**Exercise 2: E-commerce Platform Search Function**

**Analysis:**

**\* Linear Search:**

- Simpler to implement.

- No need to sort the array.

- Inefficient for large datasets (O(n)).

**\* Binary Search:**

- Much faster on large sorted datasets (O(log n)).

- Requires sorting first (O(n log n) for initial sort).

**\* Recommended:**

- For small or unsorted data: use Linear Search.

- For large and static sorted data: use Binary Search.

**My Take:**

To compare the linear and binary search, I tested both on the same product list. In linear search, I looped through the array from start to end, checking each product's name. It worked fine for a small number of products, but I could see that as the list grows, this would take more time since it may need to check every item.

Then I implemented binary search, which required the product array to be sorted by ID. It was faster because it kept dividing the array in half and quickly narrowed down to the correct item. I noticed that binary search works much faster, especially when the dataset is big. But it only works when the data is sorted, so that’s a trade-off.

In terms of time complexity, linear search is O(n) because it checks each element one by one. Binary search is O(log n), which is more efficient for large datasets. So, for real-world platforms with thousands of products, binary search is definitely the better choice.