Ecommerce Application

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1) Executive Summary

The eCommerce Management System is a comprehensive platform designed to streamline the management of products, orders, and customer interactions. It provides a user-friendly interface for sellers to list their products, manage inventory, and handle transactions, while also offering customers a seamless shopping experience. The system includes features for managing product categories, processing orders, and reviewing products, with an emphasis on improving efficiency and customer satisfaction

2) Introduction

2.1 - Background

With the rapid growth of online shopping, eCommerce platforms need efficient systems to manage product listings, orders, and customer interactions. An effective eCommerce system supports sellers and buyers by ensuring a smooth shopping experience and streamlined backend operations.

2.2 - Scope

The project covers:

- Product Management for sellers, including adding, and updating products
- User-friendly interface for customers to browse, add products to cart, and place orders
- Review system allowing customers to leave feedback on products

2.3 Limitations

- Limited to basic product and order management functionality (add, update, delete)
- No direct payment integration (future scope)
- No advanced user authentication or authorization (future scope)

3) Project Objectives

- Develop a well-structured eCommerce platform for product management, order processing, and customer interactions
- Provide an intuitive and user-friendly interface for customers to browse products, add items to their cart, and complete purchases
- Streamline product management for sellers to manage their product listings
- Enhance the customer experience by allowing easy order tracking and the ability to leave reviews on products

4) System Overview

The System has three primary user roles:

➔ Admin: Manages products, categories, and everything in the system.

➔ Seller: Manages new product, can add and update their products

➔ Customers: Can browse the products and engage (buy and review) with them

5) Modules and Functionalities

5.1 - Admin Features

- Can view/edit/add/delete products
- Can view/edit/add/delete categories
- Can view everything in the system
- Can do everything seller and customer can (listed below)

5.2 - Seller Features

- Can view products
- Can view categories
- Can add new products and update them

- Can add products to their own cart
- Can leave reviews for products

5.3 - Customer Features

- Can view products
- Can view categories
- Can add products to their own cart
- Can leave reviews for products

6) Technology Stack

- **Backend:** Spring Boot (Core Java)
- **Version Control:** GitHub
- **Database:** MySQL
- **ORM:** JPA (Java Persistence API)
- **Security:** Spring Security
- **Other Dependencies:** Lombok (for code simplification)

7) Implementation Details

The development process follows Agile methodology with iterative releases.

- Phase 1: Requirement gathering, and basic design
- Phase 2: Iterative development
- Phase 3: Review service and continue improvements

8) Security Measures

- User authentication: simple authentication to make sure they exist
- Invalid users: users need to have basic auth to do anything in system
- Password encoder: has one way hash to encode password and store it

9) Testing and Quality Assurance

Testing Done:

- User testing done using invalid inputs
- User testing done making sure valid inputs work

10) Challenges and Solutions

Some challenges faced:

- Tons of circular calls because of relations (mainly fixed using data transfer objects)
- Inconsistent saving of data in repositories, causing duplicate saves (fixed by going through each line and relation making sure it isn't saved more than necessary)

11) Future Scope and Enhancements

➔ Payment Gateway (valid gateway)
➔ Proper authorization security(JWT token)
➔ More controls based on authorization

12) Conclusion

The eCommerce System effectively achieves its goal of streamlining the management and browsing of various products available for purchase. The system is designed with a focus on enhancing user experience, allowing customers to easily browse, purchase, and track their orders. At the same time, it provides sellers with efficient tools to manage their product listings and orders. Future enhancements, including payment gateway integrations and advanced customer analytics, are planned to further improve the platform's functionality and user satisfaction.

13) Appendix

The basic structure (note: model has request DTO separate from other DTOs)