Step 1-Understand the Problem

# Explain why data structures and algorithms are essential in handling large inventories.

In a warehouse, there are thousands and thousands of products, and each product needs to added to the record, update its details and remove it when it leaves the warehouse. Among the thousands of items, it can be very tough to look for a particular item, and a suitable data structure can not only help us to find the product but also can do it in a very short amount of time.

# Discuss the types of data structures suitable for this problem.

There are 2 types of data structures that we can use to solve this problem-

1. ArrayList- We can use it to store the products in an array.
2. HashMap- We can use it and store items via a key, say like product ID.

Step 4: Analysis

# Analyze the time complexity of each operation (add, update, delete) in your chosen data structure.

The data structure that I used in my code is ArrayList, so as per it, the time complexity will be

1. Add = O(1)
2. Update = O(n)
3. Delete = O(n)

# Discuss how you can optimize these operations.

Points if implemented can make the code run faster-

1. We can sort the list in such way that the products which are often updated is brought to the front side of the list, so it will significantly reduce searching time for the program since it can find those products at the beginning only.
2. We can take take multiple inputs at 1 time, so for every product, the program don’t have to start searching from the start.
3. ArrayList is good for small inventory management. If the data is huge then the program will gradually become slow. So instead we can use HashMap, which can make the program run a lot faster.