

In C Programming and Data Structures course, you will gain in-depth knowledge regarding fundamentals of computer, preprocessor, memory organisation, compiler, linker, data types & operators and variables & qualifiers. The course is best suited for professionals who wish to brush up their C programming and data structure skills and knowledge. During the course, you will learn how to implement various logic in C programming with the help of if-else construct, loops, data structures and more. Moreover, you will gain comprehensive knowledge about the concept of functions used in C programming and also get an understanding of searching and sorting algorithms such as binary sort, quick sort and more. The training program includes topics such as Fundamentals of C and Data Structures, Basics of I-O in C, Data Types in C, Control instructions in C, Recursion in C, Pointers and Arrays, Structure and Union, linked lists, Tree and Searching, Sorting, Dynamic Memory Allocation and many more.

## Prerequisites

There are no prerequisites for this course. Anyone who wants to learn the basics of programming can attend this course.

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## Course Objectives

Upon successful completion of the course, you will be able to:

- Understand the basics of C programming
- Implement various features of C programming including variables, functions, data types and operators, linked lists, strings, pointers, arrays and more
- Gain deep knowledge of data structures
- Become proficient in the concepts and terminologies of C and data structures

## Fundamentals of C and Data Structures

- Basics of computer- CPU, ALU, Register, Cu, Primary Memory, ROM, RAM, Storage devices,
- Computer Languages
  - Low-level language
  - Machine language
  - Assembly language
  - High-level language
- Number System
  - Conversion of Decimal to Binary
  - ASCII
- Compiler and Interpreter
  - Compiler Diagram
  - Interpreter Diagram

## Introduction to C program

- Structure of C program
- program building C program
- Practice Exercises

## Basics I-O in C

- Input and Output in C
- Formatted Output with printf
- Format Conversion specifies scanf
- Practice Exercises

## Instructions in C

- Instruction types
- Arithmetic Instructions
  - Types of Arithmetic Instruction
    - Integer mode Arithmetic statement
    - Real mode Arithmetic Statement
    - Mixed mode Arithmetic Statement
  - Associativity of operators

## Introduction to Data Types in C/h3>

- Overview of C Data Types
- Void type
- Declaration
- Definition and Initialization
- Variable Qualifier
- Operators

## Introduction to Control instructions in C

- Control Instruction types
- Decision control structures
- Conditional operator
- Case-control structure
- Switch case-control
- Need of break in switch case
- Using break keyword

## C Functions

- Define functions
- Structure of C program and C function

## Introduction to Recursion in C

- Overview of Recursion
- Functions of Recursion
- Recursion vs. Iteration

## Pre-processor in C

- Define pre-processor
- Program flow
- Benefits of pre-processor
- Pre-processor directives
- Predefine macros

## Introduction to arrays in C

- Array elements
- Passing array to a function
- 2-D array

## String in C

- Memory presentation of string
- Printing string
- Operations on string

## Introduction to Structure and Union

- Differentiate between Structure and Array
- Declaring structure
- Initialization and accessing structure variable
- Array of Structure
- Passing structure in function
- Structure vs. Union

## File I-O in C

- File I/O
- Reading/Writing from file
- Example for writing a file
- Binary file I/O with example

## Introduction to Pointers in C

- Pointer Arithmetic in array
- Advice and precaution
- Practice exercises

## Overview of Pointers and Arrays

- Multi-Dimensional Arrays

- Arrays from pointers perspective

## Dynamic Memory Allocation

- Overview of Dynamic Memory Allocation
- Allocating memory dynamically

## Introduction to linked lists

- Define linked list
- Linked list terminology
- Creating link list

## Overview of Tree and Searching

- Define binary tree terminology
- Tree traversal

## Introduction to Sorting

- Sorting applications
- Sorting methods
- Bubble sort
- Quicksort
- Practice questions

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