**1.**

* **Explain the different types of linked lists (Singly Linked List, Doubly Linked List).**

**Ans :** Types of Linked Lists

* **Singly Linked List**: Each node points to the next node in the list. It allows traversal in one direction (from head to end).
* **Doubly Linked List**: Each node points to both the next and previous nodes. It allows traversal in both directions (forward and backward).

**4.**

* **Analyze the time complexity of each operation .**

**Ans :**

Time Complexity

* **Add Operation:** Time Complexity: O(1) (constant time, adding to the end of the list)
* **Search Operation:** Time Complexity: O(n) (linear time, as each element may need to be checked)
* **Traverse Operation:** Time Complexity: O(n) (linear time, as each element needs to be visited)
* **Delete Operation:** Time Complexity: O(n) (linear time, as each element may need to be checked to find and remove the target)
* **Discuss advantages of linked lists over arrays for dynamic data**

**Ans :** Advantages of Linked Lists over Arrays are given below

* **Dynamic Size**: Linked lists can grow and shrink dynamically, unlike arrays which have a fixed size.
* **Efficient Insertions/Deletions**: Insertions and deletions are more efficient with linked lists as they do not require shifting elements. Only pointers need to be updated.
* **Memory Utilization**: Linked lists use memory more flexibly as they allocate memory for nodes as needed.