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

**Explain Big O notation and how it helps in analyzing algorithms**

Big O notation is a way to describe the efficiency of an algorithm in terms of how its runtime or memory usage grows as the input size increases. It provides a standardized way to express the upper bound of an algorithm's complexity, allowing for comparison between different algorithms

**Describe the best, average, and worst-case scenarios for search operations.**

In search operations, the best-case scenario occurs when the target element is found with the fewest comparisons, the worst-case scenario involves the most comparisons, and the average-case represents the typical number of comparisons for random searches

**Analysis:**

When we compare the Binary search and Linear search . In linear search the item is checked one by one sequentially which can be more time taken if there are more number of products or items

But where as in the Binary search scenario it reduces the comparisions more than by half

Before proceeding the binary search we have to make sure that the items are in a sorted manner else it wont work properly

When the question is about which algorithm

**Use Linear Search** if:

* Your data is small
* Or unsorted and not performance-critical

**Use Binary Search** if:

* Data is **large and sorted**
* You need **fast** performance