**WEEK 1- Exercise 2: E-commerce Platform Search Function**

**Explain Big O notation and how it helps in analyzing algorithms. Describe the best, average, and worst-case scenarios for search operations.**

Asymptotic Notation (Big O)

Big O notation describes how an algorithm’s performance scales with input size.

Linear Search:

-Best case: O(1) – element found at the beginning.

-Average/Worst case: O(n) – element in middle or end.

Binary Search:

-Best case: O(1) – element at the middle.

-Average/Worst case: O(log n) – divides the array in half each time.

-Requires sorted data.

**Compare the time complexity of linear and binary search algorithms.**

Linear Search- Time Complexity: O(n), Suitable for: Small or unsorted product lists.

Binary Search- Time Complexity: O(log n), Suitable for: Large, sorted product lists.

**Discuss which algorithm is more suitable for your platform and why.**

Binary Search is Best for my e-commerce Platform:-

-Performance:

Binary Search has O(log n) time complexity, meaning it’s much faster than linear search as product count increases.

-Scalability:

If the product catalog grows to thousands or millions of items, binary search will still perform efficiently — making it suitable for large-scale platforms.

-Use Case Fit:

On e-commerce sites, product lists can often be sorted (e.g.- alphabetically by name, price, etc.), which is perfect for binary search.