■ Data Structures & Algorithms (DSA) Roadmap

Phase 1: Basics (Foundations)

- Time & Space Complexity (Big-O, Big-Theta, Big-Omega)
- Practice: min/max in array, reverse string, palindrome, frequency count

Phase 2: Arrays & Strings

- Array traversal, insertion, deletion
- Subarrays, Substrings, Sliding Window, Prefix Sum
- Problems: Two Sum, Kadane's Algorithm, Longest Substring Without Repeating Characters, Rotate Array

Phase 3: Recursion & Backtracking

- Factorial, Fibonacci, Tower of Hanoi
- N-Queens Problem, Rat in a Maze

Phase 4: Linked List

- Singly, Doubly, Circular
- Reverse linked list, Detect cycle (Floyd's), Merge sorted lists

Phase 5: Stacks & Queues

- Stack Problems: Balanced Parentheses, Next Greater Element, Postfix Evaluation
- Queue Problems: Implement Queue using Stacks, Circular Queue, LRU Cache

Phase 6: Searching & Sorting

- Linear Search, Binary Search
- Bubble, Insertion, Selection Sort
- Merge Sort, Quick Sort, Heap Sort

Phase 7: Trees

- Binary Trees, BST
- Traversals: Inorder, Preorder, Postorder, Level-order
- Height, Diameter, Lowest Common Ancestor, Balanced Trees

Phase 8: Graphs

- Representation: Adjacency List, Matrix
- BFS, DFS, Dijkstra, Bellman-Ford, Floyd-Warshall
- Kruskal's, Prim's, Topological Sort

Phase 9: Dynamic Programming (DP)

- Beginner: Fibonacci, Climbing Stairs, Coin Change
- Intermediate: LCS, LIS, Knapsack
- Advanced: Matrix Chain Multiplication, DP on Grids

Phase 10: Advanced Topics (Optional)

- Tries, Segment Trees, Fenwick Tree
- Disjoint Set Union (DSU)
- Bit Manipulation tricks

Suggested Practice Path

- Platforms: LeetCode, GeeksforGeeks, HackerRank, CodeChef
- Rule: 1 easy + 1 medium daily, revise weekly
- Timeline: Month 1-5 stepwise coverage

■ Top 75 Must-Do LeetCode Problems

- 1. Two Sum (Array) – https://leetcode.com/problems/two-sum/
- 53. Maximum Subarray (Kadane's) – https://leetcode.com/problems/maximum-subarray/
- 121. Best Time to Buy and Sell Stock – https://leetcode.com/problems/best-time-to-buy-and-sell-stock/
- 217. Contains Duplicate – https://leetcode.com/problems/contains-duplicate/
- 238. Product of Array Except Self – https://leetcode.com/problems/product-of-array-except-self/
- 20. Valid Parentheses – https://leetcode.com/problems/valid-parentheses/
- 155. Min Stack – https://leetcode.com/problems/min-stack/
- 206. Reverse Linked List – https://leetcode.com/problems/reverse-linked-list/
- 141. Linked List Cycle – https://leetcode.com/problems/linked-list-cycle/
- 21. Merge Two Sorted Lists – https://leetcode.com/problems/merge-two-sorted-lists/
- 19. Remove Nth Node From End of List – https://leetcode.com/problems/remove-nth-node-from-end-of-list/
- 876. Middle of the Linked List – https://leetcode.com/problems/middle-of-the-linked-list/
- 704. Binary Search – https://leetcode.com/problems/binary-search/
- 33. Search in Rotated Sorted Array – https://leetcode.com/problems/search-in-rotated-sorted-array/
- 153. Find Minimum in Rotated Sorted Array – https://leetcode.com/problems/find-minimum-in-rotated-sorted-array/
- 852. Peak Index in a Mountain Array – https://leetcode.com/problems/peak-index-in-a-mountain-array/
- 35. Search Insert Position – https://leetcode.com/problems/search-insert-position/
- 98. Validate Binary Search Tree – https://leetcode.com/problems/validate-binary-search-tree/

- 104. Maximum Depth of Binary Tree – https://leetcode.com/problems/maximum-depth-of-binary-tree/
- 102. Binary Tree Level Order Traversal – https://leetcode.com/problems/binary-tree-level-order-traversal/
- 101. Symmetric Tree – https://leetcode.com/problems/symmetric-tree/
- 226. Invert Binary Tree – https://leetcode.com/problems/invert-binary-tree/
- 543. Diameter of Binary Tree – https://leetcode.com/problems/diameter-of-binary-tree/
- 235. Lowest Common Ancestor of a BST – https://leetcode.com/problems/lowest-common-ancestor-of-a-binary-search-tree/
- 200. Number of Islands (Graph BFS/DFS) – https://leetcode.com/problems/number-of-islands/
- 133. Clone Graph – https://leetcode.com/problems/clone-graph/
- 994. Rotting Oranges – https://leetcode.com/problems/rotting-oranges/
- 207. Course Schedule (Topological Sort) – https://leetcode.com/problems/course-schedule/
- 210. Course Schedule II – https://leetcode.com/problems/course-schedule-ii/
- 300. Longest Increasing Subsequence (DP) – https://leetcode.com/problems/longest-increasing-subsequence/
- 1143. Longest Common Subsequence – https://leetcode.com/problems/longest-common-subsequence/
- 70. Climbing Stairs – https://leetcode.com/problems/climbing-stairs/
- 322. Coin Change – https://leetcode.com/problems/coin-change/
- 198. House Robber – https://leetcode.com/problems/house-robber/
- 213. House Robber II – https://leetcode.com/problems/house-robber-ii/
- 62. Unique Paths – https://leetcode.com/problems/unique-paths/
- 64. Minimum Path Sum – https://leetcode.com/problems/minimum-path-sum/
- 72. Edit Distance – https://leetcode.com/problems/edit-distance/
- 139. Word Break – https://leetcode.com/problems/word-break/
- 5. Longest Palindromic Substring – https://leetcode.com/problems/longest-palindromic-substring/
- 647. Palindromic Substrings – https://leetcode.com/problems/palindromic-substrings/
- 76. Minimum Window Substring – https://leetcode.com/problems/minimum-window-substring/
- 3. Longest Substring Without Repeating Characters – https://leetcode.com/problems/longest-substring-without-repeating-characters/
- 49. Group Anagrams – https://leetcode.com/problems/group-anagrams/
- 242. Valid Anagram – https://leetcode.com/problems/valid-anagram/
- 36. Valid Sudoku – https://leetcode.com/problems/valid-sudoku/
- 271. Encode and Decode Strings (Design) – https://leetcode.com/problems/encode-and-decode-strings/
- 146. LRU Cache – https://leetcode.com/problems/lru-cache/
- 155. Min Stack – https://leetcode.com/problems/min-stack/
- 297. Serialize and Deserialize Binary Tree – https://leetcode.com/problems/serialize-and-deserialize-binary-tree/