Exercise 5: Task Management System

1. Understand Linked Lists:

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

= Linked Lists:

1. Singly Linked List: Each node contains data and a reference to the next node. Efficient for insertions and deletions.

2. Doubly Linked List: Each node contains data, a reference to the next node, and a reference to the previous node. Allows traversal in both directions.

4. Analysis:

o Analyze the time complexity of each operation.

=Time Complexity Analysis:

1. Add: O(1) 2. Search: O(n)

3. Traverse: O(n) 4. Delete: O(n)

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

= Advantages of Linked Lists over Arrays:

1. Dynamic size: Can grow and shrink as needed.

2. Efficient insertions and deletions: No need to shift elements.

3. Suitable for applications where frequent insertions and deletions are required.