

# Preface

C++ is the most widely available and used object-oriented programming language. It is a very useful language that is successfully utilized by many programmers in many application areas. It is a reasonably carefully thought-out language where the design is based partly on acknowledged principles and partly on solid experience and feedback from actual use. The language is much more complicated and complex than, say, C and PASCAL. The key concepts of data abstraction and object-oriented programming are new to most people. One can use C++ effectively as a more strongly type checked C with a small amount of simple data abstraction and library use. This programming language has all the tools to write compact and comprehensive programs for finance, administration and statistics. Many of the most experienced individuals and organizations in the industry and academia use C++. Many programmers strongly prefer C++ over procedural languages such as C and PASCAL and deem the feature set provided by C++ as close to essential for their applications. C++ supports object-oriented programming. It supports it pretty well for real life applications. Its type system and general model of the world are coherent and relevant to real applications. C++ and its various implementations have a solid core where different compilers tend to agree and where the code generated is reliably good.

This book provides software solutions to problems in finance, administration and statistics. Most standard methods used in these fields are given together with their programs in C++. In some cases the output of the programs is also displayed. Moreover the book gives an introduction to C++. Most of the programs are written in C++. Some of the programs are written in C. All the standard methods such as number sorting, name sorting, applications of function templates, applications of class templates, inheritance, virtual classes, string manipulations are included.

In chapter 2 we give some basic programs in C++. These programs are very helpful for the beginners. They are also the building blocks for more complex applications. Chapter 3 is devoted to the manipulation of strings. The class concept is introduced in chapter 4. Chapter 5 and 6 deal with function and class templates. A collection of introductory programs are given. Sorting and searching algorithms are implemented in C++ in chapter 7. Chapter 8 gives a collection of useful classes. They include string classes, vector classes, a matrix class, linked lists, trees and a date class. Chapter 9 is devoted to output/input streams. Here we consider C and C++ programs. In chapter 10 a collection of applications in finance are given. Applications in administration are considered in chapter 11. Problems in statistics are considered in chapter 12. Chapter 13 describes exception handling. The standard template library is introduced in chapter 14 and several examples are given.

The level of presentation is such that one can study the subject early on in ones education in science. There is a balance between practical programming and the underlying language. The book is ideally suited for use in lectures on C, C++ and object-oriented programming. The beginner will also benefit from the book. Almost all C++ programs in the book comply to the ANSI C++ standard.

The reference list gives a collection of text books useful in the study of the computer language C++. There are a number of good text books for C++ available [3], [6], [7], [8], [11], [13], [9]. We also refer to *The Annotated C++ Reference Manual* by Margret Ellis and Bjarne Stroustrup [6]. For data structures we refer to Budd [4]. For applications in science we refer to Tan Kiat Shi and W.-H. Steeb [14] and Steeb [12]. The standard template library is described by Schildt [10], Ammeraal [1] and Budd [5].

For a comprehensive discussion of the Boyer-Moore algorithm, the Floyd-Warshall algorithm, Dijkstra algorithm, the sorting methods and the divide-and-conquer strategy we refer to Baase (1989) [2].

Without doubt, this book can be extended. If you have comments or suggestions, we would be pleased to have them. The email address of the first author is:

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