E-commerce Platform Search Function - Analysis

4. Analysis

Time Complexity Comparison:

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1. Linear Search:

- Time Complexity: O(n) in worst and average case, O(1) in best case.

- Explanation: Each element is checked one-by-one until the target is found or the end is reached.

2. Binary Search:

- Time Complexity: O(log n) in best, average, and worst case.

- Explanation: The array is divided in half at each step, making the search significantly faster for sorted arrays.

Suitability for E-commerce Platform:

- Binary search is significantly more efficient than linear search for large datasets.

- However, binary search requires the data to be sorted, which adds a preprocessing step.

Recommendation:

- For small or unsorted product lists, linear search can be used due to simplicity.

- For large-scale platforms, binary search (on a sorted array or tree-based structure) is preferred for faster response times.

- For dynamic systems, consider using more advanced data structures like Tries, Hash Maps, or even full-text

search engines (e.g., Elasticsearch).