DSA THEORY Exercise 2

Q2) **E-commerce Platform Search Function**

**1. Understanding Asymptotic Notation**

**Big O Notation**:

* Describes the upper bound of an algorithm's time complexity.
* Helps analyze efficiency and scalability by abstracting constants and lower-order terms.

**Search Operation Scenarios**:

* **Best Case**: Target found at the first position.
* **Average Case**: Target found in the middle.
* **Worst Case**: Target at the last position or not present.

**4. Analysis**

**Time Complexity**:

* **Linear Search**:
  + Best: O(1)
  + Average: O(n)
  + Worst: O(n)
* **Binary Search**:
  + Best: O(1)
  + Average: O(log n)
  + Worst: O(log n)

**Suitability**:

* **Binary Search**: More efficient (O(log n)), suitable for large datasets but requires sorted array.
* **Linear Search**: Suitable for small or unsorted datasets.