Date:

DATA STRUCTURE

1) What are data structures?
A data structure is a data organization, management and storage format that is usually usually choosen for effecient access to data.

2) Types of data structure?

1) Linear data structure:
The elements are arranged in sequence one after the other.

1- Array 2- stack 3- Queue
4- Linked list

2- Non-Linear data Structure: → Tree → Graph → Hash table
The elements are arranged in a hierarchial manner where one element will be connected to one or more elements.

3) What are arrays and their drawbacks?
An array has a fixed size which means you cannot add/Delete elements after creation You cannot resize them dynimically. The elements are stored in a contiguous memory.

Date:

Drawbacks:

- Fixed Size
- Inflexible
- Inefficient in Insertion and Deletion

4) What is stack?

A data structure that follows a particular order in which operations are performed.

LIFO Last in first out

5) What is the real life example of stack

1- Expression Evaluation

2- Piles of books 4-Undo - redo operation

3- Deck of cards

6) What is Queue.

FIFO first in first out

7) What are the real time examples of Queue?

1) A ticket line

2) An esclator.

8) What is priority queue and its example?

We will extract the value first which has either the high priority or low as needed

E.G: A line in hospital, if emergency case appears it will be handled first

9) What is Linked list ?

A data structure consists of nodes where each node contains a data field and reference to the next node. It stores the elements on different addresses.

10) Real time examples of LL ?

It is used in music Players to play music either from start or end

11) What are the types of trees

- Binary Tree
- AVL
- BST

12) What is BST ?

It Quickly allows to store the sorted list of data. The left child of parent is always small and the right on is always large irrespective of the balance factor.

13) What is AVL ?

Its a self balancing BST where the difference between the heights of left and right nodes is either 1, 0, -1

Date:

14) What is difference b/w AVL and BST.

AVL is a balanced tree as its follows the concept of balance factor while BST doesn't follow balance factor

15) Where to use array and where to use LL?

The situation where the size of the collection is known and where elements are needed to be accesed or manipulated quickly we should use arrays. And where size is unknown we should choose LL.

16) Which one is best for insertion and deletion?

LL is best for insertion and deletion as it doesn't need any updation in the list for shifting and has O(1) while array needs shifting making the O(n).

17) Why LL is preferable over arrays?

Coz it doesn't any shifting for deletion and insertion

18) What is hash table ?

A common data structure used to store key - value pairs for effecient retrival

19) What is hashing?

A technique of mapping a large chunk of data into small table using hashing function:
Generate indexes to store value

20) Time complexities of types of data structure.

	Insert	Delete	Access	Search
Array	o(1)	o(1)	o(1)	o(1)
Stack	o(1)	o(1)	o(1)	o(1)
Queue	o(1)	o(1)	o(1)	o(1)
Linked list	1	1	1	1
BST	O(logn)	logn	logn	logn
AVL	O(logn)	logn	logn	logn
Hash table	1	1	1	1

21) What is pointer.

A variable that is used to store the memory address instedd of value

22) Is the size of char pointer and int pointer same?

Yes, the sizes are same data type is used to know the type of data.

23) What is dangling pointer?

A pointer that is pointing to an invalid memory address i-e the memory has deleted or out of scope.

```
*p = &a  ,  *q = &a
      delete (q)
```

p → is now a dangling pointer

24) What is memory leakage?

A memory which is created but not deleted after use.

Any object which is created but is not accessed by program also leads to memory leakage