अखिल भारतीय सूचना प्रौद्योगिकी संगठन
All India Information Technology Association
New Delhi
WORK RELATED TO MINISTRY OF INFORMATION TECHNOLOGY (GOVT. OF INDIA)

CERTIFICATE IN DATA STRUCTURES

Eligibility : 10th   **Duration :** 2 Months
Course Code : CR-17

Introduction :-- Basic Terminology , Elementary Data Organization , Data Structure operations , Algorithm Complexity and Time-Space trade-off

Arrays :-- Array Definition , Representation and Analysis , Single and Multidimensional Arrays , address calculation , application of arrays , Character String in C , Character string operation , Array as Parameters , Ordered List , Sparse Matrices , and Vectors.

Stacks :-- Array Representation and Implementation of stack , Operations on Stacks : Push & Pop , Array Representation of Stack , Linked Representation of Stack , Operations Associated with Stacks , Application of stack : Conversion of Infix to Prefix and Postfix Expressions , Evaluation of postfix expression using stack.

Recursion :-- Recursive definition and processes , recursion in C , example of recursion , Tower of Hanoi Problem , simulating recursion.Backtracking , recursive algorithms , principles of recursion , tail recursion , removal of recursion.

Queues :-- Array and linked representation and implementation of queues , Operations on Queue : Create , Add , Delete , Full and Empty.Circular queue , Deque , and Priority Queue.

Linked list:-- Representation and Implementation of Singly Linked Lists , Two-way Header List , Traversing and Searching of Linked List , Overflow and Underflow , Insertion and deletion to/from Linked Lists , Insertion and deletion Algorithms , Doubly linked list , Linked List in Array , Polynomial representation and addition , Generalized linked list , Garbage Collection and Compaction.

Trees:-- Basic terminology , Binary Trees , Binary tree representation , algebraic Expressions , Complete Binary Tree.Extended Binary Trees , Array and Linked Representation of Binary trees , Traversing Binary trees , Threaded Binary trees.Traversing Threaded Binary trees , Huffman algorithm.

Searching and Hashing :-- Sequential search , binary search , comparison and analysis , Hash Table , Hash Functions , Collision Resolution Strategies , Hash Table Implementation.

Sorting :-- Insertion Sort , Bubble Sorting , Quick Sort , Two Way Merge Sort , Heap Sort , Sorting on Different Keys , Practical consideration for Internal Sorting.

Binary Search Trees :-- Binary Search Tree (BST) , Insertion and Deletion in BST , Complexity of Search Algorithm , Path Length , AVL Trees , B-trees.

Graphs :-- Terminology & Representations , Graphs & Multi-graphs , Directed Graphs , Sequential Representations of Graphs , Adjacency Matrices , Traversal , Connected Component and Spanning Trees , Minimum Cost Spanning Trees.

File Structures :-- Physical Storage Media File Organization , Organization of records into Blocks , Sequential Files , Indexing and Hashing , Primary indices , Secondary indices , B+ Tree index Files , B Tree index Files , Indexing and Hashing Comparisons.

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