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

Ans)

A singly linked list has a node which contains data and a reference to next node only. Singly

Linked List makes it efficient for insertion and deletion of elements. It traverses sequentially in one direction only.

A doubly linked list has a node which contains data and a reference to next node and previous node both. It uses more memory due to extra pointer usage. It allows traversal in both directions.

1. Analyze the time complexity of each operation?

Ans)

* **Add Task:** O(n) - Needs to traverse to the end of the list to add the task.
* **Search Task:** O(n) - Needs to traverse the list to find the task.
* **Traverse Tasks:** O(n) - Needs to visit each element in the list.
* **Delete Task:** O(n) - Needs to find the task and update the links.

1. Discuss the advantages of linked lists over arrays for dynamic data?

Ans)

Linked List are dynamic in nature, which means unlike arrays which are static, we can grow and shrink them dynamically as needed while in arrays we need to predefine their size and once created cannot be changed. Inserting or deleting elements in a linked list is more efficient than in an array, especially for large data sets .Also, there is no memory wastage in linked list because of its dynamic nature.