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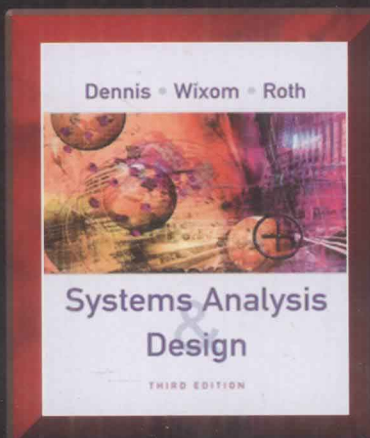


Systems Analysis and Design
Third Edition

系统分析与设计

(英文版·第3版)

Alan Dennis
[美] Barbara Haley Wixom 著
Roberta M. Roth



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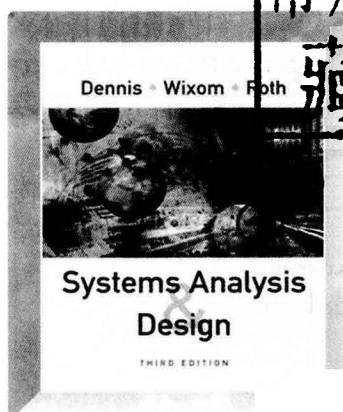
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内 容 提 要

本书是“系统分析与设计”课程的经典教材, 讲授了系统分析与设计的基本理论和知识点, 同时强调在实际项目中的应用以及其中的核心技能。全书共分为4个部分, 以整个信息系统开发生命周期为主线, 详细探讨了规划、分析、设计及实施4个阶段的活动。此外, 书中还涵盖了项目团队中需要的各种角色和技能, 以及面向对象技术, 并介绍了UML的主要元素。

本书适合作为高等院校计算机、信息系统等相关专业的本科生和研究生教材, 也可供一些软件开发人员尤其是系统分析师阅读。

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To Alec

To Chris, Haley, and Hannah

To Rich and the boys

PREFACE

PURPOSE OF THIS BOOK

Systems Analysis and Design (SAD) is an exciting, active field in which analysts continually learn new techniques and approaches to develop systems more effectively and efficiently. However there is a core set of skills that all analysts need to know—no matter what approach or methodology is used. All information systems projects move through the four phases of planning, analysis, design, and implementation; all projects require analysts to gather requirements, model the business needs, and create blueprints for how the system should be built; and all projects require an understanding of organizational behavior concepts like change management and team building.

This book captures the dynamic aspects of the field by keeping students focused on doing SAD while presenting the core set of skills that we feel every systems analyst needs to know today and in the future. This book builds on our professional experience as systems analysts and on our experience in teaching SAD in the classroom.

This book will be of particular interest to instructors who have students do a major project as part of their course. Each chapter describes one part of the process, provides clear explanations on how to do it, gives a detailed example, and then has exercises for the students to practice. In this way, students can leave the course with experience that will form a rich foundation for further work as a systems analyst.

OUTSTANDING FEATURES

A Focus on Doing SAD

The goal of this book is to enable students to do SAD—not just read about it, but understand the issues so they can actually analyze and design systems. The book introduces each major technique, explains what it is, explains how to do it, presents an example, and provides opportunities for students to practice before they do it for real in a project. After reading each chapter, the student will be able to perform that step in the system development life cycle (SDLC) process.

Rich Examples of Success and Failure

The book includes a running case about a fictitious company called CD Selections. Each chapter shows how the concepts are applied in situations at CD Selections. Unlike running cases in other books we have tried to focus these examples on planning, managing, and executing the activities described in the chapter, rather than on detailed dialogue between fictitious actors. In this way, the running case serves as a template that students can apply to their own work. Each chapter also includes numerous Concepts in Action boxes that describe how real companies succeeded—and failed—in performing the activities in the chapter. Many of these examples are drawn from our own experiences as systems analysts.

Incorporation of Object-Oriented Concepts and Techniques

The field is moving toward object-oriented concepts and techniques, both through UML, the new standard for object-oriented analysts and design, as well as by gradually incorporating object-oriented concepts into traditional techniques. We have taken two approaches to incorporating object-oriented analysis and design into the book. First, we have integrated several object-oriented concepts into our discussion of traditional techniques, although this may not be noticed by the students because few concepts are explicitly labeled as object-oriented concepts. For example, we include the development of use cases as the first step in process modeling (i.e., data flow diagramming) in Chapter 5, the use (and reuse) of standard interface templates and use scenarios for interface design in Chapter 10.

Second, and more obvious to students, we include a final chapter on the major elements of UML that can be used as an introduction to object-oriented analysts and design. This chapter can be used at the end of a course—while students are busy working on projects—or can be introduced after or instead of Chapters 6 and 7.

Real World Focus

The skills that students learn in a systems analysis and design course should mirror the work that they ultimately will do in real organizations. We have tried to make this book as “real” as possible by building extensively on our experience as professional systems analysts for organizations such as IBM, the U.S. Department of Defense, and the Australian Army. We have also worked with diverse industry advisory boards of IS professionals and consultants in developing the book and have incorporated their stories, feedback, and advice throughout. Many students who use this book will eventually use the skills on the job in a business environment, and we believe they will have a competitive edge in understanding what successful practitioners feel is relevant in the real world.

Project Approach

We have presented the topics in this book in the SDLC order in which an analyst encounters them in a typical project. Although the presentation is necessarily linear (because students have to learn concepts in the way in which they build on each other), we emphasize the iterative, complex nature of SAD as the book unfolds. The presentation of the material should align well with courses that encourage students to work on projects because it presents topics as students need to apply them.

Graphic Organization

The underlying metaphor for the book is doing SAD through a project. We have tried to emphasize this graphically throughout the book so that students better understand how the major elements in the SDLC are related to each other. First, at the start of every major phase of the system development life cycle, we have a graphic illustration that shows the major deliverables that will be developed and added to the “project binder” during that phase. Second, at the start of each chapter, we present a checklist of key tasks or activities that will be performed to produce the deliverables associated with this chapter. These graphic elements—the binder of deliverables tied to each phase and the task checklist tied to chapter—can help students better understand how the tasks, deliverables, and phases are related and flow from one to another.

Finally, we have highlighted important practical aspects throughout the book by marking boxes and illustrations with a “pushpin.” These topics are particularly important in the practical day-to-day life of systems analysts and are the kind of topics that junior analysts should pull out of the book and post on the bulletin board in their office to help them avoid costly mistakes!

WHAT'S NEW IN THE THIRD EDITION

The third edition contains several important enhancements, including some reorganized material and expanded coverage of several key topics. In addition, a new chapter organization graphic simplifies and strengthens the linkages between components of the SDLC.

In Part 1, Planning, the topic of economic feasibility has been revised and simplified. The explanation of function point analysis has been expanded. The critical path method has been added to the material on PERT.

In Part 2, Analysis, coverage of functional and nonfunctional requirements has been expanded. The relationship between functional requirements and use cases is stressed. To enhance the event-driven modeling approach, event-action lists have been introduced. The advanced data model syntax material has been moved earlier in the chapter, enhancing the utility. All data model notation has been converted to Crow's Foot. Coverage of the CRUD matrix has been moved to Chapter 7 to reinforce the concept of balancing the process and data models. In addition, a new extended example of process modeling and data modeling has been added as appendices to Chapter 6 (Process Modeling) and Chapter 7 (Data Modeling).

In Part 3, Design, some material has been reorganized. The discussion of moving from logical to physical process models has been moved to the Program Design chapter (now Chapter 11). Similarly, the material on moving from logical to physical data models has been moved to the Data Storage Design chapter (now Chapter 12). Chapter 8 now consists of two main sections: an outline of the work to be performed in the design phase with added emphasis on the System Specification deliverable, and a section on system acquisition strategies. Discussion of the use and interpretation of the weighted alternative matrix has been expanded, as well as the discussion of RFPs, RFIs, and RFQs.

In Part 4, Implementation, new emphasis is placed on the Migration Plan, consisting of three parts: preparing the organization, preparing the technology, and

preparing the people. Discussion of business contingency planning has been added to the migration plan coverage.

Finally, the coverage of Chapter 15 on object-oriented analysis and design has been updated with UML Version 2.0.

ORGANIZATION OF THIS BOOK

This book is organized by the phases of the Systems Development Life Cycle (SDLC). Each chapter has been written to teach students specific tasks that analysts need to accomplish over the course of a project, and the deliverables that will be produced from the tasks. As students complete the book, tasks will be “checked off” and deliverables will be completed and filed in a Project Binder. Along the way, students will be reminded of their progress using road maps that indicate where their current task fits into the larger context of SAD.

Chapter 1 introduces the SDLC and describes the roles and skills needed for a project team. Part 1 contains Chapters 2 and 3, which describe the first phase of the SDLC, the Planning Phase. Chapter 2 presents Project Initiation, with a focus on the System Request, Feasibility Analysis, and Project Selection. In Chapter 3 students learn about Project management, with emphasis on the Workplan, Staffing Plan, Project Charter, and Risk Assessment that are used to help manage and control the project.

Part Two presents techniques needed during the Analysis Phase. In Chapter 4, students are introduced to requirements determination and learn a variety of analysis techniques to help with Business Process Automation, Business Process Improvement, and Business Process Reengineering. Chapter 5 focuses on Use Cases, while Chapter 6 covers Process Models, and Chapter 7 explains Data Models and Normalization.

The Design Phase is covered in Part 3 of the textbook. In Chapter 8, students learn how to convert existing process and data models into physical representations of the To-Be system. They create an Alternative Matrix that compares custom, packaged, and outsourcing alternatives. Chapter 9 focuses on architecture design, which includes the Architecture Design, Hardware/Software Specification, and Security Plan. Chapter 10 focuses on the user interface and presents interface design, and students learn how to create the Interface Structure, Interface Standards, User Interface Template, and User Interface Design. Finally, the data storage and program designs are illustrated in Chapters 11 and 12, which contain information regarding the Data Storage Design, Program Structure Chart, and Program Specification.

The Implementation Phase is presented in Chapters 13 and 14. Chapter 13 focuses on system construction, and students learn how to build and test the system. It includes information about the Test Plan and User Documentation. Conversion is covered in Chapter 14, and students learn about the Conversion Plan, Change Management Plan, Support Plan, and the Project Assessment.

Chapter 15 provides a background of object orientation and explains several key object concepts supported by the standard set of object-modeling techniques used by systems analysts and developers. Then, we explain how to draw four of the most effective models in UML: the use-case diagram, the sequence diagram, the class diagram, and the behavioral state machine diagram.

SUPPLEMENTS

(www.wiley.com/college/dennis)

Online Instructors Manual

The Instructors manual provides resources to support the instructor both inside and out of the classroom:

- Short experiential exercises that instructors can use to help students experience and understand key topics in each chapter
- Short stories have been provided by people working in both corporate and consulting environments for instructors to insert into lectures to make concepts more colorful and real
- Additional mini-cases for every chapter allow students to perform some of the key concepts that were learned in the chapter.
- Answers to end of chapter questions and exercises are provided

Online Instructor's Resources

- PowerPoint slides that instructors can tailor to their classroom needs and that students can use to guide their reading and studying activities.
- Test Bank that includes a variety of questions ranging from multiple choice to essay style questions. A computerized version of the Test Bank is also available.

WebCT and Blackboard Courses

These online course management systems are tools that facilitate the organization and delivery of course materials on the Web. Easy to use, they provide powerful communication, loaded content, flexible course administration and sophisticated online testing and diagnostic systems.

Student Website

- Web Resources provide instructors and students with weblinks to resources that reinforce the major concepts in each chapter. See <http://www.wiley.com/college/dennis>.
- Web Quizzes help students prepare for class tests.

CASE Software

Three CASE (Computer-Aided Software Engineering) tools can be purchased with the text:

1. Oracle Database 10g and Oracle Development Suite 10g. This software is available under a "Development Sublicense" for personal development purposes only, and has no time restrictions or limitations.
2. Visible Systems Corporation's Visible Analyst Student Edition.
3. Microsoft's Visio
4. Microsoft Project

Contact your local Wiley sales representative for details, including pricing and ordering information.

Project Management Software

A 120-Day Trial Edition of Microsoft Project can be purchased with the textbook. Contact your local Wiley sales representative for details.

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