AfterAcademy

Data Structures and Algorithms Problem Set

Here we have listed topic-wise 100 problems asked during the interview of companies

Important Suggestions

Problem set has covered all the important approaches for **cracking any coding interview**. You could easily apply these ideas to solve other similar problems.

Several problems in the set can be solved using **more than one approaches**. This will help you to understand ideas to improve the time and space complexity.

We recommend to follow these five steps of problem solving :

1. Understanding the problem
2. Designing the brute force or basic solution
3. Improving the time and space complexity
4. Writing pseudo code on paper and checking boundary conditions

5. Programming language implementation and running the test cases

*If you have any difficulty in solving problems in a topic then we encourage to **learn or revise key concepts** related to the topic. Key idea of learning algorithm is - Doing practice and never give up!*

Data Structures and Algorithms Problem Set

#	Title	Solution	Topic	Difficulty	Companies
1.	Roman To Integer		Mathematical Algorithms	**Medium**	Amazon Microsoft Facebook
2.	Reverse Bits		Mathematical Algorithms	**Easy**	Amazon
3.	Square Root of Integer		Mathematical Algorithms	**Medium**	Amazon Microsoft Facebook
4.	Calculate power function		Mathematical Algorithms	**Easy**	Google LinkedIn Amazon
5.	Greatest Common Divisor		Mathematical Algorithms	**Medium**	Google
6.	Find the Closest Palindrome		Mathematical Algorithms	**Hard**	Microsoft Amazon
7.	Rotate matrix		Iteration / Two Pointer Approach	**Medium**	Google

#	Title	Solution	Topic	Difficulty	Companies
8.	Spiral Matrix		Iteration / Two Pointer Approach	**Medium**	Microsoft Amazon
9.	Wave Array		Iteration / Two Pointer Approach	**Easy**	Amazon Google Adobe
10.	Set Matrix Zeroes		Iteration / Two Pointer Approach	**Medium**	Amazon Google
11.	maximum j – i such that A[j] > A[i]		Iteration / Two Pointer Approach	**Medium**	Google Amazon Adobe
12.	Move zeroes to an end		Iteration / Two Pointer Approach	**Easy**	Facebook Uber
13.	Merge two sorted arrays		Iteration / Two Pointer Approach	**Medium**	Microsoft Adobe
14.	Container with Most Water		Iteration / Two Pointer Approach	**Medium**	Amazon Google Facebook Adobe
15.	Remove duplicates from sorted array		Iteration / Two Pointer Approach	**Medium**	Amazon Microsoft Google
16.	Find an element in Bitonic array		Recursion / Divide & Conquer	**Easy**	Amazon
17.	Find minimum element in sorted and rotated array		Recursion / Divide & Conquer	**Medium**	Facebook

#	Title	Solution	Topic	Difficulty	Companies
18.	Median of two sorted array of same size		Recursion / Divide & Conquer	**Hard**	Amazon Microsoft Google
19.	Inversion count in an array		Recursion / Divide & Conquer	**Hard**	Amazon Google
20.	Search for a Range in a sorted array		Recursion / Divide & Conquer	**Easy**	Microsoft Google
21.	Longest Common Prefix		Recursion / Divide & Conquer	**Hard**	Amazon Google
22.	Median in row wise sorted matrix		Recursion / Divide & Conquer	**Medium**	Amazon
23.	Swap List Nodes in pairs		Linked List	**Easy**	Amazon Microsoft
24.	Add Two Numbers as Lists		Linked List	**Medium**	Amazon Microsoft Facebook
25.	Check if a singly linked list is palindrome		Linked List	**Medium**	Amazon Microsoft
26.	Reverse a linked list from position m to n		Linked List	**Medium**	Amazon Microsoft Facebook

#	Title	Solution	Topic	Difficulty	Companies
27.	Detect and Remove Loop in a Linked List		Linked List	**Hard**	Amazon, Microsoft
28.	Merge Two Sorted Lists		Linked List	**Easy**	Amazon, Microsoft, Yahoo
29.	Remove Nth Node from List End		Linked List	**Medium**	Amazon
30.	Sort a linked list using insertion sort		Linked List	**Medium**	Microsoft, Google
31.	Find next greater element in an array		Stack and Queue	**Medium**	Amazon, Microsoft
32.	Trapping rain water		Stack and Queue	**Hard**	Amazon, Google
33.	Merge overlapping intervals		Stack and Queue	**Medium**	Amazon, Google
34.	Largest Rectangle in Histogram		Stack and Queue	**Hard**	Amazon, Google, Facebook

#	Title	Solution	Topic	Difficulty	Companies
35.	Check for balanced parentheses in an expression		Stack and Queue	**Medium**	Amazon, Microsoft
36.	Min Stack Problem		Stack and Queue	**Easy**	Amazon, Microsoft, Yahoo, Adobe
37.	LRU Cache implementation		Stack and Queue	**Hard**	Amazon, Microsoft, Adobe, Google
38.	Sort a stack using another stack		Stack and Queue	**Medium**	Amazon, Microsoft
39.	Lowest Common Ancestor of a Binary tree		Binary Tree	**Medium**	Amazon, Google, Microsoft, Facebook, Adobe
40.	Path sum in binary tree		Binary Tree	**Easy**	Amazon, Microsoft, Yahoo
41.	Min Depth of Binary Tree		Binary Tree	**Easy**	Amazon, Facebook
42.	Binary Tree Zigzag Level Order Traversal		Binary Tree	**Medium**	Amazon, Microsoft
43.	Invert Binary Tree		Binary Tree	**Medium**	Amazon, Google

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44.	Flatten Binary Tree to Linked List		Binary Tree	**Medium**	Amazon, Microsoft, Yahoo, Adobe
45.	Find diameter of binary tree		Binary Tree	**Medium**	Facebook, Google, Amazon
46.	All Nodes Distance K in Binary Tree		Binary Tree	**Medium**	Microsoft
47.	Merge two binary tree		Binary Tree	**Easy**	Amazon, Microsoft
48.	Shortest Unique Prefix		Trie	**Hard**	Google
49.	Sorted Array To Balanced BST		Binary Search Tree	**Easy**	Amazon
50.	K-th largest element in BST		Binary Search Tree	**Medium**	Amazon
51.	Minimum absolute difference in BST		Binary Search Tree	**Easy**	Google
52.	Recover Binary Search Tree		Binary Search Tree	**Hard**	Amazon, Microsoft
53.	Merge Two BST		Binary Search Tree	**Medium**	Google, Amazon, Microsoft

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54.	Lowest Common Ancestor of a BST		Binary Search Tree	**Medium**	Amazon Microsoft
55.	K Pairs with Smallest Sums		Heap / Priority Queue	**Medium**	Google
56.	Sliding window maximum		Heap / Priority Queue	**Hard**	Amazon Google
57.	Merge K sorted list		Heap / Priority Queue	**Hard**	Amazon Google
58.	Convert a min heap to max heap		Heap / Priority Queue	**Medium**	Google
59.	Check if two arrays are equal or not		Hash Table	**Easy**	Amazon Goldman Sachs
60.	Intersection of two unsorted array		Hash Table	**Medium**	Google Facebook
61.	Longest Consecutive Sequence		Hash Table	**Hard**	Amazon Google
62.	Valid Anagram		Hash Table	**Medium**	Google Amazon Microsoft

#	Title	Solution	Topic	Difficulty	Companies
63.	Majority Element		Hash Table	**Medium**	Amazon Microsoft Yahoo Google
64.	Sort Characters by Frequency		Hash Table	**Medium**	Facebook Google
65.	First Unique Character in a String		Hash Table	**Easy**	Amazon Microsoft
66.	Triplet with zero sum		Hash Table	**Medium**	Facebook Amazon Microsoft
67.	First missing positive		Hash Table	**Medium**	Amazon
68.	Largest subarray with 0 sum		Hash Table	**Hard**	Microsoft
69.	Max points on the straight line		Hash Table	**Hard**	Amazon Google
70.	Climbing Stairs Problem		Dynamic Programming	**Easy**	Amazon Google
71.	Matrix Chain Multiplication		Dynamic Programming	**Hard**	Amazon Microsoft

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72.	Longest Increasing subsequence		Dynamic Programming	**Medium**	Amazon, Microsoft, Facebook
73.	Partition Equal Subset Sum		Dynamic Programming	**Medium**	Amazon, Adobe
74.	Minimum number of jumps to reach end		Dynamic Programming	**Hard**	Amazon, Google, Ebay
75.	Interleaving String		Dynamic Programming	**Hard**	Google, Microsoft, Yahoo
76.	Coin change problem		Dynamic Programming	**Medium**	Microsoft
77.	Edit distance Problem		Dynamic Programming	**Hard**	Amazon, Google, Microsoft
78.	Min Cost Path		Dynamic Programming	**Medium**	Amazon
79.	Maximal Square		Dynamic Programming	**Medium**	Google, Microsoft
80.	Longest Arithmetic Progression		Dynamic Programming	**Medium**	Google, Microsoft
81.	Word break problem		Dynamic Programming	**Hard**	Facebook, Google

#	Title	Solution	Topic	Difficulty	Companies
82.	Maximum Subarray Sum		Dynamic Programming	**Medium**	Amazon, Microsoft, Yahoo, Facebook
83.	Palindrome Partitioning		Dynamic Programming	**Hard**	Amazon, Google
84.	Max Product Subarray		Dynamic Programming	**Medium**	Amazon, Microsoft
85.	Maximum Product of Three Numbers		Dynamic Programming	**Medium**	Amazon
86.	Gas station Problem		Greedy Algorithms	**Medium**	Amazon, Google
87.	Distribute Candy Problem		Greedy Algorithms	**Easy**	Amazon, Microsoft
88.	Fractional Knapsack problem		Greedy Algorithms	**Medium**	Amazon
89.	Sudoku Solver		Backtracking	**Hard**	Amazon, Google, Microsoft
90.	Generate Parentheses		Backtracking	**Medium**	Facebook, Microsoft

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91.	Print all subset		Backtracking	**Medium**	Amazon Microsoft Facebook
92.	Combination Sum II		Backtracking	**Medium**	Amazon Facebook Adobe
93.	Combinations		Backtracking	**Medium**	Amazon Adobe
94.	Letter Combinations of a Phone Number		Backtracking	**Hard**	Google
95.	Word ladder problem		Graph Algorithms	**Medium**	Google Microsoft Ebay
96.	Smallest Multiple With 0 and 1		Graph Algorithms	**Hard**	Amazon
97.	Check loop in array according to given constraints		Graph Algorithms	**Medium**	Google Amazon
98.	Course Schedule		Graph Algorithms	**Hard**	Amazon
99.	Knight on chessboard		Graph Algorithms	**Hard**	Amazon Goldman Sachs
100.	Surrounded regions		Graph Algorithms	**Hard**	Google

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