**Coding Questions Most Asked in Top Companies**

Loops

**loop-based coding questions**:

**1. Check if a Number is Prime (Efficient)**

* **Problem:** Given an integer **N**, determine if it is **prime** in **O(√N) time complexity**.
* **Difficulty:** Medium

**2. Find the Nth Prime Number**

* **Problem:** Given an integer **N**, return the **Nth prime number**.
* **Difficulty:** Medium

**3. Find Prime Factors of a Number**

* **Problem:** Given an integer **N**, return all its **prime factors** using an optimized approach.
* **Difficulty:** Medium

**4. Check if a Number is an Armstrong Number**

* **Problem:** Given a number **N**, check whether it is an **Armstrong Number** (sum of its digits raised to the power of number of digits equals the number itself).
* **Difficulty:** Medium

**5. Check if a Number is Palindromic**

* **Problem:** Given an integer **N**, check if it is a **palindrome** (remains the same when reversed).
* **Difficulty:** Medium

**6. Sum of Digits of a Number Until it Becomes Single Digit (Digital Root)**

* **Problem:** Given an integer **N**, repeatedly sum its digits until the result is a single-digit number.
* **Difficulty:** Medium

**7. Count the Number of Set Bits in a Number (Hamming Weight)**

* **Problem:** Given an integer **N**, count the number of **1s in its binary representation**.
* **Difficulty:** Medium

**8. Check if a Number is a Perfect Number**

* **Problem:** A perfect number is a number **N** where the sum of its **proper divisors** (excluding itself) is equal to **N**. Given **N**, check if it is a **Perfect Number**.
* **Difficulty:** Hard

**9. Find the Smallest Number that is a Multiple of Two Numbers**

* **Problem:** Given two integers **A** and **B**, find the **Least Common Multiple (LCM)**.
* **Difficulty:** Medium

**10. Find the Sum of Digits of a Factorial**

* **Problem:** Given an integer **N**, compute **N!** (factorial of N) and find the **sum of its digits**.
* **Difficulty:** Hard

**Most important string coding questions** for interviews:

**1. Longest Palindromic Substring**

* *Problem:* Find the longest substring in a given string that is a palindrome.
* *Difficulty:* Medium

**2. Regular Expression Matching**

* *Problem:* Implement regular expression matching with support for '.' and '\*'.
* *Difficulty:* Hard

**3. Minimum Window Substring**

* *Problem:* Given two strings s and t, find the minimum window in s which will contain all the characters in t.
* *Difficulty:* Hard

**4. Edit Distance**

* *Problem:* Calculate the minimum number of operations required to convert one string into another.
* *Difficulty:* Hard

**5. Decode Ways**

* *Problem:* A message containing letters from A-Z can be encoded into numbers. Given a string of digits, determine the total number of ways to decode it.
* *Difficulty:* Medium

**6. Group Anagrams**

* *Problem:* Given an array of strings, group the anagrams together.
* *Difficulty:* Medium

**7. Longest Substring with At Most K Distinct Characters**

* *Problem:* Find the length of the longest substring that contains at most K distinct characters.
* *Difficulty:* Hard

**8. Palindrome Partitioning**

* *Problem:* Partition a string such that every substring is a palindrome and return all possible palindrome partitioning.
* *Difficulty:* Hard

**9. Wildcard Matching**

* *Problem:* Implement wildcard pattern matching with support for '?' and '\*'.
* *Difficulty:* Hard

**10. Longest Repeating Character Replacement**

* *Problem:* Given a string and an integer k, find the length of the longest substring that contains the same character you can get after performing k replacements.
* *Difficulty:* Medium

**Array coding questions most asked in interviews**:

**1. Find the Duplicate Number**

* *Problem:* Given an array of n+1 integers where each integer is between 1 and n (inclusive), with exactly one duplicate, find the duplicate number.
* *Difficulty:* Medium

**2. Maximum Subarray Sum (Kadane's Algorithm)**

* *Problem:* Find the contiguous subarray within a one-dimensional array of numbers that has the largest sum.
* *Difficulty:* Medium

**3. Merge Intervals**

* *Problem:* Given a collection of intervals, merge all overlapping intervals.
* *Difficulty:* Medium

**4. Container With Most Water**

* *Problem:* Given n non-negative integers representing the heights of vertical lines, find two lines that together with the x-axis form a container that holds the most water.
* *Difficulty:* Medium

**5. Product of Array Except Self**

* *Problem:* Given an array nums of n integers, return an array output such that output[i] is equal to the product of all the elements of nums except nums[i].
* *Difficulty:* Medium

**6. Subarray Sum Equals K**

* *Problem:* Given an array of integers and an integer k, find the total number of continuous subarrays whose sum equals to k.
* *Difficulty:* Medium

**7. Longest Consecutive Sequence**

* *Problem:* Given an unsorted array of integers, find the length of the longest consecutive elements sequence.
* *Difficulty:* Hard

**8. Median of Two Sorted Arrays**

* *Problem:* Given two sorted arrays nums1 and nums2 of size m and n respectively, return the median of the two sorted arrays.
* *Difficulty:* Hard

**9. Trapping Rain Water**

* *Problem:* Given n non-negative integers representing an elevation map where the width of each bar is 1, compute how much water it can trap after raining.
* *Difficulty:* Hard

**10. 3Sum Problem**

* *Problem:* Given an array nums, find all unique triplets in the array which give the sum of zero.
* *Difficulty:* Hard

**recursion Coding Most asked**:

**1. N-th Fibonacci Number**

* *Problem:* Write a recursive function to calculate the n-th Fibonacci number.
* *Difficulty:* Medium

**2. Permutations of a String**

* *Problem:* Write a recursive function to generate all the permutations of a string.
* *Difficulty:* Medium

**3. Subsets of a Set**

* *Problem:* Given a set of integers, return all possible subsets.
* *Difficulty:* Medium

**4. Combination Sum**

* *Problem:* Given an array of integers candidates and a target number target, return all unique combinations of numbers from candidates that sum up to target.
* *Difficulty:* Medium

**5. Sudoku Solver**

* *Problem:* Write a program that solves a Sudoku puzzle using recursion.
* *Difficulty:* Hard

**6. Generate Parentheses**

* *Problem:* Given n, generate all combinations of well-formed parentheses.
* *Difficulty:* Medium
* *Example:* generate\_parentheses(3) → ["((()))", "(()())", "(())()", "()(())", "()()()"]

**7. Combination of Sum II (Unique Combinations)**

* *Problem:* Given a collection of candidate numbers and a target, find all unique combinations where the sum of the chosen numbers equals the target.
* *Difficulty:* Hard

**8. Word Search**

* *Problem:* Given a 2D board and a list of words, write a recursive function to find if any word exists in the board.
* *Difficulty:* Hard

**9. Climbing Stairs**

* *Problem:* You are climbing a staircase. It takes n steps to reach the top. Each time you can either climb 1 or 2 steps. Write a recursive function to determine the number of ways to reach the top.
* *Difficulty:* Medium

**10. Maximum Depth of Binary Tree**

* *Problem:* Given a binary tree, write a recursive function to find its maximum depth.
* *Difficulty:* Medium

**linked list coding questions** :

**1. Reverse a Linked List**

* *Problem:* Given a singly linked list, reverse the list using recursion or iteration.
* *Difficulty:* Medium

**2. Detect a Cycle in a Linked List**

* *Problem:* Given a linked list, detect if it has a cycle in it (using Floyd's Cycle-Finding Algorithm or the two-pointer approach).
* *Difficulty:* Medium

**3. Find the Middle of a Linked List**

* *Problem:* Given a singly linked list, find the middle node of the list. If there are two middle nodes, return the second one.
* *Difficulty:* Medium

**4. Merge Two Sorted Linked Lists**

* *Problem:* Given two sorted linked lists, merge them into a single sorted list.
* *Difficulty:* Medium

**5. Remove N-th Node from the End of a Linked List**

* *Problem:* Given a linked list, remove the N-th node from the end of the list in one pass.
* *Difficulty:* Medium

**6. Reverse a Linked List in Groups of K**

* *Problem:* Given a linked list, reverse the nodes in the list in groups of size k. If the number of nodes is not a multiple of k, leave the last nodes as is.
* *Difficulty:* Hard

**7. Flatten a Multilevel Doubly Linked List**

* *Problem:* Given a doubly linked list where in addition to the next and prev pointers, each node has a child pointer that may or may not point to a separate doubly linked list, flatten the list so that all the nodes appear in a single level.
* *Difficulty:* Hard

**8. Add Two Numbers Represented by Linked Lists**

* *Problem:* Given two non-negative integers represented by two linked lists, where each node represents a single digit, add the two numbers and return the result as a linked list.
* *Difficulty:* Medium

**9. Rotate a Linked List**

* *Problem:* Given a linked list, rotate the list to the right by k places. The k value may be greater than the length of the list.
* *Difficulty:* Medium

**10. Intersection of Two Linked Lists**

* *Problem:* Given two linked lists, find the node where they intersect. If they do not intersect, return null.
* *Difficulty:* Hard

**11. Merge k Sorted Linked Lists**

* *Problem:* Given an array of k sorted linked lists, merge them into one sorted linked list.
* *Difficulty:* Hard

**12. Delete a Linked List Node (without head pointer)**

* *Problem:* Given only a node to be deleted (not the head node), delete the node from the linked list.
* *Difficulty:* Medium

**most asked stack coding questions** :

1. **Implement Stack using Queues**
   * Implement a stack using two queues (push() and pop() operations).
   * Difficulty: Medium
2. **Implement Queue using Stacks**
   * Implement a queue using two stacks (enqueue() and dequeue() operations).
   * Difficulty: Medium
3. **Next Greater Element**
   * Given an array, find the next greater element for each element.
   * Difficulty: Medium
4. **Valid Parentheses**
   * Given a string containing only {, }, (, ), [, ], determine if it is balanced.
   * Difficulty: Medium
5. **Min Stack (Stack with Get Minimum in O(1))**
   * Implement a stack that supports push(), pop(), and getMin() operations in **O(1) time**.
   * Difficulty: Medium
6. **Largest Rectangle in Histogram**
   * Given an array representing the histogram bar heights, find the area of the largest rectangle that can be formed.
   * Difficulty: Hard
7. **Maximal Rectangle (2D Histogram)**
   * Given a m x n binary matrix of 0s and 1s, find the largest rectangle that contains only 1s.
   * Difficulty: Hard
8. **Trapping Rain Water**
   * Given an array representing elevation heights, compute how much water can be trapped.
   * Difficulty: Hard
9. **The Celebrity Problem**
   * Given N people at a party, find the celebrity (a person known by everyone but knows no one).
   * Difficulty: Medium
10. **Simplify Directory Path**

* Given a Unix-style file path (e.g., "/home/../usr//bin/./"), simplify it.
* Difficulty: Medium

1. **Evaluate Reverse Polish Notation (Postfix Expression)**

* Given a postfix expression, evaluate it.
* Difficulty: Medium

1. **Basic Calculator (I, II, III)**

* Implement a calculator to evaluate expressions with +, -, \*, /, (, ).
* Difficulty: Hard

**queue coding interview questions**:

**1. Implement Queue using Stacks**

* *Problem:* Implement a queue using two stacks (enqueue() and dequeue() operations).
* *Difficulty:* Medium

**2. Circular Queue**

* *Problem:* Implement a circular queue with a fixed size and support for operations like enqueue() and dequeue().
* *Difficulty:* Medium

**3. Design a Data Structure that Supports the Following Operations in O(1) Time:**

* insert(val): Inserts an element into the data structure.
* delete(val): Deletes an element from the data structure.
* getRandom(): Returns a random element from the data structure.
* *Difficulty:* Hard

**4. Sliding Window Maximum**

* *Problem:* Given an array and a sliding window size, find the maximum value in the window as it slides from left to right.
* *Difficulty:* Hard

**5. First Non-Repeating Character in a Stream**

* *Problem:* Implement a queue-like structure that returns the first non-repeating character as a stream of characters is processed.
* *Difficulty:* Medium

**6. Reorder Data in Log Files**

* *Problem:* Given an array of log files, reorder the logs so that the alphanumeric logs come before the numeric logs. Alphanumeric logs are ordered lexicographically, and numeric logs are ordered by their identifiers.
* *Difficulty:* Medium

**7. Merge K Sorted Lists**

* *Problem:* Merge k sorted linked lists into one sorted list. Use a priority queue (min heap).
* *Difficulty:* Hard

**8. Level Order Traversal of a Binary Tree**

* *Problem:* Implement the level order traversal of a binary tree using a queue.
* *Difficulty:* Medium

**9. Josephus Problem**

* *Problem:* Solve the Josephus problem using a queue. In the Josephus problem, every second person is eliminated in a circle until only one person remains.
* *Difficulty:* Hard

**10. Design a Queue with Two Stacks**

* *Problem:* Implement a queue using two stacks, and handle the enqueue and dequeue operations.
* *Difficulty:* Medium

**11. Find the Maximum Sum of k Consecutive Elements in an Array**

* *Problem:* Given an array, find the maximum sum of k consecutive elements using a sliding window approach with a queue.
* *Difficulty:* Medium

**12. Perfect Squares**

* *Problem:* Given a number n, find the least number of perfect square numbers that sum to n. Implement this using a breadth-first search (BFS) approach.
* *Difficulty:* Hard

**Dynamic programming Interview questions**:

**1. Longest Common Subsequence (LCS)**

* *Problem:* Given two sequences, find the length of the longest subsequence that appears in both sequences.
* *Difficulty:* Medium

**2. 0/1 Knapsack Problem**

* *Problem:* Given weights and values of n items, determine the maximum value that can be obtained from the items within a weight capacity W.
* *Difficulty:* Medium

**3. Coin Change Problem**

* *Problem:* Given a set of coins of different denominations and a total amount target, compute the fewest number of coins needed to make the amount. If that amount cannot be made up by any combination of the coins, return -1.
* *Difficulty:* Medium

**4. Longest Increasing Subsequence (LIS)**

* *Problem:* Given an array of integers, find the length of the longest strictly increasing subsequence.
* *Difficulty:* Medium

**5. Matrix Chain Multiplication**

* *Problem:* Given a sequence of matrices, find the most efficient way to multiply the matrices together. Return the minimum number of scalar multiplications needed.
* *Difficulty:* Medium

**6. Palindromic Subsequence**

* *Problem:* Given a string, find the length of the longest palindromic subsequence in it.
* *Difficulty:* Hard

**7. Edit Distance (Levenshtein Distance)**

* *Problem:* Given two strings, find the minimum number of operations required to convert one string to the other. The operations are insertions, deletions, or substitutions.
* *Difficulty:* Hard

**8. Word Break Problem**

* *Problem:* Given a string and a dictionary of words, determine if the string can be segmented into a space-separated sequence of dictionary words.
* *Difficulty:* Medium

**9. Maximum Subarray Sum (Kadane’s Algorithm)**

* *Problem:* Given an array of integers, find the contiguous subarray that has the largest sum and return that sum.
* *Difficulty:* Medium

**10. Rod Cutting Problem**

* *Problem:* Given a rod of length n and prices for different lengths, find the maximum revenue obtainable by cutting up the rod and selling the pieces.
* *Difficulty:* Medium

**11. Count of Subsets with Given Sum**

* *Problem:* Given a set of integers and a sum S, count the number of subsets whose sum is equal to S.
* *Difficulty:* Medium

**12. Partition Equal Subset Sum**

* *Problem:* Given a set of integers, determine if it can be partitioned into two subsets such that the sum of the elements in both subsets is equal.
* *Difficulty:* Hard

**13. Maximum Product Subarray**

* *Problem:* Given an integer array, find the contiguous subarray within the array that has the largest product.
* *Difficulty:* Medium

**14. House Robber Problem**

* *Problem:* You are a robber planning to rob houses along a street. You cannot rob two adjacent houses. Determine the maximum amount of money you can rob tonight without alerting the police.
* *Difficulty:* Medium

**15. Longest Palindromic Substring**

* *Problem:* Given a string, find the longest substring that is a palindrome.
* *Difficulty:* Hard

**Backtracking coding questions**:

**1. N-Queens Problem**

* *Problem:* Place N queens on an N x N chessboard so that no two queens threaten each other. Return all possible solutions.
* *Difficulty:* Hard

**2. Sudoku Solver**

* *Problem:* Solve a partially filled 9x9 Sudoku puzzle. You need to fill the board such that every row, column, and 3x3 grid contains all the digits from 1 to 9.
* *Difficulty:* Hard

**3. Subset Sum Problem**

* *Problem:* Given a set of integers, find all the subsets of the set that sum up to a given target sum.
* *Difficulty:* Medium

**4. Palindrome Partitioning**

* *Problem:* Given a string, partition the string into all possible palindromic substrings and return the list of all such partitions.
* *Difficulty:* Medium

**5. Word Search**

* *Problem:* Given a 2D board and a word, find if the word exists in the board. You can move horizontally or vertically to find the word.
* *Difficulty:* Medium

**6. Combinations**

* *Problem:* Given two integers n and k, return all possible combinations of k numbers out of the range [1, n].
* *Difficulty:* Medium

**7. Permutations**

* *Problem:* Given a collection of numbers, return all possible permutations of the numbers. You may not have distinct numbers in the input.
* *Difficulty:* Medium

**8. Combination Sum**

* *Problem:* Given an array of distinct integers and a target number, find all unique combinations that sum up to the target. You can reuse numbers from the array in each combination.
* *Difficulty:* Medium

**9. K Sum Problem**

* *Problem:* Given an array of integers, find all combinations of k elements that sum up to a given target.
* *Difficulty:* Hard

**10. Restore IP Addresses**

* *Problem:* Given a string containing only digits, restore it by adding dots to create valid IP addresses. A valid IP address consists of four segments, each between 0 and 255.
* *Difficulty:* Medium

**11. Permutation Sequence**

* *Problem:* Given n and k, return the k-th permutation sequence of the numbers 1 to n.
* *Difficulty:* Hard

**12. Letter Combinations of a Phone Number**

* *Problem:* Given a string representing digits, return all possible letter combinations that the number could represent. Map digits to letters like on a phone keypad.
* *Difficulty:* Medium

**13. Combination Sum II**

* *Problem:* Given an array of numbers with possible duplicates, return all unique combinations that sum to a target.
* *Difficulty:* Medium

**14. Solve N-Queens II**

* *Problem:* Solve the N-Queens problem, but instead of returning all solutions, return the number of distinct solutions.
* *Difficulty:* Hard

**15. Find All Anagrams in a String**

* *Problem:* Given a string s and a string p, find all the start indices of p’s anagrams in s. The order of output does not matter.
* *Difficulty:* Medium