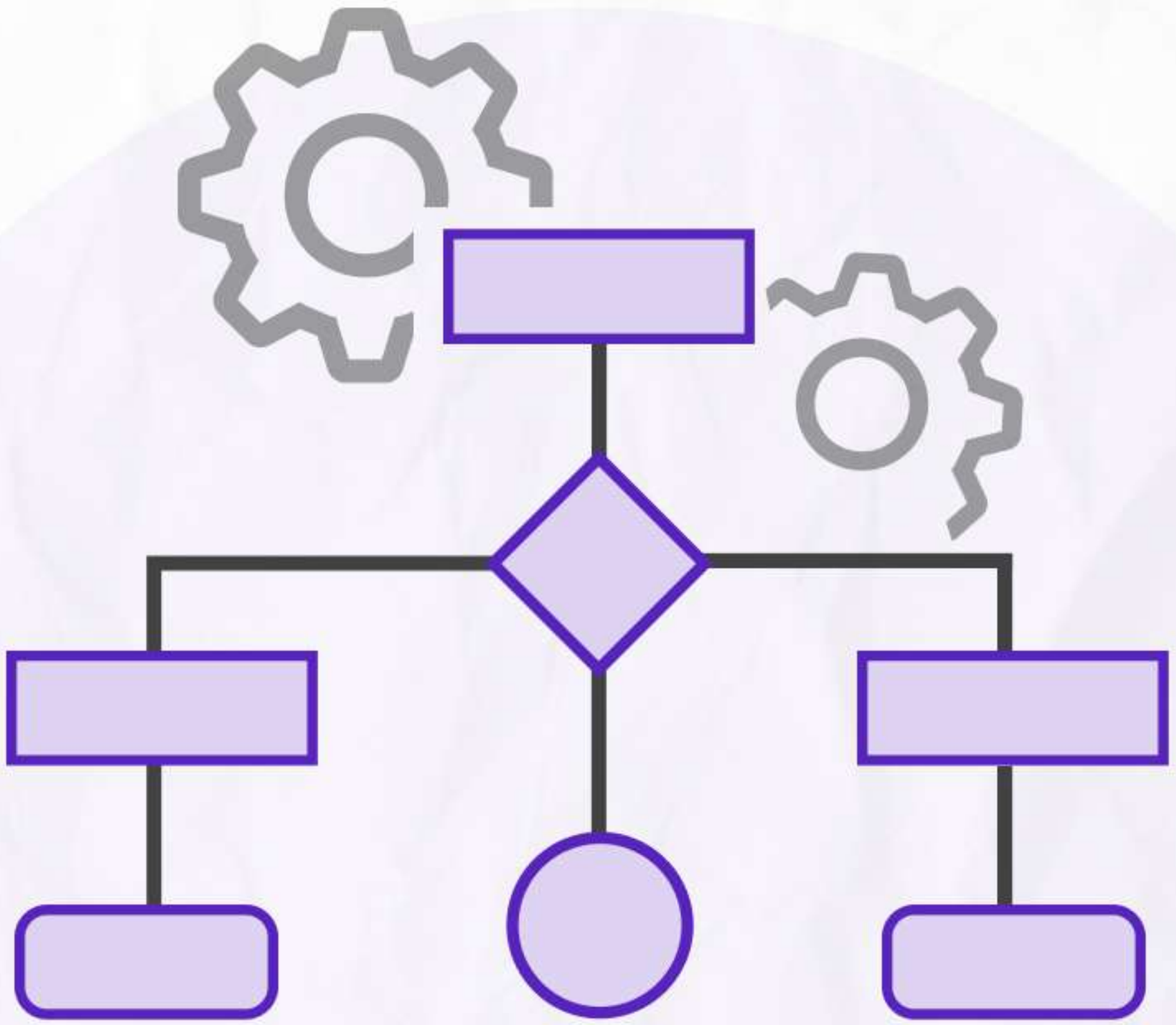
BOSSCODER ACADEMY

ULTIMATE DSA INTERVIEW GUIDE



Key Concepts And Questions

Disclaimer

Everyone learns uniquely.

What matters is developing the problem solving ability to solve new problems.

This Doc will help you with the same.

Array and Strings

Array and String problems are fundamental in coding interviews. They test the candidate's understanding of data manipulation and memory management.

Two Sum

Given an array of integers ‘**nums**’ and an integer ‘**target**’, return indices of the two numbers such that they add up to **target**. You may assume that each input would have exactly one solution, and you may not use the same element twice.

Practice Asked in: 

Longest Substring Without Repeating Characters

Given a string ‘**s**’, find the length of the longest substring without repeating characters.

Practice Asked in: 

Container With Most Water

Given n non-negative integers ‘a1, a2, ..., an’ where each represents a point at coordinate (i, ai). n vertical lines are drawn such that the two endpoints of the line ‘i’ are at ‘(i, ai)’ and ‘(i, 0)’. Find two lines, which together with the x-axis forms a container, such that the container contains the most water.

Practice Asked in: 

Median of Two Sorted Arrays

Given two sorted arrays ‘nums1’ and ‘nums2’ of size ‘m’ and ‘n’ respectively, return the median of the two sorted arrays.

Practice Asked in: 

Linked Lists

Linked Lists are a fundamental data structure for managing collections of data. Questions often involve traversal, insertion, deletion, and reversing operations.

Reverse Linked List

Given the head of a singly linked list, reverse the list and return the reversed list.

Practice Asked in: 

Merge Two Sorted Lists

Merge two sorted linked lists and return it as a new sorted list. The new list should be made by splicing together the nodes of the first two lists.

Practice Asked in: 

Linked List Cycle

Given a linked list, determine if it has a cycle in it.

Practice Asked in: 

LRU Cache

Design a data structure that follows the constraints of a Least Recently Used (LRU) cache.

Practice Asked in: 

Stacks and Queues

Stacks and Queues are abstract data types used in various applications. They are often tested in scenarios involving backtracking , scheduling, and real-time data processing.

Valid Parentheses

Given a string ‘s’ containing just the characters '(', ')', '{', '}', '[' and ']', determine if the input string is valid.

Practice Asked in: 

Min Stack

Design a stack that supports push, pop, top, and retrieving the minimum element in constant time.

Practice Asked in: 

Implement Queue using Stacks

Implement a first in first out (FIFO) queue using only two stacks.

Practice Asked in:

Decode String

Given an encoded string, return its decoded string. The encoding rule is: **k[encoded_string]**, where the encoded_string inside the square brackets is being repeated exactly k times.

Practice Asked in:

Trees and Graphs

Trees and Graphs are essential for understanding hierarchical data and network flows. These questions often involve traversal, searching, and dynamic updates.

Binary Tree Inorder Traversal

Given the root of a binary tree, return the inorder traversal of its nodes' values.

Practice Asked in:

Lowest Common Ancestor of a Binary Tree

Given a binary tree, find the lowest common ancestor (LCA) of two given nodes in the tree.

Practice Asked in:

Course Schedule

There are a total of '**numCourses**' courses you have to take, labeled from 0 to '**numCourses - 1**' . You are given an array '**prerequisites**' where '**prerequisite[i] = [ai, bi]**' indicates that you must take course '**bi**' first if you want to take course '**ai**'.

Practice Asked in:

Dynamic Programming

Dynamic Programming (DP) is a technique for solving problems by breaking them down into simpler subproblems. DP questions test a candidate's ability to optimize solutions and manage overlapping subproblems.

Climbing Stairs

You are climbing a staircase. It takes ‘n’ steps to reach the top. Each time you can either climb 1 or 2 steps. In how many distinct ways can you climb to the top?

Practice Asked in: 

Longest Increasing Subsequence

Given an integer array nums, return the length of the longest strictly increasing subsequence.

Practice Asked in: 

Edit Distance

Given two strings ‘**word1**’ and ‘**word2**’ , return the minimum number of operations required to convert ‘**word1**’ to ‘**word2**’.

Practice

Asked in: 

Sorting and Searching

Sorting and Searching are fundamental operations in computer science. Interview questions often focus on implementing and optimizing these algorithms.

Merge Intervals

Given an array of intervals where ‘**intervals[i] = [starti, endi]**’ , merge all overlapping intervals, and return an array of the non-overlapping intervals that cover all the intervals in the input.

Practice Asked in:

Search in Rotated Sorted Array

There is an integer array ‘**nums**’ sorted in ascending order (with distinct values). Prior to being passed to your function, ‘**nums**’ is possibly rotated at an unknown pivot index ‘**k**’ (1 <= k <nums.length) such that the resulting array is ‘**[nums[k], nums[k+1], ..., nums[n-1], nums[0], nums[1], ..., nums[k-1]]**’ (0-indexed).Given the array ‘**nums**’ after the possible rotation and an integer ‘**target**’ , return the index of ‘**target**’ if it is in ‘**nums**’ , or -1 if it is not in ‘**nums**’.

Practice Asked in:

Graphs and Shortest Paths

Graphs and Shortest Path algorithms are crucial for problems involving networks, maps, and optimization. These questions often require understanding graph traversal, minimum spanning trees, and shortest path calculations.

Dijkstra's Algorithm

Given a graph and a source vertex, find the shortest path from the source vertex to all other vertices in the graph.

Practice Asked in: 

Bellman-Ford Algorithm

Given a graph and a source vertex, find the shortest path from the source vertex to all other vertices, accounting for the possibility of negative weight edges.

Practice Asked in: 

Floyd-Warshall Algorithm

Find the shortest paths between all pairs of vertices in a graph, which can have positive or negative edge weights.

Practice Asked in:

Prim's Algorithm

Given a graph, find the minimum spanning tree that connects all the vertices with the least total edge weight.

Practice Asked in:

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