**Exercise 6: Library Management System**

**Understand Search Algorithms**

**Linear Search**

* Checks each element one by one until a match is found.
* Time Complexity:
  + Best: O(1)
  + Worst: O(n)

Binary Search

* Requires the list to be sorted.
* Repeatedly divides the search space in half.
* Time Complexity:
  + Always: O(log n)

**Analysis**

| **Algorithm** | **Time Complexity** | **Requires Sorted?** | **Use Case** |
| --- | --- | --- | --- |
| Linear Search | O(n) | No | Small or unsorted lists |
| Binary Search | O(log n) | Yes | Large & sorted lists (by title) |

When to Use:

* Linear Search:
  + Simple
  + Works on unsorted data
  + OK for small datasets
* Binary Search:
  + Efficient for large datasets
  + Must sort once before using
  + Useful in frequent search scenarios