**1. Understand the Problem**

**Why Data Structures and Algorithms are Essential**

Data structures and algorithms are crucial for efficiently managing large inventories. They determine how data is stored, accessed, and manipulated. Efficient data structures allow for quick addition, retrieval, and updates of inventory items, which is essential for handling a large number of products in a warehouse.

**Types of Data Structures Suitable**

* **HashMap**: Provides constant time complexity (O(1)) for add, update, and retrieve operations, making it ideal for managing inventory by product ID.
* **ArrayList**: Useful for maintaining a list of products but less efficient for frequent updates or deletions.

**4. Analysis**

**Time Complexity Analysis**

* **Add Operation**: O(1) using HashMap.put.
* **Update Operation**: O(1) using HashMap.put.
* **Delete Operation**: O(1) using HashMap.remove.
* **Get Operation**: O(1) using HashMap.get.

**Optimization**

* **Good Hash Function**: Ensures efficient handling of collisions.
* **Load Factor Management**: Helps maintain the efficiency of the HashMap as it grows.