Computing Today

An Introduction to Business Data Processing

Joseph L. Sardinas, Jr.

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To my mother and father

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Preface

About This Text

Today's students have grown up in the computer society; they constitute the first generation of which this can be said. They are science fiction fans who have seen the lines between fantasy and reality become blurred in their lifetime. Unawed by computers, many have already "played" with them in high school, and perhaps learned math and practiced spelling with them in elementary school. They already know that computers are complex and powerful. They also know that computers are *fun*.

That is the positive view projected in this introductory-level text on computers and their use in business data processing. It clearly describes how computers work from both the hardware and the software perspectives, along with the evolution of computers and business data processing.

In addition to being "fun," computer data processing has created some of the most challenging, exciting, and rewarding careers of our time. The understanding of this field, as presented in this text, will prepare students for continuing study in preparation for the jobs of the future. All essential concepts of computer use in data processing are presented here in a text that emphasizes today's technology for tomorrow's computer users and personnel.

Organization

This timely text is organized in four modules. Unit I, an *Introduction to the Field of Data Processing,* contains three chapters. Chapter 1, *Computers Today,* surveys the impact of electronic data processing on our society. In chapter 2, *The Past, Present, and Future of Data Processing,* the history of calculating devices is briefly summarized, and the remarkable technological advances that have brought us to the age of microprocessors are outlined. Chapter 3 presents an *Overview of Computers and Equipment,* introducing some key terms and concepts that will be discussed more fully in subsequent chapters.

Unit II, *Introduction to Computer Hardware,* is concerned with all the varieties of hardware. In chapter 4, *Input and Output Devices* are examined, with an emphasis both on traditional methods and on recent developments that have changed the procedures and appearance of input and output. Chapter 5 takes us into *The Central Processing Unit* to understand how computers operate, the special number systems and codes they use, and the new technology that provides vastly expanded primary storage in smaller mainframes. *Auxiliary Storage,* chapter 6, likewise emphasizes the technological advances that are blurring the distinctions between primary and auxiliary storage, while not ignoring older equipment still in service today. *Data Communications* are described in chapter 7, with a discussion of communications channels and networks from the inside-the-computer perspective, as

well as from the computer-to-computer or computer-to-terminal perspective; this chapter also examines the most dramatic application of computer communications to date—distributed data processing.

Unit III, an *Introduction to Computer Software,* presents varied aspects of this topic in six chapters. In chapter 8, *Systems and Applications Software,* programming concepts are introduced; the focus is on the programs that actually run the machines and how they interact with the hardware and the application programs. Chapter 9, *Data Base Management,* discusses the newest techniques associated with data storage and retrieval, with a focus on the organization of a data base management system (DBMS). Chapter 10, *Systems Analysis,* discusses systems in business organizations, the "life cycle" of a system, and management information systems (MIS). Chapter 11, *Flowcharts,* explains their use at both the systems and programming levels; it also introduces decision tables as a supplement or alternative to flowcharting. *Program Preparation* is the subject of chapter 12, which takes a step-by-step approach to the logical processes—top-down programming, modularization—by which programs are developed; the importance of debugging and adequate documentation at every step in the process is emphasized. *Programming Languages* are described in chapter 13, with emphasis on the capabilities and specific applications for each of several widely used programming languages.

In Unit IV, *Data Processing Management,* the focus is on the real world—the world of work in a data processing department. Chapter 14, *Managing the Data Processing Department,* describes management responsibilities and department organization so that future employees will understand the perspective of management, and perhaps aspire to become managers themselves; job opportunities and career paths in data processing are outlined. In chapter 15, *Computer Security* is discussed from the perspective of the hazards to which computer installations are subjected and the precautions that may be taken to avoid them. Finally, chapter 16, *Trends in Computer Applications,* reviews the opportunities and trends of today that will define the business data processing world of the near future, and introduces thought-provoking issues, such as individual rights to privacy and priorities in technological development.

Features

Students often ask, "What does this course or textbook have to do with my future?" The pragmatic and practical perspective from which this book has been written provides answers to that question. In addition to the frequent descriptions of the working environment throughout the text, each chapter is introduced with a "real world" application relating to the material about to be covered. These applications are designed to ease the student into the subject matter of the chapter by showing it in a realistic context.

Other features to enhance student receptivity are also provided. At the beginning of every chapter, the topics to be discussed are outlined, and a little "comic relief" is provided by a cartoon that views, with tongue in cheek, the material that follows. A summary follows the text of every chapter, as do questions for student review.

One of the major problems faced by the newcomer to the field of data processing is the jargon, which seems to be both more extensive and more "imaginative" than that of most other fields. As a guide through the maze,

this text introduces terms accompanied by an explanation or definition; the first appearance of a technical term is italicized for cross-reference to the Glossary at the end of the book. Also, at the end of every chapter, the terms the student should have learned are listed.

In the Appendix, three important computer programming languages are introduced through the imaginative use of an actual program. The amount of interest that would have accumulated on an investment of $24 from 1627 to 1981 is calculated in BASIC, COBOL, and Pascal. The small sum paid by Dutch settlers for the island of Manhattan thus provides the opportunity for explaining the syntax and vocabulary of the three languages most used today in business data processing. Students should be able to write simple programs on the basis of material contained in the Appendix and to read and understand a program written in any of these languages—and they will probably be eager for their first full-fledged programming course. Also in the Appendix is a useful list of the acronyms to which this discipline is devoted, and another of publications that might be of interest for further reading or reference.

Numerous diagrams in color have been designed expressly for this text, illustrating everything from the printing mechanisms of today's hard-copy output devices to the processes involved in structured programming. In addition, every chapter contains photographs variously showing the devices discussed, the data processing environment, or other relevant pictorial material.

Alternative Ways of Using This Text

The core of this text is formed by Units II and III, devoted, respectively, to hardware and software. The chapters in these two central modules can serve as the primary text for any introductory-level business data processing or computer course. The chapters in Units I and IV can be used in several ways, depending on the emphasis of a given course or the needs and interests of students and teacher. They can be assigned concurrently with the core curriculum chapters or as optional readings according to student interest. For example, in a strictly business-oriented learning environment, chapters 1 and 2 might be optional, while in a more general introduction to computers, chapter 14 might be optional. At the same time, however, Units I and II might provide the focus for a course in computers and society.

It is important that these six chapters not be overlooked. In these chapters, topics of grave concern today are discussed. Informed citizens cannot afford to be computer-illiterate; computer professionals cannot afford to ignore the valid concerns of the public. Computer data processing may take place inside a "black box," but it exists as part of a rapidly changing human environment and exists to serve the needs of human beings and their organizations.

Supplements

Both a Study Guide and an Instructor's Manual, which includes a Test Item File, are available as accompanying supplements to this text. The Study Guide reviews the highlights of each chapter, the technical terms introduced, and provides many self-test questions and problems.

The Instructor's Manual offers teaching suggestions and brief summaries of the contents of each chapter. It also contains the answers to the review questions at the end of every text chapter and to the discussion questions and problems in the Study Guide. The Test Item File contains over 750

true/false and multiple-choice questions in easy-to-administer parallel "A" and "B" test sets for each chapter. Many of the diagrams in the text are also included in the Instructor's Manual for use as transparency masters.

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Amherst, Massachusetts

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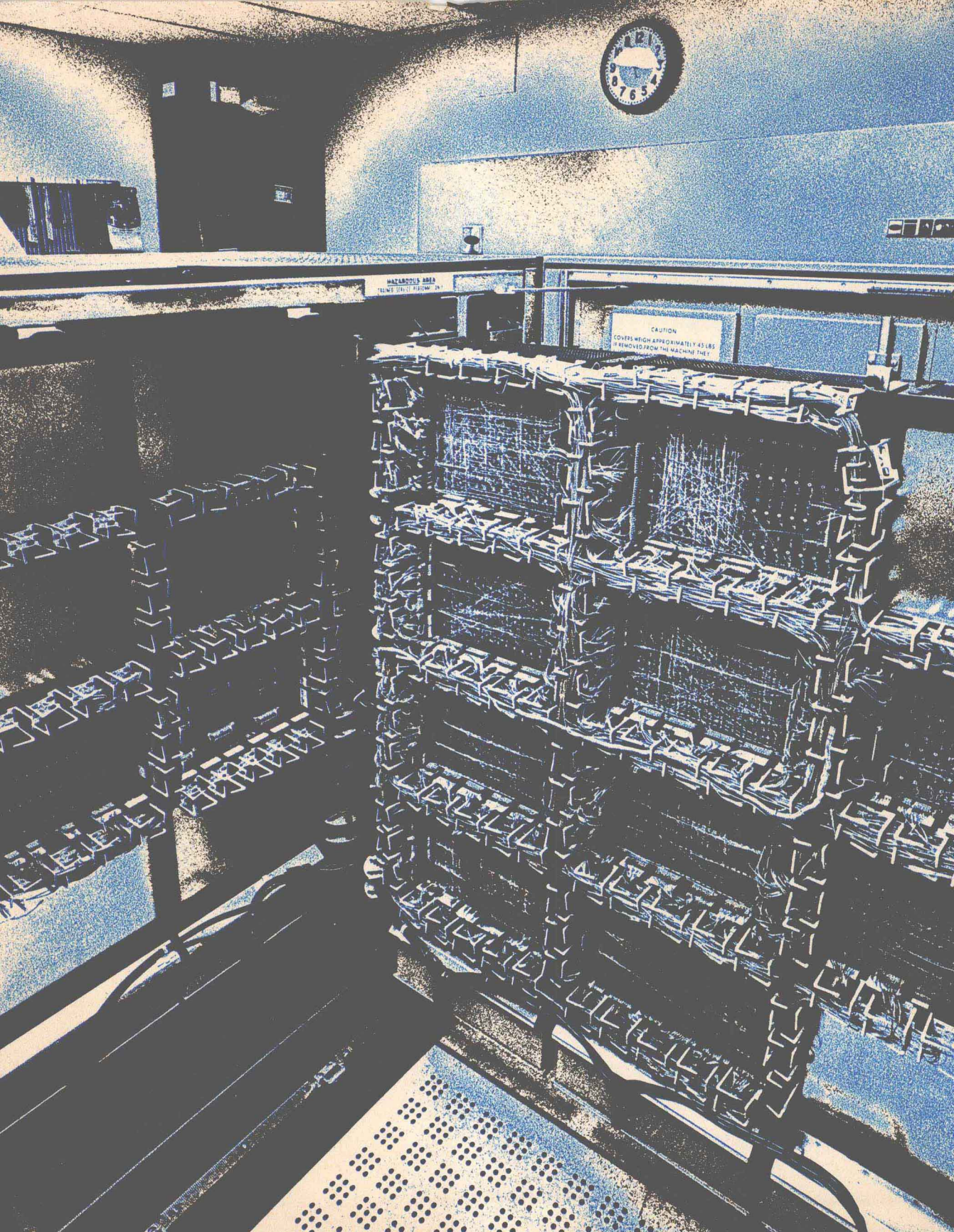
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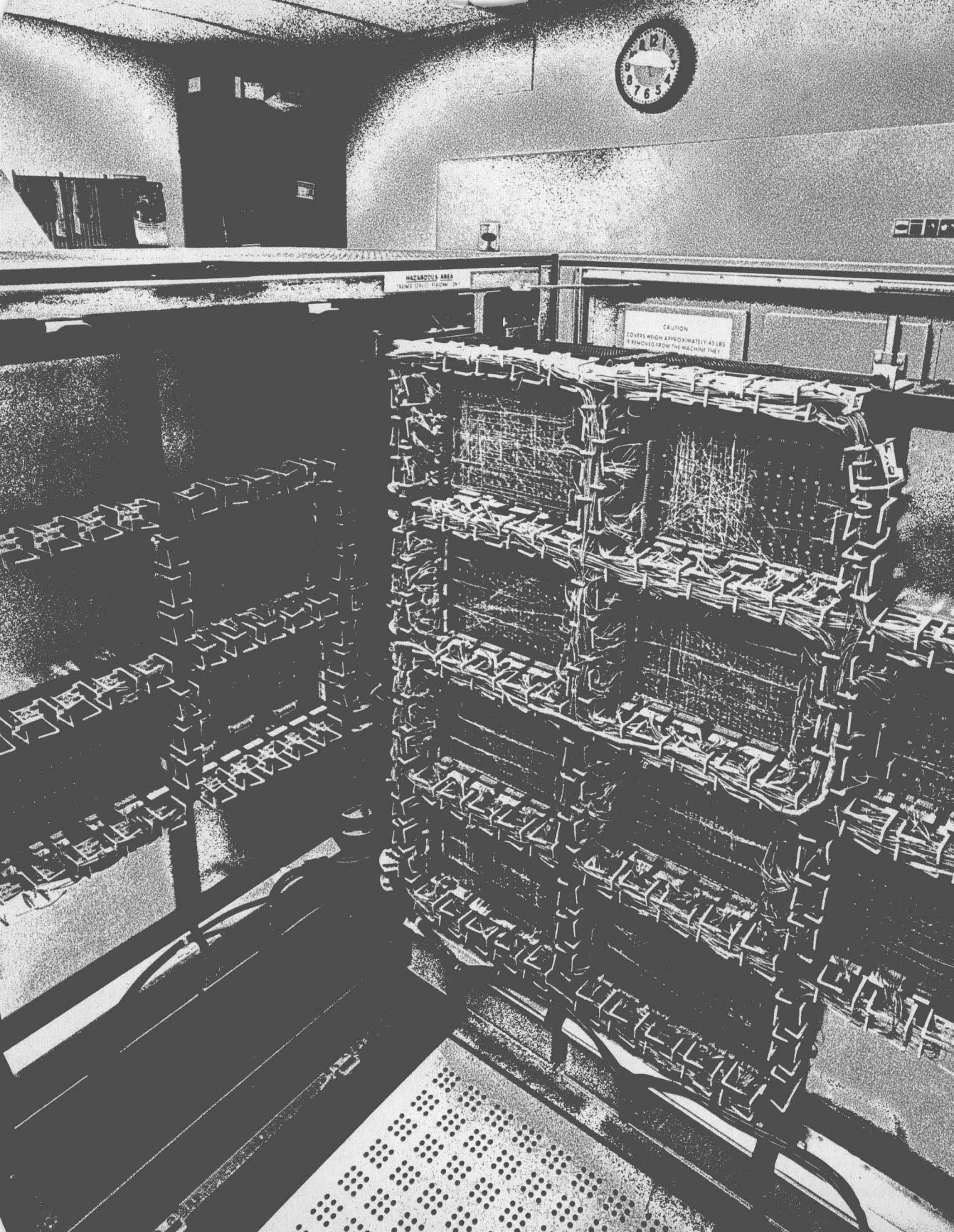
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