



DATA STRUCTURES AND ALGORITHMS

Description

Data Structure Using C training focuses on the significance of data structures and algorithms in computer programming and software development. Hands-on exposure on data structures lays a strong foundation in developing programs. According to the real life scenario, a well versed candidate can distinguish which data structure to be used to drive optimized results.

Participants in this training will learn how to organize and store data in a computer. Data structures such as arrays, stacks, queues, linked list, and trees are covered in detail. Different algorithms for searching, hashing, and sorting are explained with examples and programming. Candidates learn about the applications of binary search trees and graphs.

Expectations and Goals

We will learn about –

- The terminology used in data structures.
- How to find algorithm complexity?
- How to define and perform operations on different data structures say arrays, stacks, queues, linked list and trees?
- How to perform recursion operation?
- How to execute data operations such as searching, sorting, and hashing?
- How to use binary trees for insertion, deletion, and searching of elements?
- The use of graphs and multi-graphs.

Prerequisites

- Basic Computing and logical Knowledge.
- Knowledge of C/Java Programming.

Module	Topic
Module 1	Introduction Introduction to Data Structure and Algorithm Greedy algorithm and Divide and conquer algorithm Basic types of Data Structure (Build-in and Derived) Basic operations on Data String, Array and its limitations Dynamic memory allocation with some examples
Module 2	Array in Data Structure Array and its representations Basics operations on Arrays Insert, delete, update, sort and search operations on array
Module 3	Linked List Linked List and its representations. Types of Linked List. Basics operations (insert, deletion, display, search, delete) Doubly Linked List and Its representation. Basic operations on Doubly Linked List (insertion, deletion, Insert Last, Delete Last, Insert After, delete, display forward, display backward) Circular Linked List and its representation. Basic operations (insert, delete and display)
Module 4	Stack and Queue Stack and its representation Basic operations on Stack (Push and Pop) One example showing PUSH and POP operation on a Stack Queue and its representations Basic operations on Queue (Enqueue and Dequeue) Difference between stack and queue
Module 5	Searching and Sorting Algorithm Linear Search and Binary Search. Bubble sort and insertion sort in detail. Selection, merge, shell and quick sort in details with some example.
Module 6	Tree Data Structure Tree and its representations. Some important terms in Tree structure (node, path, root etc.) Binary Search Tree and its operation. Tree Traversal (In-Order, Pre-Order and Post-Order Traversal). AVL Tree and Spanning tree. Heap
Module 7	Graphs and its representations What is Graph in Data Structures? Some important terms in Graph. Basic operations (add vertex, Add Edge, Display vertex) Depth first and Breadth first traversal
Module 8	Project Work and Documentation

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