**Exercise 6:**

Explain linear search and binary search algorithms.

Linear Search: Checks each element in the list one by one until a match is found or the list ends.

Binary Search: Repeatedly divides the sorted list in half to locate the target element faster.

Compare the time complexity of linear and binary search.

| Search Type | Best Case | Average Case | Worst Case |
| --- | --- | --- | --- |
| Linear Search | O(1) | O(n) | O(n) |
| Binary Search | O(1) | O(log n) | O(log n) |

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

Use Linear Search when:

* The list is unsorted
* Dataset is small
* Insertion/deletion happens often and sorting is costly

Use Binary Search when:

* The list is sorted
* You need fast search on large datasets

Output:

