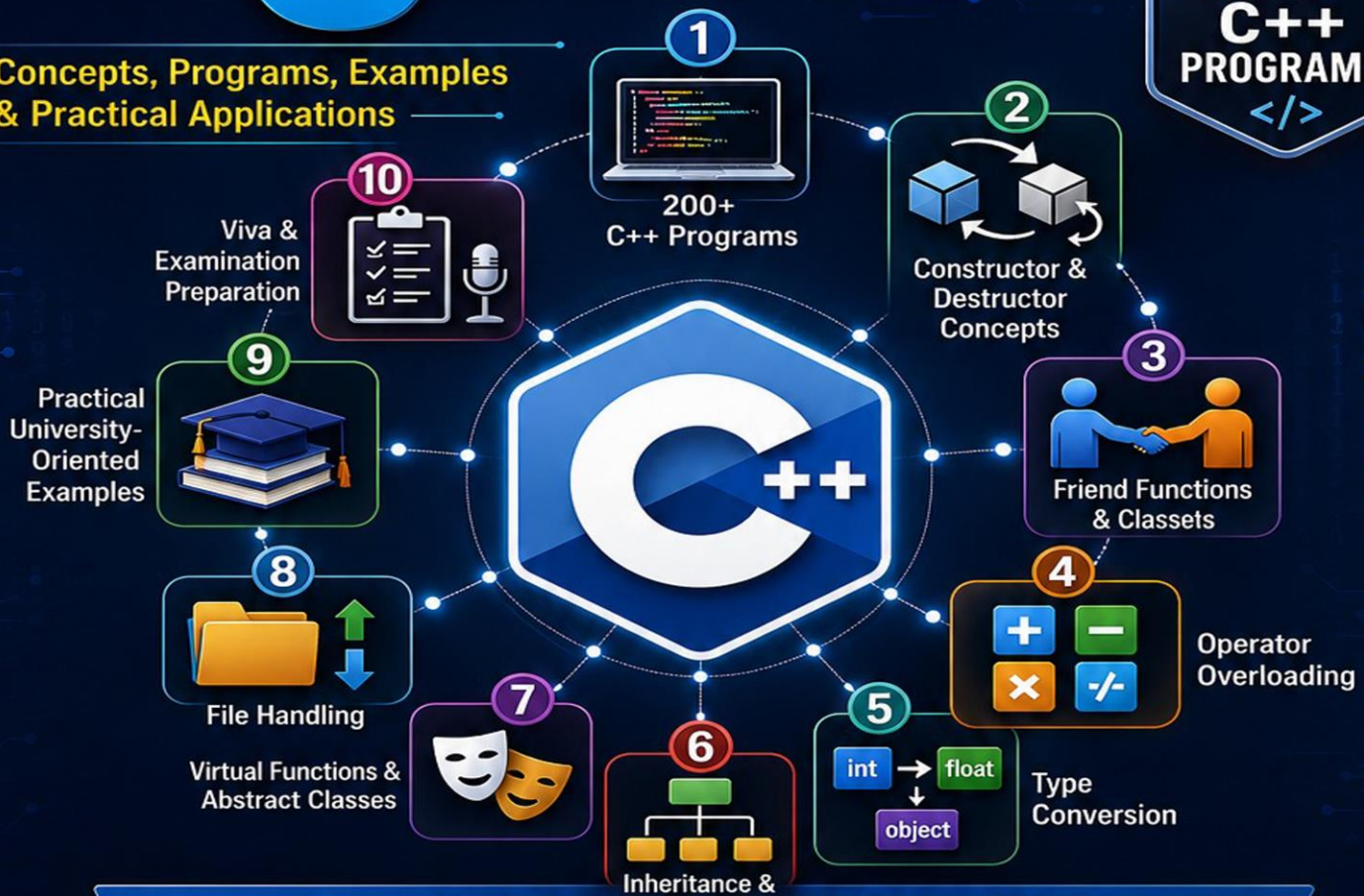


BASIC TO EXPERT IN OBJECT-ORIENTED PROGRAMMING WITH C++

Concepts, Programs, Examples
& Practical Applications

200+
C++
PROGRAMS
C++



From Fundamentals to Advanced Object-Oriented Programming

COVERS IN DEPTH

- Classes & Objects
- Constructors & Destructors
- Friend Functions & Classes
- Operator Overloading
- Type Conversion
- Inheritance
- Polymorphism & Virtual Functions
- Abstract Classes & Interfaces
- File Handling
- Memory Management
- Exception Handling
- Practical C++ Programs



SUITABLE FOR

- BCA
- B.Sc. (Computer Science)
- MCA
- M.Sc. (Computer Science)
- Engineering Students



Dr. Rohan K. Naik

Assistant Professor,
Department of Computer Science

Excellent Publishers





Dr. Rohan K. Naik

Assistant Professor,
Veer Narmad South Gujarat University,
Surat – 395007, Gujarat, India

Basic to Expert in Object-Oriented Programming

Author : Dr. Rohan K. Naik

ISBN : 978-81-69623-00-1

Page(s) : 156

Published Year : 2026

Published by : Excellent Publishers
No. 38/48, Second street, Ellappa Nagar
Kanchipuram – 631501, Tamilnadu, India.
Cell +91-9842641794
excellentpublishers2013@gmail.com
www.excellentpublishers.com



Disclaimer:

The author is solely responsible for the contents of the book in this volume in any manner, Errors, if any are purely unintentional and readers are requested to communicate such errors to the authors to discrepancies in futures.

Note: No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Copyright © 2026 Excellent Publishers, All Rights Reserved

PREFACE

Dear Reader,

Object-Oriented Programming (OOP) has become one of the most important paradigms in modern software development. It provides a systematic approach to designing, developing, and maintaining software systems by organizing programs around objects, classes, and their interactions. The concepts of encapsulation, inheritance, polymorphism, and abstraction form the foundation of efficient and reusable software development.

This book has been specially designed for undergraduate and postgraduate students of Computer Science, Information Technology, Computer Applications, and related disciplines. It aims to provide a clear understanding of Object-Oriented Programming using C++, one of the most widely used programming languages in academia and industry.

The contents of this book have been carefully organized from basic to advanced concepts. Beginning with classes and objects, the book gradually introduces constructors, destructors, friend functions, operator overloading, type conversions, inheritance, polymorphism, virtual functions, file handling, dynamic memory allocation, and various advanced OOP concepts. Each topic is supported with numerous examples, illustrations, diagrams, and practical programming exercises to strengthen conceptual understanding and problem-solving skills.

A special emphasis has been placed on practical applications and university examination requirements. The programming examples included in this book are designed to help students understand not only the theoretical concepts but also their real-world implementation. The book can serve as both a classroom textbook and a self-learning reference guide.

This work is the result of several years of teaching experience, interaction with students, and continuous refinement of instructional material. Every effort has been made to present the subject matter in a simple, structured, and student-friendly manner.

I sincerely hope that this book will serve as a valuable resource for students, educators, and programming enthusiasts seeking a strong foundation in Object-Oriented Programming with C++.

I would be grateful for suggestions and constructive feedback from readers, which will help improve future editions of this book.

Sincerely,

Dr. Rohan K. Naik

About Author(s)

Dr. Rohan K. Naik

Dr. Rohan K. Naik is a distinguished academician, researcher, and software professional with more than 20 years of combined experience in teaching and the software industry. He currently serves as Assistant Professor in Veer Narmad South Gujarat University - Surat, and is also associated with Pixeta App Lab, Navsari as a Technical Consultant.

He earned his Ph.D. in Computer Science from Uka Tarsadia University, Bardoli in 2018 and holds an MCA degree from SRIMCA, Bardoli. His professional journey includes extensive experience in software development, team leadership, academic administration, research, and curriculum development.

Dr. Naik has authored and presented numerous research papers in the fields of Face Recognition, Computer Vision, Artificial Intelligence, ERP Systems, and Intelligent Surveillance Systems. His contributions have received significant academic recognition, with over 100 citations of his research work. He has also delivered expert lectures at various universities and colleges on Object-Oriented Programming, Software Development Life Cycle, and emerging technologies.

Table of Contents

S.No.	Contents	Page No.
1	Object Oriented Programming	1
2	Principles of Object Oriented Programming	2
3	Typical Structure of Procedure Oriented Programming (POP)	3
4	Relationship of Data and Function in POP	4
5	Characteristics of Procedure Oriented Programming	5
6	Object Oriented Paradigm	6
7	Features of Object Oriented Programming (OOP)	7
8	Basic Concepts of OOP	8
9	Objects and Classes	9
10	Data Abstraction and Encapsulation	10
11	Inheritance	11
12	Polymorphism	12
13	Dynamic Binding and Message Passing	14
14	Benefits of OOP	15
15	Applications of OOP	16
16	Introduction to C++	17
17	Simple C++ Programs	18-20
18	Structure of a C++ Program	21
19	Class and Object Declaration	22-23
20	Member Function Definition (Inside & Outside Class)	24
21	Employee Class Program	25
22	Array of Objects – Student Program	26
23	Programmer and Tester Program	27
24	Employee Array Program	28
25	Function Overloading	29
26	Function Overloading by Different Number of Arguments	30
27	Function Overloading by Different Types of Arguments	31
28	Advantages of Function Overloading	32
29	Disadvantages of Function Overloading	33

30	Function Overloading Program	34-36
31	Inline Functions	37
32	Advantages and Limitations of Inline Functions	38
33	Constructors and Destructors	39
34	Constructor and Destructor Program	40
35	Special Characteristics of Constructors	41
36	Types of Constructors	42
37	Parameterized Constructor Program	43
38	Constructor with Default Arguments	44-45
39	Copy Constructor	46
40	Constructor Overloading	47-48
41	Destructor	49
42	Constructor-Destructor Program	50
43	Friend Function	51-55
44	Static Data Members and Static Member Functions	56-58
45	Operator Overloading	59-62
46	Unary Operator Overloading using Member Function	63
47	Binary Operator Overloading using Member Function	64
48	Unary Operator Overloading using Friend Function	65
49	Binary Operator Overloading using Friend Function	66
50	Operator Function Definition and Rules	67
51	Operator Overloading Guidelines	68
52	Type Conversions	79
53	Basic Type to Class Type Conversion	81
54	Class Type to Basic Type Conversion	82
55	Class Type to Class Type Conversion	83
56	Program: Basic to Class Conversion	84
57	Program: Class to Basic Conversion	85-88
58	Inheritance	89
59	Types of Inheritance	90
60	Single Inheritance	91
61	Multiple Inheritance	92
62	Multilevel Inheritance	93
63	Hierarchical (Tree) Inheritance	94
64	Hybrid Inheritance	95
65	Syntax of Inheritance	96
66	Single Inheritance Programs	97-99
67	Multiple Inheritance Programs	100-106
68	Hierarchical (Tree) Inheritance	109
69	Hierarchical Inheritance Program	111

70	Hybrid Inheritance	112-113
71	Virtual Base Class in C++	114-115
72	Hybrid Inheritance Programs	116-118
73	Abstract Classes	119
74	Constructor in Inheritance	120-122
75	Parameterized Constructor in Inheritance	123-124
76	Local Class	125
77	Nested Classes	126-127
78	Container Class (Inner Class)	128
79	Difference Between Inheritance and Containership	129-130
80	Polymorphism	131
81	Compile Time and Run Time Polymorphism	132-133
82	Overriding vs Overloading	134-135
83	Method Overriding	136
84	Runtime Polymorphism	137-139
85	Virtual Function	140-142
86	Pure Virtual Function	143-144
87	Rules of Virtual Function	145
88	Binding	146
89	Early (Static) Binding	147
90	Late (Dynamic) Binding	148
91	Memory Allocation and Deallocation Operators	149
92	New Operator	149
93	Delete Operator	150
94	This Pointer	151
95	Formatted Console I/O Operations	152
96	IOS Class Functions and Flags	153
97	Manipulators	154-158
98	User Defined Output Functions	159-160
99	File Handling Operations	161
100	Steps of File Operations	162
101	Stream Classes in C++	163
102	File Opening Methods	164
103	File Open Modes	165
104	File Pointer and Manipulation Functions	166-167

Basic to Expert in Object-Oriented Programming



Dr. Rohan K. Naik

Assistant Professor,

Department of Computer Science



Excellent Publishers

Kancheepuram, Tamilnadu, India

www.excellentpublishers.com

