



Unit - I

Chapter 1 : Fundamentals of Object Oriented Programming

1-1 to 1-55

<ul style="list-style-type: none"> 1.1 Introduction to Computer System 1-1 1.2 Storage Structure 1-2 1.3 Operating Systems..... 1-4 1.3.1 Examples of OS 1-4 1.4 Programming Language 1-5 1.4.1 Challenges in Software Development 1-5 1.4.2 Software Evolution..... 1-6 1.4.3 Types of Programming Language..... 1-6 1.4.4 Most Popular Programming Language 1-7 1.4.5 Qualities of Good Programmer 1-7 1.4.6 Terminologies in Programming..... 1-8 1.5 Introduction to Procedural, Modular Programming..... 1-9 1.5.1 Characteristics of Procedure Oriented Programming..... 1-10 1.5.2 Limitations of Procedural Programming..... 1-11 1.6 Introduction to Object - Oriented Programming 1-11 1.6.1 Need of Object-Oriented Programming (OOP) 1-12 1.6.2 Applications of OOP 1-12 1.6.3 Difference between Procedure Oriented and Object Oriented Programming 1-12 1.7 Object Oriented Languages and Object Based Languages 1-13 1.8 Fundamentals of Object-Oriented Programming 1-13 1.9 Benefits of Object - Oriented Programming 1-15 1.10 C++ as Object Oriented Programming Language 1-16 1.10.1 C++ Programming Basics..... 1-16 1.10.2 ++ Extension of C 1-16 1.10.3 Structure of C++ Program 1-17 1.10.4 C++ Program Execution 1-18 1.10.5 Different Tools for C++ Program Development..... 1-19 	<ul style="list-style-type: none"> 1.10.6 Main Function in C++ 1-19 1.11 Building Blocks of C++ 1-20 1.11.1 Comments..... 1-20 1.11.2 Tokens 1-20 1.11.2(A) Keywords 1-20 1.11.2(B) Identifiers 1-20 1.11.2(C) Constant..... 1-21 1.11.3 Const Keyword 1-21 1.12 Data Types..... 1-22 1.13 Structures..... 1-23 1.14 Enumerations 1-23 1.15 Control Structure 1-24 1.15.1 Selection Statement 1-24 1.15.2 Looping 1-26 1.16 Arrays and Strings..... 1-28 1.17 Class 1-29 1.18 Object..... 1-30 1.19 Class Scope and Accessing Class Members 1-31 1.20 Access Specifiers 1-32 1.21 Class and Data Abstraction 1-33 1.22 Separating Interface from Implementation..... 1-34 1.23 Programming in C++ 1-34 1.23.1 Variable Declarations 1-34 1.23.2 Global Scope..... 1-34 1.23.3 Reference Variables..... 1-35 1.23.4 Operators in C++ 1-36 1.23.5 Scope Resolution Operator 1-37 1.23.6 'cin' and 'cout' Operator..... 1-38 1.23.7 Formatting and I/O Manipulators 1-39 1.24 Functions 1-39 1.24.1 Function Prototypes 1-40 1.24.2 Default Parameters 1-41 1.24.3 Default and Constant Arguments..... 1-42
--	---



1.24.4	Accessing Function and Utility Function	1-43	2.8.2	Private Inheritance	2-10
1.25	Constructors	1-43	2.8.3	Member Access Control	2-11
1.26	Types of Constructor	1-44	2.9	Types of Inheritance	2-11
1.26.1	Parameterized Constructor	1-44	2.9.1	Single Inheritance.....	2-12
1.26.2	Multiple Constructors within Class	1-44	2.9.2	Multiple Inheritance	2-13
1.26.3	Constructor with Default Parameters	1-45	2.9.3	Hierarchical Inheritance.....	2-15
1.26.4	Copy Constructor	1-45	2.9.4	Hybrid Inheritance	2-15
1.26.5	Default Copy Constructor	1-46	2.10	Ambiguity in Multiple Inheritance.....	2-16
1.27	Destructors.....	1-46	2.11	Virtual Base Class	2-17
1.28	Objects and Memory Requirements	1-47	2.12	Abstract Class.....	2-18
1.29	Static Members (Variable and Functions).....	1-48	2.13	Friend Classes	2-19
1.30	Static Data Members.....	1-49	2.14	Static Class.....	2-20
1.31	Inline Functions	1-50	2.15	Nested Class.....	2-20
1.31.1	Call by Value and Call by Reference	1-51	<hr/>		
1.32	Friend Functions.....	1-52	Chapter 3 : Pointers 3-1 to 3-14		
1.32.1	Advantages and Disadvantages of Friend Functions.....	1-54	<hr/>		
<div style="border: 1px solid black; padding: 5px; display: inline-block; margin: 10px 0;">Unit - II</div>			<hr/>		
Chapter 2 : Inheritance		2-1 to 2-21	<hr/>		
2.1	Inheritance	2-1	3.1	Pointer : Indirection Operators.....	3-1
2.1.1	Containership	2-2	3.2	Memory Management : New and Delete.....	3-2
2.1.2	Base Class and Derived Class	2-3	3.3	Pointers to Objects.....	3-3
2.1.3	Defining Inheritance.....	2-3	3.4	this Pointer	3-4
2.2	Protected Members	2-4	3.5	Pointers vs Arrays	3-5
2.3	Relationship between Base Class and Derived Class	2-5	3.6	Accessing Arrays using Pointers	3-6
2.4	Constructor and Destructor in Derived Class.....	2-5	3.6.1	Pointer and String.....	3-7
2.5	Overriding Member Functions	2-7	3.7	Arrays of Pointers.....	3-7
2.6	Aggregation : Classes within Classes.....	2-8	3.8	Function Pointers	3-9
2.7	Class Hierarchies	2-9	3.9	Pointers to Pointer.....	3-10
2.8	Public and Private Inheritance	2-9	3.10	Pointers to Derived Classes	3-10
2.8.1	Public Inheritance.....	2-9	3.11	Passing Pointers to Functions	3-11
			3.12	Return Pointers from Functions	3-11
			3.13	Null Pointer.....	3-12
			3.14	Void Pointer.....	3-13
				• Model Question Paper (In Sem.).....	Q-1

**Unit - III****Chapter 4 : Polymorphism 4-1 to 4-19**

4.1	Introduction to Polymorphism	4-1
4.2	Types of Polymorphism	4-2
4.2.1	Function Overloading	4-2
4.2.2	Operator Overloading	4-3
4.2.3	Function Overriding	4-4
4.2.4	Difference between Compile Time and Run Time Polymorphism	4-4
4.3	Concept of Overloading	4-5
4.4	Overloading Unary Operators	4-5
4.5	Overloading Binary Operators	4-6
4.6	Data Conversion	4-7
4.6.1	Conversion between Basic and User Defined Data Types	4-7
4.6.2	Conversion between User Defined Data Types	4-8
4.7	Type Casting (Implicit and Explicit)	4-10
4.7.1	Implicit Type Casting	4-10
4.7.2	Explicit Type Casting	4-11
4.8	Pitfalls of Operator Overloading and Conversion	4-11
4.9	Keywords : Explicit and Mutable	4-11
4.10	Pointer to Base Class	4-14
4.11	Virtual Function and its Significance in C++	4-15
4.12	Pure Virtual Function and Virtual Table	4-16
4.12.1	Pure Virtual Functions	4-16
4.12.2	Virtual Table	4-16
4.13	Virtual Destructor	4-18
4.14	Abstract Base Class	4-18

Unit - IV**Chapter 5 : Files and Streams 5-1 to 5-20**

5.1	Data Hierarchy	5-1
5.2	Streams and Files	5-1
5.3	Stream Classes	5-2
5.4	Stream Errors	5-4
5.5	Files	5-6
5.5.1	File Handling in C++	5-6
5.5.2	C++ Classes for File Handling	5-7
5.6	Disk File I/O with Streams	5-7
5.6.1	File Opening Mode	5-10
5.6.2	Reading and Writing Class Object from File	5-10
5.6.3	Reading and Writing Multiple Class Objects	5-11
5.7	File Pointers	5-12
5.8	Error Handling in File I/O	5-14
5.9	File I/O with Member Functions	5-15
5.10	Overloading the Extraction and Insertion Operators ..	5-16
5.11	Memory as a Stream Object	5-17
5.12	Command-Line Arguments	5-18
5.13	Printer Output	5-19

Unit - V**Chapter 6 : Exception Handling 6-1 to 6-13**

6.1	Fundamentals of Exception Handling	6-1
6.2	Other Error Handling Techniques	6-2
6.3	Simple Exception Handling - Divide by Zero	6-3
6.4	Multiple Catching	6-5
6.5	Re-throwing an Exception	6-5
6.6	Exception Specifications	6-7
6.7	User Defined Exception	6-9
6.8	Processing Unexpected Exceptions	6-10



6.9	Constructor, Destructor and Exception Handling	6-11
6.10	Exception and Inheritance	6-12

Chapter 7 : Templates **7-1 to 7-10**

7.1	Introduction to Generic Programming	7-1
7.2	Power of Templates	7-3
7.2.1	Need of Templates in C++	7-4
7.3	Function Template / Applying Generic Function	7-4
7.4	Overloading Function Templates	7-6
7.5	Overloading Class Template	7-7
7.6	Class Template and Nontype Parameters	7-8
7.7	Template and Friends Generic Functions	7-8
7.8	The Type Name and Export Keywords	7-9

Unit - VI

Chapter 8 : Standard Template Library (STL) 8-1 to 8-20

8.1	Introduction to Standard Template Library (STL)	8-1
8.1.1	Components of STL	8-1
8.2	Containers	8-2
8.2.1	Sequence Container and Associative Containers	8-2
8.2.2	Container Adapters	8-3

8.3	Functions in Container Classes	8-4
8.3.1	Array	8-4
8.3.2	Deque	8-4
8.3.3	Queue	8-8
8.4	STL Vector	8-8
8.5	STL Stack	8-9
8.6	STL Lists	8-10
8.7	Algorithms	8-11
8.8	Basic Searching and Sorting Algorithms	8-12
8.9	Min Max Algorithms	8-13
8.10	Set Operations	8-13
8.11	Heap Sort	8-14
8.12	Iterators - Input, Output, Forward, Bidirectional and Random Access	8-15
8.12.1	Types of Iterators	8-16
8.13	Object Oriented Programming - Road Map to Future	8-17
	• Model Question Paper (End Sem.)	Q-1 to Q-2