INVENTORY MANAGEMENT SYSTEM

Analysis

Time Complexity Analysis:

Add Product:
The addProduct method involves adding a product to the HashMap.
Time Complexity: O(1)
Adding an element to a HashMap is generally an O(1) operation due to the average constant-time complexity for insertion.

Update Product:
The updateProduct method checks if the product with the given product id exists and then updates it.
Time Complexity: O(1)
The containsKey and put methods both have O(1) average time complexity in a HashMap.

Delete Product:
The deleteProduct method involves removing a product from the HashMap.
Time Complexity: O(1)
The containsKey and remove methods have O(1) average time complexity in a HashMap.

The operations can be optimized by :
1)When creating the HashMap, we can set an initial capacity and load factor that match our expected number of elements to reduce the need for resizing and rehashing.
2)Batch operations: If user needs to perform multiple updates or additions at once,we can consider batching these operations. This can be more efficient than performing each operation individually due to reduced overhead.