**Exercise 5: Task Management System**

**Understand Linked Lists**

**Types of Linked Lists:**

| **Type** | **Description** |
| --- | --- |
| Singly Linked List | Nodes point to the next node only. Traverse in one direction. |
| Doubly Linked List | Nodes point to both previous and next. Allows two-way traversal. |
| Circular Linked List | Last node points back to the first. Can be singly or doubly linked. |

For this task, we’ll use a **Singly Linked List**.

**Analysis**

| **Operation** | **Time Complexity** | **Description** |
| --- | --- | --- |
| Add | O(n) | Add at end (can be O(1) with tail pointer) |
| Search | O(n) | Traverse from head to find |
| Traverse | O(n) | Print all |
| Delete | O(n) | Find and remove |

**Advantages of Linked List over Array**

* Dynamic Size: No need to define size upfront.
* Efficient insertions/deletions: No shifting like arrays.
* Memory use: No wasted slots.