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

1. **Understand Asymptotic Notation:**

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

Big O Notation is used to analyze the performance of algorithms, particularly their time and space complexity as the input size increases.

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

Best Case: The fastest an algorithm can complete.  
Average Case: Expected time under normal conditions.  
Worst Case: The slowest an algorithm can take.

Search Time Complexities:  
- Linear Search: Best O(1), Average O(n), Worst O(n)  
- Binary Search: Best O(1), Average O(log n), Worst O(log n)

1. **Analysis**

**Compare the time complexity of linear and binary search algorithms.**

Linear Search:.  
- Time Complexity: O(n)  
- Suitable for small or unsorted datasets.  
  
Binary Search:   
- Time Complexity: O(log n)  
- Much faster on large datasets.  
  
Conclusion:  
Use Linear Search for small or unsorted data.  
Use Binary Search for large, sorted data for better performance.

**Discuss which algorithm is more suitable for your platform and why.**

Binary search is more suitable for an e-commerce platform as it is faster and efficient with large, sorted datasets.

1. **Output**

