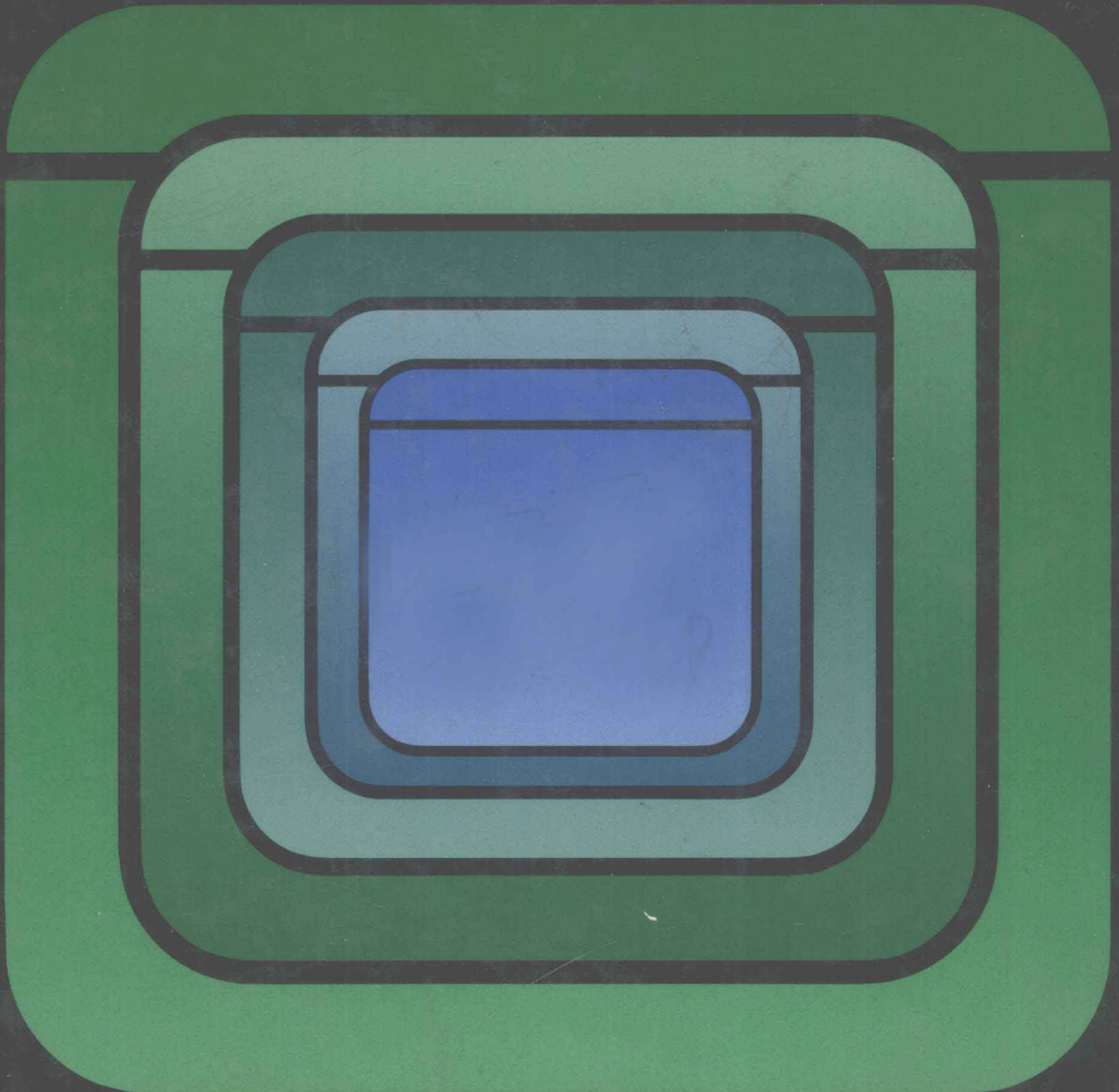


HUMANIZED INFORMATION SYSTEMS ANALYSIS AND DESIGN

People Building Systems for People

Kenneth A. Kozar



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*University of Colorado/Boulder
College of Business*

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ABOUT THE AUTHOR

KENNETH A. KOZAR has worked in the information systems field for more than 24 years. Because of the rapid changes in the field, he believes that rather than 24 years experience, he has 2 years experience at least 12 times.

Dr. Kozar has held many positions in the systems field, including developer, manager, educator, and researcher. After receiving one of the first MIS PhDs from the University of Minnesota, he has been on the faculties of the Universities of Minnesota, Calgary, Saskatchewan, and Indiana. He currently is on the faculty of the University of Colorado in Boulder. His publications have appeared in the *Management Information Systems Quarterly*, *International Journal of Man-Machine Studies*, *Journal of Systems Management*, *Journal of Information Systems Management*, and the *Journal of Product Innovation Management*. He has given numerous presentations to both academic and practitioner audiences.

Dr. Kozar has managed several systems development projects as either a full-time manager, a full-time independent consultant, or through continued consulting/training activities. Special areas of interest include improved methods for systems development, systems developer workbenches, and the behavioral/organizational issues of automated systems.



**TO MY TEACHERS AND STUDENTS:
IT IS DIFFICULT TO DISTINGUISH BETWEEN THEM**

PREFACE

Computer-based systems seem to be everywhere. We take their existence for granted except when they do not perform as expected. And more often than not, people are the key to both successful development and performance of systems.

The objective of this book on systems analysis and design is to introduce students to processes, principles, guidelines, and techniques for developing more effective computer systems. The intended audience is both users and developers of systems; in today's organizations, it often is difficult to distinguish between the two. Users are developing computer-based systems to aid themselves in job performance, and developers are acquiring computer-based systems to provide aid in building systems.

Writing the book was the result of a belief that there was a need to focus on the people aspect of systems development. The material has evolved over a number of years, a career-long endeavor. Enjoyment of teaching, belief that good was being done, and positive feedback from both students and colleagues has led to a completed book, rather than a stack of notes.

INTENT OF THE BOOK

The intent of *Humanized Information Systems Analysis and Design* is to view the building of computer systems from the person's point of view. People need computer systems. These systems are developed by people. People make the difference between successful and unsuccessful systems development. The major thrust of the book is to aid communication between people through increased trust, understanding, and empathy. Methods that serve as semantic bridges between different organizational role players are the foundation of the material.

Within a college curriculum, the book is intended as a follow-up to a computer systems fundamentals or introductory management information systems course. The assumption is made that the reader is familiar with computer basics. Terms like hardware, software, database, files, telecommunications, batch, micros, K, on-line, and compilers should already have meaning to the reader. Familiarity with computer programming might aid in understanding some development concepts. It may hinder other development skills since programming emphasizes problem solving, often at the expense of problem finding.

CONTENT OVERVIEW

The book is divided into five main parts. A top-down presentation of the material is taken. General knowledge is presented first with an unfolding of increasing levels of detail.

OVERVIEW OF CONTENTS OF TEXTBOOK

Ch 1—Overview of Systems Concepts

Ch 2 and 3—Overview of Methods of Systems
Development and the Data Generated

Ch 4—Overview of Systems
Analysis

Ch 8—Overview of Systems
Design

Ch 13—Overview of
Systems Implementation

Ch 5—Representing Systems Data

Ch 9—Design for the Machine

Ch 6—Gathering Systems Data

Ch 10/11—Design for People

Ch 7—Reviewing Systems Data

Ch 12—Design for the Auditor

Ch 14—Managing Systems Development

Ch 15—The Future?

Part I Introduction to Systems Development

The first three chapters introduce systems concepts, overview systems development, and introduce the data necessary to document a system. Chapter 1 assures that students have a clear understanding of systems thinking, components of organizational systems, and what systems development entails. Chapter 2 presents the thread that weaves through the text material, a systems development life cycle, augmented by traditional and structured development techniques. Chapter 3 takes the perspective that information systems builders need information systems to do their job properly. These information systems would contain documentation about the system under development. Each of these chapters includes a case study exhibiting the material.

Part II The Systems Analysis Phase: Process and Techniques

This part of the book introduces the processes and techniques used to define and analyze a system. Chapter 4 provides an overview of the processes and subprocesses needed to conduct a systems analysis. Management topics such as selecting appropriate projects and kicking off a project are included. Chapter 5 includes the techniques used to represent systems. Several techniques are described, and data flow diagramming is detailed for skill development. Chapter 6 specifies the various techniques of data gathering. An important technique is requirements dialoging, a means of linking the information system to business strategy. Chapter 7 presents the techniques needed to present and review material gathered in systems projects.

Part III The Systems Design Phase: Process and Techniques

This part of the book introduces the topic of systems design by reviewing the process and techniques to design for the machine, the user, and to satisfy the auditor. Chapter 8 introduces the processes and subprocesses needed to specify a systems design. A method of evaluating alternative design payoffs is presented. Chapter 9 presents the technical and physical aspects of design. Data specifications and program structure charts are introduced and exhibited. Chapter 10 presents material on achieving human performance, including procedure and job design, training design, and manual design. Chapter 11 is devoted to designing usable person-machine dialogs and input/output layouts. The technique of person-machine dialog representation is introduced and exhibited. Chapter 12 is concerned with the control, security, privacy, and recovery aspects of systems design. A unique method for determining the need for system integrity is introduced.

Part IV The Systems Implementation Phase: Process and Techniques

Getting the system built and installed in the organization is the concern of this part of the book. Chapter 13 examines top-down versus bottom-up

approaches to systems building, approaches to systems implementation, and conducts a postaudit of the development project. The need and means of systems testing as well as management of change is included in this chapter.

Part V Beyond the Process and Techniques

This section discusses material that does not fit within the development life cycle. Chapter 14 introduces systems project management and the challenges of planning and estimating. Other project management topics include managing tasks and people on a systems project and how automated aids can provide assistance. The chapter also includes an examination of alternatives to the life cycle such as user-developed systems, prototyping, and use of packaged software. Chapter 15 provides a view of systems development in the future from the author's perspective. The challenge to continue your learning and be a changemaker also is presented.

Appendixes

Appendix A presents a case study that can be used to practice systems analysis. Appendix B presents guidelines for conducting a systems project in a real-world setting. This approach has been used successfully by many student teams. Appendix C presents the results of a student team project based on the guidelines in the previous appendix.

FEATURES OF THE TEXT

The book is a blend of education and training material. It attempts to be a usable book for both students and instructors written using system concepts. And it is hoped that it will even allow you to smile and laugh when reading.

Pedagogy

Each chapter begins with a list of behavioral objectives and a short synopsis. Liberal use of photos and boxes relating real life stories are included to reinforce the material. The author calls on his vast experience to include vignettes and real life cases. He has also included actual student solutions and examples. Each chapter includes review and discussion questions. Review questions relate to the written material while discussion questions require synthesis and thinking beyond what was written. Exercises in each chapter aid learning by doing. Each chapter includes relevant references and further readings to expand learning. The instructor's guide is written by the book author.

Emphasis on People

The emphasis is on the person's role in developing systems: interviewing persons, making presentations to persons, person-software interaction, persons reviewing development deliverables, training persons, person-machine dialogs, procedures for persons, etc. But the text does not omit topics such as program or database design.

Appeal to Visual Senses

Believing a picture is worth a thousand words, the book incorporates graphic techniques wherever they are meaningful. Structured techniques such as data flow diagramming, structure charts, and a new technique promoted by the author called person-machine dialog charting are advocated, described, and practiced. The book presents alternatives to the traditional methods of development and examines knowing when, as well as developing know-how.

Tested Material

The material in the text has been tested through use at both Indiana University and the University of Colorado in Boulder. It has been used for one or two semester sequences and with both undergraduate and graduate students. Other professors have been introduced to the material at the Advanced Management Information Systems Faculty Development Institutes sponsored by the American Assembly of Collegiate Schools of Business where the author has held responsibility for the systems analysis and design track. Many helpful and insightful comments were gathered from these audiences. The author assumes responsibility for any and all deficiencies in the material.

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- Bob Bostrom, who caused me to see teaching and education in a new light.
- My family and friends for their support and encouragement, especially Nancy and Cindy, who were without many hours of my time during this endeavor.

This book is a continuing effort to aggregate ideas, concepts, and methods used in developing information systems. The author would like to hear comments from readers and adopters of the book. Thank you in advance for your inputs. Kenneth A. Kozar, University of Colorado/Boulder, College of Business/MSIS, P. O. Box 419, Boulder, Colorado, 80309.

Kenneth A. Kozar

CONTENTS

PART I INTRODUCTION TO SYSTEMS DEVELOPMENT

Chapter 1 A Review of Systems Concepts 3

WHAT IS A SYSTEM? 4

ORGANIZATIONS AS SYSTEMS 6

INFORMATION MANAGEMENT SYSTEMS 7

The Organizing Structure Subsystem. The People Subsystem. The Machine/Technology Subsystem. The Data Subsystem.

TYPES OF INFORMATION MANAGEMENT SYSTEMS 13

Operational Support Systems. Decision Support Systems. Communications Support Systems. Importance of Recognizing the Type of System.

WHAT IS SYSTEMS ANALYSIS AND DESIGN? 17

Skills a Systems Developer Needs.

COMPUTER SYSTEM LATEST WEAPON FOR DOCTORS AT WISHARD HOSPITAL 20

A Closer Look at Systems Development.

References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 2 Systems Development Methodologies: An Overview 26

THE PROCESS OF SYSTEMS DEVELOPMENT 28

The Systems Development Life Cycle. The Life Cycle as a System. An Example of a Systems Development System. Advantages of Using a Systems Approach to Systems Development.

TECHNIQUES NEEDED FOR SYSTEMS DEVELOPMENT 34

Traditional Development Techniques. Structured Techniques. Misconceptions About Structured Techniques.

COMBINING THE DEVELOPMENT PROCESS AND TECHNIQUES 39

An Example Systems Project. Successful Systems Development.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 3 A Systems Development Database 52

WHY BUILD A SYSTEMS DEVELOPMENT DATABASE? 53

Lowering the Cost of Restarting. Reducing the Needed Verbal Communication. Generating Documentation as a By-Product. Aiding Project Management. Improving Productivity. Using Automation. Performing Real Analysis.

USES OF A SYSTEMS DEVELOPMENT DATABASE 55

Systems Analysis. Computer Program Development. System Training. System Maintenance. Systems Project Management.

INFORMATION NEEDED FOR SYSTEMS DEVELOPMENT 56

System Description Using Modeling. Data About People. Data About Organizing Structures. Data About Data. Data About Technology. Other Data That Affects System Development Projects.

THE DEVELOPMENT DATABASE AND THE DEVELOPMENT PROCESS 65

Data and Process 1—Conduct Initial Study. Data and Process 2—Analyze Current System. Data and Process 3—Propose New Solutions. Data and Process 4—Detail Chosen Solution. Data and Process 5—Design New System. Data and Process 6—Construct New System. Data and Process 7—Install and Monitor System.

IMPLEMENTING THE SYSTEMS DEVELOPMENT INFORMATION SYSTEM 68**AN EXAMPLE OF A DEVELOPMENT DATABASE 69**

Background. The Rebate and Sales Reporting System—Problem and Opportunity. Building a Systems Development Database About the Rebate System. Implementation of the System.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

PART II THE SYSTEMS ANALYSIS PHASE: PROCESS AND TECHNIQUES

Chapter 4 The Processes of Systems Analysis 81**BEGINNING A SYSTEMS DEVELOPMENT PROJECT 82**

Sources of Systems Development Projects. The Project Request. Managing the Project Mix.

CONDUCTING AN INITIAL STUDY TO START THE PROJECT 87

Process 1: Conduct Initial Study.

Process 1.1—Determine Project Impact. Process 1.2—Generate Project Benefit Estimates. Process 1.3—Generate Project Cost Estimates. Process 1.4—Determine Project Mix. Process 1.5—Schedule Projects.

CONTINUING THE PROJECT 92

Process 2: Analyze Current System.

Process 2.1—Create Organizational Model. Process 2.2—Create Current Logical Model. Process 2.3—Create Current Requirements Model. Process 2.4—Create Proposed Requirements Model. Process 2.5—Create Proposed Logical Model. Process 2.6—Determine Project Disposition.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 5 Representing Systems Data 106

REPRESENTING SYSTEMS 107

REPRESENTING THE PHYSICAL SYSTEM 108

System Flowcharts. Presentation Graphs. Structure Charts.

REPRESENTING THE LOGICAL SYSTEM 112

Context Diagrams. Data Flow Diagrams. SADT Diagrams. Warnier-Orr Diagrams. Comparing Techniques.

DETAILING SYSTEM FLOW MODELS 122

Data Modeling. Data Dictionaries.

DETAILING THE TECHNIQUE OF DATA FLOW DIAGRAMMING 131

Using Data Flow Diagrams—An Example Problem.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 6 Gathering Data about a System 148

AN OVERVIEW OF DATA GATHERING 149

What Is Data Gathering? Considerations Affecting Data Gathering. Challenges of Data Gathering. Before Starting the Collection.

TECHNIQUES OF DATA GATHERING 151

Reading and Studying Written Material. Observing. Participating. "Questionnairring": Asking for Written Response. Interviewing: Asking for Verbal Response. Brainstorming: "Wish Sessions" or Group Interviews. Some Do's and Don'ts in Data Gathering.

REQUIREMENTS DEFINING: A SYSTEMS DEVELOPMENT TECHNIQUE 163

What Is Requirements Defining? What Data Do We Collect? An Overview of the Entities. Procedure for Requirements Defining. Guidelines/Gumption Traps.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 7 Reviewing the Data: Assuring Mutual Understanding 176

WHAT IS REVIEWING? 177

WHY DO REVIEWS? 178

WHEN TO REVIEW 180

WHAT CAN AND SHOULD BE REVIEWED 181

PERSONNEL ROLES IN REVIEWING 183

SYSTEMS MANAGEMENT'S ROLE IN REVIEWING 184

ASSURING PROPER REVIEW BEHAVIOR 185

Required Producers' Attitudes. Required Participants' Attitudes. Ego Saving.

REVIEW TECHNIQUES 188

The Technique of Presenting. The Technique of Team Product Reviewing By Peers. The Technique of Team Product Reviewing By Users.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

PART III THE SYSTEMS DESIGN PHASE: PROCESS AND TECHNIQUES

Chapter 8 The Processes of Systems Design 203

THE ENVIRONMENT OF SYSTEMS DESIGN 204

Design Occurs Within a Boundary Which Determines Scope. Design Is Limited By Constraints. Design Is Iterative. Design Usually Cannot Be Planned Precisely. Design Can Be Viewed Hierarchically. Design Can Be Either Logical or Physical or Both. Design Includes Both People and Technology.

GETTING THE DESIGN STARTED 206

Process 3.1—Determine Implementation Alternatives. Process 3.2—Determine Alternative Feasibilities. Process 3.3—Select Implementation Alternative. Process 3.4—Replan Project.

DETAILING THE SELECTED ALTERNATIVE 215

Process 4.1—Refine System Specification to Reflect Selected Alternative. Process 4.2—Detail Logical Model. Process 4.3—Detail Data Stores and Flows. Process 4.4—Select Application Software. Process 4.5—Select Hardware and Systems Software. Process 4.6—Approve Detailed System Specification.

CREATING THE PHYSICAL DESIGN BLUEPRINT 222

Process 5.1—Design Human Subsystem. Process 5.2—Design Basic Automated Subsystem. Process 5.3—Design File and Database Structures. Process 5.4—Design Physical Facilities. Process 5.5—Design Input/Output Subsystems. Process 5.6—Design File and Database Subsystems. Process 5.7—Design Data Conversion Specification. Process 5.8—Assemble and Review System Design.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 9 Designing for the Machine 231

ESTABLISHING A PHYSICAL SYSTEM PLAN 232

Components of a Physical System Plan. Criteria for a Physical System Plan.

CREATING THE PHYSICAL SYSTEM PLAN 236

Hardware. Telecommunications. Data. Computer Program Design.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 10 Designing for People Performance: Procedures, Manuals, and Training 275

DESIGNING FOR PEOPLE PERFORMANCE 276

Determining the Person-Machine Boundary. Means of Obtaining People Performance.

Procedure Design Considerations. Why Not Use English Narrative? Selecting a Procedure-Writing Technique.

REFERENCE MANUALS 293

Functions of a Reference Manual. Writing a Manual. Organizing the Manual. Hints for Manual Development. Once Written and Tested.

TRAINING 296

Means of Training. Reasons for Training. Managing Training. Training Guidelines. Issues in Training.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 11 Designing for the User: Dialogs and Displays 305

WHAT IS MEANT BY PEOPLE-MACHINE SYMBIOSIS? 306

User Friendly? Allowing for Tolerance.

DEVELOPING PERSON-MACHINE DIALOGS 309

Determining Where Dialogs Are Needed. Analyzing Dialog Requirements. Specifying Dialog Design.

LAYOUT DESIGN 320

Input Form Design. Output Layout Guidelines. Screen Layout Design.

TESTING THE INTERFACES 330

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 12 Designing for System Integrity 335

BUILDING INTEGRITY INTO SYSTEMS 336

Control. Security. Privacy. Recovery. Common Examples of Integrity.

WHO HAS A ROLE IN ASSURING SYSTEM INTEGRITY? 338

DETERMINING THE NEED FOR SYSTEM INTEGRITY 339

Determining Disclosure Costs. Determining Modification Costs. Determining Destruction Costs. Aggregating the Information Asset Data.

SOME CONSIDERATIONS IN BUILDING INTEGRITY 342

Tradeoffs. Batch versus Online Systems. Microcomputer Complications.

A SYSTEMS VIEW OF VULNERABILITY 343

PROTECTING THE SYSTEM 344

Physical Access Protection. Subsystem Access Protection. Processing Protection. Telecommunications Protection.

AIDS TO DESIGNING INTEGRITY 349

Use of Flow Diagrams. Use of the Data Dictionary.

PEOPLE AND INTEGRITY 350

Need for Separation of Duties. Need for Safe Personnel Policies. Publicity.

DISASTER RECOVERY 352

Consequences of No Plan. Who Is Responsible? What Should a Plan Include?

CRIME	355
PRIVACY	356
AUDITING CONTROLS	357

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

PART IV THE SYSTEMS IMPLEMENTATION PHASE: PROCESS AND TECHNIQUES

Chapter 13 Implementation: Constructing and Installing the New System 365

CONSTRUCTING THE SYSTEM 366

Bottom-Up Construction. Top-Down or Versioned Approach. System Testing.

PROCESS 6: CONSTRUCT NEW SYSTEM 370

Process 6.1—Develop Version(s) Implementation Plan. Process 6.2—Develop Software for Current Version. Process 6.3—Create Test Data and Procedures. Process 6.4—Install Hardware and Acquired Software. Process 6.5—Develop Human Materials and Training. Process 6.6—Perform Automated Subsystem Tests. Process 6.7—Train Personnel. Process 6.8—Conduct Current Version Test.

APPROACHES TO SYSTEM INSTALLATION 378

Parallel Approach. Phased Approach. Pilot Approach. Cutover Approach.

CONSIDERATIONS IN PLANNING AN APPROACH 381

Stress Considerations. Cost Considerations. Duration Considerations. Human Resource Management Considerations.

COMPONENTS OF INSTALLATION PLANNING 383

People. Procedures. Programs. Data. Hardware and Systems Software.

PROCESS 7: INSTALL AND MONITOR SYSTEM 385

Process 7.1—Conduct System Tests. Process 7.2—Conduct System Certification. Process 7.3—Cut Over to New System. Process 7.4—Operate and Monitor System.

POSTAUDIT REVIEWS 390

Why Do a Postaudit? Who Should Do Postaudits? When Should Postaudits Be Done? What Should Be Done?

MANAGING CHANGE 392

A Unique View of Change. The Analyst as a Change Agent. Change Influences Power Bases. Guidelines for Managing Change.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

PART V BEYOND THE PROCESS AND TECHNIQUES

Chapter 14 Managing Systems Development Projects 403

PROJECT MANAGEMENT 404

Project Planning. Project Management Aids. Project Managers. A Summary of Project Management.

ALTERNATIVES TO TRADITIONAL DEVELOPMENT METHODS 417

Fourth Generation Languages: Tools Facilitating Alternatives to the Classical Life Cycle. Choosing a Development Method. Packaged Software. User-Developed Systems. Prototyping.

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Chapter 15 Future Directions in Systems Development 438

SYSTEMS DEVELOPMENT IN THE FUTURE 439

The Systems Development Environment. Systems Development Activities—How Will Work Be Done? Systems Development Applications—What Will Be Worked On? Systems Developers in the Future—Who Will Do the Work? Systems Development Aids—New Tools for Developers.

LEARNING HOW TO LEARN ABOUT SYSTEMS DEVELOPMENT 450

YOUR CAREER IN SYSTEMS DEVELOPMENT 451

INTRODUCING CHANGE TO SYSTEMS DEVELOPMENT GROUPS 452

Summary. References and Further Readings. Review Questions. Discussion Questions. Exercises.

Appendix A A Case Study to Be Used for Systems Analysis 457

Appendix B A Real-World Systems Project 462

Appendix C An Example of a Student Team's Completed Real-World Systems Project 468

Index 493