**2. E-COMMERCE PLATFORM SEARCH FUNCTION**

**Understanding Asymptotic Notation**

Big O notation helps measure how an algorithm's performance scales with input size. It provides an upper bound on time or space complexity, helping us compare algorithms efficiently.  
In search operations:

* **Best case**: The item is found in the first comparison - O(1)
* **Average case**: The item is located somewhere in the middle - O(n/2) ≈ O(n)
* **Worst case**: The item is not found or at the last position - O(n) for linear, O(log n) for binary

**Analysis**

Linear search has a time complexity of **O(n)**, where each element is checked one by one. Binary search is more efficient, with a time complexity of **O(log n)**, but it requires the array to be sorted in advance.  
 For an e-commerce platform handling large datasets, **binary search** is more suitable as it scales better and offers significantly faster performance in comparison to linear search. Sorting the data before performing searches ensures optimal efficiency.

**Output**

**A screenshot of a computer screen

AI-generated content may be incorrect.**