**Exercise 6: Library Management System**

**1. Understanding Search Algorithms**

**Linear Search:** A straightforward method that involves checking each element in the list sequentially until the desired element is found or the list ends. O(n) is the worst case, where n is the number of elements.

**Binary Search:** An efficient search method for sorted lists. It repeatedly divides the list in half to locate the target element. O(log n) is the worst case.

**4. Analysis**

**Time Complexity Comparison**

* **Linear Search:** O(n)
* **Binary Search:** O(logn)

**Use Cases**

* **Linear Search:**
  + Best for small or unsorted datasets.
  + Simple to implement without sorting overhead.
* **Binary Search:**
  + Ideal for large and sorted datasets due to its efficiency.
  + Requires a sorted list, making it suitable for cases where sorting is feasible and frequent searches are needed.