PEARSON Prentice Hall

大学计算机教育国外著名教材系列

影印版

Concise Prelude to Programming
Concepts and Design
Third Edition

程序设计基础
（第3版）

Stewart Venit
Elizabeth Drake 著

PEARSON Education

清华大学出版社

北京市版权局著作权合同登记号　图字: 01-2007-3195 号

图书在版编目(CIP)数据

程序设计基础 = Concise Prelude to Programming: Concepts and Design 第 3 版：英文 /（美）维尼特（Venit, S.），（美）德雷克（Drake, E.）著. —影印本. —北京：清华大学出版社，2009.5
（大学计算机教育国外著名教材系列（影印版））
ISBN 978-7-302-19807-9

Ⅰ. 程…　Ⅱ. ①维…②德…　Ⅲ. 程序设计－高等学校－教材－英文　Ⅳ. TP311.1

中国版本图书馆 CIP 数据核字（2009）第 045636 号

责任印制：何　芊

出版发行：清华大学出版社　　**地　　址**：北京清华大学学研大厦 A 座
http:/ /www.tup.com.cn　　**邮　　编**：100084
社　总　机：010-62770175　　**邮　购**：010-62786544
投稿与读者服务：010-62776969, c-service@tup.tsinghua.edu.cn
质 量 反 馈：010-62772015, zhiliang@tup.tsinghua.edu.cn
印 刷 者：北京市昌平环球印刷厂
装 订 者：三河市兴旺装订有限公司
发 行 者：全国新华书店
开　　本：185×230　　**印张**：25.25
版　　次：2009 年 5 月第 1 版　　**印　　次**：2009 年 5 月第 1 次印刷
印　　数：1~3000
定　　价：39.00 元

本书如存在文字不清、漏印、缺页、倒页、脱页等印装质量问题，请与清华大学出版社出版部联系调换。联系电话：　010-62770177 转 3103　　产品编号：025771-01

出 版 说 明

进入21世纪，世界各国的经济、科技以及综合国力的竞争将更加激烈。竞争的中心无疑是对人才的竞争。谁拥有大量高素质的人才，谁就能在竞争中取得优势。高等教育，作为培养高素质人才的事业，必然受到高度重视。目前我国高等教育的教材更新较慢，为了加快教材的更新频率，教育部正在大力促进我国高校采用国外原版教材。

清华大学出版社从1996年开始，与国外著名出版公司合作，影印出版了“大学计算机教育丛书（影印版）”等一系列引进图书，受到国内读者的欢迎和支持。跨入21世纪，我们本着为我国高等教育教材建设服务的初衷，在已有的基础上，进一步扩大选题内容，改变图书开本尺寸，一如既往地请有关专家挑选适用于我国高校本科及研究生计算机教育的国外经典教材或著名教材，组成本套“大学计算机教育国外著名教材系列（影印版）”，以飨读者。深切期盼读者及时将使用本系列教材的效果和意见反馈给我们。更希望国内专家、教授积极向我们推荐国外计算机教育的优秀教材，以利我们把“大学计算机教育国外著名教材系列（影印版）”做得更好，更适合高校师生的需要。

清华大学出版社

Preface

Concise Prelude to Programming: Concepts & Design provides a language-independent introduction to programming concepts that helps students learn the following:

- General programming topics, such as data types, control structures, arrays, files, and subprograms
- Structured programming principles, such as top-down modular design and proper program documentation and style
- Basic tools and algorithms, such as data validation, defensive programming, sums and averages computation, and list searching and sorting

No prior computer or programming experience or any special knowledge of mathematics, finance, or other discipline is necessary.

Changes to the Third Edition

The third edition of *Concise Prelude to Programming: Concepts & Design* has undergone a thorough revision and expansion to give you an improved tool for teaching and learning programming concepts. No chapter went untouched. The major changes include the following:

- A new lively presentation—in writing style and text design—to make the book accessible to readers at different levels
- Line-by-line explanations of most pseudocode examples to help students analyze and design the logic and structure needed to solve programming problems
- Additional examples that are both practical and non-mathematical in nature in each chapter

- What and Why features that give students the opportunity to think above and beyond the material in the examples and encourage discussion and student interaction
- Examples of real code in C++ and Visual Basic that show students how pseudocode translates into real world programming
- An expanded Chapter 3 (selection structures) and Chapter 4 (repetition structures) with many more detailed examples
- A chapter presentation in which arrays are covered before data files; but the material has been written with the option for readers to cover the topics in reverse order
- Fully implementable C++ and Visual Basic code from the Focus on Problem Solving sections
- Retooled objectives to encourage active learning and to align better with Self Checks at the end of each section
- An additional section in Chapter 2 on external documentation
- An appendix of Study Skills guidelines
- A second color to show variables in code examples
- A Glossary of key terms

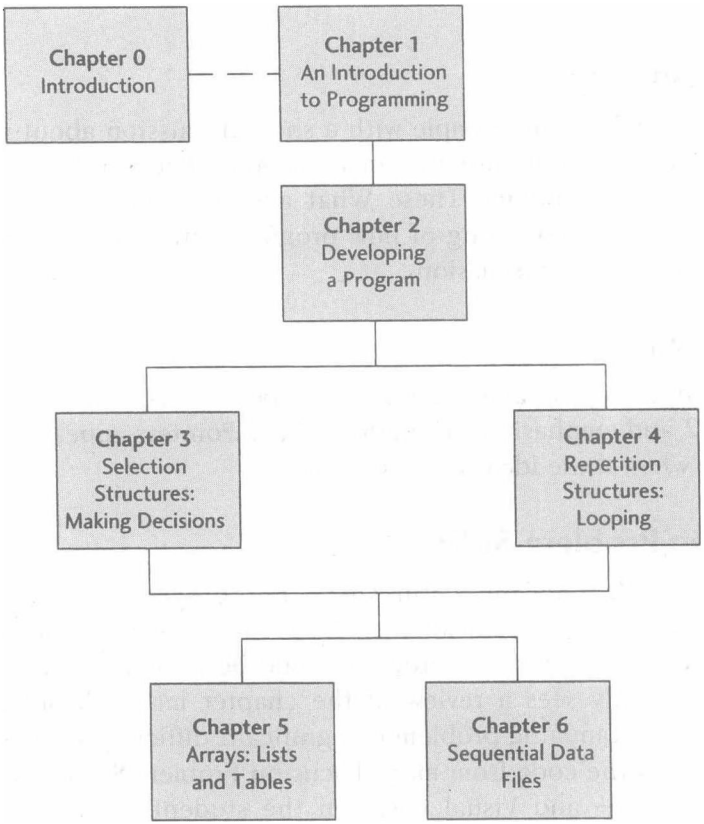
Organization of the Text

The text is organized to allow ample flexibility in the coverage of topics, as outlined in the Chapter Dependency section. Chapter 0 provides an overview of general computer concepts. Chapters 1 and 2 discuss important issues related to programming and program design, including the steps involved in the program development cycle and structured programming. Chapters 3 and 4 delve into the details of the basic programming control structures: sequence, selection (decisions), and repetition (loops). Chapter 5 focuses on how to use one- and two-dimensional arrays. Chapter 6 explains how to use data files for data manipulation and input.

Chapter Dependency

Chapter 0 may be skipped or assigned as background reading before starting Chapter 1. Chapters 1 through 4 should be covered before the following chapters, but Chapters 3 and 4 are independent of one another and may be taught in either order. Chapters 5 and 6 may also be covered in either order. Figure P.1 is a flowchart showing the interdependence of the chapters.

Figure P.1 Chapter Dependency Chart



Features of the Text

In the Everyday World

Each chapter after Chapter 0 begins with a discussion of how the material in the chapter relates to familiar things, such as "Decisions in the Everyday World." This material provides an introduction to the chapter, using an ordinary and easily understood topic, and establishes a foundation upon which to present programming concepts.

Making It Work

Making It Work features provide information about how to implement concepts in an actual high-level language such as C++ or Visual Basic. These

boxed features appear throughout the text and are self-contained and optional.

What and Why

Often we conclude an example with a short discussion about what would happen if the program were run, or what would happen if something were changed in the program. These What and Why features help students deepen their understanding of how programs run and they are useful in initiating classroom discussion.

Style Pointers

The concepts of programming style and documentation are introduced in Chapter 2 and emphasized throughout. Style Pointers appear in the text to illustrate when these ideas are discussed.

Focus on Problem Solving

Focus on Problem Solving features present a programming problem, analyze it, design a program to solve it, discuss appropriate coding considerations, and indicate how the program could be tested. In the process, the student not only sees a review of the chapter material, but also works through a programming problem of significant difficulty. Complete implementations of the code from many Focus on Problem Solving sections are available in C++ and Visual Basic on the student support Web site at http://www.aw.com/cssupport.

Exercises

The text contains the following diverse selection of exercises:

- **Self Checks** at the end of each section include several questions that test the student's understanding of the material covered in that section (answers are provided on the student support Web site).
- **Review Questions** at the end of each chapter include questions of various types that provide further review of the material covered in the chapter (answers to the odd-numbered questions are provided on the student support Web site; answers to the even-numbered questions are provided on the instructor support Web site).
- **Programming Problems** at the end of each chapter require the student to design programs that use material learned in that chapter

and certain previous chapters (solutions to some Programming Problems are provided on the student support Web site; solutions to most of the Programming Problems are provided on the instructor support Web site).

Study Skills Guidelines Appendix

Nine sets of guidelines to improve student study skills are provided in an appendix. Each set of guidelines has a specific theme; for example, Getting the Most Out of Class, Writing Programs, and Using the Textbook.

Supplements

Student Support Web Site

A variety of supplemental materials is available with the text. The following resources are available for all students at http://www.aw.com/cssupport:

- Answers to Self Checks
- Answers to odd-numbered Review Questions
- C++ and Visual Basic implementations for Focus on Problem Solving sections

Instructor's Supplements

The following supplements are available to qualified instructors from Addison-Wesley's Instructor's Resource Center. Please visit http://www.aw.com/irc or contact your campus Addison-Wesley representative to register.

- Student support materials
- Answers to even-numbered Review Questions
- Solutions to most Programming Problems
- Testbank
- PowerPoint slides

Acknowledgments

Just as there is no one right way to teach programming, there is no one right way to write a textbook about programming. In creating this book we were fortunate to have the following experienced instructors offer varied

points of view and numerous helpful suggestions. For the third edition, we thank the following people for taking the time to work with us:

William Bowers
The Pennsylvania State University, Berks

Xiomara Casado
Manatee Community College

Diane Cassidy
University of North Carolina, Charlotte

Lall Comar
Florida Community College, Jacksonville

Nicholas Duchon
University of Maryland, University College

James Fuller
Treasure Valley Community College

Patrick Hogan
Cape Fear Community College

Michael Kelly
Community College of Rhode Island

Robert Molnar
Indiana University, Purdue

David Morgan
Santa Monica College

Judy Scholl
Austin Community College

Joe Sherrill
Martin Community College

Melinda White
Seminole Community College

Julie Wright
Baker College

Over the years, many more people have been involved in the development of this text. They include the following: Colin Archibald, Heather K. Bloom, David W. Boyd, Ashraful Chowdhury, Ramona Coveny, Linda Denney, Elizabeth Dickson, Kathie Doole, Judy Dunn, Daniel L. Edwards, Jaime

Espinosa, Terry Felke-Morris, Terry Foty, Tom Friday, Susan Fulton, Carol Grimm, Bill Hammerschlag, John Humphrey, Chung Lee, Mike Matuszek, John W. Miller, Michael Passalacqua, Diane Perreault, Carol M. Peterson, Betty Reiter, Patty Santoianni, Philip Soward, Catherine D. Stoughton, Daniel R. Terrian, Peggy Watkins, and Marilyn Wildman.

The In the Everyday World essays, which provide a unique feature of this book, were envisioned and drafted by Bill Hammerschlag of Brookhaven College for the second edition, and remain in this edition.

The implementations of the code from the Focus on Problem Solving sections were created by Anton Drake from the University of Florida.

We want to extend a special thank you to Michael Hirsch, Executive Editor, who brought us together on this project and then consistently guided and encouraged us throughout, and Lindsey Triebel, Assistant Editor, who answered all our questions and provided support at every stage of the process. We are also indebted to the entire book team at Addison-Wesley, including Michelle Brown, Sarah Milmore, Marilyn Lloyd, Joyce Wells, Gillian Hall, Kathy Cantwell, Holly McLean-Aldis, and Jack Lewis.

—Stewart Venit and
Elizabeth Drake

I would like to thank my wife, Corinne, and my daughter, Tamara, for their patience and understanding; they never complained about the countless hours I spent seemingly glued to the computer keyboard while creating this book.

—Stewart Venit

I want to thank my coauthor, Stewart Venit. It was a pleasure to work with him and I am grateful for his advice, expertise, and feedback. Gillian Hall and Kathy Cantwell were especially patient with me and I am indebted to them for their gracious assistance. I also want to thank Anton and my colleague at Santa Fe Community College, Nancy McCurdy who were invaluable research assistants. And above all, I want to thank Severia, Anton, Frank, Justito, and Jacob, just for being my family. Their continuous encouragement and support have made it possible for me to do what I've always wanted to do—write.

—Elizabeth Drake

Brief Contents

Contents