DSA Roadmap After Core Topics

Phase 1: Complete Core DSA

1. Recursion & Backtracking

   Subset sum, permutations, N-Queens, Sudoku solver

2. Binary Search (on arrays & on answers)

   Search in rotated sorted array, Koko eating bananas, Aggressive cows

3. Divide and Conquer

   Merge Sort, Quick Sort, Count Inversions

Phase 2: Greedy & Heap

4. Greedy Algorithms

   Activity selection, Fractional knapsack, Job scheduling, Huffman coding

5. Heap / Priority Queue

   K largest/smallest elements, Merge K sorted lists, Median in stream

Phase 3: Graph Algorithms

6. Graph Basics

   BFS, DFS (for matrix & adjacency list)

   Detect cycle in directed/undirected graph

7. Advanced Graph

   Dijkstras Algorithm

   Bellman-Ford

   Topological Sort

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Disjoint Set Union (DSU), Kruskal, Prims (for MST)

Phase 4: Dynamic Programming (DP)

8. Basic DP

   0/1 Knapsack, Fibonacci, Climbing Stairs

9. Intermediate DP

   Longest Common Subsequence, Longest Palindromic Substring

   Edit Distance, Coin Change

10. DP on Trees, DP on Subsets, Bitmask DP

    (Once basic and intermediate are strong)

Optional Topics

11. Tries (Prefix Trees)

    Word dictionary, Autocomplete

12. Segment Trees / Fenwick Trees

    Range queries, Lazy Propagation

13. Bit Manipulation

    XOR problems, Subsets using bits

Recommended Learning Order

1. Recursion & Backtracking
2. Binary Search (on answer)

DSA Roadmap After Core Topics

3. Greedy
4. Heap / Priority Queue
5. Graphs (BFS/DFS Shortest Path MST DSU)
6. Dynamic Programming
7. Tries (Optional)
8. Segment Tree / BIT (Optional)
9. Bit Manipulation (Optional but helpful in contests)