**Library Management System**

* **Understand Search Algorithms**
* **Explain linear search and binary search algorithms.**
* **Linear Search**
* **Algorithm:** Sequentially checks each element in the list until the target element is found or the list ends.
* **Time Complexity:** in the worst case, where n is the number of elements.
* **Usage:** Suitable for unsorted or small datasets.
* **Binary Search**
* **Algorithm:** Repeatedly divides the sorted list in half, comparing the target element to the middle element to eliminate half the search space.
* **Time Complexity:** in the worst case, where n is the number of elements.
* **Usage:** Requires a sorted dataset and is efficient for large datasets.

**Analysis**

* **Compare the time complexity of linear and binary search.**
* **Linear Search:**
* Searches each element sequentially.
* Effective for unsorted or small datasets.
* **Binary Search:**
* Efficiently halves the search space.
* Requires a sorted dataset and is optimal for large datasets.
* **Discuss when to use each algorithm based on the data set size and order.**
* **Linear Search:**
* **Use When:** Data is unsorted or small.
* **Advantages:** Simple and applicable to any list.
* **Binary Search:**
* **Use When:** Data is sorted and large.
* **Advantages:** More efficient with time complexity.