

WILEY

# CORE CONCEPTS OF Accounting Information Systems

Thirteenth Edition

Mark G. Simkin, Ph.D.

Professor Department of Information Systems University of Nevada

Jacob M. Rose, Ph.D.

Trustee Professor Department of Accountancy Bentley University

Carolyn Strand Norman, Ph.D., CPA

Professor Department of Accounting Virginia Commonwealth University



VICE PRESIDENT & PUBLISHER
EXECUTIVE EDITOR
SPONSORING EDITOR
PROJECT EDITOR
ASSISTANT EDITOR
SENIOR EDITORIAL ASSISTANT
MARKETING MANAGER
PHOTO EDITOR
ASSOCIATE PRODUCTION MANAGER
PRODUCTION EDITOR

George Hoffman
Joel Hollenbeck
Mary O'Sullivan
Ellen Keohane
Courtney Luzzi
Tai Harriss
Karolina Zarychta
James Russiello
Joyce Poh
Wanqian Ye
Kenji Ngieng
© traffic analyzer/iStockphoto

This book was set by Laserwords.

COVER DESIGNER

COVER CREDIT

Founded in 1807, John Wiley & Sons, Inc. has been a valued source of knowledge and understanding for more than 200 years, helping people around the world meet their needs and fulfill their aspirations. Our company is built on a foundation of principles that include responsibility to the communities we serve and where we live and work. In 2008, we launched a Corporate Citizenship Initiative, a global effort to address the environmental, social, economic, and ethical challenges we face in our business. Among the issues we are addressing are carbon impact, paper specifications and procurement, ethical conduct within our business and among our vendors, and community and charitable support. For more information, please visit our website: www.wiley.com/go/citizenship.

Copyright © 2015, 2012, 2010 John Wiley & Sons, Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923 (Web site: www.copyright.com). Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030-5774, (201) 748-6011, fax (201) 748-6008, or online at: www.wiley.com/go/permissions.

Evaluation copies are provided to qualified academics and professionals for review purposes only, for use in their courses during the next academic year. These copies are licensed and may not be sold or transferred to a third party. Upon completion of the review period, please return the evaluation copy to Wiley. Return instructions and a free of charge return shipping label are available at: www.wiley.com/go/returnlabel. If you have chosen to adopt this textbook for use in your course, please accept this book as your complimentary desk copy. Outside of the United States, please contact your local sales representative.

#### Library of Congress Cataloging-in-Publication Data

Simkin, Mark G.

Core concepts of accounting information systems / Mark G. Simkin, Ph.D., Professor, Department of Accounting and Information Systems, University of Nevada, Jacob M. Rose, Ph.D., Trustee Professor, Department of Accountancy, Bentley University, Carolyn Strand Norman, Ph.D., CPA, Professor, Department of Accounting, Virginia Commonwealth University. — Thirteenth edition.

pages cm

Includes bibliographical references and index.

ISBN 978-1-118-74293-8 (pbk.)

- 1. Accounting-Data processing, 2. Information storage and retrieval systems-Accounting. I. Rose, Jacob M.
- II. Norman, Carolyn Strand. III. Title.

HF5679.M62 2015

657.0285-dc23

2014027300

Printed in the United States of America

10987654321

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 M.B.A. and Ph.D. degrees from the University of California, Berkeley. Before assuming his present position of professor in the Department of 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 journals such 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 ISACA Journal.

Jacob M. Rose received his B.B.A., M.S. in accounting, and Ph.D. in accounting from Texas A&M University, and he has passed the CPA exam in the state of Texas. Dr. Rose holds the position of trustee professor at Bentley University. He has also taught at Bryant University, Southern Illinois University, the University of New Hampshire, the University of Oklahoma, the University of Tennessee, and Victoria University of Wellington, and he was an auditor with Deloitte and Touche, LLP. Professor Rose has been recognized as the top instructor in accounting at multiple universities, and he has developed several accounting systems courses at the graduate and undergraduate levels. He is also a prolific researcher, publishing in journals such as *The Accounting Review*; Accounting, Organizations and Society, Behavioral Research in Accounting; Journal of Business Ethics, Journal of Information Systems, International Journal of Accounting Information Systems, Journal of Management Studies, and Accounting Horizons. Professor Rose has been recognized as the top business researcher at three universities, and he has received the Notable Contribution to the Information Systems Literature Award from the American Accounting Association.

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 co-authored 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 such journals as The Accounting Review, Accounting, Organizations and Society, Behavioral Research in Accounting, Journal of Accounting and Public Policy, Behaviour & Information Technology, Journal of Information Systems, Advances in Accounting Behavioral Research, Issues in Accounting Education, and Journal of Accounting Education. She is currently the 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, today's accountants use the many helpful features in spreadsheet software to build, analyze, and update spreadsheet models. Similarly, the Internet and mobile devices continue to change the way accountants work, communicate, obtain training, and access professional information.

Because most accounting systems are computerized, accountants must understand how hardware, software, and human procedures turn data into decision-useful financial information and also how to 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 it is certainly changing over time, but most accounting professionals believe that basic AIS concepts consist of 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. 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	10, 11, 12
IT Auditing	15
Database Concepts	7, 8, 9
Internal Control	13, 14
Management of Information Systems	4, 5, 6
Management Use of Information	1, 2, 5, 10, 11, 12
Systems Development Work	6
Technology of Information Systems	All chapters

#### About This Book

The content of AIS courses varies 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 that has little to do with the technical aspects of how systems gather, process, or store underlying accounting data.

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 upon 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 and content of the chapters permits *flexibility* in covering subject materials and allows instructors to omit chapters that students have covered in prior courses.

#### **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. Thus, each chapter begins with a list of learning objectives that emphasize the important subject matter of the chapter. This edition of the book also includes many new real world Casesin-Point, which we include to illustrate a particular concept or procedure. Each chapter also includes a more-detailed real-world case as an end-of-chapter AlS-at-Work feature.

Each chapter ends with a summary and a list of key terms. To help students understand the material, each chapter includes multiple-choice questions for self-review with answers. There are also three types of end-of-chapter exercises: (1) discussion questions, (2) problems, and (3) case analyses. 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.

The end-of-chapter materials include references and other resources that allow interested students to explore the chapter material in greater depth. In addition, instructors may wish to assign one or a number of articles listed in each chapter reference section to supplement chapter discussions. These articles are also an important resource for instructors to encourage students to begin reading such professional journals as Strategic Finance, The Journal of Accountancy, and The Internal Auditor. We also included a selection of current videos at the end of each chapter.

#### Supplements

There are a number of supplements that accompany this textbook. One is an instructor's manual containing suggested answers to the end-of-chapter discussion questions, problems, and case analyses. There is also a test bank consisting of true-false, multiplechoice, and matching-type questions, as well as short answer problems and fill-inthe-blank questions, so that instructors have a wide variety of choices. In addition, PowerPoint lecture slides accompany the text, and all of these materials can be accessed from the book's companion website at www.wiley.com/college/simkin.

#### What's New in the Thirteenth Edition?

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

- An expanded section in Chapter 1 describes career paths for accountants interested in predictive analytics, where acute shortages exist for qualified individuals.
- A new color—both inside and on the cover! This edition uses red to highlight information and to make the book more interesting to read.

- The book offers expanded coverage of important topics, such as big data, cloud computing, and the 2013 COSO Report, as well as updated information on the importance of XBRL and new uses of IT in the sales and purchasing processes.
- New material addresses topics such as e-accounting, accounting uses of social media, fraud detection with accounting data, virtual currencies, decision trees, and systems acquisition of small-scale ERP systems.
- Many new Case-in-Points illustrate the concepts discussed in the textbook and give students a better grasp of the material.
- New AIS at Work features at the end of many chapters help students better understand the impact of systems in a wide variety of contexts.
- More Test Yourself multiple choice questions help students assess their understanding of the chapter material.
- Many new discussion questions, problems, and cases at the end of chapters give instructors more choices of comprehensive assignments for students.
- · New links to video clips and recommended readings highlight important topics.

The end of the book contains an updated glossary of AIS terms.

#### Acknowledgements

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 revising this textbook. Next, we thank those instructors who read earlier drafts of this edition of our textbook and provided enormously valuable ideas and 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'd also like to thank the following people who provided feedback for the Thirteenth Edition:

Heather Carrasco, University of Alabama, Tuscaloosa Yining Chen, Western Kentucky University Lakshmi Chennupati, National University, Sacramento Gerald Childs, Waukesha County Technical College Roger Debreceny, University of Hawaii at Manoa Larry DeGaetano, Montclair State University Richard Green, Texas A&M University, San Antonio James Hay, Wilson College Betsy Haywood-Sullivan, Rider University Derek Jackson, Saint Mary's University of Minnesota Russell Jacques, Saint Leo University Ernest Kallenbach, University of Pittsburgh at Bradford Jacquleyne Lewis, Kaplan University A. Matsumoto, University of Hawaii, West Oahu Kevin McFarlane, University of Colorado, Denver Debra Moore, Dallas Baptist University Linda Parsons, University of Alabama Roxanne Phillips, Regis University

Gerard Ras, Wayne State College
Linda Russell, Rogers State University
Donna Simpson, The University of Scranton
Marilyn Stansbury, Calvin College
James Stavris, University of Hartford
Nolan Taylor, Indiana University and Purdue University
Sarah Thorrick, Loyola University, New Orleans
Tawei (David) Wang, University of Hawaii at Manoa

We sincerely appreciate the efforts of three additional individuals who helped us in various stages of this book: Ms. Sangeetha Parthasarathy, Ms. Amoolya Rao, and Ms. Paula Funkhouser. Sangeetha was our primary contact with our production contractor, and worked hard to implement our manuscript changes and create the preliminary and final page proofs for our book. Similarly, Amoolya tirelessly proofread major portions of our book. Finally, Paula helped us with our supplementary materials on this and several previous editions.

Lastly we thank our many students for the insightful feedback and useful suggsetions. We do listen!

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

# **CONTENTS**

	PTER 1 ountant/	Accounting Information Systems and the 1		Spam and Phishing/ 52 Firewalls, Intrusion Detection Systems,
1.1	Introducti Systems?	ion: Why Study Accounting Information ?/ 1		Value-Added Networks, and Proxy Servers/ 5.  Data Encryption/ 55
1.2	Careers in Tradition	n Accounting Information Systems/ 2 nal Accounting Career Opportunities/ 2		Digital Signatures and Digital Time Stamping/ 56
	Certified	s Consulting/ 2 I Fraud Examiner/ 3 tion Technology Auditing and Security/ 4	3.1	PTER 3 Cybercrime, Fraud, and Ethics/ 67 Introduction/ 67
1.3	Prediction Accounting	ve Analytics/ 5 ng and IT/ 6	3.2	Cybercrime and Fraud/ 68 Distinguishing Between Cybercrime and Fraud/ 68
	Manage	al Accounting/ 6 erial Accounting/ 9		Cybercrime Legislation/ 70 Cybercrime Statistics/ 72
1.4	Auditing Taxation	1/ 13	3.3	Examples of Cybercrime/ 73 Compromising Valuable Information/ 74
1.4	Account	e Accounting Information Systems? / 13 ting Information Systems / 13 e of Accounting Information Systems in		Hacking/ 75 Denial of Service/ 76
1.5	Organ	e of Accounting Information Systems in nizations/ 17 ew in Accounting Information	3.4	Preventing and Detecting Cybercrime and Fraud/ 78
1.0	Systems? Cloud Co	?/ 18 omputing—Impact for Accountants/ 18		Enlist Top-Management Support/ 79 Increase Employee Awareness and Education/ 79
	Suspicio	ability Reporting/ 19 ous Activity Reporting/ 20 c Accounting, Governmental Accountants,		Assess Security Policies and Protect Passwords/ 80
	and T	errorism/ 21 te Scandals and Accounting/ 21		Implement Controls/ 81 Identify Computer Criminals/ 82 Maintain Physical Security/ 83
CHA	PTER 2	Accounting on the Internet/ 33		Recognize the Symptoms of Employee Fraud/ 84 Use Data-Driven Techniques/ 85
2.1		ion/ 33 net and World Wide Web/ 34	2.5	Employ Forensic Accountants/ 86
	Internet Intranet	Addresses and Software/ 34 s and Extranets/ 35 rld Wide Web, HTML, and IDEA/ 36	3.5	Ethical Issues, Privacy, and Identity Theft/ 86 Ethical Issues and Professional Associations/ 87 Meeting the Ethical Challenges/ 88
	Groupw Blogs	rare, Electronic Conferencing, and s/36		Privacy/ 89 Company Policies with Respect to Privacy/ 89 Identity Theft/ 90
2.3	XBRL—Fi	Media and Its Value to Accountants/ 37 inancial Reporting on the Internet/ 38	CHV	PTER 4 Information Technology and AISs/ 99
		stance Documents and Taxonomies/ 38 nefits and Drawbacks of XBRL/ 40	4.1	Introduction/ 99
2.4	Electronic	rent Status of XBRL/ 41 c Business/ 42 unting/ 42	4.2	The Importance of Information Technology to Accountants/ 100 Six Reasons/ 100
	Retail S	ales/ 43 ents, E-Wallets, and Virtual	4.3	The Top 10 Information Technologies/ 101 Input, Processing, and Output Devices/ 102
	Curre Busines	encies/ 44 es-to-Business E-Commerce/ 46 nic Data Interchange (EDI)/ 47		Input Devices/ 102 Central Processing Units/ 108 Output Devices/ 110
2.5	Cloud C	omputing/ 47 and Security on the Internet/ 49	4.4	Secondary Storage Devices/ 111 Magnetic (Hard) Disks/ 112
		Theft and Privacy/ 49		CD-ROMs, DVDs, and Blu-Ray Discs/ 113 Flash Memory/ 114

	Image Processing and Record Management	2	Outsourcing/ 196
	Systems/ 114	6.6	Implementation, Follow-Up, and
4.5	Data Communications and Networks/ 115		Maintenance/ 197
	Communication Channels and Protocols/ 115		Implementation Activities/ 198
	Local and Wide Area Networks/ 116		Managing Implementation Projects/ 199
	Client/Server Computing/ 118		Postimplementation Review/ 202
	Wireless Data Communications/ 120		System Maintenance/ 202
	Cloud Computing/ 122	2000	
4.6	Computer Software/ 122	CHA	PTER 7 Database Design/ 215
	Operating Systems/ 123	7.1	Introduction/ 215
	Application Software/ 124	7.2	An Overview of Databases/ 215
	Programming Languages/ 125		What Is a Database?/ 216
			Significance of Databases/ 216
CHA	PTER 5 Documenting Accounting Information		Storing Data in Databases/ 218
	ems/ 139		Additional Database Issues/ 220
		7.3	Steps in Developing a Database Using the Resources,
5.1	Introduction/ 139		Events, and Agents (REA) Approach/ 223
5.2	Why Documentation is Important/ 140		Step 1—Identify Business and Economic
5.3	Primary Documentation Tools/ 143		Events/ 223
	Data Flow Diagrams/ 144		Step 2—Identify Entities/ 224
	Document Flowcharts/ 149		Step 3—Identify Relationships/ 225
	System Flowcharts/ 153		Step 4—Create Entity-Relationship
	Process Maps/ 156		Diagrams/ 227
5.4	Other Documentation Tools/ 158		Step 5—Identify Attributes of Entities/ 227
	Program Flowcharts/ 159		Step 6—Convert E-R Diagrams into Database
	Decision Tables and Decision Trees/ 160		Tables/ 229
	Software Tools for Graphical Documentation and	7.4	Normalization/ 230
	SOX Compliance/ 162	7.7	First Normal Form/ 231
5.5	End User Computing and Documentation/ 164		Second Normal Form/ 232
	The Importance of End User Documentation/ 165		Third Normal Form/ 233
	Policies for end user Computing and		Tillia Notiliai Formy 233
	Documentation/ 166	CHA	PTER 8 Organizing and Manipulating the Data in
CHA	PTER 6 Developing and Implementing Effective		bases/ 243
	ounting Information Systems/ 179	8.1	Introduction/ 243
		8.2	Creating Database Tables in Microsoft
6.1	Introduction/ 179		Access/ 244
6.2	The Systems Development Life Cycle/ 180		Database Management Systems/ 244
	Four Stages in the Systems Development Life		An Introduction to Microsoft Access/ 244
	Cycle/ 180		Creating Database Tables/ 245
	Systems Studies and Accounting Information		Creating Relationships/ 247
	Systems/ 181	8.3	Entering Data in Database Tables/ 250
6.3	Systems Planning/ 182		Creating Records/ 250
	Planning for Success/ 182		Ensuring Valid and Accurate Data Entry/ 251
	Investigating Current Systems/ 183		Tips for Creating Database Tables and
6.4	Systems Analysis/ 184		Records/ 254
	Understanding Organizational Goals/ 184	8.4	Extracting Data from Databases: Data Manipulation
	Systems Survey Work/ 185		Languages (DMLs)/ 255
	Data Analysis/ 186		Creating Select Queries/ 255
	Evaluating System Feasibility/ 187		Creating Action Queries/ 258
6.5	Detailed Systems Design and Acquisition/ 189		Guidelines for Creating Queries/ 260
	Designing System Outputs, Processes, and		Structured Query Language (SQL)/ 260
	Inputs/ 189		Sorting, Indexing, and Database
	The System Specifications Report/ 192		Programming/ 261
	Choosing an Accounting Information		Online Analytical Processing (OLAP) and Data
	System/ 193		Mining/ 261

8.5	Cloud Databases and Data Warehouses/ 262 Cloud Databases/ 262 Data Warehouses/ 263		usiness Processes in Special Industries/ 349 Professional Service Organizations/ 350 Not-for-Profit Organizations/ 351 Health Care Organizations/ 352
СНУ	PTER 9 Database Forms and Reports/ 275		usiness Process Reengineering/ 354
9.1	Introduction/ 275		Why Reengineering Sometimes Fails/ 355
9.2	Forms/ 275		, , , , , , , , , , , , , , , , , , , ,
9.2	Creating Simple Forms/ 277	CHAPT	ER 12 Integrated Accounting and Enterprise
	Using Forms for Input and Output Tasks/ 280		re/ 363
	Subforms: Showing Data from Multiple		ntroduction/ 363
	Tables/ 281		ntegrated Accounting Software/ 364
	Concluding Remarks About Forms/ 283		Small Business Accounting Software/ 364
9.3	Reports/ 283		Mid-Range and Large-Scale Accounting
0.0	Creating Simple Reports/ 283		Software/ 367
	Creating Reports with Calculated Fields/ 287		Specialized Accounting Information
	Creating Reports with Grouped Data/ 289		Systems/ 367
	Concluding Remarks About Reports/ 291	12.3 E	nterprise-Wide Information Systems/ 368
	action and the state of the sta		Enterprise System Functionality/ 369
СНА	PTER 10 Accounting Information Systems and		The Architecture of Enterprise Systems/ 371
	ness Processes: Part I/ 301		Business Processes and ERP Systems/ 374
	Introduction/ 301		Benefits and Risks of Enterprise Systems/ 375
	Business Process Fundamentals/ 302		electing a Software Package/ 377
10.2	Overview of the Financial Accounting Cycle/ 302		When Is a New AIS Needed? 378
	Coding Systems/ 303		Selecting the Right Accounting Software/ 378
10.3	Collecting and Reporting Accounting	CHART	ER 13 Introduction to Internal Control
	Information/ 304		
	Designing Reports/ 305		ns/ 391
	From Source Documents to Output Reports/ 306		ntroduction/ 391
10.4	The Sales Process/ 307		Definition of Internal Control/ 392 Internal Control Systems/ 393
	Objectives of the Sales Process/ 308		oso Internal Control—Integrated
	Inputs to the Sales Process/ 311		ramework/ 393
	Outputs of the Sales Process/ 312		1992 COSO Report/ 393
10.5	The Purchasing Process/ 313		2013 COSO Report/ 395
	Objectives of the Purchasing Process/ 314		nterprise Risk Management/ 396
	Inputs to the Purchasing Process/ 315		2004 ERM Framework/ 396
	Outputs of the Purchasing Process/ 318		Using the 2004 ERM Framework/ 398
10.6	Current Trends in Business Processes/ 320		xamples of Control Activities/ 400
	Business Process Outsourcing (BPO)/ 321		Good Audit Trail/ 400
	Business Process Management Software/ 322		Sound Personnel Policies and Procedures/ 401
			Separation of Duties/ 402
	PTER 11 Accounting Information Systems and		Physical Protection of Assets/ 404
	ness Processes: Part II/ 333		Monitoring Internal Control Systems/ 408
	Introduction/ 333		Reviews of Operating Performance/ 408
11.2	The Resource Management Process/ 334		COSO Guidance on Monitoring/ 408
	Human Resource Management/ 334		Operating Performance vs. Monitoring/ 408
44.0	Fixed Asset Management/ 337		2012 COBIT, Version 5/ 409
11.3	The Production Process/ 340		ypes of Controls/ 411
	Objectives of the Production Process/ 340		Preventive Controls 411
	Inputs to the Production Process/ 344		Detective Controls 412
11 /	Outputs of the Production Process/ 345 The Financing Process/ 346		Corrective Controls/ 412 valuating Controls/ 412
11.4	Objectives of the Financing Process/ 346	10.7 E	Requirements of the Sarbanes-Oxley Act/ 413
	Inputs to the Financing Process/ 348		Cost-Benefit Analysis/ 413
	Outputs of the Financing Process/ 348		A Risk Matrix/ 415

# CHAPTER 14 Computer Controls for Organizations and Accounting Information Systems/ 425

- 14.1 Introduction/ 425
- 14.2 Enterprise-Level Controls/ 426
  Risk Assessment and Security Policies/ 427
  Designing a Security Policy/ 427
  Integrated Security for the Organization/ 427
- 14.3 General Controls for Information Technology/ 428
  Access to Data, Hardware and Software/ 429
  Personnel Policies to Protect Systems and
  Data/ 434
  Additional Policies to Protect Systems and
  Data/ 436
- 14.4 Application Controls for Transaction Processing/ 442 Input Controls/ 443 Processing Controls/ 446 Output Controls/ 448

#### CHAPTER 15 Information Technology Auditing/ 459

- 15.1 Introduction/ 459
- 15.2 The Audit Function/ 460
  Internal versus External Auditing/ 460
  Information Technology Auditing/ 461

- Evaluating the Effectiveness of Information Systems
  Controls/ 464
- 15.3 The Information Technology Auditor's Toolkit/ 466 Auditing Software/ 466 People Skills/ 468
- 15.4 Auditing Computerized Accounting Information
  Systems/ 469
  Testing Computer Programs/ 469
  Validating Computer Programs/ 471
  Review of Systems Software/ 472
  Validating Users and Access Privileges/ 473
  Continuous Auditing/ 474
- 15.5 Information Technology Auditing Today/ 476
  Information Technology Governance/ 476
  The Sarbanes-Oxley Act of 2002/ 476
  Auditing Standards No. 5 (AS 5)/ 478
  Third-Party and Information Systems Reliability
  Assurances/ 478

Glossary/ (Available online at http://www.wiley.com/college/simkin)

Index/ 487

# Chapter 1

# Accounting Information Systems and the Accountant

After reading this chapter, you will:

- 1. *Better understand* the huge impact information technology (IT) has on the accounting profession and why you need to study accounting information systems.
- 2. Be familiar with career opportunities that combine accounting and IT knowledge and skills.
- 3. Learn how IT influences accounting systems.
- 4. Understand how financial reporting is changing with advances in IT, such as XBRL.
- 5. Appreciate how accountants use business intelligence for decision-making.
- 6. Be aware of what is new in the area of accounting information systems.
- 7. Be able to distinguish between such terms as "systems," "information systems," "information technology," and "accounting information systems."

"Cloud computing ... It's about reallocating the IT budget from maintenance—such as keeping servers running, performing upgrades, and making backups—to actually improving business processes and delivering innovation to the finance organization."

Gill, R. 2011. Why cloud computing matters to finance. Strategic Finance 92(7): 43–47.

# 1.1 INTRODUCTION: WHY STUDY ACCOUNTING INFORMATION SYSTEMS?

This chapter begins by answering the question "why should you study accounting information systems?" There are many reasons, but one of the most important is because of 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 savvy. A large number of specialized and highly compensated employment opportunities are only available to those students who possess an integrated understanding of accounting and information systems and can bring that understanding to bear on complicated business decisions.

Think about it. When is the last time you went into a bank, filled out a piece of paper to withdraw cash from your bank account, and then stood in line waiting for a teller to help you? When is the last time you went to a travel agency to ask someone to find you an airline ticket for your spring break vacation to Florida or the Virgin Islands?

Or when is the last time you stood in line to fill out paperwork for the courses you wanted to take for next semester? Most likely, the answer to each of these questions is "never." And that is because of IT. Information technology is so pervasive today that it is nearly impossible to do anything that does not in some way involve technology. So ask yourself the question, "how can you possibly be a successful accountant if you do not have a basic understanding of how technology influences the profession?"

#### 1.2 CAREERS IN ACCOUNTING INFORMATION SYSTEMS

Our introductory remarks to this chapter suggest a variety of reasons why you should study accounting information systems (AISs). Of them, perhaps the most interesting to students is the employment opportunities available to those who understand both accounting and information systems.

#### **Traditional Accounting Career Opportunities**

Certainly, a number of traditional accounting jobs are available to those who choose to study accounting as well as accounting information systems. Because technology plays such a strong role in internal auditing, public accounting, managerial accounting, auditing, and taxation, AIS majors enjoy the advantage of understanding both traditional accounting concepts and information systems concepts. Recognizing the importance to accountants of knowledge about information systems, the American Institute of Certified Public Accountants (AICPA) developed a new designation: Certified Information Technology Professional (CITP), which accountants can earn if they have business experience and if they pass an examination.

#### **Systems Consulting**

A consultant is an outside expert who helps an organization solve problems or who provides technical expertise on an issue. **Systems consultants** provide help with issues concerning information systems—for example, by helping an organization design a new information system, select computer hardware or software, or reengineer business processes so that they operate more effectively.

One of the most important assets a consultant brings to the job is an objective view of a client's organization and its processes and goals. AIS students who are skilled in both accounting and information systems are particularly competent systems consultants because they understand how data flow through accounting systems as well as how business processes function. Systems consultants can help a variety of organizations, including professional service organizations, private corporations, and government agencies. This broad work experience, combined with technical knowledge about hardware and software, can be a valuable asset to CPA clients. Because it is likely that a newly designed system will include accounting-related information, a consultant who understands accounting is particularly helpful. Many systems consultants work for large professional service organizations, such as Accenture or Cap Gemini Ernst & Young. Others may work for specialized organizations that focus on the custom design of accounting information systems.

Consulting careers for students of accounting information systems also include jobs as value-added resellers (VARs). Software vendors license VARs to sell a particular

software package and provide consulting services to companies, such as help with their software installation, training, and customization. That is, VARs are individuals who take a product and add value to the product for their customers, which might include such services as strategic planning, system design and implementation, technical support, database development, and other similar services. A VAR may set up a small one-person consulting business or may work with other VARs and consultants to provide alternative software solutions to clients.

Case-in-Point 1.1 American Management Technology (AMT) is a locally owned computer business in Chesterton, Indiana and provides both computer products and services to small businesses. It is especially focuses on providing network systems and services to small and medium-sized businesses. Its services include design and installation of network systems, training, and support. The staff at AMT consists of several technicians with over a combined 70 years of experience serving the Northwest Indiana computing community.1

#### **Certified Fraud Examiner**

Due to increased concerns about terrorism and corporate fraud, forensic accounting is an important area for accountants to study and develop their skills. An accountant can acquire the Certified Fraud Examiner (CFE) certification by meeting the qualifications of the Association of Certified Fraud Examiners. To become a Certified Fraud Examiner, an individual must first meet the following qualifications: have a bachelor's degree, at least two years of professional experience in a field either directly or indirectly related to the detection or deterrence of fraud, be of high moral character, and agree to abide by the bylaws and code of professional ethics of the ACFE. If these are met, then the individual may apply for the CFE examination.

You might be asking yourself what sort of professional experience might be useful if you wish to satisfy the two-year requirement for certification. Not surprisingly, these jobs may be located within CPA firms across the Unites States, as well as within international public accounting firms. Other such positions might include working within a for-profit organization as an internal auditor, with a valuation expert in a law firm, with an FBI or CIA agent, or as an auditor for Medicaid, Medicare, or many other government organizations.

The salary ranges and possible job locations are varied. Most positions will likely be located in larger metropolitan areas, but may also be found in mid-sized cities. From the chart below (Figure 1-1) you can see that the salary ranges include several levels of positions in the internal audit area. Why do you think that might be the case?

Job Title	Salary Range
Fraud Investigator	\$39,551-91,715
Senior Internal Auditor	\$53,424-90,613
Internal Auditing Manager	\$74,441-111,778
Internal Auditor	\$42,971-76,480
Senior Auditor	\$50,848-95,600

FIGURE 1-1 Examples of job titles and pay range for CFEs. Source: PayScale.com, Average Salary for Certification: Certified Fraud Examiner (CFE), accessed March 2014.

<sup>&</sup>lt;sup>1</sup> AMT Computers, Chesterton, Indiana, accessed from www.amtcomputers.com, March 2014.

#### Assurance Services

- · Financial statement attestation
- · Internal control reporting
- Assess procedures and controls concerning privacy and confidentiality, performance measurement, systems reliability, outsourced process controls, information security

Business Risk Services
Fraud Investigation and Dispute Services
Technology and Security Risk Services
Specialty Advisory Services

**FIGURE 1-2** A sample of the many types of services offered by Ernst & Young LLP, one of the largest international professional service organizations.

Essentially, fraud occurs where there are weak internal controls or when a manager or employee circumvents the internal controls that are in place. A more detailed explanation of internal controls is contained in Chapters 13 and 14.

#### Information Technology Auditing and Security

**Information technology (IT) auditors** focus on the risks associated with computerized information systems. These individuals often work closely with financial auditors to assess the risks associated with automated AISs—a position in high demand because almost all systems are now computerized. Information systems auditors also help financial auditors decide how much time to devote to auditing each segment of a company's business. This assessment may lead to the conclusion that the controls within some portions of a client's information systems are reliable and that less time need be spent on them—or the opposite. Due to the growing need for this type of auditor, we devote an entire chapter to IT auditing—Chapter 15.

IT auditors are involved in a number of activities apart from assessing risk for financial audit purposes. Many of these auditors work for professional service organizations, such as Ernst & Young, PricewaterhouseCoopers, or KPMG. Figure 1-2 identifies a partial listing of the types of services offered by Ernst & Young.

IT auditors might be CPAs, or they might be licensed as **Certified Information Systems Auditors (CISAs)**—a certification given to professional information systems auditors by the **Information Systems Audit and Control Association (ISACA)**. To become a CISA, you must take an examination and obtain specialized work experience. Many CISAs have accounting and information systems backgrounds, although formal accounting education is not required for certification. IT auditors help in documenting and evaluating IT controls.

According to the ISACA website, there is a growing demand for employees who have IS audit, control, and security skills. The CISA certification is therefore in high demand worldwide because these individuals: (1) are qualified, experienced professionals; (2) provide the enterprise with a certification for IT assurance that is recognized by multinational clients, lending credibility to the enterprise; (3) have proficiency in technology controls; (4) demonstrate competence in five domains, including standards and practices; organization and management; processes; integrity, confidentiality, and availability; and software development, acquisition, and maintenance; (5) demonstrate a commitment to providing the enterprise with trust in and value from information