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

**Understanding Asymptotic Notation**

* **Big O Notation**:
  + Big O notation is a mathematical representation used to describe the upper bound of an algorithm's running time as a function of the input size. It helps in analyzing the efficiency of algorithms by providing a high-level understanding of their time and space complexity.
  + Example: O(n), O(log n), O(n^2) represent linear, logarithmic, and quadratic time complexities respectively.

**Best, Average, and Worst-Case Scenarios**:

* **Best Case**: The scenario where the algorithm performs the minimum number of operations. For example, in linear search, the best case is when the target element is at the first position (O(1)).
* **Average Case**: The expected scenario where the algorithm performs an average number of operations. It takes into account all possible cases and their probabilities.
* **Worst Case**: The scenario where the algorithm performs the maximum number of operations. For example, in linear search, the worst case is when the target element is at the last position or not present at all (O(n)).

**Analysis**

* **Time Complexity Comparison**:
  + **Linear Search**: O(n) in the worst and average case. It checks each element sequentially.
  + **Binary Search**: O(log n) in the worst and average case. It divides the search interval in half with each step.
* **Suitability for the Platform**:
  + **Linear Search** is simpler and doesn't require the array to be sorted. It's suitable for small datasets or unsorted data.
  + **Binary Search** is more efficient for large datasets but requires the data to be sorted. It is suitable for platforms where products can be maintained in a sorted order.