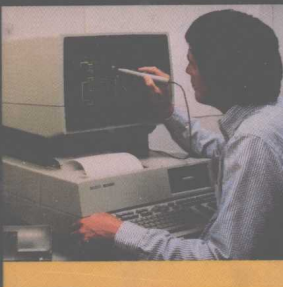
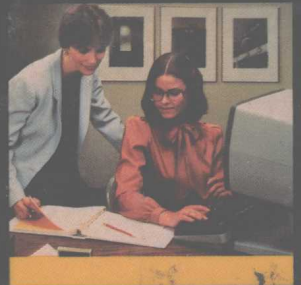
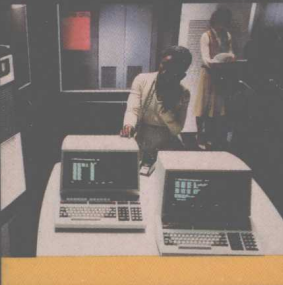
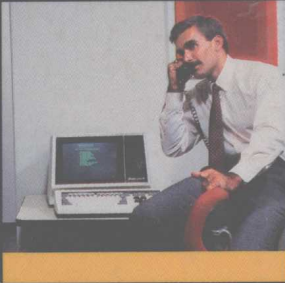


Information Systems Analysis and Design



Jud Ostle

Information Systems Analysis and Design

Judson R. Ostle

*With
David Arnold*



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Preface

INFORMATION SYSTEMS ANALYSIS AND DESIGN presents the tools, techniques, and concepts needed by analysts to develop information systems in the rapidly changing business environment of the eighties.

Today the analyst is faced with concerns that are important in the decisions and processes of an efficient business information system. These concerns include data communications, computer abuse, data base systems, batch versus on-line versus distributed data processing, information system cost-benefit analysis, and software package evaluation and selections.

These concerns are barely mentioned, or at best superficially treated, in many of today's systems analysis and design textbooks. **INFORMATION SYSTEMS ANALYSIS AND DESIGN** emphasizes the most recent and validated analysis and design methods, and shows how they can be used to meet the formidable challenges of the 1980s.

The Textbook

As the world of systems analysis becomes more complex, students require comprehensive direction on the subject. To this end, the textbook has been organized in a sequential, building-block manner. Students are exposed to

simpler, less complex considerations before being introduced to more difficult subject matter. Throughout, the text provides a unique understanding of basic concepts, how these concepts are applied today, and how they might be applied tomorrow. Thus **INFORMATION SYSTEMS ANALYSIS AND DESIGN** presents real-world examples which encourage students to learn by doing.

Throughout the text, students are asked to analyze and design several critical portions of an information system. When they have completed these projects, they are asked to evaluate the impact of a user-requested change. Systems analysts frequently experience this type of request; with practical applications the student will develop analytical skills and problem-solving abilities, and gain an understanding of the importance of organizational influences on system design.

Traditional systems analysis tools and techniques such as flow charts, decision tables, and matrices are presented as an adjunct and supplement to structured approaches. Proven project management techniques and tools needed in any systems development approach or activity—including project estimating, planning, control, and reviews—complete this core set of analysis and management skills.

Organization

The text is divided into three major sections:

Part I. Information Systems Analysis and Design—An Overview. The text begins with a discussion of what data is and how it is transformed into information, how computers meet business information needs, the concept of the systems development life cycle, and the systems analyst's role in this process. With this section, and those that follow, individual mini-cases and a major continuous case give students practical reinforcement of the concepts covered. Additional case material can be found in the **STUDY GUIDE**, giving students further opportunities to practice what they have learned.

The text moves on to a discussion of the systems analysis profession, characteristics of successful analysts, and training and continuing education opportunities available to professionals. Proven information gathering techniques and tools, such as document review, interviewing, questionnaires, sampling, and observation, provide students with the building blocks of information collection. These skills are essential before analysis can truly begin, regardless of whether the development approach follows structured or traditional methodologies. Included is an in-depth examination of structured analysis and design tools and techniques with the emphasis on how

to apply these to the problems confronted during analysis, design, and development activities. Part I concludes with various methods of project planning, scheduling, estimating, control, and review.

Part II. Basic Information System Design Considerations. Analysts face a number of critical decisions when developing or designing an information system. Part II covers those believed to be the most crucial: whether the system should be on-line or batch, the type of audit trails required, input/output verification needs, and special data communication and distributed data processing concerns. Particular emphasis has been placed on describing the advantages of on-line versus batch systems, with special attention to the need for audit trails in an on-line environment. This is accompanied by an extended discussion of the capabilities and options offered to on-line systems by data communications equipment and software.

With the acceptance of general-purpose software packages, the analyst must examine in-house development versus purchase. In addition, a staggering number of hardware choices confronts the analyst, making the process of hardware and vendor evaluation and selection a major challenge for the prospective analyst. This section includes criteria for vendor selection, evaluation criteria, and a software vendor checklist to help future analysts understand the decision-making process.

Part II concludes with a detailed discussion of computer abuse and the most prevalent forms of computer crime, and recommends protective methods that should be considered as part of a system design. The key concerns of data integrity, security, and administration raised by data base management completes the discussion of information system design considerations.

Part III. Information System Phases. This section leads students through the five phases of information system analysis and design, exploring the activities, requirements, and documentation for each phase. A continuous case study—**ON-LINE RADIO**—is used throughout these chapters to illustrate the evolution of a systems development project. The case, based on an actual radio station, allows the student to follow and participate in the development of a multifaceted system with a typical mix of generic and industry-specific features. Starting with “Problem Definition” and ending with “Implementation,” the student is systematically led through the separate phases.

Part III concludes with a discussion of which industries are most likely to hire analysts, and features interviews with systems analysts and other information systems professionals who at one time in their careers were systems analysts.

Appendix. Because of the importance of completed cost-benefit analyses for new projects in an era of soaring development and implementation costs, this special section describes the various methods of calculating cost-benefit analyses, and the advantages and disadvantages of each.

Special Features

Mini-case presentations in the beginning chapters are paced with students' growing knowledge, and provide understanding of such topics as *personal interviewing*, *project estimating*, *data communications costs*, and *software package screening*. After gaining the baseline experience, students are ready to tackle the more demanding analysis and design issues raised in the continuous case study, **ON-LINE RADIO** (described in the discussion of Part III above).

In addition to the mini-cases in the early chapters and the comprehensive continuous case study, **INFORMATION SYSTEMS ANALYSIS AND DESIGN** contains additional features designed to cultivate students interest in the material.

Each chapter includes two high-interest boxed sections by noted science writer David Arnold. These full-page boxes, **THE PRESENT** and **A FUTURE PERSPECTIVE**, contrast today's methods and systems with what may occur in the future. **THE PRESENT** reviews today's information systems in action, and provides perspective on such diverse topics of current interest as the role of workstations, the changing appearance and role of business graphics, and events that occur when input is misplaced.

A FUTURE PERSPECTIVE describes what might be state-of-the-art situations years from now. These scenarios extrapolate on current technological trends and what could be the systems analyst's profession in the first decade of the twenty-first century. Topics include artificial intelligence, information handling by the U.S. Postal Service, biotechnology, and talking to computers.

To broaden student awareness, three important high-interest *Target Applications* support the concepts developed throughout the book. These are presented in special sections:

- *Project Development*—with a microcomputer
- *Data Base Management Systems*—comparison
- *High-speed Laser Printer Systems*—evaluation and selection

Learning Aids

To ensure student mastery of concepts and to reinforce learning by doing, each chapter contains a wealth of learning aids.

- *Chapter objectives* focus student attention on central concepts and what is to be learned in the chapter.

- *Key terms* are listed at the opening of each chapter. They are then bold-faced when introduced in the chapter with a complete definition. Finally, they are reviewed both in the end-of-chapter summary and in the complete glossary at the end of the book.
- *Getting Started* sections at the beginning of each chapter set the stage for learning by focusing the student's attention on interesting situations or events that lead into the chapter and its concepts.
- *Diagrams and photographs*. Extensive use of two-color diagrams and worksheets, often from actual companies and organizations, as well as timely and interesting photographs enliven and reinforce the learning process.
- *Chapter summaries* review terms and concepts, and are valuable study devices in preparation for classroom discussions and examinations.
- *Review questions* allow students to test their mastery of what they have read and learned.
- *Glossary of terms*. This section reviews the definitions given throughout in the book with cross-references where first introduced.
- *Bibliography* at the end of the book lists important sources of information and is a guide for further reading and exploration.

Instructor and Student Support

INFORMATION SYSTEMS ANALYSIS AND DESIGN is accompanied by a complete supplementary set of materials for instructor and student. These include an *Instructor's Manual*, *Study Guide/Workbook*, *Transparency Masters*, and both printed and computerized *Test Packages*.

Instructor's Manual

The *Instructor's Manual* is an innovative package of support material designed to assist the instructor in classroom presentations. The manual provides the following aids:

- Keyed chapter outline and objectives
- Chapter summary
- List of boldfaced key terms from text
- Lesson plans

- Teaching tips and recommended strategies
 - Guide to use of mini-cases and **ON-LINE RADIO**
 - Answers to review questions
 - Resources list for additional information
-

Study Guide/Workbook

The *Study Guide/Workbook with Mini-Cases*, authored by Paul Ross of Millersville University, provides student support and reinforcement to the textbook and lectures. The guide aids students with day-to-day assignments, expansion of classroom lectures, special emphasis on selected topics, and provides a basis for homework assignments. Each chapter contains eight key elements:

- Overview chapter summaries
 - Learning objectives
 - Point-by-point chapter summaries
 - Key terms with cross-reference page numbers in the text
 - Problem set to define key terms
 - Case studies
 - Problem set for case to test mastery of chapter concepts
 - Test and review questions, including multiple choice, true/false, and short answer, each with keys
-

Transparency Masters and Acetates

A complete set of transparency masters for use with an overhead projector is available to the instructor. These masters contain diagrams from the text, complete with commentary for effective classroom use. Additionally, for qualified adopters of **INFORMATION SYSTEMS ANALYSIS AND DESIGN**, these masters are available in ready-to-use acetate form.

Test Package

To further assist the instructor, a test package of more than 1,000 test items is available, including multiple choice, true/false, fill-in, matching, and short

answer questions for testing or reinforcement purposes. The test package is available in both printed form and computerized formats for users of the IBM PC and Apple II.

Acknowledgments

This textbook project began many years ago, largely due to encouragement from Robert Hicks of San Jose State University. His support helped me decide to tackle this ambitious undertaking, and I greatly appreciate the time he took out of his busy teaching, writing, and consulting activities to guide me down the path.

Anyone who has been through the process of starting with a few ideas and seeing them through to the final production of a textbook knows that the spark is kept alive by many talented and dedicated editorial and production people who get you to transform your ideas into a completed book. My special thanks to my editor Brete Harrison—his energy and enthusiasm for the project was unflagging and unfailing, and I remain amazed at how he juggled the efforts of many contributors without losing track of where we were and where we were going.

Towards the end of this project, I was fortunate to be joined by three colleagues in putting the finishing touches on the text and ancillary materials. David Arnold brought his writing style and visionary outlook to **THE PRESENT** and **A FUTURE PERSPECTIVE**. He is also responsible for developing the innovative real-world case **ON-LINE RADIO**. Paul Ross created an excellent *Study Guide/Workbook*. Terrill Vick provided many of the down-to-earth and challenging mini-cases. Their contributions were timely and most appreciated.

I would like to thank the following reviewers for their constructive comments and helpful suggestions: Gerald Anderson, Willis Calicott, Bernice Folz, Mike Michaelson, George Miller, David Presser, Paul Ross, Sylvia Twomey, Joseph Waters, and Ken Veatch, as well as the many other professional colleagues who freely shared their experiences teaching information systems.

My family—Terry, Mary Lea, and Judson II—postponed meals, celebrations, and vacations so this project could be completed. My wife carefully reviewed the manuscript and offered many constructive suggestions. I cannot thank them enough for their support, encouragement, and, above all, patience.

Judson R. Ostle

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