Online Store Inventory Console App

Required Skills

To successfully complete this task, trainees should apply the following skills:

- **Business Analysis:** Understanding e-commerce workflows such as inventory tracking and discount application.
- **Data Modeling:** Designing structured data representations for diverse products and categories.
- **Algorithmic Thinking:** Implementing stock tracking and dynamic discount calculations.
- **Code Reusability:** Building generic solutions like an inventory manager using generics.
- **Attention to Detail:** Managing stock updates accurately and handling invalid orders gracefully.

Objective

Create a console-based Inventory Management System to manage products, categories, and customer orders in an online store.

Functional Requirements

- The system should support adding new product categories (e.g., electronics, clothing, home appliances).
- Products should have attributes such as name, price, stock quantity, and category.
- Different product types (e.g., Electronics, Clothing) should be modeled as separate subclasses with specific behaviors or attributes (like warranty for electronics or size for clothing).
- Implement discount calculation where different product types have distinct discount logic.
- Track and manage stock quantities, reducing stock when an order is placed and updating stock accordingly.
- The system should allow placing customer orders, updating stock levels, and displaying order details including total price and discounts applied.
- Provide a generic inventory manager that can handle any type of product, allowing addition, removal, and listing of products.
- Display clear and descriptive messages for actions like stock updates, insufficient stock warnings, and successful order placements.

Expected OOP Applications

- Structured use of classes to represent products, categories, and orders.
- Inheritance to create specific product types inheriting from a generic product class.
- Abstract classes or interfaces to enforce the implementation of discount calculations.

- Application of mixins to include functionalities like stock tracking across different product types.
- Use of generics to create a flexible and reusable inventory manager.

Deliverables

1. **Complete Dart Console Applications** for both tasks.
2. **Documentation** explaining the application of each OOP concept in the solutions.
3. **Sample Input/Output Demonstrations** showcasing key features and user interactions.
4. **Instructions for running** each console application.