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

**Asymptotic Notation**: Mathematical tool used to describe the efficiency of an algorithm as the input size grows.

It tells us how fast or slow an algorithm runs.

How much memory it uses.

**Big O Notation** is a mathematical notation used to describe the time and space complexity of algorithms as the input size (n) grows. It provides an upper bound on the growth rate, helping to estimate how efficiently an algorithm scales.

It abstracts away hardware and programming language differences.

It helps in comparing different algorithms based on performance.

**Linear Search**

Best Case: O(1) (if item present in first)

Average Case: O(n/2), which simplifies to O(n);

Worst Case: O(n) (item not found)

**Binary Search**

Best Case: O(1);

Average Case and Worst Case: O(log n);

**Analysis:**

Linear Search: Time complexity: O(n) - Suitable for Small datasets or unsorted data

Binary Search:- Time Complexity:- O(log n) -Suitable for Large, Sorted datasets