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Business Data Processing

5th Edition

Elias M. Awad

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ELIAS M. AWAD

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To Sandy, Michael, Bruce, and Brenda

Preface

For over two years, the data processing literature has focused more and more on the “age of the end user,” as well as on the end user’s role in the planning and development of computer systems. Computer manufacturers have made a clear effort in today’s systems designs. Rather than designing computers with programmers and analysts in mind, today’s technology and the programming sophistication needed for generating information through the computer have been simplified for the nontechnical mind of the user. High-level, powerful software packages and a “programmed” approach to problem solving now enable the user to “talk” to the computer in very little time. This orientation, in conjunction with the developments relating to the makeup, operation, applications, design, and management of the computer necessitated the production of this revision.

This edition of *Business Data Processing*, like the four previous editions, is written more than ever for entry-level students, who are preparing for management or staff positions in areas such as production, marketing, accounting, finance, or information systems. It is also for those who are planning a career in government, health, and educational organizations that require processing of information for decision making. In many programs, students entering computer science could benefit from the unique coverage of the field in this revision.

The purpose of this text, then, is to introduce the data processing beginners and the future users to the important topics that are relevant to their career goals. More specifically, the objective of this edition is to provide:

1. the fundamentals, concepts, and developments in computer-based information processing,
2. a comprehensive orientation to the computer — what it is, what it can do, its limitations, and potential —
3. the analysis, design, and implementation of systems projects, and
4. some insights and procedures relevant to the acquisition, installation, and management of computer systems.

This edition underwent more extensive revision in organization, content, and presentation than any previous editions. The contents of seventeen of these earlier chapters have been extensively revised, reorganized, and condensed into thirteen chapters. Four of the earlier chapters have been dropped, and six new chapters have been added. An appendix covering the essence of word processing is also included. Although the net effect of the total project has been a reduction of the text size by over 150 pages, the material represents a comprehensive coverage of the technology and the latest in data processing methods and procedures.

Like previous editions, the opening pages of each chapter contain *learning objectives* and a *chapter outline*. A *chapter summary*, “*terms to learn*,” and *review questions* conclude each chapter, to test and reinforce the learning objectives and the important points. (Additionally, the words and phrases in the “terms to learn” list are set in heavy, boldface type in the text for easy reference.)

This text is organized into five parts. The key features and a brief description of the revisions are summarized below:

Part I, consisting of the first four chapters, discusses the capabilities and uses of a computer. *Chapter 1* is a new chapter. It presents an overview of the makeup, benefits, and drawbacks of computers. *Chapter 2* summarizes the data processing cycle and computer applications in various industries. *Chapter 3* deals with key developments in computer technology, the future impact of the power of the computer, and trends and projections in the computer field. The latter section includes trends in main memory and the emerging concept of distributed data processing. *Chapter 4* summarizes the different ways of classifying computer systems. The uses of microcomputers, personal computing, and the various types of distributed data processing are all new additions.

Part II emphasizes the internal makeup and structure of a computer system, detailed in *Chapters 5–10*. The chapters illustrate the equipment needed for a computer system, why they are used, and how the user communicates with the computer as a system.

Chapter 5 examines the types of main memory, how advanced memory systems function, and how data is represented in memory. New additions include bubble and laser memory systems, along with data structure and organization.

Chapter 6 explains the input and output devices for computer systems and

shows how input data is prepared and entered into the computer for processing. Special-purpose output technology (relating to COM and to computer micro-graphics) is also included.

Chapter 7 focuses on the characteristics, uses, and makeup of magnetic tape as an alternative input/output medium.

Chapter 8 describes the characteristics, layout, and file organization of magnetic disc for direct-access data processing. The section on disc layout, file organization, and disc file capacity is all new.

Chapter 9 features card replacement, direct data entry, and pattern recognition devices. Included is a new section on source data automation, with a discussion of electronic funds transfer, automated teller machines, and intelligent point of sale transfer.

Chapter 10 is an extensive revision of the telecommunications area. The major topics include fundamental communications concepts, application categories, telecommunication hardware, and the various services offered by common carriers.

Part III consists of three new chapters on the development of systems applications. *Chapter 11* focuses on analysis of the elements of an application in order to determine if conversion is feasible, why companies decide on converting applications, how an analyst gathers and organizes data for analysis, and what constitutes a systems proposal. *Chapter 12* discusses the major steps in systems design, how files are organized, the basics of forms design, and the steps taken in systems testing and conversion. *Chapter 13* describes the functions, the basic programs, and the advanced facilities of operating systems. The latter section includes an overview of the features of real-time, time-sharing, and virtual storage systems.

Part IV is a section on the basics of programming and software. *Chapter 14* is a major revision of the tools used for program planning. *Chapter 15* is a new chapter detailing the programming cycle, how a program is converted into a machine-readable language, the uses of compilers and assemblers, and the basics of *structured programming*. The latter section explains the makeup and uses of *top-down program design*, *structured walkthrough*, and the *HIPO diagram*. *Chapters 16 and 17* are updated versions of earlier chapters on Basic and Cobol, respectively. They can be easily deleted in classes where students have had a prior programming course or language.

Part V emphasizes management considerations of the computer. It consists of new material in *Chapter 18* on the criteria for evaluating computer acquisitions, financial considerations in computer acquisitions, and the cost of computer resources. *Chapter 19* is a fresh outlook at the functions of the computer center, the personnel positions that make up a computer center, the different approaches to locating a center, and the control measures designed to safeguard data against fraud or embezzlement.

This text is designed for use as a first course in computer data processing for one quarter or one semester at the college or university level. No prior mathematical or computer background is required. The material is representa-

tive of computers in general. No specific computer system or manufacturer is featured. The material can also be covered without access to any computer, although a visit to one would be helpful.

The material is organized into five parts to provide continuity in the way an introduction to data processing course should be taught. It is based on the author's twenty years of teaching and publishing experience in the field. It should be noted, however, that the parts provide some *modular* flexibility in meeting unique sets of needs. For example, if programming is taught as a part of the course, part I can be covered, followed by the first chapter in part IV to teach the procedure in program preparation.

Many individuals have provided input in the preparation of this text. The author thanks Ron Ledwith of Prentice-Hall, Inc., for his interest in and support of the project from its inception and for his valued counsel. Special thanks go to Fred Dahl, whose talent and years of experience are reflected in the production of this volume. Most important, several persons were especially constructive with their comments on initial drafts. Professor Nilo Niccolai of the University of North Carolina–Charlotte and Victor Streeter of the University of Michigan–Dearborn were especially helpful, as well as Instructor Glenn A. Mitchell of Vanderbilt University. The author also recognizes with deep appreciation the invaluable input that hundreds of his students at Florida International University have provided regarding various sections of the manuscript.

Elias M. Awad

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