**Step 1:** **Understand the Problem: -**

Q1) Explain why data structures and algorithms are essential in handling large inventories.

Solution: -

The question can be answered using these three points:

->Data structures and algorithms are essential for handling large inventories because they ensure efficient data retrieval, insertion, and deletion.

->They help manage memory effectively, maintain data integrity, and enable complex queries.

->Efficient algorithms also ensure that operations remain fast and scalable, even as the inventory grows.

This is crucial for real-time processing and smooth operations in large inventory systems.

Q2) Discuss the types of data structures suitable for this problem.

Solution: -

The different types of data structures suitable for this problem are:

->ArrayList

->HashMap

**Step 4: Analysis: -**

Q1) Analyze the time complexity of each operation (add, update, delete) in your chosen data structure.

Solution: -

The time complexity of each operation is:

->Addition of a new product: O (1)

->update of a product: O (1)

->delete of a product from inventory: O (1)

Q2) Discuss how you can optimize these operations.

Solution: -

There is no further optimization is required as the time complexity of all the operations in HashMap is already in O (1).