

# Data Structure Mastery



## Powering Up with C/C++

- 3 Days Free Trail Session
- 50 Live Interactive lectures
- 100+ hands-on exercises



231, Veda Business Park, Above Tinkus  
cafe, Bhawarkua Main Rd, near Apple  
Hospital, Indore

 [director@codemantra.org](mailto:director@codemantra.org)

More Information

[www.codemantra.org](http://www.codemantra.org)

**COD**  **MANTRA**

# DSA USING C/C++

## LEVEL 1- PREREQUISITE FOR DATA STRUCTURE

### Pointers Introduction

- INTRODUCTION OF ADDRESS & ITS PROPERTIES
- ADDRESS OF (&) | VALUE AT ADDRESS (\*) OPERATORS
- POINTER VARIABLE & ITS TYPE DECLARATION
- POINTER ARITHMETIC
- OPERATION ON ADDRESS

### Memory Allocation

- INTRODUCTION OF STATIC & HEAP MEMORY
- STATIC MEMORY ALLOCATION & ITS DRAWBACKS
- INTRODUCTION OF DYNAMIC MEMORY ALLOCATION
- WAY TO ACCESS DYNAMICALLY ALLOCATED MEMORY USING POINTERS
- DIRECT MEMORY ALLOCATION USING MALLOC & FREE FUNCTION
- DMA LOGICAL PROBLEMS & ITS SOLUTION

### Structure & Pointer

- INTRODUCTION OF OBJECT & ITS PROPERTY
- CREATE YOUR OWN DATA TYPE & OBJECT USING STRUCTURE
- STATIC & DYNAMIC OBJECT AND ARROW (->) OPERATOR
- ARRAY OF STATIC & DYNAMIC OBJECT

### Function and Recursion

- INTRODUCTION TO FUNCTION & LIFO ARCHITECTURE
- FUNCTION DECLARATION , DEFINITION & CALLING
- FUNCTION DECLARATION FLOW WITH EXAMPLE
- LOCAL VARIABLE - GLOBAL VARIABLE - BLOCK

- ARGUMENT PASSING
- CALL BY VALUE ADDRESS
- PASSING ARRAY TO FUNCTION
- INTRODUCTION OF RECURSION
- BINARY RECURSION

## LEVEL 2- INTRODUCTION OF DATA STRUCTURE

### Core of Data Structure

- INTRODUCTION OF DATA STRUCTURE
- WAYS TO STORE DATA | CONTINUOUS & LINKING
- NORMAL VARIABLES VS ARRAY PART-1
- NORMAL VARIABLES VS ARRAY PART-2

### Array- Linear Way To Store Data

- ARRAY ACCESS VS MANIPULATION
- STATICALLY & DYNAMICALLY ALLOCATED ARRAY
- DYNAMICALLY EXPANDABLE ARRAY
- 2D ARRAY & ITS INTERNAL REPRESENTATION
- DYNAMIC 2D ARRAY

### Linkedlist - Link One Data With Another

- INTRODUCTION OF LINKED LIST
- OPERATION ON LINKED LIST | INSERT ( START | END | TRAVERSE )
- OPERATION ON LINKED LIST | DELETE ( START | END )
- INSERT, DELETE & UPDATE ELEMENT AT SPECIFIC POSITION IN THE LINKED LIST
- DOUBLY LINKED LIST AND OPERATION ON LIST ( INSERT AND TRAVERSE )
- DOUBLY LINKED LIST ( DELETE & UPDATE )
- CIRCULAR LINKED LIST AND OPERATION ON LIST ( INSERT AND TRAVERSE )

- CIRCULER LINKED LIST ( DELETE & UPDATE )
- CIRCULER DOUBLY LINKED LIS AND OPERATION ON LIST ( INSERT AND TRAVERSE )
- CIRCULER DOUBLY LINKED LIST ( DELETE & UPDATE )

## LEVEL 3- LINEAR DATA STRUCTURE

### Stack

- INTRODUCTION OF STACK & IT'S IMPORTANCE
- IMPLEMENTATION OF STACK USING ARRAY & ITS OPERATION
- IMPLEMENTATION OF STACK USING LINKED LIST & ITS OPERATION
- MONOTONIC STACK AND ITS IMPLEMATATION

### Queue

- INTRODUCTION OF QUEUE & ITS IMPORTANCE
- INPUT & OUTPUT RESTRICTED QUEUE (THIS IS ALSO A SIMPLE QUEUE)
- IMPLEMENTATION OF QUEUE USING ARRAY & ITS OPERATION
- IMPLEMENTATION OF QUEUE USING LINKED LIST & ITS OPERATION
- CIRCULAR QUEUE & ITS OPERATION
- DOUBLE ENDED QUEUE (DEQUE) & ITS OPERATION
- PRIORITY QUEUE & ITS OPERATION
- ASCENDING PRIORITY QUEUE & ITS OPERATION
- DESCENDING PRIORITY QUEUE & ITS OPERATION

## LEVEL 4- SORTING

### Iteration Technique

- SELECTION SORT
- BUBBLE SORT
- INSERTION SORT

## Divide & Conquer Technique

- MERGE SORT
- QUICK SORT
- HEAP SORT
- RADIX SORT

## LEVEL 5- TREE

### Introduction of Tree

- Introduction to Tree
- Basic Terminologies In Tree
- Representation of Tree Data Structure:
- Basic Operation Of Tree

### Types of Tree

- Generic Trees (N-ary Tree)
- Binary Tree
- Ternary Tree
- Binary Search Tree
- Ternary Search Tree
- AVL Tree
- B tree and B+ tree
- Red Black Tree

## LEVEL 6- GRAPH

### Introduction of Graph

- INTRODUCTION TO GRAPHS AND ITS REPRESENTATIONS
- TYPES OF GRAPHS WITH EXAMPLES AND ITS PROPERTIES
- APPLICATIONS, ADVANTAGES AND DISADVANTAGES OF GRAPH
- TRANSPOSE GRAPH DIFFERENCE BETWEEN GRAPH AND TREE

### Graph Concept

- BREADTH FIRST & DEPTH FIRST TRAVERSAL FOR A GRAPH
- APPLICATIONS OF DEPTH & BREADTH FIRST TRAVERSAL
- ITERATIVE DEPTH FIRST SEARCH
- BFS FOR DISCONNECTED GRAPH
- DIFFERENCE B/W BFS AND DFS