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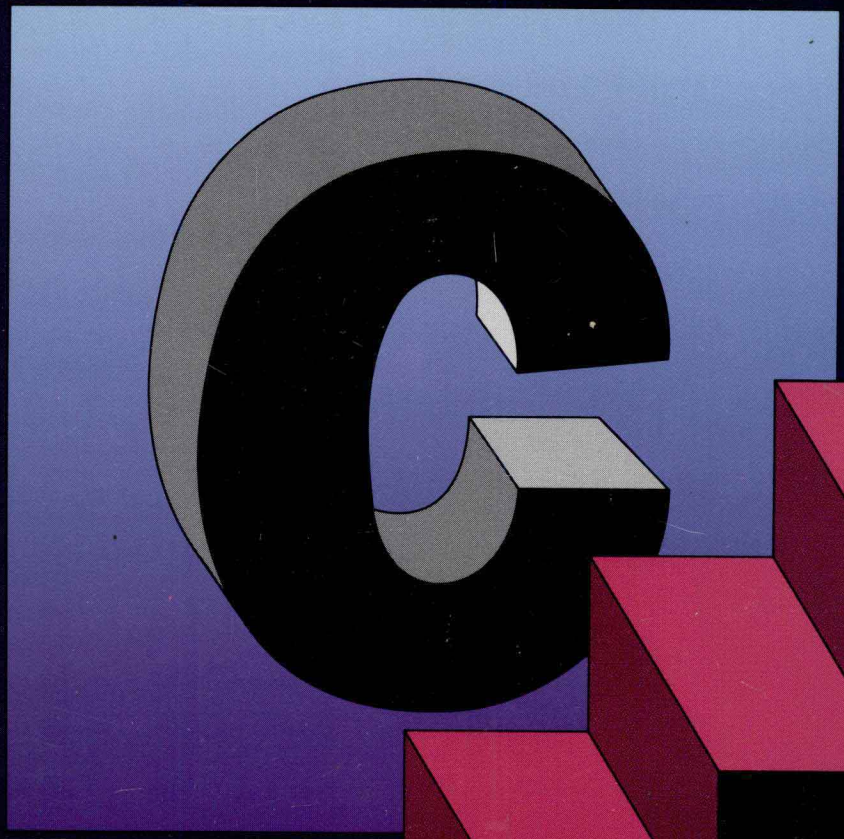
The Waite Group®

Mitchell Waite
and Stephen Prata

C: Step-by-Step

Includes ANSI C



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Mitchell Waite, Stephen Prata
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Dedication

To Benjamin, whose warm and furry four-legged body helped me endure the rigors of writing.

— Mitchell Waite

To my wife, Kathleen.

— Stephen Prata

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Preface

When we wrote *C Primer Plus* in 1984, we aimed to create a friendly, easy-to-use, self-study guide to learning and using the C programming language. The book's subsequent success makes us think we met that goal. However, use of *C Primer Plus* has now moved from self study into the classroom as more institutions offer courses in C. This shift prompted us to develop a new edition of the book, one more directed toward the classroom environment. We surveyed instructors who use our book to find out what features they felt a textbook edition should have. Their advice and our own experiences in teaching C in the classroom have led to this book: *C Step by Step*.

Features

We've retained the major features of the original book, for they are what made the book work for many readers. These features include the following:

- The book is an introduction to programming as well as to C. We don't assume you already are proficient in some other language; however, we do assume you are not a complete computer novice. We don't discuss the history of computing or how computers work.
- We emphasize an interactive approach. In computing, you learn by doing. We often use short, easily typed examples to illustrate just one or two concepts at a time. This gives you quick feedback on how specific concepts work.
- We clarify ideas with figures and illustrations.
- We summarize the main C features in boxes highlighted with a screened background. These boxes simplify finding the summaries when you flip through the text.
- We offer occasional tidbits of information and advice in unscreened boxes.
- Each chapter contains review questions and programming exercises.

- We cover a full range of C topics, including pointers, structures, and bitwise operations.

To this tried and true foundation, we've also added several modifications and features:

- There are many more review questions and exercises. These increase your feedback on concept development and skills comprehension.
- We've increased the emphasis on programming skills by discussing structured programming, step-wise refinement, and top-down programming.
- We've increased the number of programming examples to provide more insight into programming design and analysis.
- More attention is given to developing the skills to find and avoid programming errors.
- We've integrated coverage of the ANSI C standard into the text.
- We cover loops and files earlier than before, and we've augmented the treatment of files.
- We've rewritten and expanded explanations, when necessary, to clarify the subject matter.
- The chapters are structured in a more organized fashion. Each begins with a list of contents and a list of objectives. Each ends with a summary, review questions, and exercises.
- We provide answers for half the review questions at the end of the book.

All in all, we believe we've retained the flavor of the original while adding elements that make this version more suitable for classroom use.

Hardware/Software

Nearly all the examples are "generic" C; that is, they're meant to run on any standard C implementation. We've tested the programs on a VAX 11/750 computer running under BSD 4.3 UNIX and on an IBM AT clone using Microsoft 5.1 C, Microsoft QuickC, and Borland Turbo C, all under MS-DOS. We've pointed out places where the program results may be implementation-dependent, that is, where they may depend on the particular hardware or software in use. Occasionally, we do discuss implementation-dependent matters, although we've confined our remarks to UNIX and DOS (PC-DOS or MS-DOS), which are currently the two most common C environments.

Advice to the Student

In general, learning works best as an active, not a passive process. This is particularly true for programming. Therefore, we encourage you to try out the examples in the book. Such practice will give you a better idea of how C works. If you have questions about a program, you can explore them by modifying the example. Be an active, experimenting learner, and you will learn C more quickly and in greater depth.

We wish you good fortune in learning C. We've tried to make this book meet your needs, and we hope it helps you reach your goals.

Acknowledgements

From Mitchell Waite

I would like to take this opportunity to thank the people who have helped to make *C: Step-by-Step* a reality.

First, I would like to thank Stephen Prata for his continued support and faultless writing, and ability to endure my demands for perfection.

I would like to thank the numerous college professors who responded to the original survey for *C Primer Plus,* and also those who reviewed *C: Step-by-Step's* 1200 manuscript pages. You gave us valuable feedback. Scott Calamar of The Waite Group was critical in pulling the final manuscript together and coordinating with the production company and the author. I would also like to thank Susan Nelle of Business Media Resources for her coordination of the development process and Jane Granoff for managing the production of the book.

Finally I give my thanks to the people behind the scenes at SAMS, who believed in the idea of a college textbook on C: Richard Swadley, who put us in touch with BMR and handled all the pre-sales support for the book, Jim Hill for his faith in the idea, and to all the other people at SAMS who in one way or another are involved in making *C: Step-by-Step* a success.

From Stephen Prata

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