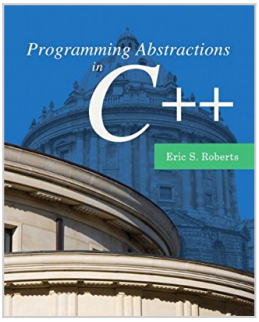

Programming Abstractions in C++

By Eric Roberts

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This text is intended for use in the second programming course

Programming is a matter of learning by doing. Eric Roberts' ***Programming Abstractions in C++*** gives students opportunities to practice and learn with engaging graphical assignments. A client-first approach to data structures helps students absorb, and then apply the material.

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This program presents a better teaching and learning experience—for you and your students. It will help:

- **Improve Student Comprehension with a Client-first Approach to Data Structures:** To aid in student understanding, this book presents the full set of collection classes early.
- **Defer the Presentation of C++ Features that Require a Detailed Understanding of the Underlying Machine:** Introducing collection classes early enables students to master other equally important topics without having to struggle with low-level details at the same time**.**
- **Engage Students with Exciting Graphical Assignments:** An open-source library supports graphics and interactivity in a simple, pedagogically appropriate way.
- **Support Instructors and Students:** The companion website provides source code, sample run PDFs, answers to review questions, and more.

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Editorial Review

From the Back Cover

Written by a master teacher and author of the highly acclaimed *The Art and Science of C*, this new book helps students master the fundamentals of data structures while encouraging them to develop strong software engineering skills. By emphasizing modern programming concepts such as interfaces, abstraction, and encapsulation, the text provides an ideal foundation for further study of programming. With his clear explanations and engaging writing style, Professor Roberts leads students through the CS2 curriculum in a way that captures and holds their interest throughout.

Highlights

- This book introduces several library packages to simplify the programming process, making it possible for students to concentrate on high-level conceptual issues without being distracted by the complexities of C.
- It contains an extensive discussion of recursion, including a large number of sample programs and exercises that range in difficulty from simple recursive functions to the minimax strategy for analyzing two-player games.
- It emphasizes the practical skills necessary to write solid, reusable code.

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About the Author

After receiving his Ph.D. in Applied Mathematics from Harvard University in 1980, Eric Roberts taught at Wellesley College from 1980-85, where he chaired the Computer Science Department. From 1985-90, he was a member of the research staff at Digital Equipment Corporation’s Systems Research Center in Palo Alto, California, where he conducted computer science research, focusing on programming tools for multiprocessor architectures. In September 1990, Roberts joined the Stanford faculty, where he is now Professor of Computer Science and the John A. and Cynthia Fry Gunn University Fellow in Undergraduate Education.

From 1990 to 2002, Professor Roberts was Associate Chair and Director of Undergraduate Studies for Computer Science. In that capacity, he was the principal architect of Stanford’s introductory programming sequence, which for many years held the distinction of being the largest course at Stanford. He has also written four computer science textbooks that are used at many colleges and universities throughout the world. His research focuses on computer science education, particularly for underserved communities. From 1998 to 2005, Roberts was Principal Investigator for the Bermuda Project, which developed the computer science curriculum for Bermuda’s public secondary schools.

While at Stanford, Professor Roberts has received several university- level teaching awards, including the Bing Fellowship, established “to recognize excellence in teaching and a committed interest to the teaching of undergraduates”; the Dinkelspiel Award, which recognizes “distinctive and exceptional contributions to undergraduate education”; and the Laurance and Naomi Carpenter Hoagland Prize, awarded for excellence in undergraduate teaching. In January 2002, Roberts was named one of the first eight University Fellows in Undergraduate Education, which are designed “to reward faculty who make truly outstanding contributions

to Stanford’s undergraduate experience.”

Professor Roberts has been active in professional organizations dedicated to computer science education. From 2005 to 2007, he served as co-chair of the Education Board of the Association of Computing Machinery (ACM) and was for many years on the board of the ACM Special Interest Group on Computer Science Education (SIGCSE). From 1998 to 2001, Roberts served as co-chair and principal editor for the ACM/IEEE- CS Joint Task Force on Computing Curricula 2001, which published a detailed set of curriculum guidelines in December 2001. He also chaired the ACM Java Task Force from 2004 to 2006. In 2003, Roberts received the SIGCSE Award for Outstanding Contribution to Computer Science Education. Professor Roberts is a Fellow of the ACM and the American Association for the Advancement of Science (AAAS).

Professor Roberts has also been active in several organizations seeking to promote socially responsible use of science and technology. He is past president of both Computer Professionals for Social Responsibility, a public-interest organization of computer scientists and other professionals concerned about the impact of computer technology on society, and Student Pugwash USA, which encourages students to use their training in science and technology to create a better world. In 1999-2000, Roberts was the Eugene M. Lang Visiting Professor for Social Change at Swarthmore College.

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