Synopsis of Java Lab Project

E-Commerce Management System

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1. Introduction

The **E-Commerce Management System** is a desktop application built using Java Swing. It allows users to browse products, add them to a shopping cart, and place orders through a simple graphical interface. The main aim of this project is to demonstrate how **Object Oriented Programming (OOP)** concepts can be applied in building a real-world style application. The project provides hands-on experience with encapsulation, inheritance, polymorphism, and abstraction while also strengthening GUI programming skills in Java.

2. Problem Statement

Managing a collection of products, maintaining a cart, and handling orders in a structured way can become complicated without a proper system. The problem is to design and implement a simple application that provides the following features:

- Display a catalog of products with details.
- Allow users to add or remove products in a shopping cart.
- Enable users to view and confirm their orders.
- Provide a basic but user-friendly graphical interface.

3. Proposed Solution / Methodology

The project will be implemented using **Java and Swing UI**. The solution will be structured into classes and objects that represent entities such as `Product`, `Cart`, `Order`, and `User`. The design will follow OOP principles:

- **Encapsulation:** Data such as product details and order information will be hidden inside classes with controlled access through getters and setters.
- **Inheritance:** A generic class hierarchy will be created, for example, a base `User` class and specialized classes such as `Customer`.

- **Polymorphism:** Functions like displaying product details will be handled differently depending on the type of product or user interface component.
- **Abstraction:** Abstract classes and interfaces will be used for defining generic behaviors like order processing.

The GUI will be created using Swing components such as `JFrame`, `JPanel`, `JTable`, and `JButton`. The interaction between UI and backend logic will demonstrate modular programming practices.

4. Expected Outcome

The expected outcome of the project is a functional desktop application where users can:

- Browse through a list of products.
- Add or remove items from their shopping cart.
- View and confirm their orders.

From an academic perspective, the project will illustrate the use of OOP in designing real-world applications and strengthen our understanding of Java concepts.

5. Timeline / Work Plan

- **Week 1–2:** Requirement analysis, class design, and UML diagrams.
- **Week 3–4:** Implementation of core classes (`Product`, `Cart`, `Order`).
- **Week 5–6:** Development of GUI using Swing components.
- **Week 7:** Integration of modules and testing.
- **Week 8:** Documentation and final submission.

6. References

1. Herbert Schildt, *Java: The Complete Reference*, McGraw Hill.
2. Oracle Java Documentation: `https://docs.oracle.com/javase/`