

30 Day DSA Learning Roadmap

Week 1: Basics of Data Structures

Day 1-2: Introduction to DSA and Complexity Analysis

- Understand what DSA is and why it is important.
- Learn about time and space complexity.
- Big O notation, Omega (Ω), and Theta (Θ).

Day 3-4: Arrays

- Introduction to arrays and their types.
- Basic operations: traversal, insertion, deletion.
- Multidimensional arrays.
- Practice problems.

Day 5-6: Linked Lists

- Singly linked list.
- Doubly linked list.
- Circular linked list.
- Basic operations: traversal, insertion, deletion.
- Practice problems.

Day 7: Review and Practice

- Review all topics covered in Week 1.
- Solve various problems on arrays and linked lists.

Week 2: Advanced Data Structures

Day 8-9: Stacks

- Introduction to stacks.
- Implementation using arrays and linked lists.
- Basic operations: push, pop, peek.
- Applications of stacks.
- Practice problems.

Day 10-11: Queues

- Introduction to queues.
- Implementation using arrays and linked lists.
- Types of queues: simple, circular, and priority queues.
- Basic operations: enqueue, dequeue, front, rear.
- Applications of queues.
- Practice

Day 12-13: Hashing

- Introduction to hashing.
- Hash functions and collision resolution techniques.
- Applications of hashing.
- Practice problems.

Day 14: Review and Practice

- Review all topics covered in Week 2.
- Solve various problems on stacks, queues, and hashing.

Week 3: Trees

Day 15-16: Binary Trees

- Introduction to binary trees.
- Types of binary trees.
- Basic operations: insertion, deletion, traversal (in-order, pre-order, post-order).
- Practice problems.

Day 17-18: Binary Search Trees (BST)

- Introduction to BST.
- Properties of BST.
- Basic operations: insertion, deletion, search.
- Practice problems.

Day 19: Heaps

- Introduction to heaps.
- Types of heaps: min-heap, max-heap.
- Basic operations: insertion, deletion.
- Applications of heaps.
- Practice problems.

Day 20-21: AVL Trees

- Introduction to AVL trees.
- Properties of AVL trees.
- Basic operations: insertion, deletion, rotations.
- Practice problems.

Week 4: Graphs and Advanced Algorithms

Day 22-23: Graphs

- Introduction to graphs.
- Representation of graphs: adjacency matrix, adjacency list.
- Types of graphs: directed, undirected, weighted, unweighted.
- Basic operations: traversal (BFS, DFS).
- Practice problems.

Day 24-25: Sorting Algorithms

- Introduction to sorting algorithms.
- Bubble sort, selection sort, insertion sort.
- Merge sort, quick sort, heap sort.
- Practice problems.

Day 26-27: Searching Algorithms

- Linear search.
- Binary search.
- Practice problems.

Day 28-29: Advanced Topics

- Dynamic programming: introduction and basic problems.
- Greedy algorithms: introduction and basic problems.

Day 30: Review and Final Practice

- Review all topics covered in Week 3 and Week 4.
- Solve various problems on trees, graphs, sorting, and searching.
- Work on a comprehensive project or solve multiple complex problems.



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