

Preface

Programming is understanding.
– Kristen Nygaard

I find using C++ more enjoyable than ever. C++’s support for design and programming has improved dramatically over the years, and lots of new helpful techniques have been developed for its use. However, C++ is not *just* fun. Ordinary practical programmers have achieved significant improvements in productivity, maintainability, flexibility, and quality in projects of just about any kind and scale. By now, C++ has fulfilled most of the hopes I originally had for it, and also succeeded at tasks I hadn’t even dreamt of.

This book introduces standard C++[†] and the key programming and design techniques supported by C++. Standard C++ is a far more powerful and polished language than the version of C++ introduced by the first edition of this book. New language features such as namespaces, exceptions, templates, and run-time type identification allow many techniques to be applied more directly than was possible before, and the standard library allows the programmer to start from a much higher level than the bare language.

About a third of the information in the second edition of this book came from the first. This third edition is the result of a rewrite of even larger magnitude. It offers something to even the most experienced C++ programmer; at the same time, this book is easier for the novice to approach than its predecessors were. The explosion of C++ use and the massive amount of experience accumulated as a result makes this possible.

The definition of an extensive standard library makes a difference to the way C++ concepts can be presented. As before, this book presents C++ independently of any particular implementation, and as before, the tutorial chapters present language constructs and concepts in a “bottom up” order so that a construct is used only after it has been defined. However, it is much easier to use a well-designed library than it is to understand the details of its implementation. Therefore, the standard library can be used to provide realistic and interesting examples well before a reader can be assumed to understand its inner workings. The standard library itself is also a fertile source of programming examples and design techniques.

[†] ISO/IEC 14882, Standard for the C++ Programming Language.

This book presents every major C++ language feature and the standard library. It is organized around language and library facilities. However, features are presented in the context of their use. That is, the focus is on the language as the tool for design and programming rather than on the language in itself. This book demonstrates key techniques that make C++ effective and teaches the fundamental concepts necessary for mastery. Except where illustrating technicalities, examples are taken from the domain of systems software. A companion, *The Annotated C++ Language Standard*, presents the complete language definition together with annotations to make it more comprehensible.

The primary aim of this book is to help the reader understand how the facilities offered by C++ support key programming techniques. The aim is to take the reader far beyond the point where he or she gets code running primarily by copying examples and emulating programming styles from other languages. Only a good understanding of the ideas behind the language facilities leads to mastery. Supplemented by implementation documentation, the information provided is sufficient for completing significant real-world projects. The hope is that this book will help the reader gain new insights and become a better programmer and designer.

Acknowledgments

In addition to the people mentioned in the acknowledgement sections of the first and second editions, I would like to thank Matt Austern, Hans Boehm, Don Caldwell, Lawrence Crowl, Alan Feuer, Andrew Forrest, David Gay, Tim Griffin, Peter Juhl, Brian Kernighan, Andrew Koenig, Mike Mowbray, Rob Murray, Lee Nackman, Joseph Newcomer, Alex Stepanov, David Vandevorode, Peter Weinberger, and Chris Van Wyk for commenting on draft chapters of this third edition. Without their help and suggestions, this book would have been harder to understand, contained more errors, been slightly less complete, and probably been a little bit shorter.

I would also like to thank the volunteers on the C++ standards committees who did an immense amount of constructive work to make C++ what it is today. It is slightly unfair to single out individuals, but it would be even more unfair not to mention anyone, so I'd like to especially mention Mike Ball, Dag Brück, Sean Corfield, Ted Goldstein, Kim Knuttila, Andrew Koenig, Josée Lajoie, Dmitry Lenkov, Nathan Myers, Martin O'Riordan, Tom Plum, Jonathan Shopiro, John Spicer, Jerry Schwarz, Alex Stepanov, and Mike Vilot, as people who each directly cooperated with me over some part of C++ and its standard library.

Murray Hill, New Jersey

Bjarne Stroustrup