1.Understand Search Algorithms:

Explain linear search and binary search algorithms.

Ans: Linear search is a straightforward algorithm for finding a specific element in a list. It checks each element of the list one by one from the beginning to the end until the target element is found or the end of the list is reached. Binary search is an efficient algorithm for finding a specific element in a sorted list. It repeatedly divides the search interval in half, comparing the target value to the middle element of the current interval.

4. Analysis:

Compare the time complexity of linear and binary search.

Ans:

Linear Search

Best case – O(1), Average case – O(n), Worst case - O(n)

Binary Search

Best case – O(1), Average case – O(log n) , Worst case - O(log n)

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

Linear Search: Best for unsorted or small datasets and dynamic data where sorting is impractical. Time complexity is O(n).

Binary Search**:** Best for large, sorted datasets where efficiency is crucial and the dataset is relatively static. Time complexity is O(log n).