

Programming Using C++

Introduction to object oriented programming, characteristics of object programming languages.

Overview of C++: Characters and string literals, variables, objects and their declarations, operators.

Principles of Object-Oriented Programming: Software Crisis; Software Evolution; A Look at Procedure-Oriented Programming; Object Oriented Programming Paradigm; Basic Concepts of Object-Oriented Programming; Benefits of OOP; Object Oriented Languages; Applications of OOP.

Beginning with C++: What is C++?, Applications of C++, Character and string literals, object and their declarations, operators, A Simple C++ Program, More C++ Statements, An Example with Class; Structure of C++ Program, Creating the Source File, Compiling and Linking.

Tokens, Expressions and Control Structures: Introduction; Tokens; Keywords; Identifiers; Basic Data Types; User-Defined Data Types; Derived Data Types; Symbolic Constants; Type Compatibility; Declaration of Variables; Dynamic Initialization of Variables; Reference Variables; Operators in C++; Scope Resolution Operator; Member Dereferencing Operators; Memory Management Operators; Manipulators; Type Case Operator; Expressions and Implicit Conversions; Operator Overloading; Operator Precedence; Control Structures.

Functions in C++: Introduction; The Main Function; Function Prototyping; Call by Reference; Inline Functions; Default Arguments; const Arguments; Function Overloading; Friend and Virtual Functions.

Statements: Simple statements, conditional statements, compound conditions, book lean, expressions, nested conditions, switch statements, Type Conversion.

Loops and Iterations: While statement, do... while, for, break, continue.

Functions: Library functions, user defined functions, declaration and definitions, local variables and functions, function types, passing by reference, passing by constant reference, scope of functions, overloading.

Overloading: Overloading the assignment operator, arithmetic operator, relational operators, increment and decrement operators, conversion operators. String classes, composition and inheritance, stream I/O templates. Elements of Visual C++, working with forms, communicating with other applications, class libraries.

Arrays: Defining arrays, array elements, initializing and processing arrays, passing arrays to functions, sorting and searching arrays, type definitions, multidimensional arrays.

Pointers and References: Introduction to pointers and references, objects and values, returning a reference, array and pointers, new and delete operators, pointers to pointers and functions.

Classes and Objects: Introduction; C Structures Revisited; Specifying a Class; Defining Member Functions; A C++ Program with Class; Making an Outside Function Inline; Nesting of Member Functions; Private Member Functions; Arrays Within a Class; Memory Allocation for Objects; Static Data Members; Static Member Functions; Arrays of Objects; Objects as Function Arguments; Friendly Functions; Returning Objects; const Member Functions; Pointers to Members.

Constructors and Destructors: Introduction; Constructors; Parameterized Constructors; Multiple Constructors in a Class; Constructors with Default Arguments; Dynamic Initialization of Objects; Copy Constructor; Dynamic Constructors; Constructing Two-Dimensional Arrays; Destructors.

Operator Overloading and Type Conversions: Introduction; Defining Operator Overloading; Overloading Unary Operators; Overloading Binary Operators; Overloading Binary Operators Using Friends; Manipulation of Strings Using Operators; Rules for Overloading Operators; Type Conversions.

Inheritance: Extending Classes: Introduction; Defining Derived Classes; Single Inheritance; Making a Private Member Inheritable; Multilevel Inheritance; Multiple Inheritance; Hierarchical Inheritance; Hybrid Inheritance; Virtual Base Classes; Abstract Classes; Constructors in Derived Classes; Member Classes: Nesting of Classes.

Pointers and References, Virtual Functions and Polymorphism: Introduction to pointers and references; Pointers to Objects; objects and values, returning a reference, array and pointers, new and delete operators, pointers to pointers and functions, this Pointer; Pointers to Derived Classes; Virtual Functions; Pure Virtual Functions.

Strings: Strings, string I/O arrays of strings, string related library functions.

Classes: Introduction, class declaration, constructors, access functions, copy constructor, class destructor.

Managing Console I/O Operations: Introduction; C++ Streams; C++ Stream Classes; Unformatted I/O Operations; Formatted Console I/O Operations; Managing Output with Manipulators.

Working with Files: Introduction; Classes for File Stream Operations; Opening and Closing a File; Detecting End-of-File; More About Open(): File Modes; File Pointers and Their Manipulations; Sequential Input and Output Operations; Updating a File: Random Access; Error Handling During File Operations; Command-Line Arguments.

Object-Oriented Systems Development: Introduction; Procedure-Oriented Paradigms; Procedure-Oriented Development Tools; Object-Oriented Paradigm; Object-Oriented Notations and Graphs; Steps in Object-Oriented Analysis; Steps in Object-Oriented Design; Implementation; Prototyping Paradigm; Wrapping Up.

