

# Thinking in C++, Volume 1, 2nd Edition

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MindView, Inc.



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I think your book is very, very, VERY good. I have compared it to others in the bookstore, and have found that your book actually teaches me basic C++ fundamentals while I learn the STL... a very nice experience to learn about both at once, hand-in-hand. I think your book is laid out very well, and explains things in an easy-to-understand fashion. Jeff Meininger, Software Developer, boxybutgood.com

Your book is the best by far of any I've seen. Please get it right so that we can all have an excellent and "reliable" reference work! And please hurry! We are desperate for a work of this quality! Steve Strickland, Live Minds (a Puzzle business)

(On Usenet) Unlike most other C++ authors, Eckel has made a career of teaching C++ and Java classes ONLY. He's had the benefit of a GREAT deal of novice feedback, and the books reflect that. His books are not just about writing in C++/Java, but understanding the intent of the languages and the mindset that goes with thinking in them. Eckel's also the best technical writer I've read since Jeff Duntemann. Very clear and easy to read. Don't be put off by the apparent large size of his books. Either can be read in \*less\* than 21 days. :-} Randy Crawford, MRJ Technology Solutions, Fairfax VA

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Your work is greatly appreciated and I thank you for helping me understand both C++ and Java better. Barry Wallin, Math/Computer Science Teacher, Rosemount High School, Rosemount, MN

I would like to thank you for your book "Thinking in C++" which is, with no doubt, the best book I ever read about this subject. Riccardo Tarli - SW Engineer - R&D TXT Ingegneria Informatica - Italy

I have been reading both of your books, Thinking In Java and Thinking In C++. Each of these books is easily the best in its category. Ratnakarprasad H. Tiwari, Mumbai, India

... the "Debugging Hints" section is so valuable, I'm tempted to print it and keep it with me at all times. I think this section should be a mandatory part of any introductory class after the first one or two programming problems. Fred Ballard, Synectics Inc.

Your book is really a treasure trove of C++ knowledge. I feel like you give a good overview and then explain the nuts and bolts. Raymond Pickles, Antenna Section, Radar Division, U.S. Naval Research Laboratory, Washington DC

As an Internal Medicine Specialist and Computer Scientist I spend a great deal of time trying to extract information from books and journals. My experience is that a good author is one who makes difficult concepts accessible, a great one makes it look almost easy. On this score you are certainly one of my top three technical writers. Keep up the good work. Dr. Declan O'Kane, Leicester, England

For my second-level C++ course, "Thinking in C++" is my constant reference and companion, and I urge my students to consult it regularly. I refer to the chapter on Operator Overloading constantly. The examples/code alone are worth the cost of the book many times over. So many books and development environments are predicated on the assumption that the only application for a programming language is for a Windows environment; it's great to find and use a book which concentrates on C++ so we can prepare our students for careers in fields like embedded systems, networking, etc., which require real depth of understanding. Robert Chase, Professor, Sweet Briar College

I think it's a fantastic intro to C++, especially for longtime dabblers like me - I often know "how," but rarely "why," and TIC2 is a godsend. Tony Likhite, System Administrator/DBA, Together Networks

After reading the first 80 pages of this book, I have a better understanding of oop than I've gotten out of the ton of books I've accumulated on the subject. Thanks... Rick Schneewind



# Thinking

In

C++

Second Edition

Bruce Eckel  
President, MindView Inc.



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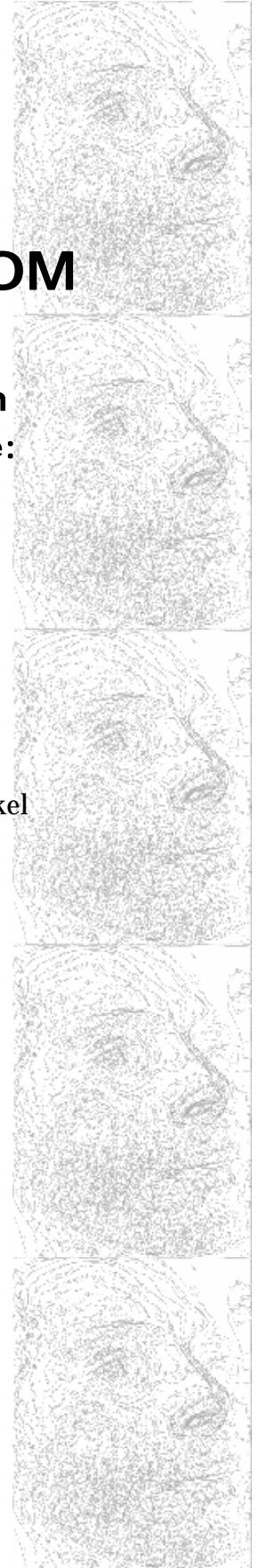
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# Dedication

To my parents, my sister, and my brother

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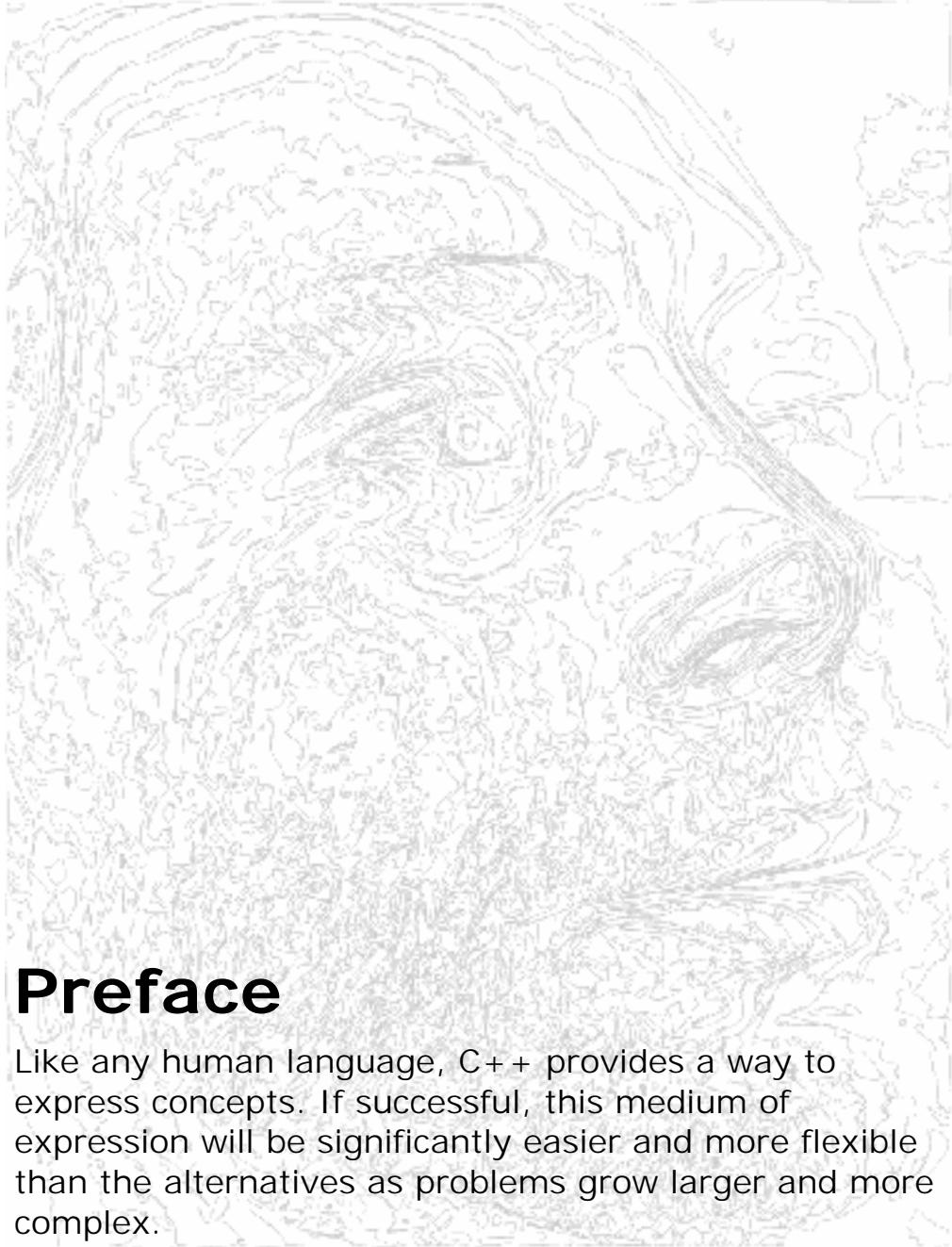
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## **Preface**

Like any human language, C++ provides a way to express concepts. If successful, this medium of expression will be significantly easier and more flexible than the alternatives as problems grow larger and more complex.

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You can't just look at C++ as a collection of features; some of the features make no sense in isolation. You can only use the sum of the parts if you are thinking about *design*, not simply coding. And to understand C++ this way, you must understand the problems with C and with programming in general. This book discusses programming problems, why they are problems, and the approach C++ has taken to solve such problems. Thus, the set of features I explain in each chapter will be based on the way that I see a particular type of problem being solved with the language. In this way I hope to move you, a little at a time, from understanding C to the point where the C++ mindset becomes your native tongue.

Throughout, I'll be taking the attitude that you want to build a model in your head that allows you to understand the language all the way down to the bare metal; if you encounter a puzzle, you'll be able to feed it to your model and deduce the answer. I will try to convey to you the insights that have rearranged my brain to make me start "thinking in C++."

## What's new in the second edition

This book is a thorough rewrite of the first edition to reflect all of the changes introduced in C++ by the finalization of the C++ Standard, and also to reflect what I've learned since writing the first edition. The entire text present in the first edition has been examined and rewritten, sometimes removing old examples, often changing existing examples and adding new ones, and adding many new exercises. Significant rearrangement and re-ordering of the material took place to reflect the availability of better tools and my improved understanding of how people learn C++. A new chapter was added which is a rapid introduction to the C concepts and basic C++ features for those who don't have the C background to tackle the rest of the book. The CD ROM bound into the back of the book contains a seminar that is an even gentler introduction to the C concepts necessary to understand C++ (or Java). It was created by Chuck Allison for my company (MindView, Inc.), and

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it's called "Thinking in C: Foundations for Java and C++." It introduces you to the aspects of C that are necessary for you to move on to C++ or Java, leaving out the nasty bits that C programmers must deal with on a day-to-day basis but that the C++ and Java languages steer you away from (or even eliminate, in the case of Java).

So the short answer to the question "what's different in the 2<sup>nd</sup> edition?" is: what isn't brand new has been rewritten, sometimes to the point where you wouldn't recognize the original examples and material.

## What's in Volume 2 of this book

The completion of the C++ Standard also added a number of important new libraries, such as **string** and the containers and algorithms in the Standard C++ Library, as well as new complexity in templates. These and other more advanced topics have been relegated to Volume 2 of this book, including issues such as multiple inheritance, exception handling, design patterns, and topics about building and debugging stable systems.

## How to get Volume 2

Just like the book you currently hold, *Thinking in C++, Volume 2* is downloadable in its entirety from my Web site at [www.BruceEckel.com](http://www.BruceEckel.com). You can find information on the Web site about the expected print date of Volume 2.

The Web site also contains the source code for both of the books, along with updates and information about other seminars-on-CD ROM that MindView, Inc. offers, public seminars, and in-house training, consulting, mentoring, and walkthroughs.



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