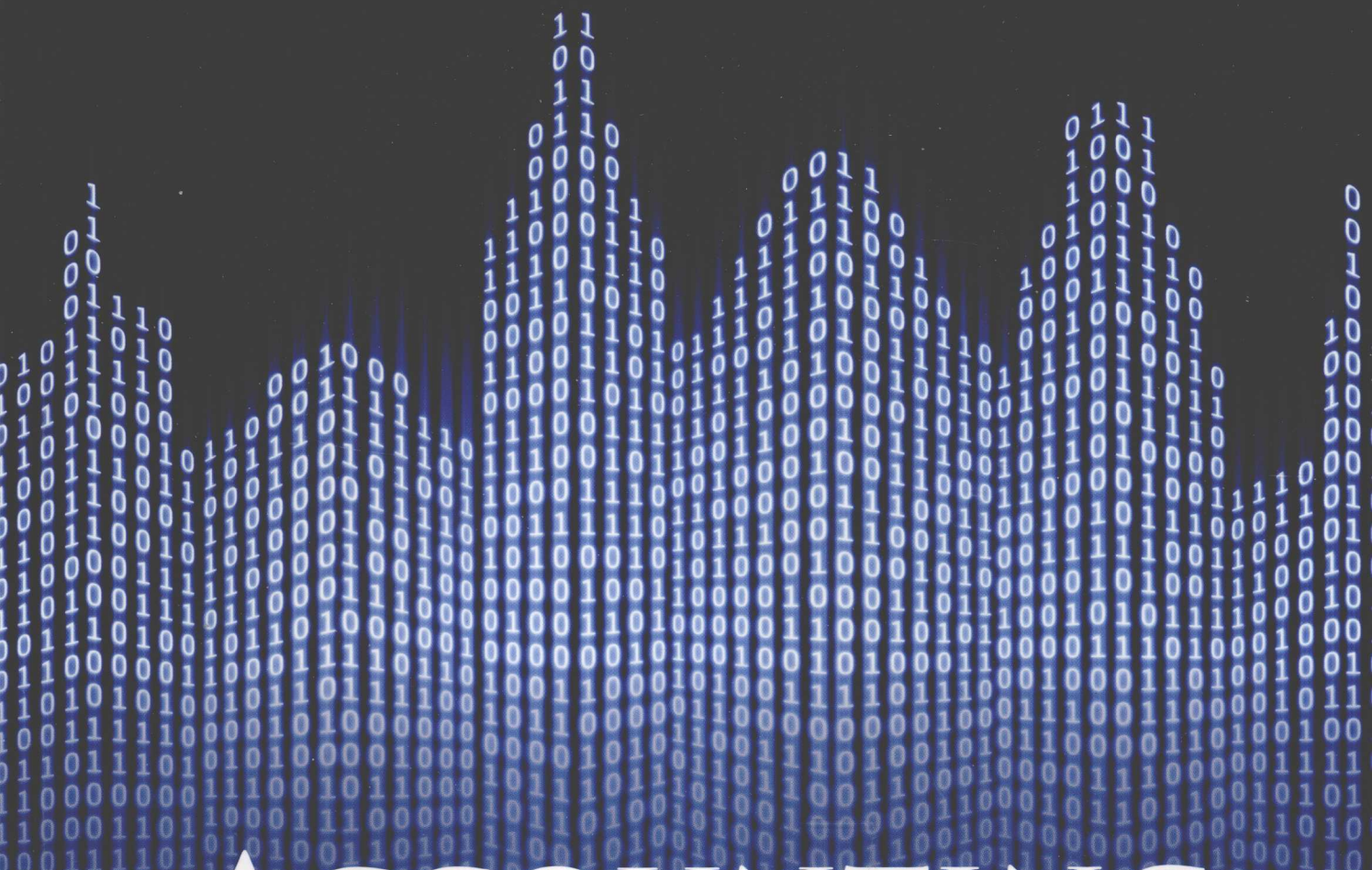
Simkin | Rose | Norman



Accounting Information Systems

Twelfth Edition

International Student Version

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In memory of my father, Edward R. Simkin
(Mark G. Simkin)

Chase your big dreams!
(Jacob M. Rose)

Thank you to my students—you're the best!
(Carolyn S. Norman)

ABOUT THE AUTHORS

Mark G. Simkin received his A.B. degree from Brandeis University and his MBA and Ph.D. degrees from the Graduate School of Business at the University of California, Berkeley. Before assuming his present position of professor in the Department of Accounting and Information Systems, University of Nevada, Professor Simkin taught in the Department of Decision Sciences at the University of Hawaii. He has also taught at California State University, Hayward, and the Japan America Institute of Decision Sciences, Honolulu; worked as a research analyst at the Institute of Business and Economic Research at the University of California, Berkeley; programmed computers at IBM's Industrial Development—Finance Headquarters in White Plains, New York; and acted as a computer consultant to business companies in California, Hawaii, and Nevada. Dr. Simkin is the author of more than 100 articles that have been published in such journals as *Decision Sciences, JASA, The Journal of Accountancy, Communications of the ACM, Interfaces, The Review of Business and Economic Research, Decision Sciences Journal of Innovative Education, Information Systems Control Journal,* and the *Journal of Bank Research.*

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Carolyn Strand Norman received her B.S. and M.S.I.A. degrees from Purdue University and her Ph.D. from Texas A&M University. Dr. Norman is a Certified Public Accountant (licensed in Virginia) and also a retired Lieutenant Colonel from the United States Air Force. At the Pentagon, she developed compensation and entitlements legislation, working frequently with House and Senate staffers. Prior to assuming her current position, Dr. Norman taught at Seattle Pacific University where she coauthored the book, *XBRL Essentials* with Charles Hoffman, and was selected as Scholar of the Year for the School of Business and Economics. Dr. Norman has published more than 50 articles in journals such as *The Accounting Review; Accounting, Organizations and Society; Behavioral Research in Accounting; Journal of Accounting and Public Policy; Journal of Information Systems; Advances in Accounting Behavioral Research; Issues in Accounting Education;* and *Journal of Accounting Education*. She is currently the Interim Chair of the Accounting Department at Virginia Commonwealth University.

PREFACE

Information technologies affect every aspect of accounting, and as technologies advance, so does our accounting profession! For example, accountants no longer spend much of their day footing ledgers and making hand calculations. Today, accountants use the many helpful functions in spreadsheet software and update or change calculations instantly. And increasingly, the Internet continues to change the way accountants work.

Because most accounting systems are computerized, accountants must understand software and information systems to turn data into financial information and develop and evaluate internal controls. Business and auditing failures continue to force the profession to emphasize internal controls and to rethink the state of assurance services. As a result, the subject of accounting information systems (AIS) continues to be a vital component of the accounting profession.

The purpose of this book is to help students understand basic AIS concepts. Exactly what comprises these AIS concepts is subject to some interpretation, and is certainly changing over time, but most accounting professionals believe that it is the knowledge that accountants need for understanding and using information technologies and for knowing how an accounting information system gathers and transforms data into useful decision-making information. In this edition of our textbook, we include the core concepts of Accounting Information Systems indicated by chapter in the table below. The book is flexible enough that instructors may choose to cover the chapters in any order.

ACCOUNTING INFORMATION SYSTEMS COURSE CONTENT AREA COVERAGE

AIS Applications	7, 8, 15
Auditing	12
Database Concepts	3, 4, 5
Internal Control	9, 10, 11
Management of Information Systems	1, 2, 13
Management Use of Information	1, 6, 7, 8, 14, 15
Systems Development Work	13
Technology of Information Systems	All chapters
Use of Systems Technology	All chapters

About This Book

The content of AIS courses continues to vary widely from school to school. Some schools use their AIS courses to teach accounting students how to use computers. In other colleges and universities, the course focuses on business processes and data modeling. Yet other courses emphasize transaction processing and accounting as a communication system and have little to do with the technical aspects of how underlying accounting data are processed or stored.

Given the variety of objectives for an AIS course and the different ways that instructors teach it, we developed a textbook that attempts to cover the core concepts of AIS. In writing the text, we assumed that students have completed basic courses in financial and managerial accounting and have a basic knowledge of computer hardware and software concepts. The text is designed for a one-semester course in AIS and may be used at the community college, baccalaureate, or graduate level.

Our hope is that individual instructors will use this book as a foundation for an AIS course, building around it to meet their individual course objectives. Thus, we expect that many instructors will supplement this textbook with other books, cases, software, or readings. The arrangement of the chapters permits *flexibility* in the instructor's subject matter coverage. Certain chapters may be omitted if students have covered specific topics in prior courses.

In the first chapter, we lay the basic foundation for the remainder of the text and set the stage for students to think about the pervasiveness of technology that is common to organizations and the impact technology has on the accounting profession. This chapter also includes a section on careers in AIS that is designed to introduce students to the career paths that combine accounting with the study of information systems. Students taking the AIS course may or may not have had an earlier course in information technology. Chapter 2 allows those who did not have such a course to learn about the latest technologies and emphasizes their use in accounting. For students who have had earlier courses in computers and/or information systems, this chapter serves as a review but might also contain new technologies that students have not studied in other courses.

Chapter 3 begins our coverage by discussing database concepts in general, describing how to design database tables and relationships, and discussing how databases promote efficient storage of the data needed to support business decisions. This chapter also responds to increasing instructor interest in teaching the REA approach to data modeling. Chapter 4 describes how to use the latest version of Microsoft *Access* to create databases and extract data from databases. Chapter 5 continues the discussion of how to use Microsoft *Access* to develop database forms and reports. Chapters 4 and 5 are more "how to" than the other chapters in the book, and they allow the instructor to guide students with hands-on experience in using software to implement the database concepts they have learned.

Chapter 6 describes the various tools that accountants can use to document an AIS for their own and others' understanding of information flows. Business processes and software solutions for improving those processes are gaining in importance in today's businesses. Chapters 7 and 8 discuss several core business processes and highlight a number of Business Process Management (BPM) solutions that are currently available in the marketplace. Instructors who focus on transaction cycles in their AIS courses may choose to use supplemental pedagogical tools, such as software and practice sets, to cover this material in more depth.

Although the subject of internal control appears repeatedly throughout the book, we examine this subject in depth in Chapters 9 and 10. These two chapters introduce students to internal controls that are necessary at each level of the organization. Chapter 11 focuses on computer crime, ethics, and privacy to help students understand the need for internal controls.

Chapter 12 introduces the topic of auditing in an IT environment. Information technology auditing is an increasingly important field and represents a great career opportunity for students who understand both accounting and IT. Recognizing that some students in AIS courses may have completed courses in management information systems (MIS) and thus are already familiar with systems development topics, the emphasis in Chapter 13 is on the accountant's role in designing, developing, implementing, and maintaining a system. Although we integrated Internet technology throughout this book, its influence on accounting information systems is so great that we devoted a special chapter to it. Chapter 14 provides a basic overview of Internet concepts, discusses financial reporting on the Internet including an expanded section on XBRL, explores the

accounting components of e-business, and covers the issues of privacy and security. Finally, in Chapter 15, we discuss accounting and enterprise software, and the chapter provides advice related to AIS selection.

Special Features

This edition of our book uses a large number of special features to enhance the coverage of chapter material as well as to help students understand chapter concepts. This edition includes many new real-world Cases-in-Point, which are woven into the text material and illustrate a particular concept or procedure. Each chapter also includes a more detailed real-world case as an end-of-chapter *AIS-at-Work* feature.

Each chapter ends with a summary and a list of key terms. To help students understand the material in each chapter, this edition includes three types of end-of-chapter exercises: discussion questions, problems, and cases. This wide variety of review material enables students to examine many different aspects of each chapter's subject matter and also enables instructors to vary the exercises they use each semester.

There are two major supplements to this textbook. One is an instructor's manual containing suggested answers to the end-of-chapter discussion questions, problems, and cases. There is also a test bank of true-false, multiple-choice, and matching-type questions. The test bank includes short-answer problems and fill-in-the-blank questions so that instructors have a wide variety of choices.

What's New in the Twelfth Edition

This edition of our book includes a number of changes from prior editions. These include

- A new coauthor with an international reputation in the AIS community!
- All new database chapters. Material related to the design of databases and database theory is all presented in the first database chapter, rather than spread throughout three chapters. The following two chapters describe how to apply the theoretical concepts using Access 2010. The new approach allows instructors to easily select a desired emphasis: theory, application, or both. New database diagramming methods simplify the design process for students.
- Expanded coverage of topics that are increasingly important to accounting systems, including cloud computing, data mining, sustainability accounting, forensic accounting COBIT version 5, COSO's 2010 Report on Enterprise Risk Management, enterprise controls, and internal auditing of IT.
- The discussion of internal controls in Chapter 10 and auditing of IT in Chapter 12 are reorganized to reflect new PCAOB standards.
- An expanded section in Chapter 1 on career paths for accountants interested in forensic accounting.
- Many new *Case-in-Points* that identify examples of the discussion in the textbook. These examples illustrate the topic to give students a better grasp of the material.

- Chapter reorganization, with database chapters moved closer to the front, as requested by our adopters. Instructors still have the flexibility to integrate the database concepts and database development anywhere in their course.
- An updated glossary of AIS terms at the end of the book.
- New *AIS at Work* features at the end of many chapters to help students better understand the impact of systems in a wide variety of contexts.
- A number of new problems and cases at the end of chapters so that instructors have more choices of comprehensive assignments for students.

ACKNOWLEDGMENTS

We wish to thank the many people who helped us during the writing, editing, and production of our textbook. Our families and friends are first on our list of acknowledgments. We are grateful to them for their patience and understanding as we were writing this book. Next, we thank those instructors who read earlier drafts of this edition of our textbook and provided suggestions to improve the final version.

In addition, we are indebted to the many adopters of our book who frequently provide us with feedback. We sincerely appreciate Paula Funkhouser who helped us with our supplementary materials on this and several previous editions. Finally, we thank all of our many students who have given us feedback when we've used the book. We do listen!

Mark G. Simkin
Jacob M. Rose
Carolyn S. Norman

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Chapter 1

Accounting Information Systems and the Accountant

INTRODUCTION

The study of **accounting information systems (AISs)** is, in large part, the study of the application of **information technology (IT)** to accounting systems. This chapter describes the ways that IT affects financial accounting, managerial accounting, auditing, and taxation. We begin by answering the question "what are accounting information systems" and then look at some new developments in the field. Following this, we will examine some traditional roles of AISs in organizations.

Why should you study AISs? There are many reasons, which we will review briefly in this chapter, but one of the most important is the special career opportunities that will enable you to combine your study of accounting subjects with your interest in computer systems. In today's job market, accounting employers expect new hires to be computer literate. In addition, a large number of specialized and highly compensated employment opportunities are only available to those students who possess an integrated understanding of accounting and IT and can bring that understanding to bear on complicated business decisions. The last part of this chapter describes a number of special career opportunities for those with an interest in AISs.

WHAT ARE ACCOUNTING INFORMATION SYSTEMS?

What do the following have in common: (1) a shoebox filled with a lawyer's expense receipts, (2) the monthly payroll spreadsheet in the computer of an auto-repair shop, (3) the *Peachtree* accounting system for a small chain of dry-cleaning stores, and (4) the enterprise resource planning (ERP) system of a large manufacturer? The answer is that they are all examples of AISs. How can such a wide range of accounting applications each qualify as an AIS? The answer is that this is the essence of what AISs are—collections of raw and stored data (that together typically serve as inputs), processing methods (usually called "procedures"), and information (outputs) that serve useful accounting purposes. Do such systems have to be computerized? The first example—the shoebox—suggests that they do not. Can they be complicated? The last example—an ERP system—illustrates one that is.

Accounting Information Systems—A Definition

Accounting information systems (AISs) stand at the crossroads of two disciplines: accounting and information systems. Thus, the study of AISs is often viewed as the study of computerized accounting systems. But because we cannot define an AIS by its size, it is better to define it by what it *does*. This latter approach leads us to the following definition that we will use as a model in this book:

Definition: An ***accounting information system*** *is a collection of data and processing procedures that creates needed information for its users.*

Let us examine in greater detail what this definition really means. For our discussion, we'll examine each of the words in the term "accounting information systems" separately.

Accounting. You probably have a pretty good understanding of accounting subjects because you have already taken one or more courses in the area. Thus, you know that the accounting field includes financial accounting, managerial accounting, and taxation. AISs are used in all these areas—for example, to perform tasks in such areas as payroll, accounts receivable, accounts payable, inventory, and budgeting. In addition, AISs help accountants to maintain general ledger information, create spreadsheets for strategic planning, and distribute financial reports. Indeed, it is difficult to think of an accounting task that is not integrated, in some way, with an AIS.

The challenge for accountants is to determine how best to provide the information required to support business and government processes. For example, in making a decision to buy office equipment, an office manager may require information about the sources of such equipment, the costs of alternate choices, and the purchasing terms for each choice. Where can the manager obtain this information? That's the job of the AIS.

AISs don't just support accounting and finance business processes. They often create information that is useful to nonaccountants—for example, individuals working in marketing, production, or human relations. Figure 1-1 provides some examples. For this information to be effective, the individuals working in these subsystems must help the developers of an AIS identify what information they need for their planning, decision making, and control functions. These examples illustrate why an AIS course is useful not only for accounting majors but also for many nonaccounting majors.

Information (versus Data). Although the terms **data** and **information** are often used interchangeably, it is useful to distinguish between them. *Data* (the plural of *datum*) are raw facts about events that have little organization or meaning—for example, a set of raw scores on a class examination. To be useful or meaningful, most data must be processed into useful *information*—for example, by sorting, manipulating, aggregating, or classifying them. An example might be computing of the class average from the raw scores of a class examination.

Application	Examples of AIS Information
Supply chain management	Demand trends, inventory levels and warehouse management, supplier relationship management.
Finance	Cash and asset management, multicompany and multicurrency management, credit card transaction summaries.
Marketing	Sales management, sales forecasts and summaries, customer relationship management.
Human resources	Workforce planning tools and employee management, benefits management, payroll summaries and management.
Production	Inventory summaries, product cost analysis, materials requirement planning.

FIGURE 1-1 Examples of useful information an AIS can generate for various business functions.

Do raw data *have* to be processed in order to be meaningful? The answer is "not at all." Imagine, for example, that *you* take a test in a class. Which is more important to you—the average score for the class as a whole (a processed value) or *your* score (a raw data value)? Similarly, suppose you own shares of stock in a particular company. Which of these values would be *least* important to you: (1) the *average* price of a stock that was traded during a given day (a processed value), (2) the price *you* paid for the shares of stock (an unprocessed value), or (3) the *last* price trade of the day (another unprocessed value)?

Raw data are also important because they mark the starting point of an **audit trail**—that is, the path that data follow as they flow through an AIS. In a payroll system, for example, an input clerk enters the data for a new employee and the AIS keeps track of the wages due that person each pay period. An auditor can verify the existence of employees and whether each employee received the correct amount of money.

Case-in-Point 1.1 A former payroll manager at the Brooklyn Museum pleaded guilty to embezzling $620,000 by writing paychecks to "ghost employees." Dwight Newton, 40, admitted committing wire fraud by adding workers to the payroll who did not exist and then wiring their wages directly into a joint bank account that he shared with his wife. Under a plea agreement, Newton must repay the museum the stolen funds. He was ordered to forfeit $77,000 immediately, sell his Barbados timeshare, and liquidate his pension with the museum.[1]

Despite the potential usefulness of some unprocessed data, most end users need financial totals, summary statistics, or exception values—that is, processed data—for decision-making purposes. Figure 1-2 illustrates a model for this—a three-stage process in which (1) raw and/or stored data serve as the primary inputs, (2) processing tasks process the data, and (3) meaningful information is the primary output. Modern AISs, of course, harness IT to perform the necessary tasks in each step of the process. For example, a catalog retailer might use some Web pages on the Internet to gather customer purchase data, then use central file servers and disk storage to process and store the purchase transactions, and finally employ other Web pages and printed outputs to confirm and distribute information *about* the order to the appropriate parties.

Although computers are wonderfully efficient and useful tools, they also create problems. One is their ability to output vast amounts of information quickly. Too much information, and especially too much trivial information, can overwhelm its users, possibly causing relevant information to be lost or overlooked. This situation is known as **information overload**. It is up to the accounting profession to determine the nature and timing of the outputs created and distributed by an AIS to its end users.

Another problem with computerized data processing is that computers do not *automatically* catch the simple input errors that humans do. For example, if *you* were performing payroll processing, you would probably know that a value of "−40" hours

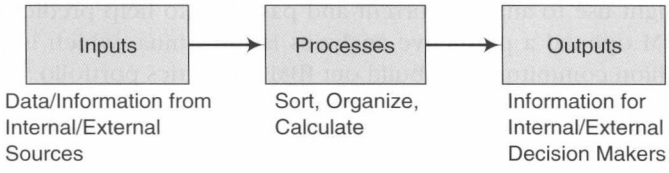

FIGURE 1-2 An information system's components. Data or information is input, processed, and output as information for planning, decision-making, and control purposes.

[1] http://www.payroll-fraud.com/rc009.html

for the number of hours worked was probably a mistake—the value should be "40." A computer can be programmed to look for (and reject) bad input, but it is difficult to anticipate all possible problems.

Yet a third problem created by computers is that they make audit trails more difficult to follow. This is because the path that data follow through computerized systems is electronic, not recorded on paper. However, a well-designed AIS can still document its audit trail with listings of transactions and account balances both before and after the transactions update the accounts. A major focus of this book is on developing effective internal control systems for companies, of which audit trails are important elements. Chapters 9, 10, and 12 discuss these topics in detail.

In addition to collecting and distributing large amounts of data and information, modern AISs must also organize and store data for future uses. In a payroll application, for example, the system must maintain running totals for the earnings, tax withholdings, and retirement contributions of each employee in order to prepare end-of-year tax forms. These data organization and storage tasks are major challenges, and one of the reasons why this book contains three chapters on the subject (see Chapters 3, 4, and 5).

Besides deciding *what* data to store, businesses must also determine the best way to *integrate* the stored data for end users. An older approach to this problem was to maintain independently the data for each of its traditional organization functions—for example, finance, marketing, human resources, and production. A problem with this approach is that, even if all the applications are maintained internally by the same IT department, there will be separate data-gathering and reporting responsibilities within each subsystem, and each application may store its data independently of the others. This often leads to a duplication of data-collecting and processing efforts, as well as conflicting data values when specific information (e.g., a customer's address) is changed in one application but not another.

Organizations today recognize the need to integrate the data associated with their functions into large, seamless data warehouses. This integration allows internal managers and possibly external parties to obtain the information needed for planning, decision making, and control, whether or not that information is for marketing, accounting, or some other functional area in the organization. To accomplish this task, many companies are now using large (and expensive) **enterprise resource planning (ERP) system** software packages to integrate their information subsystems into one application. An example of such a software product is *SAP ERP*, which combines accounting, manufacturing, and human resource subsystems into an enterprise-wide information system—that is, a system that focuses on the *business processes* of the organization as a whole. We discuss these systems in more depth in Chapter 15.

SAP, SAS Institute, IBM, and Oracle have recognized the need for integrated information and therefore developed business intelligence software to meet this need. The latest innovation is **predictive analytics**, which these software developers are adding into their main software suites. Predictive analytics includes a variety of methodologies that managers might use to analyze current and past data to help predict future events. In March 2010, IBM opened a predictive analytics lab in China, which is the latest in an estimated $12 billion commitment to build out IBM's analytics portfolio.[2]

Case-in-Point 1.2 Accountants and other managers are using predictive analytics, a technique that takes advantage of data stored in data warehouses, to create systems that allow them to use their data to improve performance. FedEx uses these tools to determine how customers will react to proposed price changes or changes in service. The police force in

[2] http://itmanagement.earthweb.com/features/article.php/3872536/Business-Intelligence-Software-and-Predictive-Analytics.html