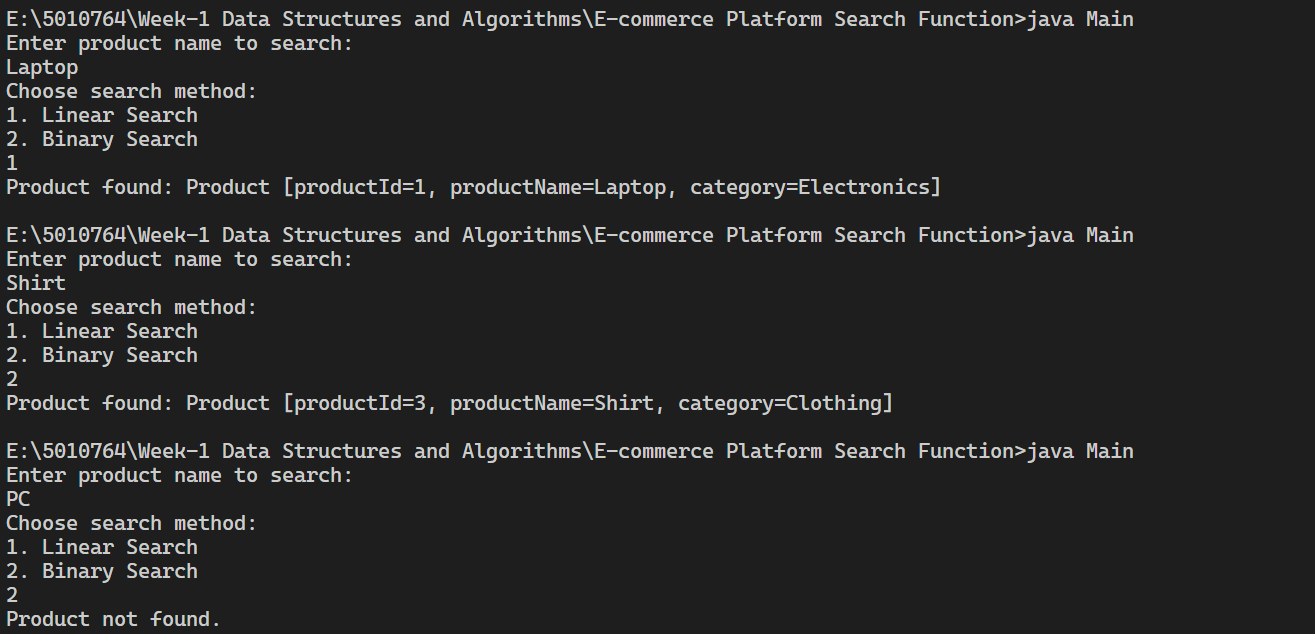
**E-COMMERCE PLATFORM SEARCH FUNCTION:**

1. **Understanding Asymptotic Notation**
   * **Big O Notation: This notation is used to describe the efficiency of an algorithm, particularly its time and space complexity as the input size grows. It helps in understanding the algorithm's performance in different conditions.**
   * **Best, Average, and Worst-Case Scenarios for Search Operations:**
     + **Best Case: The scenario where the desired item is found at the beginning of the data set, resulting in minimal operations.**
     + **Average Case: Represents the expected performance across various input sizes or configurations.**
     + **Worst Case: The situation where the desired item is located at the end of the data set, or is not present at all, leading to the maximum number of operations.**
2. **Setup**
   * **A Product class is created with attributes necessary for searching, including productId, productName, and category.**
3. **Implementation**
   * **Linear Search Algorithm: This straightforward algorithm iterates through each item in the array until it finds a match.**
   * **Binary Search Algorithm: This efficient algorithm works on a sorted array, repeatedly dividing the search interval in half to find the target.**
   * **Products are stored in an array for linear search and a sorted array for binary search.**
4. **Analysis**
   * **Time Complexity Comparison:**
     + **Linear Search: O(n), where n is the number of items in the array. It checks each item sequentially.**
     + **Binary Search: O(log n), due to its strategy of halving the search space with each step.**
   * **Algorithm Suitability:**
     + **For smaller or unsorted data sets, linear search might be more practical due to its simplicity.**
     + **For larger, sorted data sets, binary search is preferable due to its significantly faster performance.**
5. **Output**

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