

TOPIC INDEX

- **Classes and Objects**
 - a) Defining a class
 - b) Creating objects
 - c) Access specifiers (public, private, protected)
 - d) Member variables and member functions
 - e) Objects as parameters in functions
- **Constructors and Destructors**
 - a) Default, parameterized, and copy constructors
 - b) Destructor and its purpose
- **Abstraction**
 - a) Hiding implementation details
- **Static Members and Methods**
 - a) Static variables inside a class
 - b) Static functions in a class
- **Constant Member Functions**
- **Friend Functions and Friend Classes**
 - a) Accessing private members using friend functions
 - b) Friend classes

7. Inheritance

- **Types of Inheritance**
 - Single inheritance
 - Multiple inheritance
 - Multilevel inheritance
 - Hierarchical inheritance
 - Hybrid inheritance
- **Derivation types** (public, private, protected)
- **Base and derived classes**
- **Constructor and destructor execution order in inheritance**
- **Virtual base class**

- **Friend function with Virtual Class**

8. Polymorphism

- **Function Overloading**
- **Operator Overloading**
 - a) Overloading binary and unary operators
 - b) Rules and best practices
- **Method Overriding**
- **Virtual Functions and Runtime Polymorphism**
- **Abstract Classes and Pure Virtual Functions**

9. Memory Management

- **Dynamic Memory Allocation** (new and delete)
 - a) this pointer
- **Dangling Pointers and Memory Leaks**

10. Templates and Generic Programming

- Function Templates
- Class Templates
- Template Specialization
- Variadic Templates

11. Exception Handling

- **Basics of Exception Handling**
 - try, catch, throw statements
- **Multiple catch blocks**
- **Handling different exception types**
- **Standard Exception Classes**
- **User-Defined Exceptions**

12. File Handling

- File streams (ifstream, ofstream, fstream)
- Opening and closing files
- Reading from and writing to files
- File modes (ios::in, ios::out, ios::app, etc.)
- Binary file handling