Computer Programming with C++

This textbook provides in-depth explanation of C and C++ programming languages along with the fundamentals of object oriented programming paradigm. Essential concepts including functions, arrays, pointers and inheritance are explained in a coherent manner.

The book follows an example-driven approach, to facilitate easy comprehension of theoretical concepts. Common concepts of C programming language are also elaborated wherever necessary. The text provides detailed explanation on complex topics including Dynamic Memory Allocation, Object Slicing, VTABLEs, Up Casting and Down Casting.

The concepts are explained using line diagrams, notes, conversation themes and flow charts. The book offers useful features including error finding exercises, quiz questions and points to remember. Necessary comments to explain the logic used to implement particular functionality are provided for the ease of readers. Plenty of computer programs, review questions and useful case studies are interspersed throughout the text.

The book is intended for undergraduate and graduate students of engineering and computer science.

Kunal Pimparkhede is an adjunct faculty at the Vidyalankar Institute of Technology, Mumbai. As a software professional, he has development experience in technologies such as Adobe Flex, Informatica; database systems like Oracle, Sybase; Java based frameworks like Spring, Struts, etc. His areas of interest include Microprocessors, Automata Theory, Data Structures, Analysis of Algorithms, Artificial Intelligence and Computer Programming.

Computer Programming with C++

Kunal Pimparkhede

CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom
One Liberty Plaza, 20th Floor, New York, NY 10006, USA
477 Williamstown Road, Port Melbourne, vic 3207, Australia
4843/24, 2nd Floor, Ansari Road, Daryaganj, Delhi – 110002, India
79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781316506806

First published 2017

Printed in India

A catalogue record for this publication is available from the British Library

Library of Congress Cataloging-in-Publication Data
Names: Pimparkhede, Kunal, author.
Title: Computer programming with C++ / Kunal Pimparkhede.
Description: New York : Cambridge University Press, 2016. | Includes index.
Identifiers: LCCN 2015051227 | ISBN 9781316506806 (paperback)
Subjects: LCSH: C++ (Computer program language) | C (Computer program
language) | Object-oriented programming (Computer science) | Computer
programming. | BISAC: COMPUTERS / Programming Languages / General.
Classification: LCC QA76.73.C153 P469 2016 | DDC 005.13/3--dc23 LC record available at
http://lccn.loc.gov/2015051227

ISBN 978-1-31-650680-6 Paperback

Additional resources for this publication at www.cambridge.org/9781316506806

Cambridge University Press
978-1-316-50680-6 — Computer Programming with C++
Kunal Pimparkhede
Frontmatter
More Information

Contents

Cambridge University Press
978-1-316-50680-6 — Computer Programming with C++
Kunal Pimparkhede
Frontmatter
More Information

PART-II Object Oriented Programming

Preface

A computer program is a set of instructions which is followed by a machine to generate the required output. The language in which a computer program is written is called a computer programming language. Several computer programming languages are in use in the IT industry today, for developing diverse software applications.

The study of C and C++ is considered an important step towards mastering computer programming fundamentals. Hence, C and C++ are included in the syllabus of any computer science course.

This textbook provides in-depth explanations of C and C++ programming languages along with the fundamentals of the object oriented programming paradigm.

About the Book

This book will be of use to anyone who is a beginner and aspires to learn the fundamentals of computer programming using C and C++. It has been primarily written for students of academic courses which include the study of C, C++ and object oriented programming paradigm. Simple and lucid language has been used to facilitate easy comprehension of complex topics.

Salient Features

- Example-driven approach illustrates application of theoretical concepts
- Theme of a conversation interspersed in the text, elucidate essential themes of the subject
- Each program includes necessary comments to explain the logic used to implement a particular functionality
- Several line diagrams and flow charts facilitate easy comprehension of theoretical concepts
- Student-friendly pedagogical features include:
  - ✓ Error Finding Exercise
  - ✓ Solved Problems

- ✓ Objective Questions
- ✓ Review Questions

Chapter Organization

This book comprises 17 chapters. **Chapter 1** gives an overview of computer organization and architecture. It also explains the C/C++ development environment. **Chapters 2** to **5** discuss the basic features of C/C++ including data types, variables and different control statements which are supported by the language. **Chapter 6** describes the creation of multivalued data types (also referred to as collection types) using arrays in C/C++. **Chapter 7** explains modular programming using functions. **Chapter 8** elucidates the fundamentals of memory management using pointers in C/C++. **Chapter 9** discusses the creation of composite data types using structures and unions in C/C++. Chapter 10 explains the principles of memory management and Dynamic memory allocations in C++ style. **Chapters 11** to **17** provide in-depth coverage of object oriented features supported by C++.

NOTES

Chapters 1 to 9 cover features which are common to C as well as C++. Hence programs written in these chapters will work with C as well as C++ compilers unless specified otherwise. Whereas Chapters 11 to 17 cover object oriented features which are supported only by C++ and not by C. Chapter 10 explains dynamic memory allocation in C++ style. Hence programs written from Chapter 10 to 17 will work with C++ compilers only.

Does this book also explain the underlying systems which are involved in the execution of a computer program ?

Chapter 1 gives an understanding of computer organization, operating system and other system programs which make up the underlying platform required to execute any C/C++ program. Chapter 1 also gives an overview of many areas which are relevant for understanding computer programming fundamentals using C/C++. The specific features of individual topics have been explained in detail in the later chapters of this book.

I have put my best efforts to make this book as illustrative and interactive as possible. Any suggestions to further improve this book are always welcome. You can write to me at *kunalp84@rediffmail.com*.

Acknowledgements

Contribution and support of many people in my life has made this book possible. I am indebted to Vishwas Deshpande, Chairman, Vidyalankar Institute of Technology for giving me a wonderful platform to showcase my learnings. I am grateful to Professor N. H. Dubey for his constructive feedback, which added significant value to this project. I owe special thanks to my dear dearer dearest daughter Swara for allowing me to work long hours while I was writing this book.

I am thankful to Professors V. S. Padmakumar, Sanjeev Dwivedi, Sachin Bhojewar, Pankaj Vanwari from Vidyalankar Institute of Technology; Professors Kalpana Sagvekar, Sunil Surve and Brijmohan Daga from Fr. Conceacao Rodrigues College of Engineering, Mumbai; Professor Asawari Dudwadkar, Vivekanand Institute of Technology, Mumbai; Professors Prasad Kulkarni, Vinayak Shinde, Leena Thakur, Surbhi Crasto and Ajit Parab from Babasaheb Gawde Institute of Technology, Mumbai; Professor Yogesh Prabhu, Dr A. K. Pathak, Professor Sameer Velankar and Professor Yogesh Rajadhyaksha for their excellent support at different stages which helped me to present my learnings so well in the form of this book.

I am thankful to Ruhi Bajaj, Thadomal Shahani Engineering College, Mumbai and Shweta Loonkar, D. J. Sanghavi College of Engineering, Mumbai for their valuable suggestions which helped mould this script to meet the needs of a wide range of audience.

I sincerely acknowledge the contribution of all my teachers, who have played a vital role in developing my understanding of the subject and broadening my perspectives. They have strongly influenced me in building a positive attitude towards creative learning.

I would also like to thank every member of the team at Cambridge University Press, including Rachna Sehgal, who supported me throughout the publishing process to actuate timely release of this book.

I express heartfelt gratitude to my family for their moral support and patience. I am thankful to Pradeep Pimparkhede, Shalaka Pimparkhede, Dipti Pimparkhede, Swara Pimparkhede, Prabhavati Pimparkhede, Nivedita Bakre, Rajgopal Pai and Jayanti Pai for their patience while I was writing this script.