

C Programming

Comments from Recent Editions Reviewers

“Of any C textbook on the market, the Deitel book easily provides the clearest and most in-depth approach to standard C programming for students of all abilities. With this book, my students have a tremendous resource that will enable them to succeed not only in my classroom but in the professional workplace for years to come.” — **William Smith, Tulsa Community College**

“The end-of-chapter exercises are worth their weight in gold if you are learning, and especially teaching, C.”
— **Jim Hogg, Program Manager, C/C++ Compiler Team, Microsoft Corporation**

“An excellent introductory computer science text. While C is a complex language, this book does a good job making this material accessible while providing a strong foundation for further learning.” — **Robert C. Seacord, Secure Coding Manager at SEI/CERT, author of The CERT C Secure Coding Standard and technical expert for the international standardization working group for C**

“The extended examples, along with the supporting text, are the best of any of the C texts I’ve seen. Running the code for the supplied examples in conjunction with reading the text provides students with a laboratory for gaining a thorough understanding of how C works.”
— **Tom Rethard, University of Texas at Arlington**

“It would be hard for anyone not to understand pointers clearly after reading this text!”
— **José Antonio González Seco, Parliament of Andalusia**

“A great introduction to the C programming language and software engineering. It’s fresh and up to date with modern software industry realities. Teaches pseudocode, flowcharts, algorithms and various approaches to problem solving. There are quite a few fun, involving exercises that make me want to code.” — **Vytautas Leonavicius, Microsoft Corporation**

More Comments Inside the Back Cover

Millions of students and professionals worldwide have learned programming with Deitel® books, videos, e-books, online articles, instructor-led training and resource centers. *C How to Program, 8/e* introduces procedural programming in C and object-oriented and generic programming in C++. It’s appropriate for introductory- and intermediate-level C and C++ programming courses. Features include:

- Rich coverage of fundamentals; real-world examples.
- Integrated features of the **C99** and **C11** standards.
- **Secure C Programming** sections.
- Code tested on **GNU gcc**, **Visual C++**®, **Xcode**® **LLVM**.
- **Debugging** with GNU gdb, Visual C++® and Xcode®.
- **Making a Difference** contemporary exercises.
- **Multithreading and multi-core performance**.
- **Detailed chapter summaries** with page references.
- **Problem solving**, data types, control statements, functions, arrays, pointers, strings, formatted I/O, structures, unions, bit manipulation, enumerations, files, data structures and preprocessor.
- **Searching and sorting** with an introduction to Big O.
- New treatment of **object-oriented programming** in C++ based on the Deitels’ *C++ How to Program, 9/e*.
- See the Preface for more.

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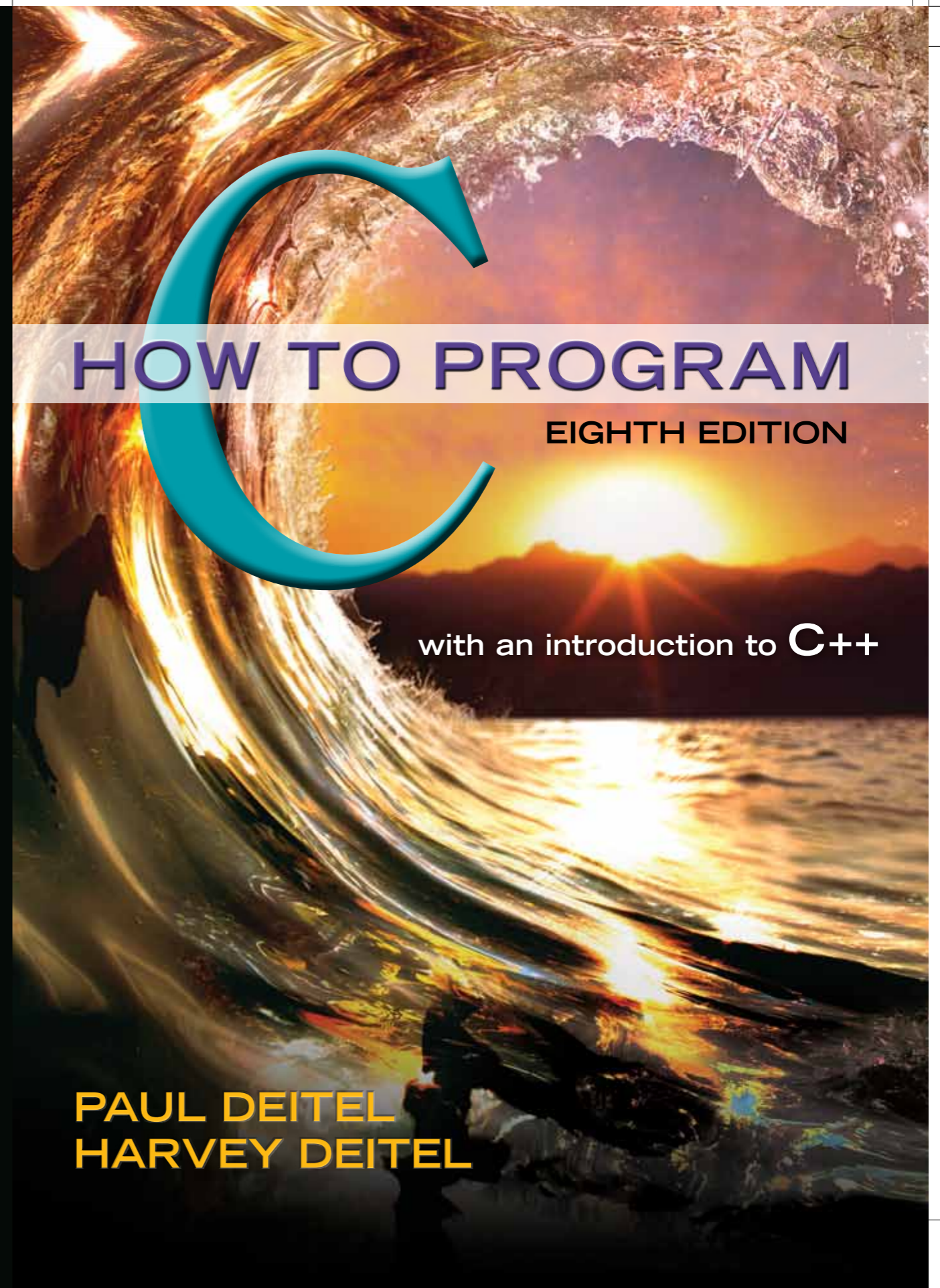
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with an introduction to C++

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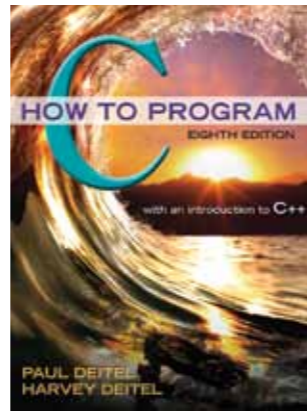


THE DEITEL® HOW TO PROGRAM SERIES

The DEITEL® HOW TO PROGRAM SERIES is designed for introductory- and intermediate-level college programming courses, and is widely used by professional programmers. The series presents focused treatments on a growing list of emerging and mature technologies, including C, Java™, C++, C#, Visual Basic®, JavaScript™, Internet and web development, Python®, Swift™, iOS® and Android™ app development and more. Each book in the series uses the Deitels' live-code teaching methodology—concepts are presented in the context of completely coded, fully tested apps with sample live executions.

ABOUT THIS BOOK

C is one of the most widely used programming languages in the world. It has influenced a whole family of object-oriented languages, including C++, Java™, C#, Objective-C® and, most recently, Apple's new programming language for iOS® and OS X® app development and systems programming—Swift™. *C How to Program, 8/e* provides rich coverage of programming fundamentals, focuses on problem-solving techniques, is up-to-date with the C99 and C11 standards and introduces important real-world concepts, such as secure C programming, multithreading and multi-core performance, and more. All of the C code was tested using the latest GNU gcc, Visual C++ and Xcode LLVM compilers. The book also includes a 300+ page introduction to object-oriented programming with C++ taken from the Deitels' book *C++ How to Program, 9/e*. If you're an instructor considering adopting this book for your classes or a student or professional programmer considering purchasing the book, you can quickly get the gist of the book by reading the back cover, the reviewer testimonials on the pages inside the back cover and the Preface.



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Additional Comments from Recent Editions Reviewers

“Excellent introduction to the C language and to computer programming in general. Covers essential topics that form the foundation of any education in computer science, as well as important practices from software engineering like approaches to software design and secure programming. Additionally, each chapter offers interesting exercises, ranging from classic algorithmic challenges like the Towers of Hanoi to addressing real-world, contemporary problems. Deftly covers an impressive scope without overwhelming the student, even when covering the trickiest parts of C. C possesses a depth that can be difficult to master. By presenting key concepts in a clear and easy-to-understand manner, the book gives students the opportunity to build their knowledge from the ground up to arrive at an understanding that goes beyond merely knowing the syntax.”

—Brandon Invergo, GNU/European Bioinformatics Institute

“This book teaches a beginning programmer how to write good C programs. Covers all the topics you would expect, explained in an easy, matter-of-fact style, with lots of examples. But it also covers topics you might not expect: recursion, algorithms, Big-O notation, abstract data types, tree traversals and multithreading—in that same style that makes them simple and natural. Another excellent feature is the long list of optional coding exercises at the end of each chapter. My favorites—writing a simulator for an invented machine; then writing a compiler for a small language that targets that machine simulator.”

—Jim Hogg, Program Manager, C/C++ Compiler Team, Microsoft Corporation

“Having reviewed programming books for nearly twenty 20 years, I recognize quality right from page 1. The first sign is the use of standard terminology. And yet, *C How To Program 8th Edition* offers much more: it discusses C11 and C99 features, an emphasis on secure C programming including Annex K (the so-called secure standard library functions), self-testing exercises, a summary of the topics discussed in each chapter and most importantly complete code listings that have been thoroughly tested and distilled. It's no secret that C intimidates novices. Its raw pointers, zero-based array indexes, unchecked arrays and funky strings are a fertile source of bugs and security loopholes. *C How To Program* addresses these issues without fear, presenting effective techniques for avoiding them. The main strength of this book is a clear, professional and reader-friendly style. Up-to-date, accurate and covers just about everything a C novice would need to know.”

—Danny Kalev, Certified System Analyst, C Expert and Former Member of the C++ Standards Committee

“A clear introduction to computing in general and to C programming in particular; it was nice to see context and history given before diving into the language. I liked the very up-to-date examples. A great job of introducing (in Chapter 2) the core concepts behind C programming. Good use of pseudocode. A good job covering the essentials of program structure. An excellent pointers chapter; pointers are the most difficult part of learning C and the topic is presented here in a very clear and easy-to-understand way; I particularly liked the clear explanation of the different “const” combinations. I also found the function pointers section to be easy to read; finally, the sometimes pesky notation for pointers (that is, where to put the *, where to put the const, when to put parentheses) is handled neatly; nice exercises, too (particularly, the Simpletron simulator one). The Strings chapter really shines with its exercises, especially the larger-scale ones. The Formatted I/O chapter is just right—it does a fine job of explaining the detailed features of printf and scanf. Structs are explained in a very clear way—the playing card example does a very good job illustrating their use. This chapter brings back very fond memories of learning data structures in C for the first time; it does a great job of covering those lessons in a clear and interesting way; with the exercises at the end, the usefulness of these structures should become readily apparent to the student, and implementing them should be fun practice. A good job of highlighting some of the pitfalls with using macros. Great introduction to sorting—the examples do a good job illustrating sort algorithms and make it clear why some are more efficient than others. A mixed topics chapter like Other Topics is really necessary (and, I might add, very interesting to read); many of the topics in this chapter together help to indicate how the code will interact with the ‘outside world’ of the OS—redirections, errors, build systems (make), command line, etc.—which is nice.”

—Brandon Invergo, GNU/European Bioinformatics Institute

“Chapter 2, overall, is an ideal chapter to start programming with—the text is clear, the terminology is accurate but never too technical/dense, the examples are realistic (for beginners) and every detail is explained without letting the reader scratch his head looking for answers—way to go! A good introduction to pointers, const declarations and the interaction between arrays and pointers—the pointer arithmetic section is very good. Covers well the str and mem function families. Explains the essential issues of stream I/O clearly with good examples. The File Processing chapter gets the balance right between technical details and simplicity. Data Structures is unquestionably one of the best chapters in the book—I really enjoyed reading it.”

—Danny Kalev, Certified System Analyst, C Expert and Former Member of the C++ Standards Committee

“Nice example on scoping. Good clear explanation of arrays—and especially good exercises. A really good pointers chapter; the exercises are particularly good, especially the Simpletron machine simulator, reaching some fundamental and interesting computer science; makes the book much richer than simply another C textbook. String exercises are innovative and challenging. Formatted input/output examples are good—much better to illustrate what's going on, than trying to parse the descriptions. Provides all the information required for a beginning C programmer to perform file I/O, which opens up the gateway to building realistic Apps. Good data structures chapter that guides the reader carefully thru using pointers and linked lists; the exercises are again excellent; I love the very last one on building your own compiler; by working through this example, the reader gets a good feel for the essence of how a compiler works—an exciting topic in computer science. The Other C Topics chapter contains a useful overview of advanced features. Great examples that show the evolution of each sort—it's a good, unscary, explanation of sorting techniques. Useful overview of what features arrived with C99 and C11—multithreading is the one that will impact readers most.”

—Jim Hogg, Program Manager, C/C++ Compiler Team, Microsoft Corporation

More Comments on Facing Page