DSA Cheat Sheet - Interview Revision

1. Arrays & Strings

- Techniques: Sliding Window, Two Pointers, Hashing
- Key Problems:
  - Two Sum
  - Maximum Subarray (Kadane's)
  - Longest Substring Without Repeating Characters
  - Merge Intervals
  - Move Zeros

2. Hashing

- Use HashMap/HashSet for frequency/counting
- Key Problems:
  - Group Anagrams
  - Longest Consecutive Sequence
  - Isomorphic Strings

3. Linked List

- Fast & Slow Pointers, Reversal, Cycle Detection
- Key Problems:
  - Reverse a Linked List
  - Detect a Cycle
  - Merge Two Sorted Lists
  - Find Middle Node

4. Stack & Queue

- Use Stack for parsing and monotonic problems
- Key Problems:
  - Valid Parentheses
  - Next Greater Element
  - Min Stack

5. Trees & BST

- Traversals (Inorder, Preorder, Postorder), DFS, BFS

- Key Problems:
  - Inorder Traversal
  - Height of Tree
  - Lowest Common Ancestor
  - Check Balanced Tree

6. Heap / Priority Queue

- Min Heap, Max Heap using priority_queue in C++
- Key Problems:
  - Kth Largest Element
  - Top K Frequent Elements
  - Merge K Sorted Lists

7. Recursion & Backtracking

- Explore all possibilities, use backtracking to revert
- Key Problems:
  - Subsets
  - Permutations
  - Sudoku Solver

8. Dynamic Programming (DP)

- Use memoization or tabulation to optimize recursion
- Key Problems:
  - Fibonacci
  - Longest Common Subsequence
  - 0/1 Knapsack
  - Longest Palindromic Substring

9. Prefix Sum

- pre[i] = pre[i-1] + a[i]
- Range Sum [L, R] = pre[R] - pre[L-1]
- Key Problems:
  - Subarray Sum Equals K
  - Equilibrium Index
  - 2D Prefix Sum for matrix queries