

SKILLSPROUT: TECHS FOR TOMMOROW

MASTER C PROGRAMMING

Complete Beginner to Advanced



Detailed
Course Syllabus

CONTENTS

C - BASICS TO ADVANCED

INTRODUCTION

- C Overview
- Getting Started with C
- Basic Structure & Syntax
- C Comments
- C Variables

C DATA TYPES, OPERATORS & USER I/O

- Introduction C Data Types & Constants
- C Operators
- Format Specifiers & Escape Sequence
- User Input/Output

CONDITIONAL STATEMENTS

- C if...else statements
- Switch Case Statements

ITERATION STATEMENTS

- Linear Search and its analysis C Loops
- while Loop
- do-while Loop
- for Loop
- C Break/Continue

ARRAYS

- Array Basics
- Array Operations

STRINGS

- String Basics
- C String Functions

FUNCTION IN C

- Function Basics
- Function Parameters

CONTENTS

- Functions Declaration
- Recursive Functions

POINTERS IN C

- C Pointers
- Operations on Pointers
- C VOID Pointer
- C NULL Pointer
- Dangling Pointer
- Wild Pointer

MEMORY MANAGEMNT IN C

- C Static Variables
- C Memory Layout
- C Memory Allocation

STRUCTURE & UNIONS IN C

- C Structures
- C Unions
- C Typedef

FILE HANDLING IN C

- File Handling Basics
- Operations on Files
- Files 1/0

CONTENTS

DATA STRUCTURES IN C

INTRODUCTION

- Analysis of Algorithms
- Asymptotic Notation
- Big O notation
- Omega notation
- Theta notation
- Analysis of loops
- Time Complexity and Space Complexity

RECURSION

- Introduction
- Application
- Recursion practices
- Tail Recursion
- Writing Base Cases
- Print 1 to n and n to 1 using recursion

ARRAYS

- Introduction
- Operations on array
- Average of an array
- Maximum in array
- Second largest in array
- Check if array is sorted
- Reverse an array
- Rotate an array

SEARCHING

- Linear Search and its analysis
- Binary Search and its analysis
- Index of first and last occurrence
- Count occurrences in a sorted array

CONTENTS

SORTING

- Bubble Sort
- Selection Sort
- Insertion Sort
- Merging two sorted arrays
- Introduction of merge sort, algorithm and analysis
- Implementation of Quick Sort and analysis

MATRIX

- Introduction and Passing 2D arrays as arguments
- Matrix boundary traversal
- Matrix in snake pattern
- Transpose of a matrix
- Spiral traversal of matrix
- Searching in row-wise and column-wise sorted matrix

HASHING

- Concept of hashing
- Direct Address Table
- Collision Handling
- Chaining
- Open addressing
- Double Hashing

STRINGS

- Introduction
- Escape sequences
- Reverse a string
- String Comparisons
- Operations on String
- Pattern Searching
- Check for Anagram
- Check for Palindrome

LINKED LIST

- Introduction
- Implementation and Applications
- Traversal of Linked List

CONTENTS

- Insertion at beginning and end in Linked List
- Sorted insert in Linked List
- Delete first and last node of Linked List - Reverse a linked list.

DOUBLY LINKED LIST

- Introduction
- Advantages and Disadvantages
- Insertion at beginning and end in Doubly Linked List
- Delete first and last node of Doubly Linked List
- Reverse a Doubly Linked List

CIRCULAR LINKED LIST

- Introduction
- Advantages and Disadvantages
- Insertion at beginning and end in Circular Linked List - Delete head and Kth node of Circular Linked List.

STACK

- Introduction
- Array implementation
- Linked List implementation
- Prefix, Infix and Postfix expressions, their conversion and evaluation.

QUEUE

- Introduction
- Implementation using linked list
- Insertion in queues, Deletion in queues
- Implementing stack using queues and vice versa - Circular queues
- Introduction and applications - Implementing using array and linked list.

DEQUE

- Introduction
- Applications and array implementation.

TREES

- Introduction of Trees
- Applications
- Binary Tree

CONTENTS

- Traversal of Tree
- Implementation of Preorder, Inorder and Postorder traversal
- Iterative Inorder and Preorder

BINARY SEARCH TREES

- Introduction
- Insert, Ceil, Floor and Search in BST.

HEAP

- Introduction
- Implementation of Heap
- Binary Heap (Heapify and Extract)
- Binary Heap (Decrease Key, Build Heap and Delete)

GRAPH

- Introduction
- Representation – Adjacency List and Adjacency Matrix
- Implementation of Adjacency List
- Application of BFS and DFS