**1. What is the difference between Data Structures and Data Types?**

**Answer:**

* Data structure is a collection of values, the relationship between the values, and functions or methods which can be applied to the values.
* Data Primitive types (string, number, boolean, and referenced type (object, array, function)

**2. What is a Stack? What is LIFO?**

**Answer:**

* **Stack** is a linear data structure in which ONLY **the last inserted element can be removed and accessed.**
* **Stack has top and bottom. Items may ONLY be removed or added from the top**
* **LIFO (Last in, First out):** think of this form as stacking plates on a table, to get the bottom plate, you need to remove all the other ones on the top**.**

**3. What is a Queue? What is FIFO?**

**Answer:**

* Queue is a linear data structure, but you can only remove the first added element.
* Queue has front and back. Removed (dequeue) from the front, added (enqueue) to the back
* FIFO (first-in, first-out)

**4. What is a Node? (Data Structures; Trees)**

**Answer:**

**Trees** are well-known as a non-linear data structure. They don’t store data in a linear way. They organize data hierarchically.

**Node (the most basic data structure):** can contain data and pointers to other nodes**. Node** is an entity of a collection. Tree is a collection of entities called nodes. **The first node** of the tree is called the **root node.**

**5. What is a Head Node? A Tail Node?**

**Answer:**

Head Node: has a value and the next pointer is a node (the first node of a linked list)

Tail Node: has value and the next pointer is a null reference (the last node of a linked list)

**6. What is the difference between a Singly and Doubly Linked List?**

**Answers:**

**A linked list is a data structure that contains nodes. It’s a linear operation.**

**Singly Linked List:**

* Contains 2 fields: data and next link (pointer)
* Traversal is in one direction
* Less memory than DLL because it has only 2 fields
* Mostly used for the execution of stacks.
* Do not need to perform any searching operation

**Doubled Linked List:**

* Contains 3 fields: data, previous link, and next link
* Traversal is in both directions (forward and backward)
* More memory than SLL because it has 3 fields.
* Mostly used for the execution heaps, stacks, and binary trees.
* Used for searching for a better implementation

Linked List Methods: append(), prepend(), remove(), size(),. print(), return the index

**7. Describe a Binary Tree?**

**Answer:**

* A non-linear data structure
* A tree whose elements have **at most 2 children**.
* A binary tree node contains the following parts:

1. Data
2. Pointer to left child
3. Pointer to right child

Methods: Insertion. Deletion, search, traverse

**8. What is a Root Node?**

**Answer:**

Root node is the first node of a tree, the node that does not have any parent node.

**9. What is DFS? (Depth First Search)**

**Answer:**

**DFS (Depth First Search) is an algorithm to traverse trees**. Start from the root and visit all possible routes to reach the leaf node.

**10. What is BFS? (Breadth-First Search)**

**Answer:**

**BFS**  **is an algorithm to traverse trees.**  Start from the root node and visit from left to right (sibling nodes within the same level) before moving on to the next level.