**Library Management System**

1. Explain linear search and binary search algorithms

* Linear Search:

1. Description: Checks each element sequentially until the target is found or the end is reached.
2. Time Complexity: O(n) – searches through each element, which can be slow for large datasets.

* Binary Search:

1. Description: Divides the search interval in half repeatedly, assuming the list is sorted.
2. Time Complexity: O(log n) – much faster than linear search for large, sorted datasets.
3. Compare the time complexity of linear and binary search

* Linear Search:

Time Complexity: O(n) – linear scan through the array.

Advantages: Simple and works with unsorted data.

Disadvantages: Inefficient for large datasets.

* Binary Search:

Time Complexity: O(log n) – efficient for large, sorted datasets.

Advantages: Fast search in sorted data.

Disadvantages: Requires sorted data

1. Discuss when to use each algorithm based on the data set size and order

* Linear Search: Use when data is unsorted or for small datasets.
* Binary Search: Use when data is sorted and large, as it provides faster search times.