storage devices, including memory hierarchies, CD-ROM, and digital optical disks.
3. An accelerated trend toward the distribution of information and computing power to users through high-performance local and wide area networks, leading to extensive client/server linkages from microcomputers to mainframes.
4. Dramatic advances in user-centered computer interfaces, providing multimedia, i.e., combination of text, graphics, image, and speech, and exhibiting some artificial intelligence capabilities.
5. Continuation of the breakdown of the traditional division between home and work, with increasing use of small, portable computers and high-definition, multifunction displays ranging in size from pocket to wall.

Collectively, these technological trends support the quick response required by competitive enterprises. For example, successful retailers have acquired the agility needed to be profitable in a rapidly changing, consumer-sensitive marketplace. These retailers know that a multimonth planning cycle is not adequate. They depend upon the Universal Product Code (UPC) and Electronic Data Interchange (EDI) to capture sales data for internal use, such as inventory management, and for direct transmission to the computer information systems of their manufacturers so that production schedules can continuously anticipate demand. These and other computer information systems of increasing complexity make the task of the systems analyst, who is the principal developer of applications software for computer information systems, a daunting one.

¹"The Promise of the Next Decade," *Computer*, Vol. 24, No. 9, Sept. 1991, Los Alamitos, CA.

Fortunately, powerful computer-based information systems engineering tools and techniques are also emerging. Systems analysts are now able to automate many of the structured analysis and design techniques used in lieu of, or in conjunction with, traditional methods. Time-consuming paper and pencil tasks are being accomplished quickly and efficiently by computer-assisted systems engineering (CASE) workbenches. Rapid applications development (RAD) tools such as prototyping can speed up the life-cycle process and produce higher-quality systems for less cost. The new methodologies are changing the teaching and practice of systems analysis, and they are the motivators that led to *Contemporary Systems Analysis*.

Goal and Scope of This Book

The goal of *Contemporary Systems Analysis* is to provide students with a comprehensive introduction to the information engineering skills that they, as future users or systems analysts, will need to work in a competitive, computer-integrated business environment. In this highly interactive work situation, the need and opportunities for cooperation between systems analysts and information systems users throughout the entire SDLC will be greatly amplified.

Contemporary Systems Analysis provides a balanced treatment of the four phases of the SDLC: study, design, development, and operation. Although current in its coverage, the text does not overly stress a specific tool or technique. Rather, it is designed to provide the student with the perspective needed to identify and select the combination of tools and techniques most appropriate to solving a particular business problem.

A three-tiered approach is taken toward contemporary practices in systems analysis and design. The tiers are as follows:

1. *The systems development life cycle (SDLC)* as a methodology for managing complex software projects.
2. *Structured systems analysis and design techniques* for analyzing existing systems and developing top-down performance specifications for new or improved systems.
3. *Concurrent prototyping* as a means of speeding up the life-cycle process and providing continuous validation of system performance, including the presentation of computer-assisted systems engineering (CASE) as a powerful analysis, design, and development tool.

Throughout the text a user-oriented, TQM emphasis is maintained. This emphasis has three salient attributes consistent with the feedback nature of the SDLC: continuous improvement, user involvement, and focus on the *usability* of the information system, which is the worth or quality of the system as perceived by its users. This perception is the ultimate measure of the success or failure of a computer information system.

New Features of the Text

The features that distinguish *Contemporary Systems Analysis* from the predecessor text by Gore and Stubbe are the following:

1. Inclusion of TQM as an important topic, and one that reinforces the concept that customer-perceived “usability” is the measure of the value of the system.
2. Updating of all topics consistent with observed and projected changes in hardware and software development technologies.
3. Consolidation of related materials, such as technology and project management.
4. Expanded treatment of rapid applications development, including data-driven, event-driven, and prototyping techniques.
5. Emphasis on microcomputer/workstation (vs. mainframe) solutions in a networked, distributed data processing environment.
6. Inclusion of end-of-chapter “For Exercise” mini-exercises designed to illustrate and amplify important topics.
7. An in-text SDLC case study that reflects the growing importance of client/server relationships among mainframes, midrange computer systems, and user workstations.
8. Two new student workbooks, each developed to illustrate a current and industry-relevant case study.

Other Special Features of the Text

Special features of the text that are consistent with its goals and scope are as follows:

1. **Support for an accompanying “hands-on” laboratory.** The text and student workbook are designed so that assignments may be completed in a microcomputer equipped laboratory using popular spreadsheet, data base, and graphics software packages designed for use with IBM PC and compatible or Macintosh microcomputers. Midrange and microcomputer CASE products can be used with many assignments. One of the most popular CASE methodologies is Excelerator, which will be given to adopters of this text.²
2. **A presentation and learning reinforcement sequence consistent with the SDLC sequence of activities.** Major concepts, tools, and techniques that are applicable throughout the SDLC are introduced in the first three units of the text. These include: information and business system concepts, communications and documentation, project management, data flow diagrams, and CASE tools. The next four units follow the SDLC sequence of activities and provide opportunities to apply these tools to activities characteristic of the study, design, development, and operation phases.

²*Excelerator*, a well-known CASE methodology, is a product of Intersolve, Inc., and adopters of *Contemporary Systems Analysis* will receive a free copy that can be used on two computers. Additional copies are available for a small fee.

3. **Use of in-text learning aids:**

Each major unit begins with an overview that introduces the chapters in that unit and explains the relationships among them.

Each chapter begins with a preview and statement of measurable student learning objectives, followed by a list of key terms and their definitions. Key terms appear in boldface type in the text, and other significant terms are italicized.

Each chapter includes a summary that synthesizes the main points and “For Discussion” questions that expand upon major concepts and related issues.

“For Exercise” mini-assignments are included in all chapters in which important tools or techniques are presented.

A glossary that includes all key (boldfaced) and significant (italicized) terms serves as a study aid and ready reference.

4. **An Integrated Learning Package.** *Contemporary Systems Analysis* is an integrated learning package that is comprised of:

The text itself with the features described above.

A student workbook accompanied by an instructors’ solutions manual. The workbook, which is new to this edition, is entitled *Champion, an Agile Industry*, and it reflects the major themes of the text. It contains assignments that parallel significant chapter topics. These assignments are more comprehensive than the “For Exercise” mini-assignments that appear in the text, and they are designed to require a higher level of critical thinking.

A second workbook, under development, will be available to new or continuing adopters of the text. This will provide an opportunity to give alternate assignments. Both workbooks will be updated to maintain currency.

High-quality transparency masters for all significant figures and an extensive test bank.

5. **A comprehensive instructor’s manual.** The manual:

Describes unit and chapter goals.

Identifies measurable student performance objectives.

Lists key points indexed to page and figure number.

Provides answers to “For Discussion” questions and “For Exercise” mini-assignments at the end of each chapter.

Contains chapter quizzes and unit examinations, with answers.

6. **A continuous, integrated, in-text case study.** The case study is a unified presentation of all the major activities that occur throughout the SDLC phases. It can serve as a practical reference for subsequent seminar or actual systems projects.

Contemporary Systems Analysis is designed to serve both as a text for an introductory course in systems analysis and as a guidebook for students in an advanced, project-oriented course. It is designed to meet not only the needs of information systems majors, but also those of all business students because they, too, will interact with computer information systems throughout their professional careers.

Acknowledgments

Contemporary Systems Analysis owes its existence, first, to the students who were responsible for the real-time testing of the manuscript and who have, often unknowingly, contributed to the many revisions of the materials that resulted in the creation of this text.

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Marvin Gore
John Stubbe
Walnut, California

Brief Contents

Preface xvii

- Unit 1 Contemporary Systems Analysis and Design 2
 - 1 Contemporary Information Systems Analysis and Design 4
 - 2 A Business as an Information System 32
- Unit 2 Managing the Computer Information Systems Project 62
 - 3 Communication and Documentation 64
 - 4 Project Management 88
- Unit 3 Information Systems Engineering 114
 - 5 Data Flow Diagrams and the Data Dictionary 116
 - 6 Computer-Assisted Systems Engineering (CASE) 152
- Unit 4 The Study Phase 172
 - 7 Initial Investigation 176
 - 8 System Performance Definition 206
 - 9 Candidate System Evaluation 240
 - 10 Study Phase Report and Review 266
 - Exhibit 1 The Study Phase Report—OARS Case Study 274
- Unit 5 The Design Phase 288
 - 11 Detailed System Design 292
 - 12 Data Modeling 310
 - 13 Output Design 332
 - 14 Input Design 350
 - 15 Design Phase Report and Review 364
 - Exhibit 2 The Design Phase Report—OARS Case Study 372

■ Unit 6	The Development and Operation Phases	394
16	Preparing for Implementation	402
17	Computer Program Development	422
18	Development Phase Report and Review	440
Exhibit 3	The Development Phase Report—OARS Case Study	446
19	System Operation and Change Management	466
Glossary		495
Credits		513
Index		515

Table of Contents

Preface xvi

1 *unit*

Contemporary Systems Analysis and Design 2

Chapter 1 Chapter One

Contemporary Information Systems Analysis and Design 4

Preview	4
Objectives	5
Key Terms	5
Computer Information Systems	6
Information System Concepts	6
Business Information Systems	10
The Systems Development Life Cycle	11
The Life-Cycle Phases	11
The Life-Cycle Flowchart	12
<i>The Life-Cycle Activities</i>	12
<i>Life-Cycle Management and Documentation</i>	12

Systems Analysis and the Systems Analyst	14
Systems Analysis	14
The Systems Analyst	14
Careers in Systems Analysis	14
<i>Performing Systems Analysis</i>	14
<i>Opportunities and Compensation</i>	15
<i>Personal Qualifications</i>	15
The User and the SDLC	17
<i>Information Resource Management</i>	17
<i>Distributed Data Processing</i>	17
<i>The Concept of Usability</i>	19
Evolution of Information Systems Engineering	19
Classical Life-Cycle Methodology	19
Structured Analysis and Design Methods	21
Prototyping	22
<i>Definition of Prototyping</i>	22
<i>Prototyping Version of the SDLC</i>	22
Automating the Systems Development Life Cycle	24
The Forces of Change	24
Automated Systems Development Life-Cycle Tools	25
<i>Task-Oriented Tools</i>	25
<i>Computer-Assisted Systems Engineering (CASE)</i>	26

Summary	27
For Review	29
For Discussion	29
For Exercise: Quality Management and Computer Information Systems	30

Chapter Two

A Business as an Information System 32

Preview	32
Objectives	33
Key Terms	3
Business System Characteristics	34
Business Goals and Objectives	34
A Business: A System of Systems	34
Describing the Business Organization	38
The Organization Chart	38
The Organization Function List	44
Information Structure of a Business	44
Product Flow and Information Flow	44
Information Generators	48
Management Uses of Information	48
Information System Levels	48
Feedback and Control	51
Quality Management	53
Total Quality Management (TQM)	53
TQM and Information Systems: The Agile Enterprise	58
Summary	58
For Review	59
For Discussion	59
For Exercise: Organization Chart for NEWDREAM Corporation	60

2 Unit

Managing the Computer Information Systems Project 62

Chapter Three

Communication and Documentation 64

Preview	64
Objectives	65
Key Terms	65
The Elements of Communication	66
The Communication Process	66
Toward More Effective Communication	66
Interviewing Techniques	69
Technical Writing	70
Technical Writing Defined	70
Types of Technical Writing	70
<i>Policies and Procedures</i>	70
<i>Narratives</i>	71
<i>Specifications</i>	72
<i>Manuals</i>	72
<i>Reports</i>	72
Presentations	73
Preparing for the Presentation	73
Scheduling the Presentation	73
The Presentation Outcome	74
Generating the Documentation	76
Word Processing	77
Presentation Graphics	77
<i>Types of Basic Charts</i>	77
<i>Development of Effective Charts</i>	81
<i>Graphics Software</i>	81

Desktop Publishing	84
<i>Word Publishing</i>	84
<i>Text/Graphics Formatting</i>	84
Summary	86
For Review	86
For Discussion	87
For Exercise: Communicating with Charts	87

Chapter 4

Project Management 88

Preview	88
Objectives	89
Key Terms	89
The Systems Team	90
The Team Members	90
The Principal User	91
Roles and Responsibilities	
Throughout the SDLC	91
Joint Application Design (JAD)	92
Usability Engineering	92
Project Planning and Reporting	93
Progress Planning and Status	
Reporting	93
Cost Planning and Status Reporting	96
Performance Indices and Charts	97
Critical Path Networks	100
Critical Path Method (CPM)	102
Program Evaluation and Review	
Technique (PERT)	104
Project Reviews	110
Purposes of Project Reviews	110
The Project Review Package	111
Summary	111
For Review	112
For Discussion	112
For Exercise: Critical Path Network for the Janis Corporation	113

3

Information Systems Engineering

114

Chapter 5

Data Flow Diagrams and the Data Dictionary 116

Preview	116
Objectives	117
Key Terms	117
Structured Analysis and Design	118
Separating the What From the How	118
Documentation Needs	118
Data Flow Diagrams	119
Definition of a Data Flow Diagram	119
Data Flow Diagram Transformations and Decomposition	120
Guidelines for Drawing Data Flow Diagrams	127
The Data Dictionary	127
Data Elements and Data Structures	127
Data Dictionary Definition and Entries	131
Entities and Attributes	135
Entity-Relationship Diagrams	135
Identification Codes	136
The Code Plan	136
Common Types of Codes	137
Sequence Codes	137
<i>Simple Sequence Code</i>	137
<i>Block Sequence Code</i>	138

Group Classification Code	139
Significant Digit Code	140
Alphanumeric Codes	140
<i>Mnemonic Codes</i>	141
<i>Alphabetic Derivation Codes</i>	142
Process Specification	143
Decision Tables	143
Decision Trees	145
Structured English	146
Summary	147
For Review	148
For Discussion	149
For Exercise 1: Data Flow Diagram	
Representation of the Systems	
Development Life Cycle	149
For Exercise 2: Understanding Codes	150

Chapter Six

Computer-Assisted Systems Engineering (CASE) 152

Preview	152
Objectives	153
Key Terms	153
Pathways to Case	154
Search for Productivity and Quality	154
Hardware and Software	
Developments	154
<i>Microcomputers</i>	154
<i>Micro to Mainframe Link</i>	155
User Involvement in the SDLC	157
Nonprocedural Languages	158
Applications Generators	158
Query Languages and Report	
Generators	158
Fourth Generation Languages (4GLs)	159
Structured Methodologies	159
Evolution of Structured	
Methodologies	159

Classification of Structured	
Methodologies	160
<i>Process-Oriented Model</i>	160
<i>Data-Oriented Model</i>	160
<i>Object-Oriented Model</i>	161
CASE Products	162
Tools and Workbenches	162
Categories of CASE Products	163
Components of CASE Products	165
<i>Basic CASE Tools</i>	165
<i>Advanced CASE Tools</i>	166
CASE and the SDLC	167
Summary	168
For Review	169
For Discussion	170
For Exercise: Potential for CASE	170

4

The Study Phase 172

Chapter Seven

Initial Investigation 176

Preview	176
Objectives	177
Key Terms	177
Problem Identification	178
Need Identification	178
The Information Service Request	178
The Initial Investigation	181
Project Initiation	181
Background Analysis	184
Fact-Finding Techniques	184
<i>Data Collection</i>	185
<i>Correspondence and</i>	
<i>Questionnaires</i>	185
<i>Personal Interviews</i>	186
<i>Observation</i>	188
<i>Research</i>	189

Fact-Analysis Techniques	189
<i>Data Element Analysis</i>	190
<i>Input-Output Analysis</i>	191
<i>Recurring Data Analysis</i>	195
<i>Report Use Analysis</i>	195
<i>Results of Analysis</i>	195
User Review	198
Modified Information Service Request	198
Project Directive	200
Summary	202
For Review	202
For Discussion	203
For Exercise: The Hollerith Card Company	203

Chapter 8

System Performance Definition 206

Preview	206
Objectives	207
Key Terms	207
Transition from the Logical to the Physical Model	208
Example System—ABCO Corporation:	
On-line Accounts Receivable System (OARS)	208
ABCO History	208
OARS Initial Investigation	210
Project Directive	213
Logical Model of the New System	218
General Constraints	222
Statement of General Constraints	222
Example System: General Constraints	223
Specific Objectives	224
Identification and Ranking of Specific Objectives	224
Example System: Specific Objectives	225

Output Description	225
Output Identification and Description	225
Example System: Output Description	228
Summary	238
For Review	238
For Discussion	238
For Exercise: OARS Hierarchy Chart	239

Chapter 9

Candidate System Evaluation 240

Preview	240
Objectives	241
Key Terms	241
Purposes of a Candidate System Evaluation	242
Steps in a Candidate System Evaluation	242
Step 1: Develop the System Candidates	243
Step 2: Perform Preliminary Evaluation of System Candidates	246
Step 3: Prepare Detailed Descriptions of Candidates	247
Step 4: Identify Meaningful System Characteristics	252
Step 5: Determine Performance and Cost for Each Candidate	252
Step 6: Weight the System Performance and Cost Characteristics	260
Step 7: Select the "Best" System	261
The General System Design	262
Summary	264
For Review	264
For Discussion	265
For Exercise: Candidate Evaluation Matrix	265

Chapter 10

Study Phase Report and Review 266

- Preview 266
- Objectives 267
- Key Terms 267
- Performance Specification 268
- Study Phase Report 268
 - Structure and Content 268
 - Example Study Phase Report 271
- Study Phase Review 271
- Summary 272
- For Review 272
- For Discussion 273

Exhibit 1 The Study Phase Report—OARS Case Study 274

5

The Design Phase 288

Chapter 11

Detailed System Design 292

- Preview 292
- Objectives 293
- Key Terms 293
- Detailed Design Specifications 294
 - General System Design 294
 - Identifying Processing Requirements 294
 - Identifying Control Requirements 302
 - Identifying Reference Manual Requirements 303

- Test Requirements 303
 - Identification of Test Requirements 303
 - Structured Walk-throughs 304
- Hardware Acquisition 304
- Summary 307
- For Review 308
- For Discussion 308
- For Exercise: Vendor Evaluation Matrix 308

Chapter 12

Data Modeling 310

- Preview 310
- Objectives 311
- Key Terms 311
- Objectives of Data Modeling 312
- Understanding the Data and Data Flows 312
 - Data Flow Diagrams 312
 - The Data Dictionary 312
- Understanding the Relationships between Entities 312
- Entity-Relationship Diagrams (ERDs) 314
- Drawing Entity-Relationship Diagrams 315
- Normalization of Files 317
 - Purpose of Normalization 317
 - Normal Forms 317
- Data Base Management Systems 320
 - DBMS Components 322
 - DBMS Functions 323
 - DBMS Architectures 324
 - Data Base Management Systems and the Personal Computer 326
 - The Data Base Administrator (DBA) 326
- The Prototyping Engine 327
 - Attributes of the Prototyping Engine 327
 - The Prototyping Cycle 328

Summary 330
For Review 331
For Discussion 331
For Exercise: File Normalization 331

Chapter 13 Thirteen

Output Design 332

Preview 332
Objectives 333
Key Terms 333
General Principles of Output Design 334
Printer Output 334
 Designing Effective Printer Layouts 334
 Printer Layout Forms 334
 Prototyping Printer Outputs 340
 Graphics and Desktop Publishing 340
Visual Display Terminal Screen Output 344
 Designing Effective Screen Layouts 344
 Screen Layout Forms 344
Summary 347
For Review 348
For Discussion 348
For Exercise: Output Display Design 348

Chapter 14 Fourteen

Input Design 350

Preview 350
Objectives 351
Key Terms 351
Source Document Design 352
 Source Document Design Responsibility 352

Principles of Source Document Design 352
 Ease of Data Recording 352
 Ease of Use 353
 Required Data 353
 Cost Considerations 354
Automated Source Document Design 355
Source Document Control 355
VDT Input Screen Design 357
 Designing Effective Input Screen Layouts 357
 Screen Layout Forms 358
 Prototyping VDT Screens 359
Input Scanners 360
Summary 362
For Review 363
For Discussion 363
For Exercise: Input Form Design 363

Chapter 15 Fifteen

Design Phase Report and Review 364

Preview 364
Objectives 365
Key Terms 365
Design Specification 366
Design Phase Report 366
 Structure and Content 366
 Example Design Phase Report 368
Design Phase Review 368
Summary 369
For Review 369
For Discussion 370

Exhibit 2 The Design Phase Report—OARS Case Study
372