1) **What is data structure?**

- The data structure is not a programming language
- The data structure is a set of algorithms that we can use in the programming language to structure the data in the memory
- It is used to organize data in the memory

2) **Types of data structures?**

- Primitive data structures
- Non-primitive data structures

3) **What is primitive data structure?**

- Primitive data structures are the primitive data types
    - Int
    - Float
    - Char
    - Pointer is an example of primitive data types that can hold single values.

4) **What is a non-primitive data structure?**

- There are two types of non-primitive data structures
    - Linear data structure
    - non-linear structure

5) **What is Linear data structure?**

- The arrangement of data in a sequential manner is known as a linear data structure
- In this data structure, one element is connected to only one another element

- Example
    - Array
    - Stack
    - Queue
    - Linked list

6) Non-linear data structure?

- When one element is connected to n number of elements known as a non-linear data structure
- In this case, elements are arranged in a random manner

7) Classification of data structures?

- Static data structure
- Dynamic data structure

8) What is static data structure?

- It is the type of data structure where the size is allocated at the compile time
- In this case, the maximum size is fixed

9) What is dynamic structure?

- It is the type of data structure where the size is allocated at the run time
- In this case, the maximum size is flexible

10) Major operations of Data structure?

- Searching
- Sorting
- Insertion
- Updation
- Deletion

11) Advantages of data structure?

- Efficiently
- Reusability
- Abstraction

12) What is an array?

- An array is a collection of similar types of data items and each data item is called an element of the array

13) What is Linked List?

- A linked list is a linear data structure that is used to maintaining the list in the memory
- It can be seen as a collection of nodes at non-continuous memory locations
- Each node of the list contains a pointer to its adjacent nodes

14) What is Queue?

- A queue is a linear data structure
- In Queue element can be inserted at the one end called rear
- An ELement can be deleted at the other end called the front
- It is an abstract data structure similar to a stack
- It follows the First in first out method

15) What is a stack?

- Stack is a linear data structure
- In stack insertion and deletion can be done in only one end that is called top
- Stack is an abstract data structure and can be implemented in most the programming languages
- It follows last in first out method

- A real-world example of a stack is
    - piles of plate
    - Deck of cards

16) What is the tree?

- The tree is a multilevel data structure with a hierarchical relationship
- Its elements are known as nodes
- The bottom-most nodes in the hierarchy are called the leaf node
- The topmost node is called the root node
- Each node contains pointers to point the adjacent node

17) What is Graph?

- A graph can be defined as a pictorial representation of a set of elements connected by the links known as edges

18) Need of data structure?

- If thousands of users searching the data simultaneously on a web server, then there are chances to sever can be failed during the process
- In order to solve the problem, the data structure is used

19) What is an algorithm?

- The algorithm is a set of rules to perform some problem-solving operation by the computer
- An algorithm is a step-by-step process.

20) Types of LinkedList?

- Singular LinkedList
- Doubly LinkedList
- Circular LinkedList
- Doubly CircularLinkedList

21) **What is Singly LinkedList?**

- Singly Linked List is a data structure that connected together via a link
- It contains two parts
- One is the data part and another is the address part
- Address part contains the address of the next node
- Address part in the node is known as pointer

22) What is Doubly LinkedList?

- Doubly LinkedList is a linear data structure that includes three parts
- The three parts are
    - One data part
    - Pointer to the previous node
    - Pointer to the next node

23) What is Circular LinkedList?

- In a circular LinkedList, the last node of the list contains pointers to the first node of the list
- Circular Liked lists are mostly used in task maintenance in operating systems

24) What is Circular Doubly Linked List?

- Circular Doubly linked list is a more complex type of data structure which node contains pointer to its previous and next nodes
- Circular Linked List does not contain null in any of the nodes

25) Why circular Queue introduce?

- There was one limitation in the array implementation of queue
- If the rear reaches the end position of the queue, then we can not add any elements to the queue
- To solve this problem, the concept of the circular queue was introduced

26) What is the circular queue?

- A circular queue is similar to the linear queue based on the FIFO method
- In a circular queue, the last position is connected to the first position that forms a circle

27) What is a priority queue?

- priority queue behaves similarly to the normal queue in that each element has some priority
- The element with the highest priority would come first in the priority queue

28) What is a Binary tree?

- If the node can have a maximum of two children means that is called a Binary tree
- In a Binary tree, each node can have 0,1 or 2 children

29) What is a binary search tree?

- A binary search tree can be defined as a class of binary tree, in which the nodes are arranged in a specific order
- In a binary search tree, the value of the left node is less than the value of the root node
- Similarly, the value of the right node is greater than or equal to the value of the root node

30) What is an AVL tree?

- An AVL tree can be defined as a highest balancing binary tree
- In the AVL tree, each node is associated with a balance factor which is calculated by subtracting the right subtree node from its left subtree node

31) What is Btree?

- In a Btree the root node must have at least two nodes
- All the leaf nodes must be the same level

32) What is a graph?

- A graph can be defined as a group of vertices and edges that are used to connect the vertices

33) What is searching?

- Searching is the process of finding some particular element in the list
- If the element is present in the list, then the process is called successful and returns the location of the element
- Otherwise, the search is called unsuccessful
- There are two types of searching
    - linear search
    - Binary search

34) What is linear search?

- Linear search is the simplest search algorithm
- It is also called sequential search
- In this type of search, we simply traverse the list completely and match each element of the list with the item whose location is to be found
- If the match is found then the location of the item is returned otherwise the algorithm returns a null value

35) What is a binary search tree?

- The binary search is the search technique that works efficiently on the sorted list
- The binary search follows the divide and conquers method in which, the list is divided into halves and the item compare with the middle element
- If the match is found it returns the location of the middle element otherwise it returns null