Data Structures and Algorithms With Python

Duration: 50 Hours

Price: INR 9999/-

1.   Introduction to Data Structures and Algorithms

•   Overview of data structures and algorithms

•   Importance of data structures and algorithms in programming

•   Complexity analysis of algorithms

•   Big O notation and its use in algorithm analysis

2.   Python basics for Data Structures and Algorithms

•   Variables and data types

•   Control structures (if-else, loops)

•   Functions and modules

•   Object-oriented programming concepts in Python

3.   Arrays and Linked Lists

•   Introduction to arrays and linked lists

•   Implementation of arrays and linked lists in Python

•   Traversing and searching arrays and linked lists

•   Insertion and deletion in arrays and linked lists

4.   Stacks and Queues

•   Introduction to stacks and queues

•   Implementation of stacks and queues in Python

•   Operations on stacks and queues

•   Applications of stacks and queues

5.   Trees

•   Introduction to trees and binary trees

•   Tree traversal algorithms

•   Binary search trees and their implementation

- Balancing techniques for binary search trees

6. Graphs

- Introduction to graphs and graph terminologies

- Graph representation in Python

- Graph traversal algorithms

- Shortest path algorithms (Dijkstra's, Bellman-Ford, Floyd-Warshall)

- Minimum Spanning Tree algorithms (Prim's and Kruskal's)

7. Sorting and Searching

- Sorting algorithms (Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort)

- Analysis of sorting algorithms

- Searching algorithms (Linear search, Binary search)

- Hashing and its applications

8. Advanced Data Structures

- Heaps and Priority Queues

- Trie and Suffix Tree

- Disjoint Set and Union Find

- Segment Tree and Fenwick Tree

9. Dynamic Programming

- Introduction to dynamic programming

- Overlapping subproblems and optimal substructure

- Memoization and Tabulation

- Applications of dynamic programming (Fibonacci series, Longest Common Subsequence, Knapsack problem)

10. Miscellaneous topics

- Bit manipulation and its applications

- Recursion and Backtracking

- Greedy algorithms

- Computational geometry (Convex hull, Closest pair of points)

This is a comprehensive syllabus that covers most of the important topics in Data Structures and Algorithms with Python. The depth and duration of the course may vary depending on the level and scope of the course.