

Registered Office: B-23, Krishi Nagar II, Taru Chhaya Nagar, Taro Ki koot, near B-2 Bypass, Jaipur, Rajasthan 302029

Algorithms and DataStructures in Python

(Competitive Programming)

Total Duration: 50 Hours [25 Sessions - 2 Hours Every Session]

Section 1:

- Setting up the environment
- Jupyter NoteBook
- Know about Importance of Competitive Programming
- Key to get a JOB in Product Based Companies, Start preparing for it
- Data structures and abstract data types

Section 2:

- What is an array data structure
- Arrays related interview questions
- Linked list data structure and its implementation
- Stacks and queues
- Related interview questions

Section 3:

- Algorithmic Thinking, Peak Finding
- Models of Computation, Python Cost Model, Document Distance
- What are binary search trees
- Practical applications of binary search trees

Section 4:

- Problems with binary trees
- Binary Search Trees, BST Sort
- Balanced trees: AVL trees and red-black trees
- AVL Trees, AVL Sort

Section 5:

- Insertion Sort, Merge Sort
- Heaps and Heap Sort
- Counting Sort, Radix Sort, Lower Bounds for Sorting and Searching

Section 6:

- Associative arrays and dictionaries
- How to achieve O(1) constant running time with hashing
- Ternary search trees as associative arrays
- Hashing with Chaining



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- Simulation Algorithms
- Table Doubling, DNA Sequence Matching

Section 7:

- Numerics
 - a. Integer Arithmetic, Karatsuba Multiplication
 - b. Square Roots, Newton's Method
- Graphs:
 - a. Basic graph algorithms
 - b. Breadth-first and depth-first search
 - c. Topological Sorting

Section 8:

- Shortest path algorithms
- Dijkstra's algorithm, Speeding up Dijkstra
- Bellman-Ford algorithm

Section 9:

- What are spanning trees
- Kruskal algorithm

Section 10:

- Sorting algorithms
- Bubble sort, selection sort and insertion sort
- Quicksort and merge sort
- Non-comparison based sorting algorithms
- Counting sort and radix sort

Section 11:

- Memoization, Subproblems, Guessing, Bottom-up; Fibonacci, Shortest Paths
- Parent Pointers; Text Justification, Perfect-Information Blackjack
- String Subproblems, Pseudo Polynomial Time.
- Parenthesization, Edit Distance, Knapsack

Section 12:

- Computational Complexity
- Algorithms Research Topics
- String Subproblems, Pseudo Polynomial Time.
- Parenthesization, Edit Distance, Knapsack



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After Data Structures & Algorithms, You will learn about some Latest libraries which we actually use in the market.

- Numpy for mathematical calculation
- Pandas
- Matplotlib / Bokeh to make graph
- Webbrowser to play with Web Browser
- Selenium Automation
- Scrapy / BeautifulSoup
- Web Scraping