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

**Understand Asymptotic Notation:**

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

Ans-

Big O notation describes the performance of an algorithm as the input size grows. It helps analyze time complexity (speed) and space complexity (memory).

Linear Search:

Best Case: O(1) – when the item is at the start

Average Case: O(n/2) → O(n)

Worst Case: O(n) – item not found or at the end

Binary Search (on sorted data):

Best Case: O(1) – middle item

Average & Worst Case: O(log n)

**Analysis:**

* + Compare the time complexity of linear and binary search algorithms.
  + Discuss which algorithm is more suitable for your platform and why.

Ans-

Linear Search: Time Complexity = O(n)

Binary Search: Time Complexity = O(log n)

Binary search is better for large, sorted data. Linear search is easier but slower.