**Exercise 6: Library Management System**

1. Explain linear search and binary search algorithms.
   * Linear Search
     1. Algorithm: Linear search visits each element one by one to locate the required element until that one is found or the last one.
   * Binary Search
     1. Algorithm: Binary search finds the middle element of an ordered list, compares it with the target value, and discards half of the list depending on the comparison. It repeats these steps until the target value is located, or the list can be divided no further than it has been.
2. Compare the time complexity of linear and binary search.
   * Linear Search: O(n) — In worst case, the search has to go through all 'n' elements of list.
   * Binary Search: O(log n) — Because the search has to halve the list with each iteration — reducing the number of comparisons that need to be made significantly.
3. Discuss when to use each algorithm based on the data set size and order.
   * Linear Search:
     1. Unsorted Data: If the data is unsorted, then one has to use a linear search.
     2. Small Datasets: For small datasets, the simplicity of the linear search is more bearable than its O(n) complexity.
   * Binary Search:
     1. Sorted Data: Binary search needs that the dataset is sorted. Its complexity is O(log n); hence, for big datasets, it is very effective.
     2. Large Datasets: For large datasets, the time taken in for searching elements using binary search is quite less when compared to that in linear search.