**LIBRARY MANAGEMENT SYSTEM**

Linear search is a straightforward approach for finding an item in a list by checking each element one by one, starting from the beginning. It compares each item to the target until it either finds a match or reaches the end of the list. Although easy to understand and implement, linear search can be sluggish with large datasets because it might have to check every item.

Binary search, on the other hand, is much more efficient but only works with sorted lists. It works by repeatedly dividing the list in half. You start by comparing the target value to the middle element of the list. If they match, the search is done. If not, you decide whether to continue with the left half or the right half based on whether the target is smaller or larger than the middle element. This halving process speeds up the search significantly.

**Time Complexity Comparison:**

* **Linear Search**: O(n) – Checks each item one by one, which can be slow for large lists.
* **Binary Search**: O(log n) – Quickly narrows down the search by dividing the list in half each time, making it much faster for large, sorted lists.

In essence, linear search is simple and works on any list, but it's not efficient for large data. Binary search is quick for sorted lists but requires that the data be in order.