50 DSA Interview Questions with Answers

1. What is Data Structure?

A data structure is a way of organizing and storing data so that it can be accessed and worked with efficiently.

2. What are the types of Data Structures?

Primitive and Non-Primitive. Non-Primitive includes Linear (Array, Stack, Queue) and Non-Linear (Tree, Graph).

3. What is an Array?

An array is a collection of items stored at contiguous memory locations.

4. What is a Linked List?

A linked list is a linear data structure where each element is a separate object connected using pointers.

5. What are the types of Linked Lists?

Singly, Doubly, and Circular Linked Lists.

6. What is a Stack?

A stack is a LIFO (Last In, First Out) data structure used for expression evaluation, recursion, etc.

7. What are Stack operations?

Push, Pop, Peek/Top, and isEmpty.

8. What is a Queue?

A queue is a FIFO (First In, First Out) data structure used in scheduling and buffering.

9. Types of Queues?

Simple Queue, Circular Queue, Priority Queue, and Deque.

10. What is a Binary Tree?

A binary tree is a hierarchical data structure with nodes having at most two children.

11. What is Binary Search Tree (BST)?

A BST is a binary tree where left child < parent < right child.

12. What is Tree Traversal?

Tree traversal is visiting all nodes in a tree using Inorder, Preorder, and Postorder methods.

13. What is a Graph?

A graph consists of vertices and edges representing relationships between objects.

14. Types of Graphs?

Directed, Undirected, Weighted, and Unweighted.

15. What is DFS?

Depth First Search explores as far as possible along a branch before backtracking.

16. What is BFS?

Breadth First Search explores neighbors level by level.

17. What is Hashing?

Hashing is a technique to map data of arbitrary size to fixed-size values called hash codes.

18. What are Hash Collisions?

When two keys hash to the same index. It can be handled using chaining or open addressing.

19. What is Dynamic Programming?

A method for solving complex problems by breaking them down into simpler subproblems and storing results.

20. What is Greedy Algorithm?

An algorithm that makes the best local choice at each step hoping for a global optimum.

21. What is Recursion?

When a function calls itself to solve smaller instances of the same problem.

22. Difference between Recursion and Iteration?

Recursion uses function calls and stack; iteration uses loops.

23. What is Sorting?

Sorting arranges elements in a particular order (ascending or descending).

24. Name some Sorting Algorithms.

Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort, Heap Sort.

25. What is Searching?

Searching is the process of finding an element in a data structure.

26. Difference between Linear and Binary Search?

Linear search scans all elements; binary search divides and conquers (requires sorted data).

27. What is Time Complexity?

It measures the amount of time an algorithm takes as a function of input size.

28. What is Space Complexity?

It measures the amount of memory an algorithm uses as a function of input size.

29. What is Big O Notation?

Big O describes the upper bound of an algorithm's growth rate.

30. What is O(1)?

Constant time complexity where the execution time doesn't depend on input size.

31. What is O(n)?

Linear time complexity where execution time grows linearly with input size.

32. What is O(log n)?

Logarithmic time complexity as seen in binary search.

33. What is Heap?

A complete binary tree used for priority queue implementation.

34. What are Heap Types?

Min-Heap and Max-Heap.

35. What is a Trie?

A trie is a tree-like data structure used for storing strings efficiently.

36. What is a Segment Tree?

A tree used for range queries and updates efficiently.

37. What is a HashMap?

A data structure that stores key-value pairs with fast lookups using hashing.

38. What is a Priority Queue?

A queue where each element is associated with a priority and served based on priority.

39. What is Two Pointer Technique?

A technique where two pointers traverse the data structure for optimized searching or sorting.

40. What is Sliding Window Technique?

Used to optimize problems involving subarrays or substrings by maintaining a window over the data.

41. What is Divide and Conquer?

An approach that divides problems into smaller parts, solves them, and combines the results.

42. What is Merge Sort?

A divide-and-conquer algorithm that splits the array, sorts parts, and merges them.

43. What is Quick Sort?

A sorting algorithm that selects a pivot and partitions the array around it.

44. What is a Hash Table?

A data structure that maps keys to values using a hash function.

45. What is Graph Cycle Detection?

Detecting cycles in a graph using DFS or Union-Find.

46. What is Union-Find?

A data structure used to detect cycles and manage disjoint sets efficiently.

47. What is Topological Sorting?

Ordering of vertices in a directed acyclic graph such that for every edge (u,v), u appears before v.

48. What is Backtracking?

A method to solve problems recursively by trying all possible solutions and undoing steps if not valid.

49. What is the difference between Stack and Queue?

Stack is LIFO; Queue is FIFO.

50. What are applications of DSA?

Used in databases, operating systems, compilers, AI, and more.