

- **Introduction**
  - History of C
  - Characteristics of C
  - C Program Structure
  - Constants
  - Data types
  - Variables
  - Keywords
  - Console Input / Output Statements
  - Compilation and Execution
- **Operators**
- **Branching & Looping Statements**
  - Simple if Statement
  - If-else
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  - switch Statement
  - while loop
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  - for loop
  - Jump Statements like goto,continue,break
- **Arrays**
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  - Matrix problems
- **Strings**
  - String Functions
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- **Functions**
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  - Pre defined functions
  - User defined functions
  - Types of functions based on arguments and return type
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- **Pointers**
  - Pointer Concepts
  - Pointers and Functions
  - Pointers and Arrays
  - Array of Pointers
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  - Pointers and Structures
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- **Structures**
  - Defining New Data types
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  - Using array type structure variable
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  - Enumerated Data types
  - Type Definition
- **Files**
  - Writing contents to file
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  - Files with records
- **Command line arguments**
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  - itoa()
- **Graphics**

- **Data Structures**

- Dynamic memory allocation concepts
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- Linked Lists
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  - Double linked list
  - Circular
- Searching concepts
  - Linear search
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  - Bubble sort
  - Insertion sort
  - Radix sort
  - Merge sort
  - Quick sort
  - Selection sort
- Trees
- Graphs

## C++ Language

- **C++ Overview**

- C++ Characteristics
- Object-Oriented Terminology
- Polymorphism
- Object-Oriented Paradigm
- Abstract Data Types
- I/O Services
- Standard Template Library
- Standards Compliance

- **Functions and Variables**

- Functions: Declaration and Definition
- Variables: Definition, Declaration, and Scope
- Variables: Dynamic Creation and Derived Data
- Arrays and Strings in C++

- Qualifiers
- **Classes in C++**
  - Defining Classes in C++
  - Classes and Encapsulation
  - Member Functions
  - Instantiating and Using Classes
  - Using Constructors
  - Multiple Constructors and Initialization Lists
  - Using Destructors to Destroy Instances
  - Friendship
- **Operator Overloading**
  - Operator Overloading
  - Working with Overloaded Operator Methods
- **Initialization and Assignment**
  - Initialization vs. Assignment
  - The Copy Constructor
  - Assigning Values
  - Specialized Constructors and Methods
  - Constant and Static Class Members
- **Storage Management**
  - Memory Allocation
  - Dynamic Allocation: new and delete
- **Inheritance**
  - Overview of Inheritance
  - Defining Base and Derived Classes
  - Constructor and Destructor Calls
- **Polymorphism**
  - Overview of Polymorphism
- **Input and Output in C++ Programs**
  - Standard Streams
  - Manipulators
  - Unformatted Input and Output
  - File Input and Output
- **Exceptions**
  - Exceptions
  - Inheritance and Exceptions
  - Exception Hierarchies
  - Inside an Exception Handler
- **Templates**
  - Template Overview

- Customizing a Templated Method
- Standard Template Library Containers