



# Complete DSA

## Patterns List

### Core Algorithmic Patterns

- Two Pointers
- Sliding Window
- Fast & Slow Pointers
- Merge Intervals
- Cyclic Sort
- In-place Reversal of Linked List
- Top K Elements
- K-way Merge
- Two Heaps
- Modified Binary Search
- Bit Manipulation
- Prefix Sum
- Difference Array
- Counting Techniques
- Mathematical Patterns

### Recursion & Backtracking

- Basic Recursion
- Backtracking (Subsets, Permutations, N-Queens, etc.)
- Memoization
- Divide and Conquer
- Tail Recursion

### Dynamic Programming (DP)

- 0/1 Knapsack
- Unbounded Knapsack
- Subset Sum / Partition
- Fibonacci Sequence
- Longest Common Subsequence
- Longest Increasing Subsequence
- Palindrome-based DP
- DP on Trees
- DP on Grids
- Bitmask DP
- State Compression DP
- Coin Change
- Catalan Numbers
- Digit DP

### Data Structures & Patterns

#### Arrays & Strings

- Kadane's Algorithm
- Sliding Window Max/Min
- Dutch National Flag
- Mo's Algorithm

#### Linked Lists

- Reverse List
- Cycle Detection
- Merge K Sorted Lists
- Add Two Numbers

#### Trees

- DFS, BFS
- Diameter, LCA
- Morris Traversal
- Serialize/Deserialize

#### Heaps

- Top K
- Median of Stream
- Merge K Sorted Lists

#### Hash Maps / Sets

- Two Sum / Four Sum
- Longest Consecutive Subsequence
- Group Anagrams

#### Stacks & Queues

- Monotonic Stack/Queue
- Valid Parentheses
- Largest Rectangle in Histogram

### Graph Patterns

- BFS / DFS
- Topological Sort
- Cycle Detection
- Union Find
- Kruskal's / Prim's Algorithm
- Dijkstra / Bellman-Ford
- Floyd-Warshall
- Tarjan's Algorithms
- Shortest Path in Grid
- Bipartite Check

### Tries & String Algorithms

- Trie
- Aho-Corasick
- KMP
- Rabin-Karp
- Manacher's Algorithm

### Sorting Algorithms

- Bubble, Selection, Insertion
- Merge Sort
- Quick Sort
- Heap Sort
- Counting / Radix / Bucket Sort

### Miscellaneous

- Greedy
- Sweep Line
- Reservoir Sampling
- Binary Search on Answer
- Meet in the Middle
- Segment Trees / BIT
- Sparse Tables
- Number Theory (Sieve, GCD, CRT, etc.)
- Game Theory