教育部高等教育司推荐
国外优秀信息科学与技术系列教学用书

系统分析与设计方法

（第七版　影印版）

SYSTEMS ANALYSIS & DESIGN for the Global Enterprise

(Seventh Edition)

Lonnie D. Bentley
Jeffrey L. Whitten

Mc Graw Hill Education

高等教育出版社
Higher Education Press

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序

20世纪末，以计算机和通信技术为代表的信息科学和技术对世界经济、科技、军事、教育和文化等产生了深刻影响。信息科学技术的迅速普及和应用，带动了世界范围信息产业的蓬勃发展，为许多国家带来了丰厚的回报。

进入21世纪，尤其随着我国加入WTO，信息产业的国际竞争将更加激烈。我国信息产业虽然在20世纪末取得了迅猛发展，但与发达国家相比，甚至与印度、爱尔兰等国家相比，还有很大差距。国家信息化的发展速度和信息产业的国际竞争能力，最终都将取决于信息科学技术人才的质量和数量。引进国外信息科学和技术优秀教材，在有条件的学校推动开展英语授课或双语教学，是教育部为加快培养大批高质量的信息技术人才采取的一项重要举措。

为此，教育部要求由高等教育出版社首先开展信息科学和技术教材的引进试点工作。同时提出了两点要求，一是要高水平，二是要低价格。在高等教育出版社和信息科学技术引进教材专家组的努力下，经过比较短的时间，第一批引进的20多种教材已经陆续出版。这套教材出版后受到了广泛的好评，其中有不少是世界信息科学技术领域著名专家、教授的经典之作和反映信息科学技术最新进展的优秀作品，代表了目前世界信息科学技术教育的一流水平，而且价格也是最优惠的，与国内同类自编教材相当。

这项教材引进工作是在教育部高等教育司和高教社的共同组织下，由国内信息科学技术领域的专家、教授广泛参与，在对大量国外教材进行多次遴选的基础上，参考了国内和国外著名大学相关专业的课程设置进行系统引进的。其中，John Wiley公司出版的贝尔实验室信息科学研究中心副总裁Silberschatz教授的经典著作《操作系统概念》，是我们经过反复谈判，做了很多努力才得以引进的。William Stallings先生曾编写了在美国深受欢迎的信息科学技术系列教材，其中有多种教材获得过美国教材和学术著作者协会颁发的计算机科学与工程教材奖，这批引进教材中就有他的两本著作。留美中国学者Jiawei Han先生的《数据挖掘》是该领域中具有里程碑意义的著作。由达特茅斯学院Thomas Cormen和麻省理工学院、哥伦比亚大学的几位学者共同编著的经典著作《算法导论》，在经历了11年的锤炼之后于2001年出版了第二版。目前任教于美国Massachusetts大学的James Kurose教授，曾在美国三所高校先后10次获得杰出教师或杰出教学奖，由他主编的《计算机网络》出版后，以其体系新颖、内容

先进而倍受欢迎。在努力降低引进教材售价方面，高等教育出版社做了大量和细致的工作。这套引进的教材体现了权威性、系统性、先进性和经济性等特点。

教育部也希望国内和国外的出版商积极参与此项工作，共同促进中国信息技术教育和信息产业的发展。我们在与外商的谈判工作中，不仅要坚定不移地引进国外最优秀的教材，而且还要千方百计地将版权转让费降下来，要让引进教材的价格与国内自编教材相当，让广大教师和学生负担得起。中国的教育市场巨大，外国出版公司和国内出版社要通过扩大发行数量取得效益。

在引进教材的同时，我们还应做好消化吸收，注意学习国外先进的教学思想和教学方法，提高自编教材的水平，使我们的教学和教材在内容体系上，在理论与实践的结合上，在培养学生的动手能力上能有较大的突破和创新。

目前，教育部正在全国35所高校推动示范性软件学院的建设和实施，这也是加快培养信息科学技术人才的重要举措之一。示范性软件学院要立足于培养具有国际竞争力的实用性软件人才，与国外知名高校或著名企业合作办学，以国内外著名IT企业为实践教学基地，聘请国内外知名教授和软件专家授课，还要率先使用引进教材开展教学。

我们希望通过这些举措，能在较短的时间，为我国培养一大批高质量的信息技术人才，提高我国软件人才的国际竞争力，促进我国信息产业的快速发展，加快推动国家信息化进程，进而带动整个国民经济的跨越式发展。

教育部高等教育司

二〇〇二年三月

Dedication

To my lovely wife Cheryl and my children Robert, Heath, and Coty. To my coauthor and good friend Jeff and our twenty years of writing side by side.

–Lonnie

To my father. You instilled in me the work ethic, perseverance, and curiosity for knowledge that has made this book possible.

–Jeff

> Intended Audience

Systems Analysis and Design for the Global Enterprise, seventh edition, is intended to support one or more practical courses in information systems development. These courses are normally taught to both information systems and business majors at the sophomore, junior, senior, or graduate level.

We recommend that students take a computer- and information systems–literacy course before using this text. While not required or assumed, a programming course can significantly enhance the learning experience provided by this textbook.

> Why We Wrote This Book

More than ever, today's students are "consumer-oriented," due in part to the changing world economy, which promotes quality, competition, and professional currency. They expect to walk away from a course with more than a grade and a promise that they'll someday appreciate what they've learned. They want to "practice" the application of concepts, not just study applications of concepts. We wrote this book (1) to balance the coverage of concepts, tools, techniques, and their application, (2) to provide the most examples of system analysis and design deliverables available in any book, and (3) to balance the coverage of classic methods (such as *structured analysis* and *information engineering*) and emerging methods (e.g., *object-oriented analysis, agile development,* and *rapid application development*). Additionally, our goal is to serve the reader by providing a postcourse, professional reference for the best current practices.

We have written the book using a lively, conversational tone. This approach (and the numerous examples) delivers a comprehensive text that still connects with the student throughout the learning process.

> Changes for the Seventh Edition

- **Reorganization for Better Clarity:** The object-oriented analysis chapter has become Chapter 10 to better position it alongside the structured analysis chapters (Chapters 8 and 9). Other chapters have been reorganized internally. For example, Chapter 9, in response to reviewer comments, has undergone extensive reorganization. Also, the discussion of sequential versus iterative development has been moved to Chapter 3 to place it with related methodology concepts.
- **Expanded Object-Oriented Coverage:** As object-oriented analysis and design grows in importance, coverage continues to increase. The seventh edition more fully explains the object-oriented approach and tracks both where it follows the same path as the traditional, structured approach and where the two approaches part ways. The object-oriented analysis chapter (Chapter 10) features expanded coverage of activity diagrams. New to this edition in Chapter 10 is coverage of system sequence diagrams. Chapter 16 features expanded coverage of object-oriented design. Persistence and system design classes are discussed as well as entity, controller, and interface design classes. The discussion of sequence diagrams and CRC cards has been expanded, and their role in the design process explained more fully. Coverage of design patterns has been greatly expanded with a discussion of the Gang of Four patterns and an examination of two of the patterns.
- **UML 2.0:** Both Chapter 10 and Chapter 16 have been revised to cover the UML 2.0 specification. Each UML 2.0 diagram is listed with an explanation of its purpose. In Chapters 7, 10, and 16, five of the thirteen UML 2.0 diagrams are developed in depth and three more are shown and discussed.
- **Expanded Discussion of Feasibility:** The discussion of feasibility now includes legal feasibility and cultural (or political) feasibility as well as our traditional four tests of feasibility (operational, economic, schedule, and technical).
- **Use of Context Diagrams:** Even as the move away from data flow diagrams and to UML diagrams continues, the context diagram continues to be important as a

tool for understanding system scope. It has been added to the tools used in Chapter 5 and can be employed in the classroom as a first modeling assignment.

- **Updated Technology References:** The extensive references to example technologies has been continued in the seventh edition and updated to reflect technological changes, version updates, and mergers and acquisitions of technology companies.
- **Revision of the SoundStage Running Case:** The SoundStage case has been condensed, changed from a dialogue format to a narrative format, and integrated into the opening of each chapter. Featuring the perspective of a just-graduated systems analyst in his first assignment, SoundStage briefly introduces the concepts taught in each chapter and underscores their importance in a real systems project.

> Pedagogical Use of Color

The seventh edition continues the use of color applied to an adaptation of Zachman's *Framework for Information Systems Architecture*. The color mappings are displayed in the inside front cover of the textbook.

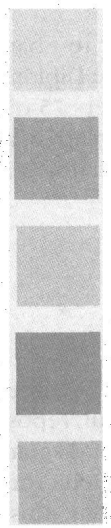
The information systems building blocks matrix uses these colors to introduce recurring concepts. System models then reinforce those concepts with a consistent use of the same colors.

> Organization

Systems Analysis and Design for the Global Enterprise, seventh edition, is divided into four parts. The text's organization is flexible enough to allow instructors to omit and resequence chapters according to what they feel is important to their audience. Every effort has been made to decouple chapters from one another as much as possible to assist in resequencing the material—even to the extent of reintroducing selected concepts and terminology.

Part One, "Developing Systems," presents the information systems development scenario and process. Chapters 1 through 4 introduce the student to systems analysts, other project team members (including users and management), information systems building blocks (based on the Zachman framework), a contemporary systems

Information Systems Framework
Color is used consistently throughout the text's framework to introduce recurring concepts.



represents methods

represents data and/or knowledge

represents process

represents communication/interface

represents people

development life cycle, and project management. Part One can be covered relatively quickly. Some readers may prefer to omit project management or delay it until the end of the book.

Part Two, "Systems Analysis Methods," covers the front-end life-cycle activities, tools, and techniques for analyzing business problems, specifying business requirements for an information system, and proposing a business and system solution. Coverage in Chapters 5 through 11 includes requirements gathering, use cases, data modeling with entity-relationship diagrams, process modeling with data flow diagrams, object-oriented analysis, and solution identification and the system proposal.

Part Three, "Systems Design Methods," covers the middle life-cycle activities, tools, and techniques. Chapters 12 through 16 include coverage of both general and detailed design, with a particular emphasis on application architecture, rapid development and prototyping, external design (interfaces), internal design (e.g., database and software engineering), and object-oriented design.

Part Four, "Beyond Systems Analysis and Design," is a capstone unit that places systems analysis and design into perspective by surveying the back-end life-cycle activities. Specifically, Chapters 17 examine system implementation.

> Supplements and Instructional Resources

It has always been our intent to provide a complete course, not just a textbook. We are especially excited about this edition's comprehensive support package. It includes software bundles and other resources for both the student and the instructor. The supplements for the seventh edition include the following components.

For the Instructor

Instructor's Manual with PowerPoint Presentations

The instructor's manual is offered on the *Instructor's CD-ROM*. This manual includes course planning materials, teaching guidelines and PowerPoint slides, templates, and answers to end-of-chapter problems, exercises, and minicases.

The PowerPoint presentations on the CD-ROM include over 400 slides. All slides are complete with instructor notes that provide teaching guidelines and tips. Instructors can (1) pick and choose the slides they wish to use, (2) customize slides to their own preferences, and (3) add new slides. Slides can be organized into electronic presentations or be printed as transparencies or transparency masters.

Test Bank

The *Instructor's CD-ROM* also includes an electronic test bank covering all the chapters. Computerized/Network Testing with Brownstone Diploma software is fully networkable for LAN test administration. Each chapter offers 75 questions in the following formats: true/false, multiple choice, sentence completion, and matching. The test bank and answers are cross-referenced to the page numbers in the textbook. A level-of-difficulty rating is also assigned to each question.

> Packages

System Architect Student Edition Version 8

An optional package combines the textbook, Student Resource CD, and a student version of System Architect. System Architect is a powerful, repository-based enterprise modeling tool which supports a comprehensive set of diagramming techniques and features, including all nine UML diagram types, business enterprise modeling, data modeling, business modeling with IDEFO and IDEF3 notations, plus many more.

Visible Analyst Workbench

Another optional package combines the textbook, Student Resource CD, and Visible Analyst Workbench. This tool integrates business function analysis, data modeling and database design, process modeling, and object modeling in one easy-to-use package. Print versions of each case can be ordered through McGraw-Hill's Custom Publishing group by visiting www.primiscontentcenter.com. A *build your own project* model is retained for instructors and students who want to maximize value by leveraging students' past and current work experience or for use with a live-client project.

Primis Content Center

Primis Online

Print versions of projects and cases, as well as other MIS content, can be ordered through McGraw-Hill's Custom Publishing Group.

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Jeffrey L. Whitten
Lonnie D. Bentley

郑重声明

Brief Contents

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