1. **Array and hashing**

**Array Traversal / Simulation**

- Running Sum of 1D Array

- Final Value of Variable After Performing Operations

- Max Consecutive Ones

- Plus One

- Find the Difference

- Find the Array Concatenation Value

**Hashing (Frequency / Set / Map)**

- Contains Duplicate

- Two Sum

- Valid Anagram

- Group Anagrams

- Majority Element

- Majority Element II

- Top K Frequent Elements

- Happy Number

- Single Number

**Sorting Based**

- Merge Sorted Array

- Squares of a Sorted Array

- Valid Anagram

- Group Anagrams

**Two Pointer Technique**

- Remove Duplicates from Sorted Array

- Remove Element

- Move Zeroes

- Squares of a Sorted Array

- Merge Sorted Array

**Cyclic Sort / Index Mapping**

- Missing Number

- Find the Duplicate Number

**Prefix / Suffix Computation**

- Product of Array Except Self

**Greedy / Optimization**

- Best Time to Buy and Sell Stock

**Sequence / Set Logic**

- Longest Consecutive Sequence

**Heap / Priority Queue**

- Kth Largest Element in an Array

- Kth Largest Element in Array

- Top K Frequent Elements

**Matrix Problems**

- Set Matrix Zeroes

- Transpose Matrix

● Valid Sudoku

## Array Rotation / Rearrangement

● Rotate Array

● Check if Array is Sorted and Rotated

## Bit Manipulation

● Single Number

## String Encoding / Decoding

● Encode and Decode Strings

## Brute Force / Simple Array Logic

● Concatenation of Array

2. **Two pointers**

## Two Pointer Technique

● Container With Most Water

● Two Sum II

● Valid Palindrome

● Valid Palindrome II

● Reverse String

● Reverse Vowels of a String

● Remove Duplicates from Sorted Array

● Move Zeroes

## Two Pointer + Sorting

- 3Sum

- 3Sum Closest

- Dutch National Flag (Sort Colors)

**Sliding Window**

- Longest Substring Without Repeating Characters

**Stack / Two Pointer Combination**

- Trapping Rain Water

**String Matching / String Traversal**

- Find First Occurrence in String

**Subsequence Pattern**

- Is Subsequence

**In-Place Array Manipulation**

- Remove Duplicates from Sorted Array

- Move Zeroes

- Dutch National Flag (Sort Colors)

**Greedy / Optimization**

- Container With Most Water

- Trapping Rain Water

3. **Sliding window**

**Sliding Window – Fixed Size**

- Permutation in String

- Find All Anagrams in a String

## Sliding Window – Variable Size

- Longest Substring Without Repeating Characters

- Minimum Size Subarray Sum

- Minimum Window Substring

- Longest Repeating Character Replacement

- Subarray Product Less Than K

## Sliding Window + Deque / Monotonic Queue

- Sliding Window Maximum

## Binary Array Sliding Window

- Longest Subarray of 1s After Deleting One

- Max Consecutive Ones III

## Prefix Sum + Sliding Window

- Count Number of Nice Subarrays

   **4. Stacks**

## Monotonic Stack (Next Greater / Smaller)

- Daily Temperatures

- Next Greater Element I

- Next Greater Element II

- Largest Rectangle in Histogram

## Stack Simulation

- Evaluate Reverse Polish Notation

- Remove All Adjacent Duplicates

**Parentheses / Expression Validation**

- Valid Parentheses

**Design Stack**

- Min Stack

**Path / String Processing Using Stack**

- Simplify Path

**Greedy + Stack**

- Car Fleet

5. **Binary search**

**Basic Binary Search**

- Binary Search

- Search Insert Position

- First & Last Position of Element in Sorted Array

- Single Element in a Sorted Array

**Binary Search on Rotated Sorted Array**

- Find Minimum in Rotated Sorted Array

- Search in Rotated Sorted Array

- Search in Rotated Sorted Array II

**Binary Search on Answer (Optimization Problems)**

- Koko Eating Bananas

- Capacity to Ship Packages within D Days

- Minimum Number of Days to Make m Bouquets

- Divide Chocolate

- Aggressive Cows (SPOJ)

**Binary Search on Matrix**

- Search a 2D Matrix

- Search a 2D Matrix II

**Advanced Binary Search / Partitioning**

- Median of Two Sorted Arrays

- Find Kth Smallest Pair Distance

**Binary Search on Index / Properties**

- Find Peak Element

- H-Index II

**Binary Search with Data Structure**

- Time Based Key Value Store

6. **Linked list**

**Linked List Basics**

- Delete Node in a Linked List

- Middle of the Linked List

- Delete the Middle Node

**Fast & Slow Pointer**

- Linked List Cycle

- Linked List Cycle II

- Middle of the Linked List

- Palindrome Linked List

**Two Pointer Technique**

- Remove Nth Node From End

- Reorder List

**Reversal Patterns**

- Reverse Linked List

- Reverse Nodes in k-Group

- Swap Nodes in Pairs

**Merge Sorted Lists**

- Merge Two Sorted Lists

- Merge K Sorted Lists

**Dummy Node / Carry Handling**

- Add Two Numbers

**Hashing + Linked List**

- Copy List With Random Pointer

**Design Data Structure**

- LRU Cache

**In-Place Modification / Pointer Manipulation**

- Flatten Multilevel Doubly Linked List

## Cycle / Duplicate Detection (Floyd's Algorithm)

- Find the Duplicate Number

### 7. Trees

## Tree Traversal (DFS / BFS)

- Binary Tree Level Order Traversal

- Binary Tree Zigzag Level Order Traversal

- Binary Tree Right Side View

- Maximum Depth of Binary Tree

- Count Good Nodes in Binary Tree

## Depth-First Search (DFS)

- Same Tree

- Subtree of Another Tree

- Invert Binary Tree

- Balanced Binary Tree

## Binary Tree Properties / Path Based

- Diameter of Binary Tree

- Binary Tree Maximum Path Sum

- Longest Zigzag Path in Binary Tree

- Maximum Product of Splitted Binary Tree

## Tree Construction

- Construct Binary Tree From Preorder and Inorder

## Binary Search Tree (BST) Specific

- Validate Binary Search Tree

- Kth Smallest Element in BST

- Lowest Common Ancestor (BST)

## Tree + Dynamic Programming

- House Robber III

## Tree Serialization

- Serialize and Deserialize Binary Tree

## Greedy / Camera Placement

- Binary Tree Cameras

## 8. Heap/Priority queue

## Heap / Priority Queue

- K Closest Points to Origin

- Kth Largest Element in Array

- Last Stone Weight

- Top K Frequent Words

## Heap + Streaming Data

- Find Median from Data Stream

- Kth Largest Element in a Stream

## Greedy + Heap

- Task Scheduler

- Reorganize String

- Distant Barcodes

**Design / System Simulation**

- Design Twitter

9. **Backtracking**

**Backtracking – Combinations**

- Combination Sum

- Combination Sum II

**Backtracking – Permutations**

- Permutations

- Permutations II

- Next Permutation

**Backtracking – Subsets / Power Set**

- Subsets

- Subsets II

**Backtracking – String Construction**

- Generate Parentheses

- Letter Combinations of a Phone Number

**Backtracking – Board / Grid Based**

- N Queens

- Word Search

- Rat in a Maze

- Sudoku Solver

## Backtracking + DP / Pruning

- Palindrome Partitioning

- Word Break II

### 10. Tries

## Trie Implementation / Basics

- Implement Trie (Prefix Tree)

## Trie + DFS / Backtracking

- Word Search II

## Trie with Wildcard / Search

- Design Add & Search Words Data Structure

## Trie + Prefix Replacement

- Replace Words

## Trie + Prefix Sum / Hashing

- Map Sum Pairs

### 11. Graphs

## Graph Traversal (BFS / DFS)

- Clone Graph

- Max Area of Island

- Number of Islands

- Friendship Circles

**Connected Components**

- Number of Connected Components

- Graph Valid Tree

**Topological Sort / Directed Graph**

- Course Schedule

- Course Schedule II

**Cycle Detection / Union Find**

- Redundant Connection

**Grid BFS / Multi-Source BFS**

- Rotting Oranges

- Walls and Gates

**Grid DFS / Flood Fill**

- Surrounded Regions

- Pacific Atlantic Water Flow

**Shortest Path (BFS)**

- Word Ladder

**Shortest Path + Backtracking**

- Word Ladder II

**Graph Coloring / Bipartite Check**

- Is Graph Bipartite

**Graph + Priority Queue (Dijkstra / BFS Variant)**

- Path with Minimum Effort

### 12. Advanced graph

**Topological Sort / DAG**

- Alien Dictionary

- Topological Sort

- Course-style DAG ordering

- Remove Minimum Number of Vertices to Make DAG

**Shortest Path – Dijkstra**

- Network Delay Time

- Swim in Rising Water

- Path with weighted edges (Dijkstra's Algorithm – Multiple Problems)

**Shortest Path – BFS (Unweighted / Grid)**

- Shortest Path in Binary Matrix

**Shortest Path – Modified BFS / Dijkstra**

- Minimum Cost to Make at Least One Valid Path

**Shortest Path – Bellman-Ford**

- Bellman-Ford (Detect Negative Cycle)

- Cheapest Flights Within K Stops

**Minimum Spanning Tree (MST)**

- Min Cost to Connect All Points (MST)

**Graph Traversal + DFS**

- All Paths From Source Lead to Destination

- Find Eventual Safe States

**Graph Traversal + Backtracking**

- Reconstruct Itinerary

**Advanced Graph / Mixed Concepts**

- Alien Dictionary

## 13. 1D Dynamic Programming

**1D DP – Fibonacci Style**

- Fibonacci Number

- Climbing Stairs

- House Robber

- House Robber II

**DP on Stocks (State Machine)**

- Best Time to Buy and Sell Stock With Cooldown

**DP – Unbounded Knapsack / Coin Change**

- Coin Change

**DP – Subset / Knapsack (0/1)**

- Partition Equal Subset Sum

## DP on Strings

- Decode Ways

- Word Break

- Count Vowel Strings

## DP – Kadane's Algorithm / Subarray

- Maximum Subarray

- Maximum Product Subarray

## DP – Increasing Sequence

- Longest Increasing Subsequence

## DP – Counting Patterns

- Arithmetic Slices

## Greedy / DP Hybrid

- Jump Game

- Jump Game II

## 14. 2D Dynamic Programming

## Interval DP

- Burst Balloons

## DP – Unbounded Knapsack / Counting Ways

- Coin Change II

- Target Sum

**DP on Strings (2D DP)**

- Longest Common Subsequence

- Edit Distance

- Distinct Subsequences

- Interleaving String

- Regular Expression Matching

**DP on Grid / Matrix**

- Unique Paths

- Unique Paths II

- Minimum Path Sum

- Longest Increasing Path in a Matrix

**15. Greedy**

**Greedy – Feasibility / Validation**

- Gas Station

- Lemonade Change

- Valid Parenthesis String

**Greedy – Frequency / Counting**

- Hand of Straights

**Greedy – Partitioning**

- Partition Labels

**Greedy – Selection / Scheduling**

- Interval Scheduling

- Activity Selection Problem

- Minimum Platform

## Greedy – State Tracking

- Merge Triplets

## Greedy / DP Hybrid

- Jump Game

## 16. Intervals

## Interval Merging

- Merge Intervals

- Insert Interval

## Interval Overlap / Conflict Detection

- Meeting Rooms

- Non Overlapping Intervals

## Interval Counting / Resource Allocation

- Meeting Rooms II

## Interval Intersection

- Interval Intersection

## Interval + Heap / Queries

- Minimum Interval to Include Each Query

## Interval Scheduling / Free Time

- Employee Free Time

### 17. Math/geometry

**String + Math Simulation**

- Add Strings

- Multiply Strings

- Reverse Integer

- Palindrome Number

- Largest Odd Number in a String

**Math / Number Theory**

- Pow(x, n)

- Nth Digit

**Base Conversion / Mapping**

- Excel Sheet Column Number

- Excel Sheet Column Title

**Counting / Simple Logic**

- Fizz Buzz

**Geometry / Matrix Transformation**

- Rotate Image

**Matrix Traversal**

- Spiral Matrix

**Design / Hashing + Geometry**

- Detect Squares

### 18. Bit manipulations

**Bit Manipulation – Basics**

- Number of 1 Bits

- Reverse Bits

- Counting Bits

**Bit Manipulation – XOR Pattern**

- Single Number

- Single Number II

- Single Number III

**Bit Manipulation – Math / Logic**

- Sum of Two Integers

**Bit Manipulation + Array Logic**

- Missing Number

- Find the Difference

**PATTERN 1: Stack as a Simple Container**

- **Valid Parentheses**

- **Backspace String Compare**

- **Remove Adjacent Duplicates**

- **Evaluate Reverse Polish Notation**

**PATTERN 2: Stack with Auxiliary Data (Min / Frequency)**

- **Maximum Frequency Stack** *(optional but powerful)*
- **Min Stack**


## PATTERN 3: Next Greater / Smaller Element (Monotonic Stack – Foundation)

- **Next Greater Element I**

- **Next Greater Element II**

- **Daily Temperatures**


## PATTERN 4: Monotonic Stack – Range & Area Problems

- **Largest Rectangle in Histogram**

- **Trapping Rain Water**

- **Sum of Subarray Minimums**


## PATTERN 5: Collision / Elimination Using Stack

- **Asteroid Collision**

- **Remove K Digits**


## PATTERN 6: Monotonic Stack + Greedy Logic

- **Car Fleet**


## PATTERN 7: Queue ↔ Stack Conversion

- **Implement Stack Using Queues**

- **Implement Queue Using Stacks**


## PATTERN 8: Sliding Window with Deque

- **Moving Average from Data Stream**

- **Sliding Window Maximum**

## PATTERN 9: Circular Queue / Deque Design

- **Design Circular Queue**

- **Design Circular Deque**

## PATTERN 10: K-th Element Problems

- **Kth Largest Element in an Array**

- **Kth Largest Element in a Stream**

- **Last Stone Weight**

## PATTERN 11: Dual Heap (Median Pattern)

- **Find Median From Data Stream**

## PATTERN 12: Frequency + Heap

- **Top K Frequent Elements**

## PATTERN 13: Merge / Scheduling Using Heap

- **Merge K Sorted Lists**

- **Single Threaded CPU**

## PATTERN 14: Cache Design (Very High Value)

- **LRU Cache**

- **LFU Cache**

**PATTERN 15: System-Style Design**

- **Design Twitter**