كلية الحاسبات والذكاء الإصطناعي
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جامعة حلوان
HELWAN UNIVERSITY

E-commerce Website Project Documentation

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INTRODUCTION

The e-commerce website project aims to provide a comprehensive online platform for users to browse, search, and purchase products, as well as for administrators to manage the platform efficiently. This documentation outlines the requirements, functionality, and architectural design of the e-commerce website.

USER REQUIREMENTS

- **User Registration** : Users can create accounts and register and log out securely.

- **User Authentication :** Implement a secure authentication mechanism to verify the identity of users during login and protect their account information.

- **Product Catalog Browsing and Searching :** Provide a user-friendly interface to browse and search for products, including categories, filters, and sorting options.

USER REQUIREMENTS

- **Product Details :** Display detailed information about each product, including images, descriptions, prices, availability, and customer reviews.

- **Shopping Cart :** Enable users to add products to a virtual shopping cart, view the cart contents, modify quantities, and proceed to checkout.

- **Checkout Process:** Implement a seamless and intuitive checkout flow, including multiple payment options, shipping address input, and order confirmation.

ADMIN REQUIREMENTS

- **Admin Dashboard :** Provide a centralized dashboard for administrators to manage the e-commerce platform, including product management, order processing, and user management.

- **Product Management :** Allow administrators to add, edit, and delete products from the catalog, including details such as title, description, pricing, inventory management, and images.

- **Order Management :** Enable administrators to view and process incoming orders, update order status, generate invoices, and handle returns or refunds.

ADMIN REQUIREMENTS

- **User Management :** Provide functionality for administrators to manage user accounts, including account verification, password resets, and user role assignments.

- **Inventory Management:** Allow administrators to track and manage product inventory, receive low stock notifications, and update availability information.

- **Promotions and Discounts:** Implement the ability for administrators to create and manage promotional campaigns, discount codes, and special offers.

ADMIN REQUIREMENTS

- **Content Management :** Allow administrators to manage static content pages, such as the homepage, about us, and FAQs, to keep the website information up to date.

ARCHITECTURE SCOPE

1. System Components:

- **Frontend:** User interface components (product listings, search, shopping cart, checkout).
- **Backend:** Server-side logic for handling requests, managing data, and integrating with external services.
- **Database:** Storage for product information, user data, orders, and other relevant entities.
- **External Services:** Integration with payment gateways, shipping providers, and possibly third-party APIs for features like reviews or social login.

ARCHITECTURE SCOPE

2. Functionality:

- User Registration and Authentication
- Product Browsing and Search
- Shopping Cart Management
- Checkout and Payment Processing
- Order Management and Tracking
- User Account Management
- Product Reviews and Ratings
- Wishlist/Favorites
- Recommendations/Personalization

ARCHITECTURE SCOPE

3. Scalability:

- **Horizontal Scaling** : Load balancing across multiple servers to handle increased traffic.
- **Vertical Scaling** : Upgrading server resources (CPU, RAM, storage) as needed.
- **Caching** : Implementing caching mechanisms to reduce database load and improve performance.

ARCHITECTURE SCOPE

4. Security:

- **Secure Socket Layer (SSL) encryption for data transmission.**
- **Hashing and salting user passwords.**
- **Protection against common web vulnerabilities (SQL injection, XSS, CSRF).**
- **Compliance with data protection regulations (GDPR, CCPA).**

ARCHITECTURE SCOPE

5. Performance:

- **Optimized frontend code for fast page rendering.**
- **Efficient database queries and indexing.**
- **Content Delivery Network (CDN) for serving static assets.**
- **Asynchronous processing for non-blocking operations (e.g., sending confirmation emails).**

ARCHITECTURE SCOPE

6. Integration:

- **Integration with payment gateways (Stripe, PayPal, etc.).**
- **Integration with shipping carriers (UPS, FedEx, etc.).**
- **Integration with inventory management systems.**
- **APIs for accessing product data or other services.**

ARCHITECTURE SCOPE

7. Monitoring and Maintenance:

- **Monitoring system health, performance metrics, and error logs.**
- **Regular backups of database and application code.**
- **Scheduled maintenance windows for updates and patches.**

ARCHITECTURE SCOPE

8. Data Management:

- **Relational database schema for storing product, user, order, and other data.**

- **Regular data backups and disaster recovery procedures.**

ARCHITECTURE SCOPE

9. User Experience:

- **Intuitive navigation and user-friendly interface.**
- **Accessibility features for users with disabilities.**
- **Performance optimization for fast page load times.**

FUNCTIONAL REQUIREMENTS

User Registration and Authentication

- **User Registration :** Users should be able to create an account by providing necessary information such as username, email address, and password.

- **User Authentication:** A secure authentication mechanism should be implemented to verify the identity of users during login, ensuring the protection of their account information.

FUNCTIONAL REQUIREMENTS

Product Search and Browsing

- **Product Search :** Users should have the ability to search for products based on keywords, categories, and filters.

- **Product Browsing :** A user-friendly interface should be provided to allow users to browse through the product catalog, including categories, filters, and sorting options.

FUNCTIONAL REQUIREMENTS

Shopping Cart Management

- **Adding Products :** Users should be able to add products to their virtual shopping cart.

- **Viewing Cart :** Users should have the option to view the contents of their shopping cart.

- **Modifying Cart :** Users should be able to modify the quantities of products in their cart and remove items if needed.

FUNCTIONAL REQUIREMENTS

Order Management

- **Placing Orders :** Users should be able to proceed to checkout and place orders for selected items in their shopping cart.

- **Viewing Order History :** Users should have access to their order history, allowing them to track the status of past orders.

FUNCTIONAL REQUIREMENTS

User Profile Management

- **Updating Profile Information :** Users should be able to update their profile information, such as shipping addresses and payment methods.

- **Managing Account Settings :** Users should have the option to manage their account settings, including password changes and email preferences.

FUNCTIONAL REQUIREMENTS

Email Notifications

- **Order Confirmation:** Users should receive automated email notifications upon successful order placement, confirming their purchase.

- **Shipment Tracking:** Users should receive email notifications with tracking information once their order has been shipped.

- **Account Activities:** Users should receive email notifications for account-related activities, such as password resets and account verifications.

FUNCTIONAL REQUIREMENTS

Guest Checkout

- **Guest Purchases:** Guests should have the option to make purchases without creating an account, streamlining the checkout process for users who prefer not to register.

FUNCTIONAL REQUIREMENTS

Admin Management Operations

- **User Management :** Administrators should be able to manage user accounts, including adding, deleting, and updating user information.

- **Product Management :** Administrators should have the ability to manage products in the catalog, including adding new products, editing existing ones, and removing outdated ones.

- **Order Management :** Administrators should be able to view and process incoming orders, update order statuses, generate invoices, and handle returns or refunds.

FUNCTIONAL REQUIREMENTS

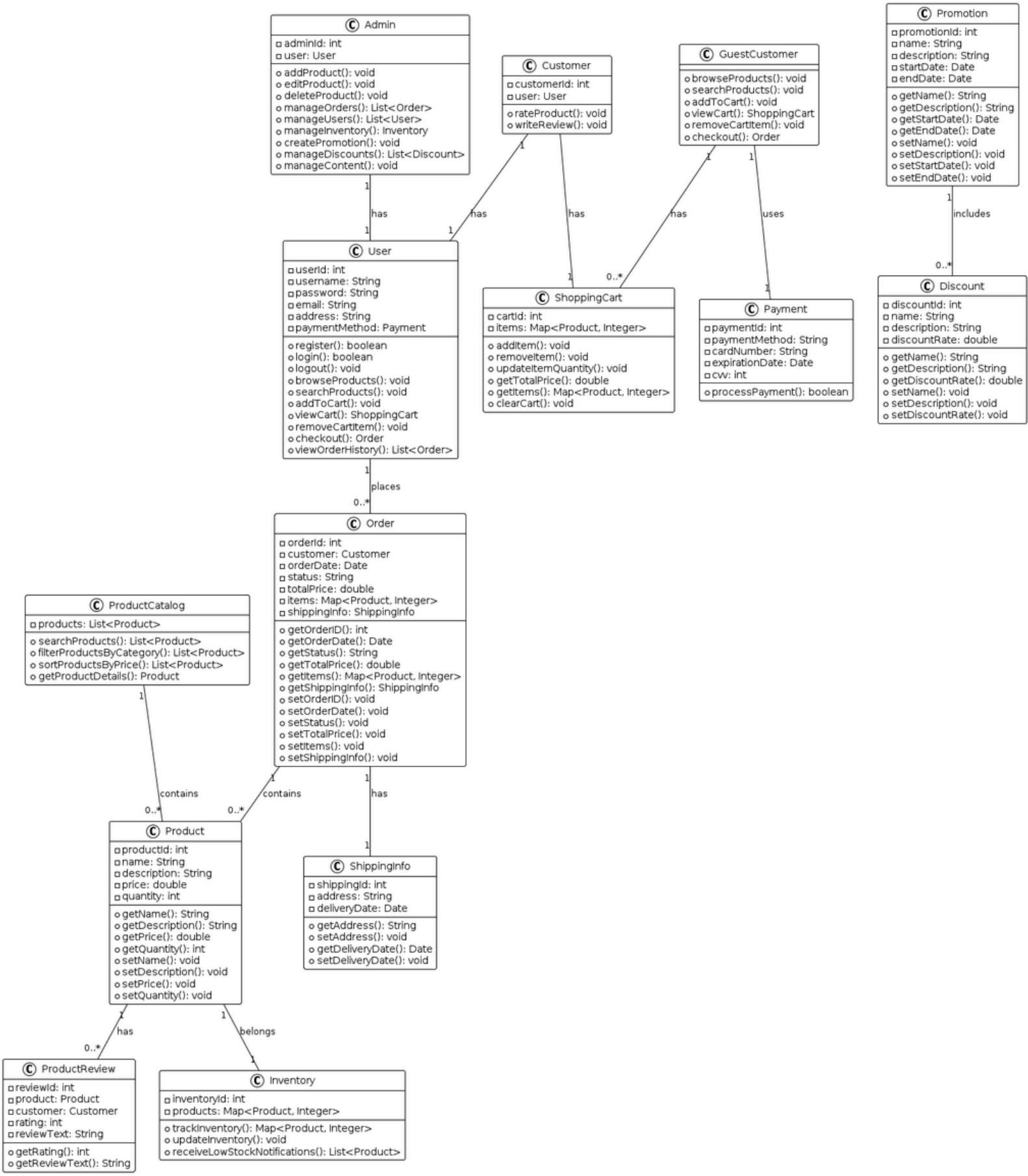
Admin Management Operations

- **Inventory Management :** Administrators should be able to track and manage product inventory, receive low stock notifications, and update availability information.

- **Promotions and Discounts :** Administrators should have the ability to create and manage promotional campaigns, discount codes, and special offers to attract customers.

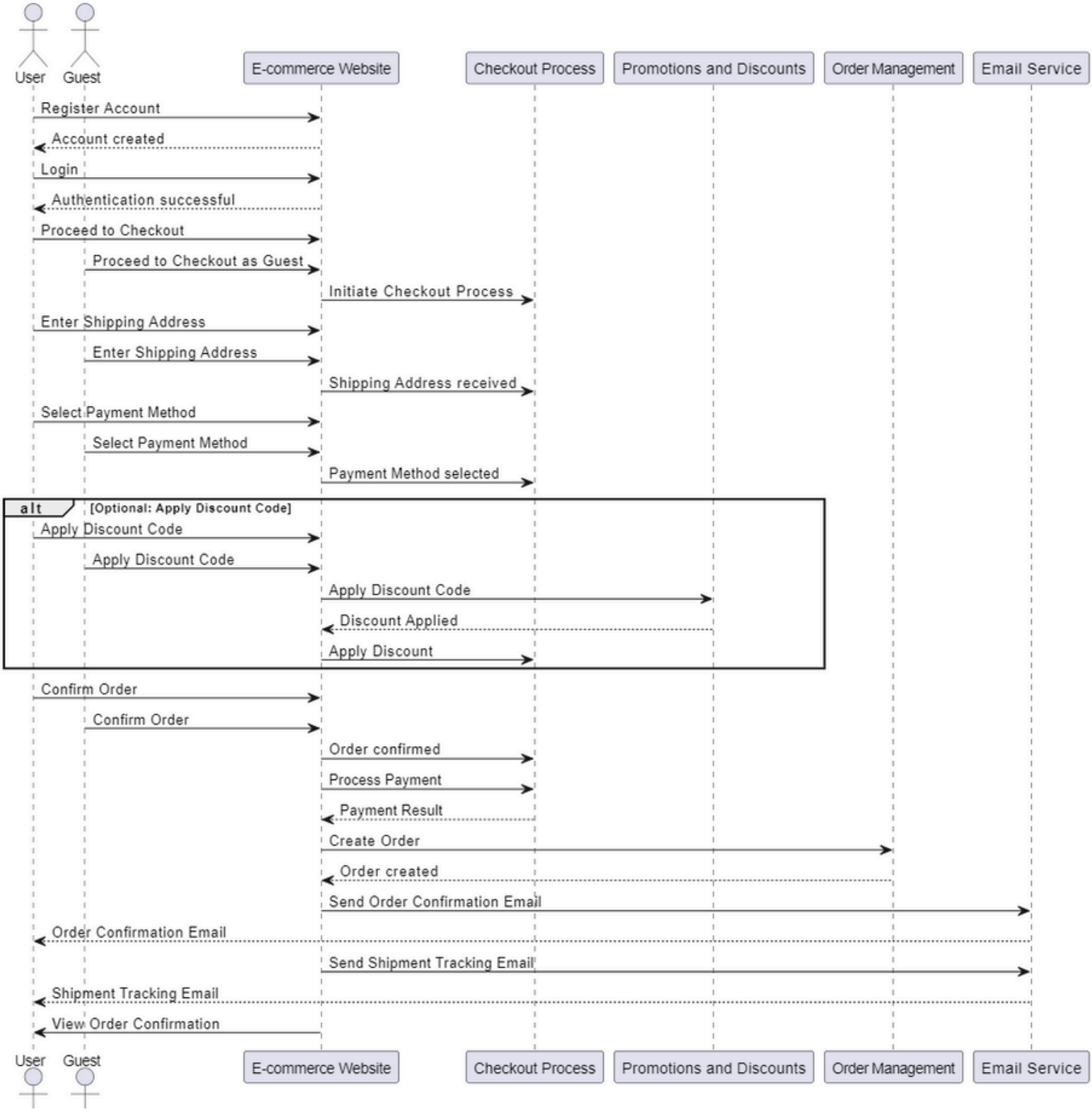
- **Content Management :** Administrators should be able to manage static content pages, such as the homepage, about us, and FAQs, to ensure that website information is up to date and relevant.

Class Diagram

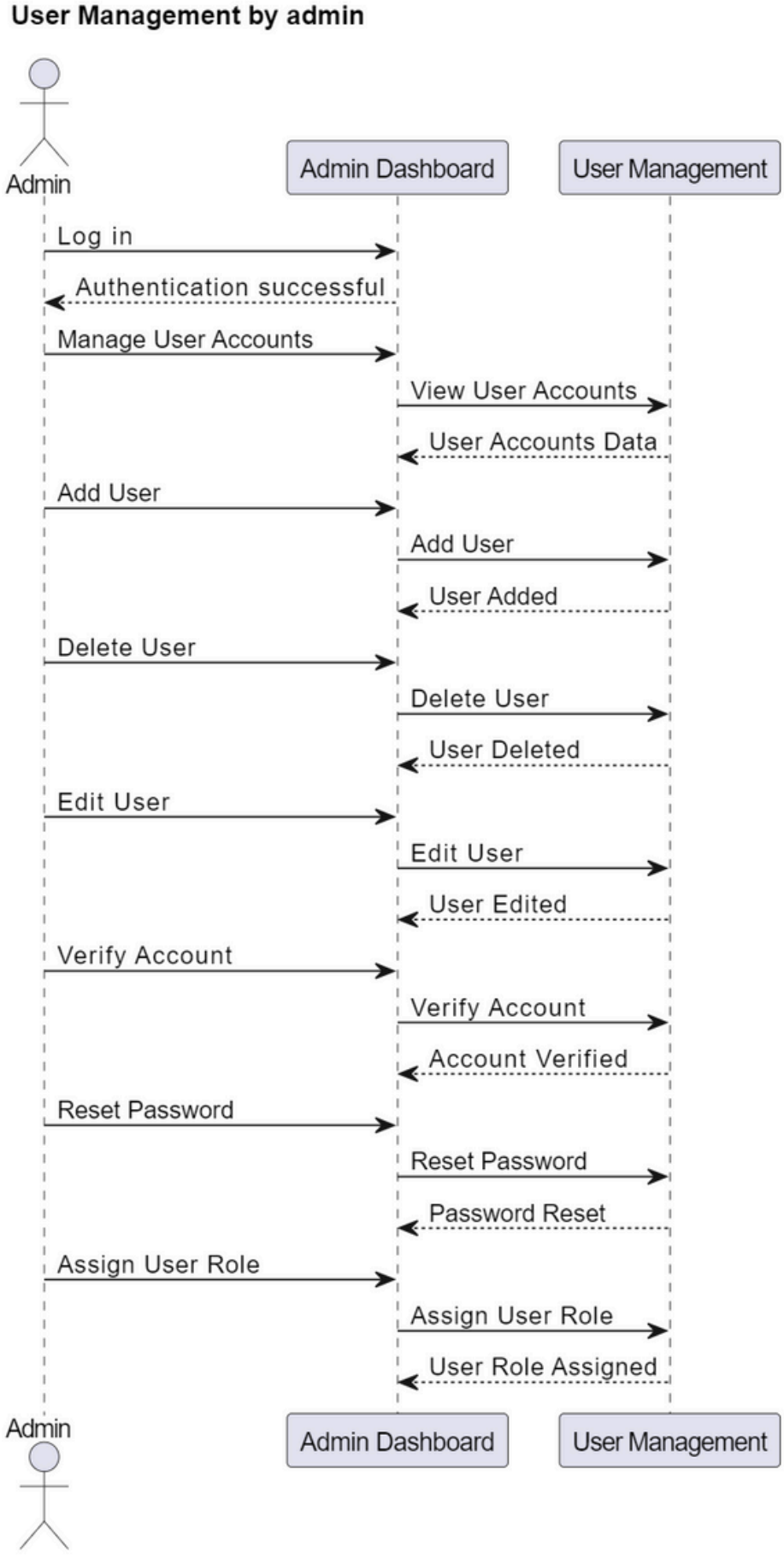


Sequence Diagrams

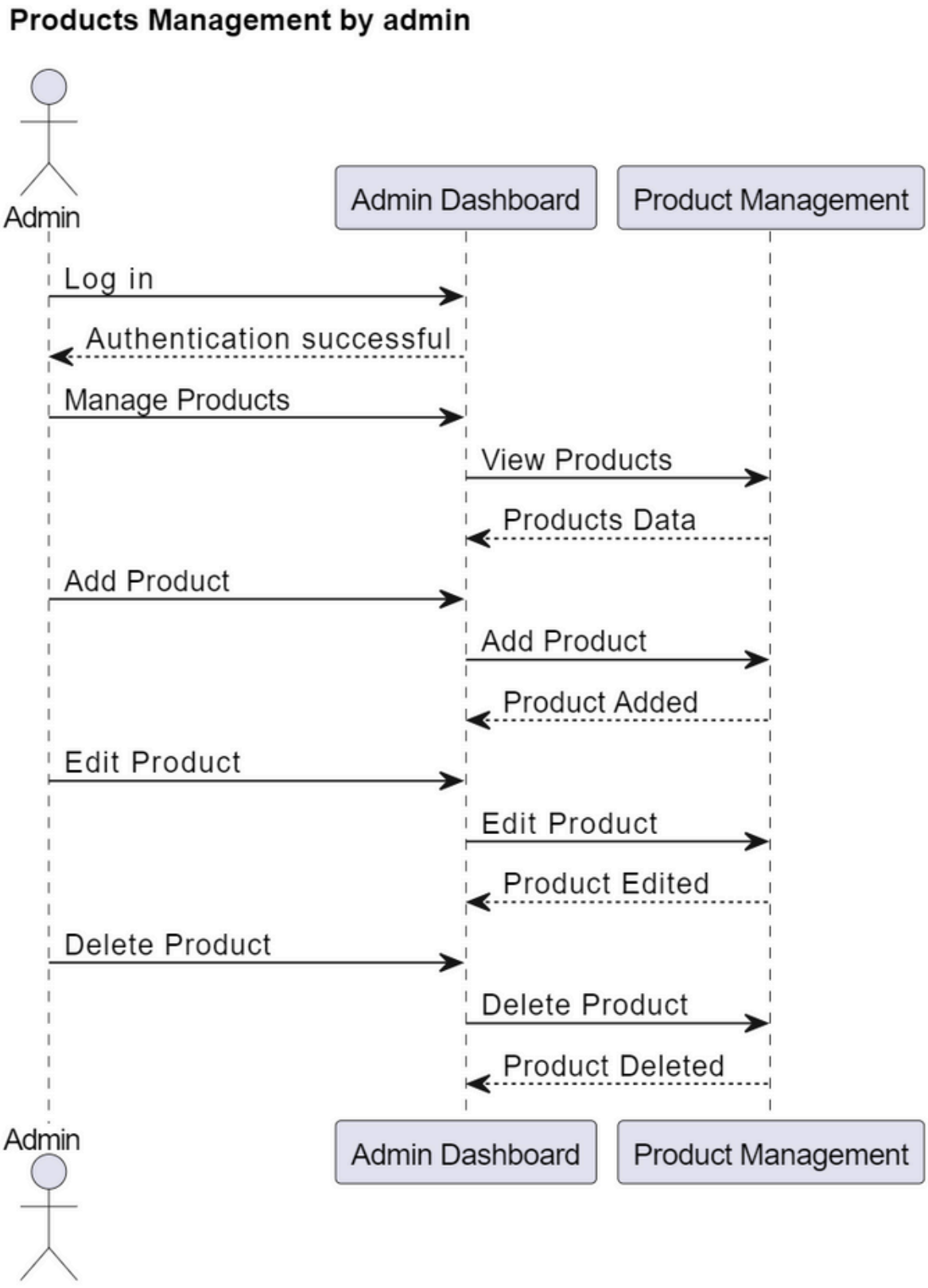
Check out and Place Order



Sequence Diagrams

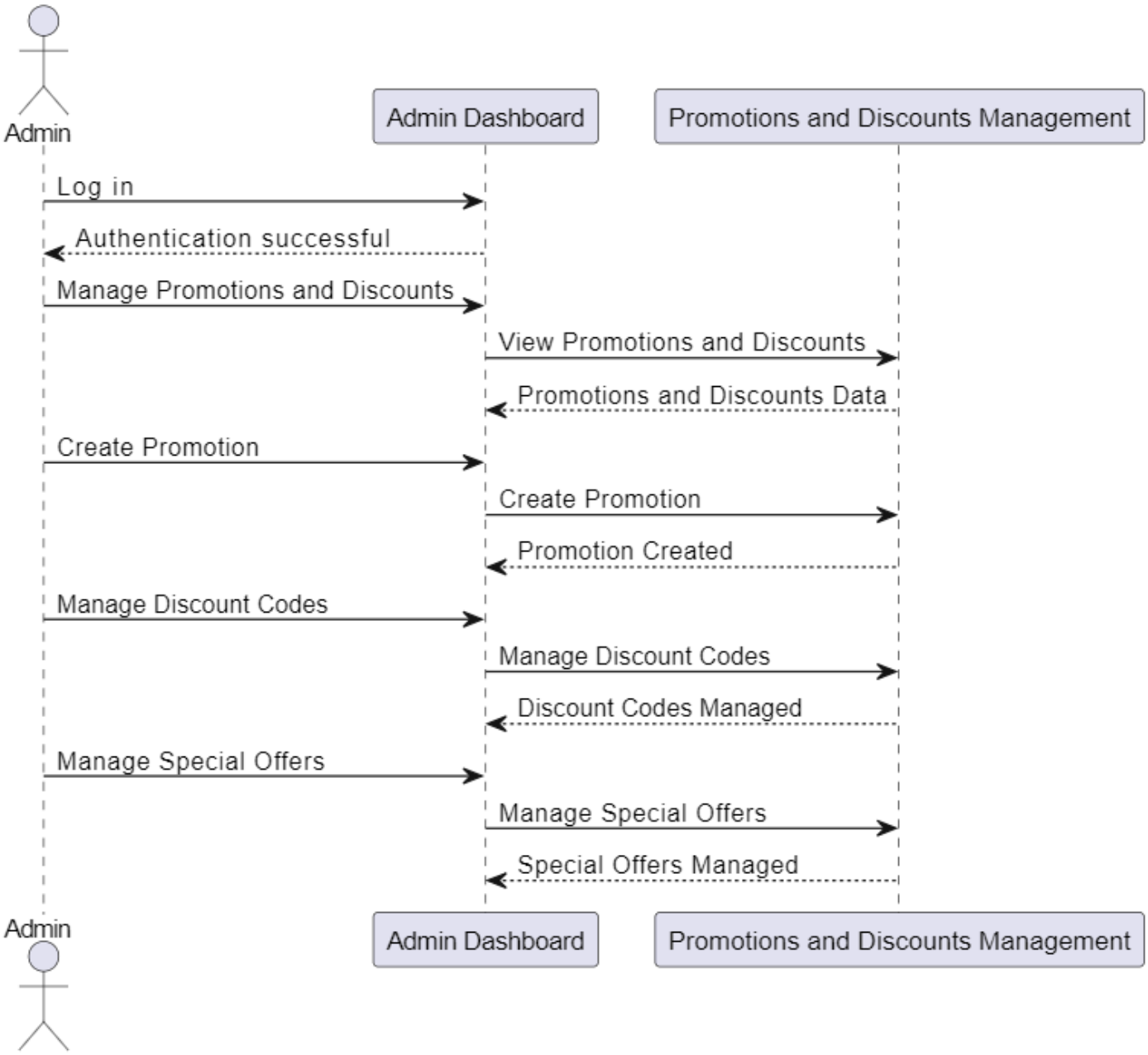


Sequence Diagrams



Sequence Diagrams

Promotions and Discounts Management by admin



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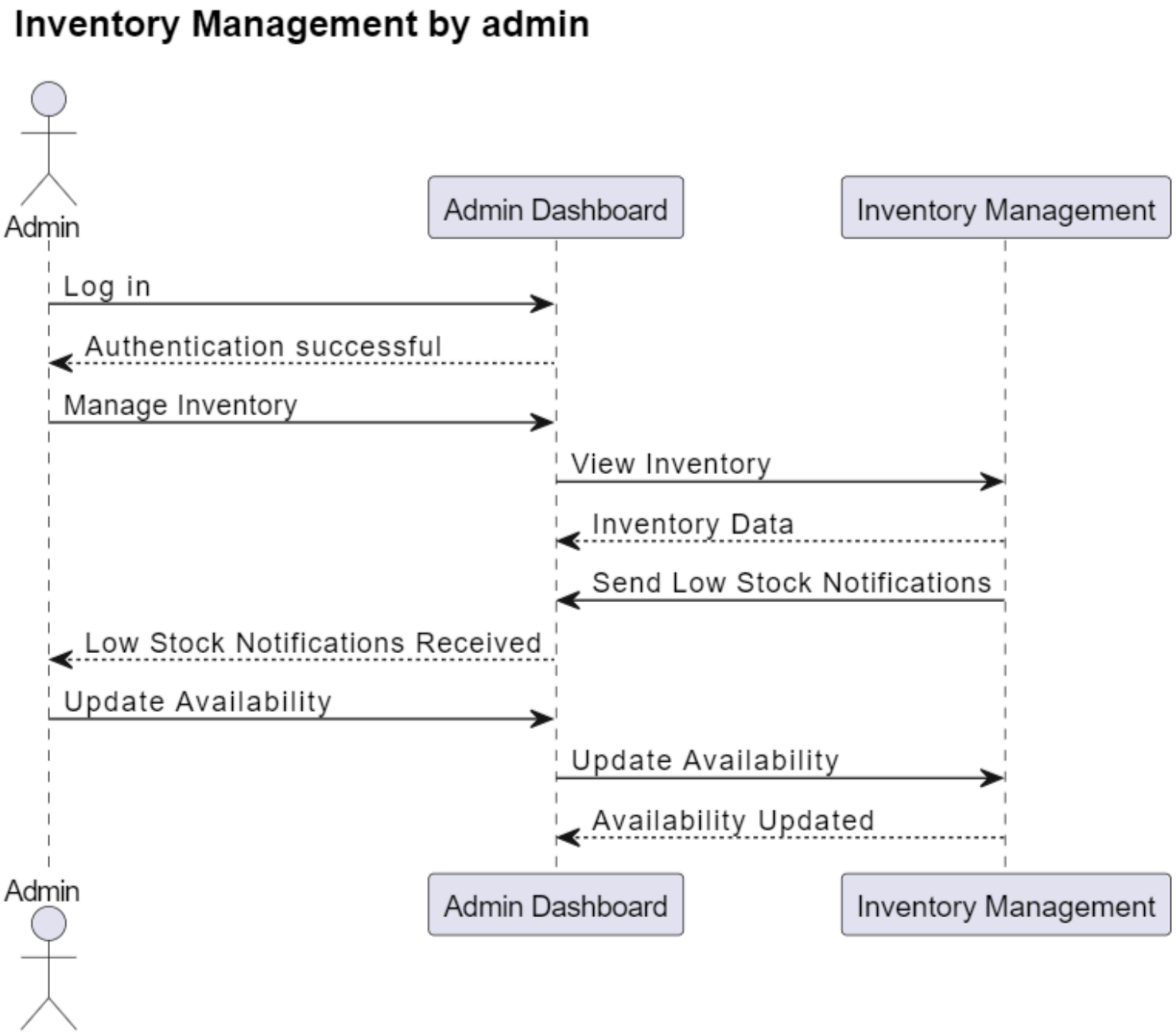

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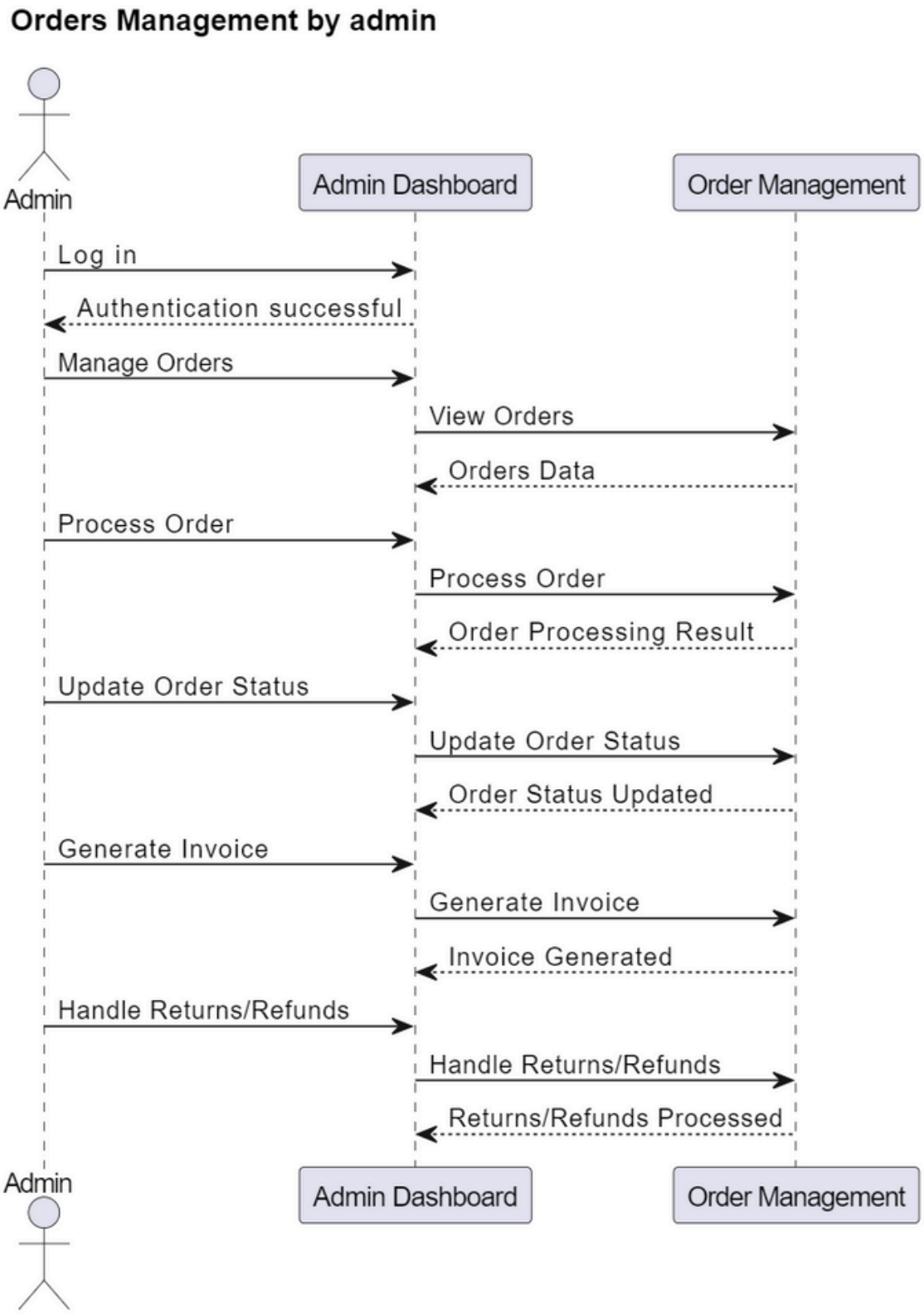
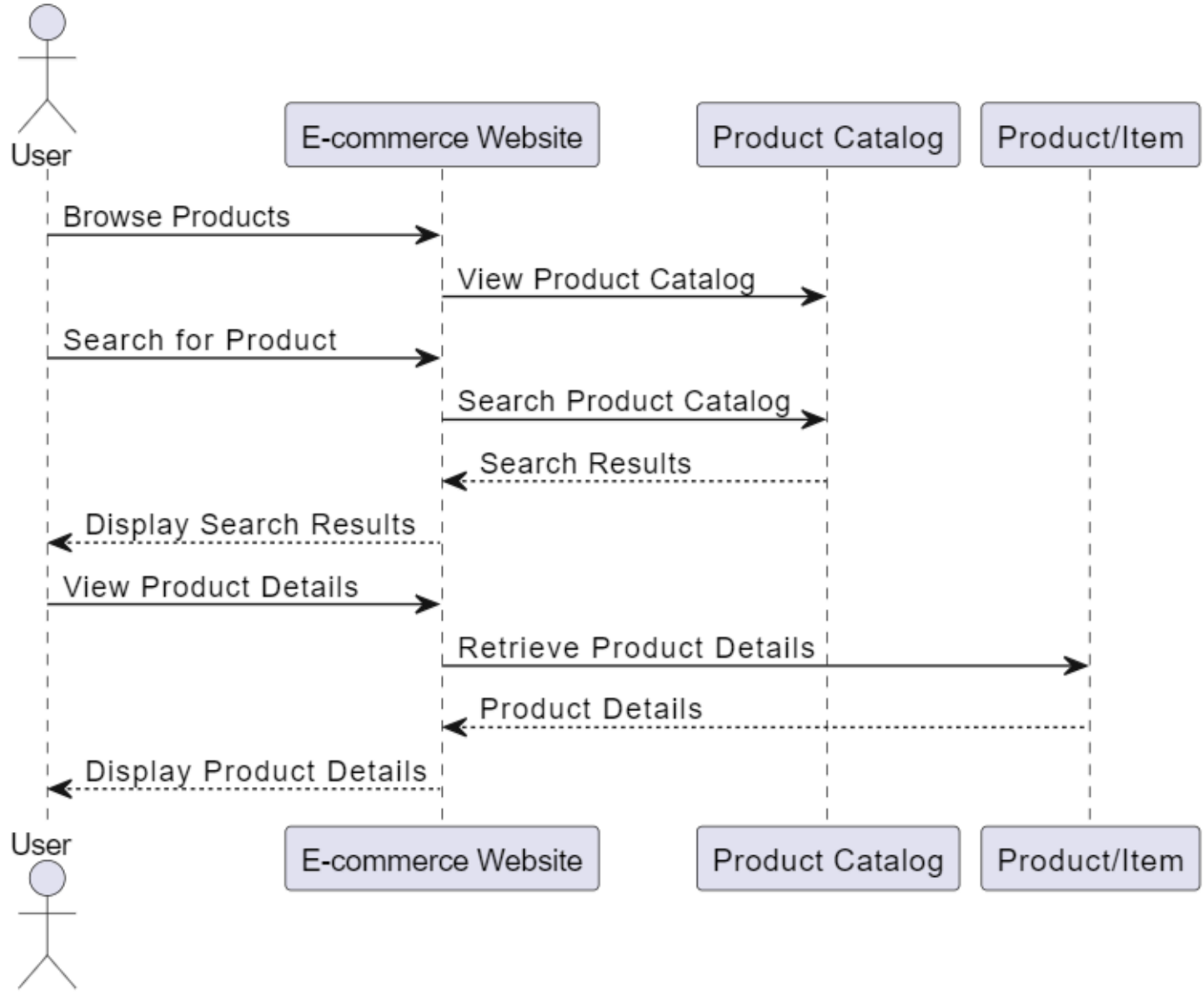


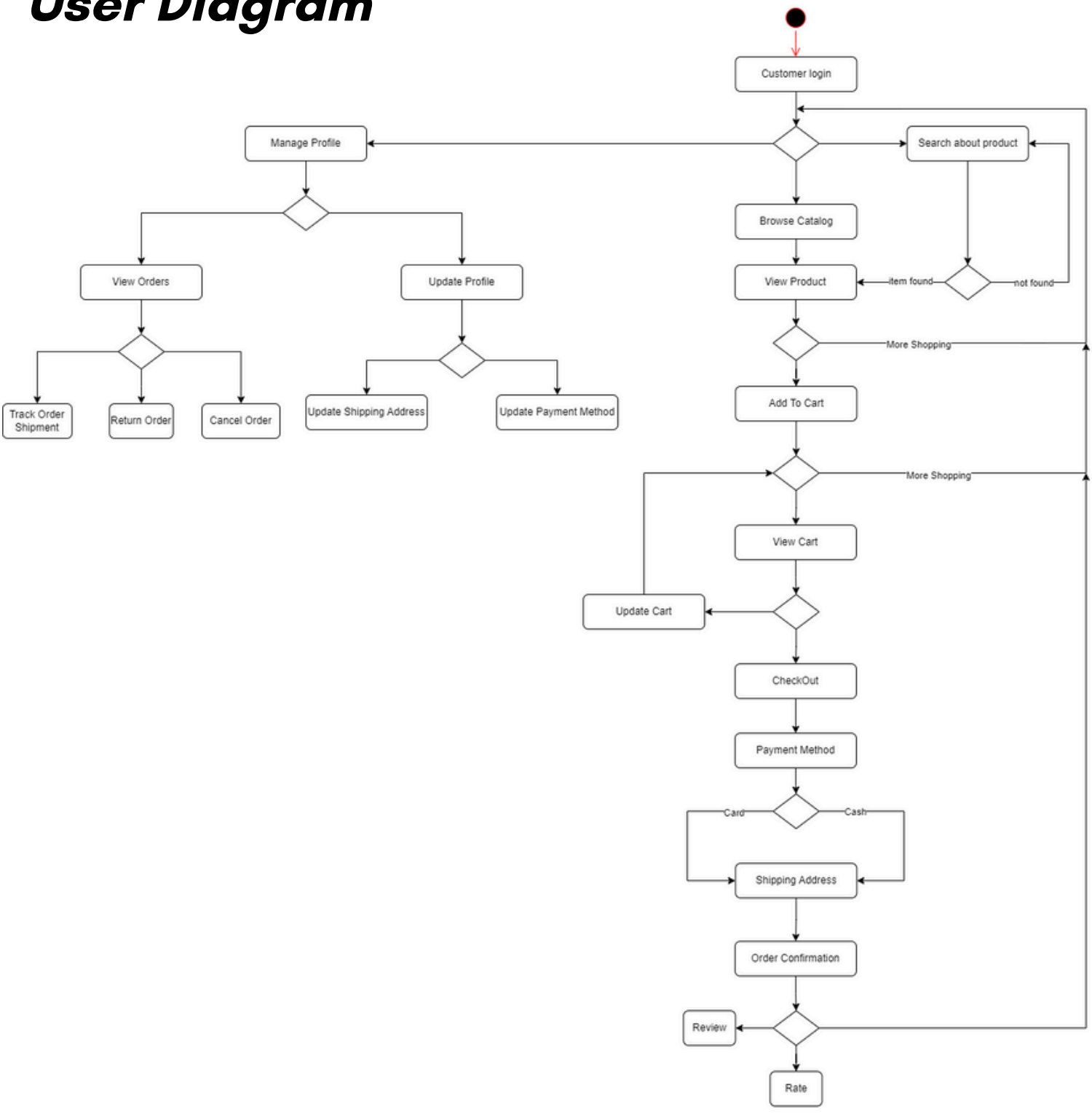
Sequence Diagrams

Browsing about item and catalog searching



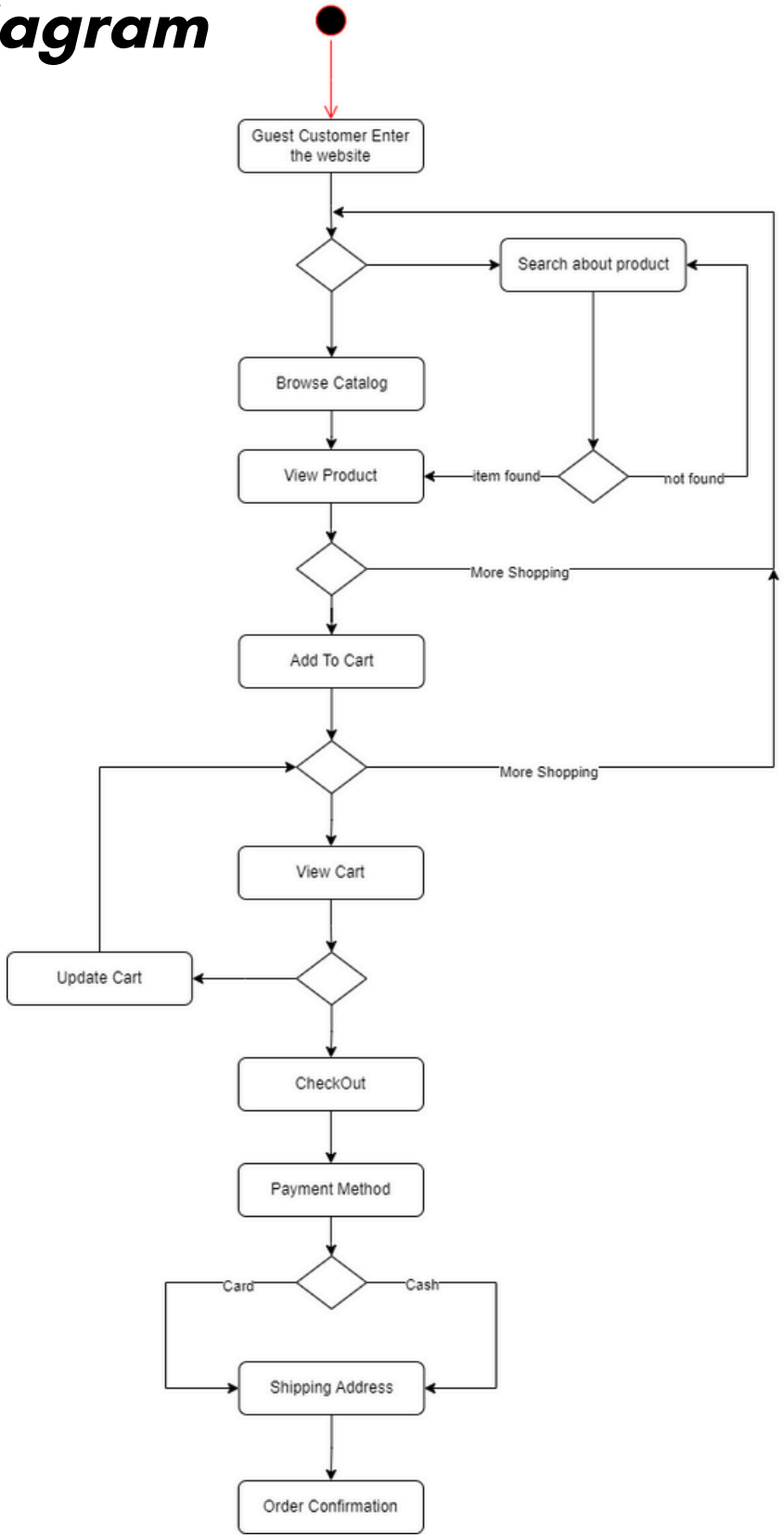
Activity Diagrams

User Diagram



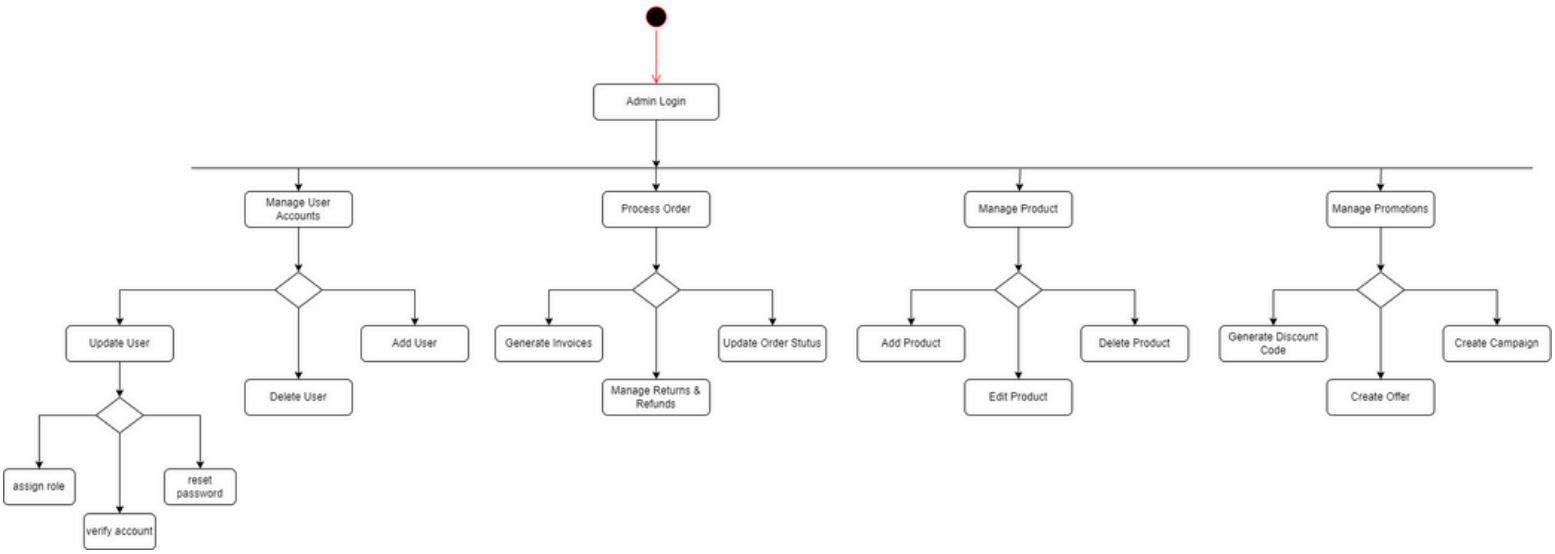
Activity Diagrams

Guest Diagram

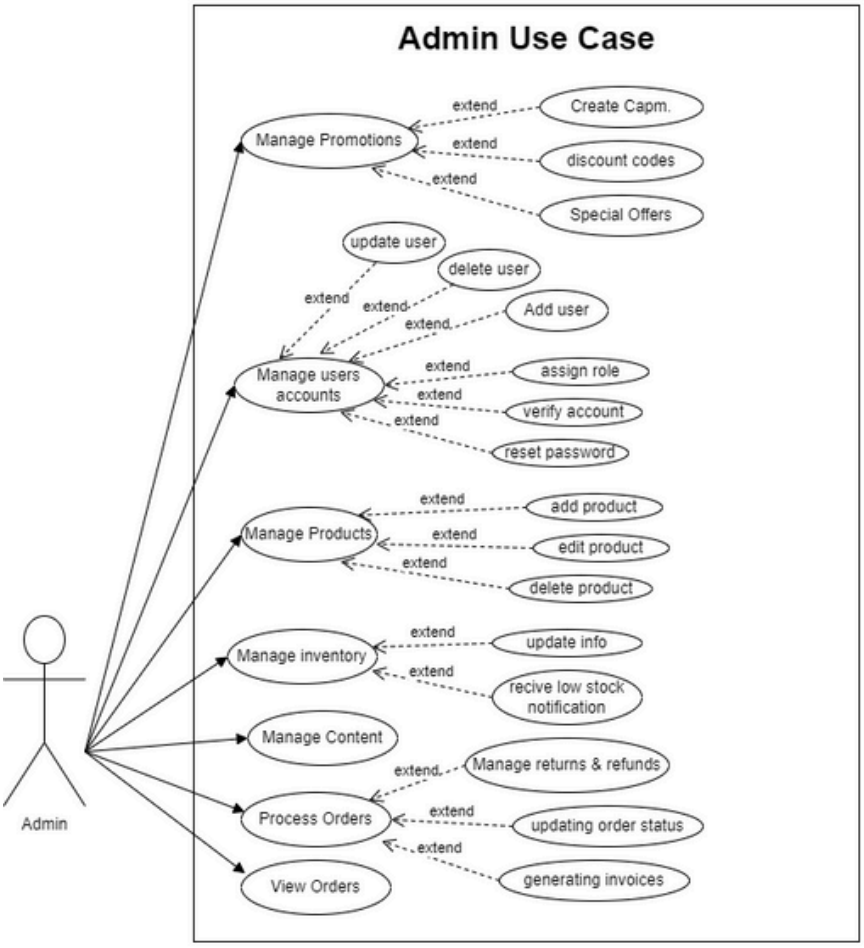


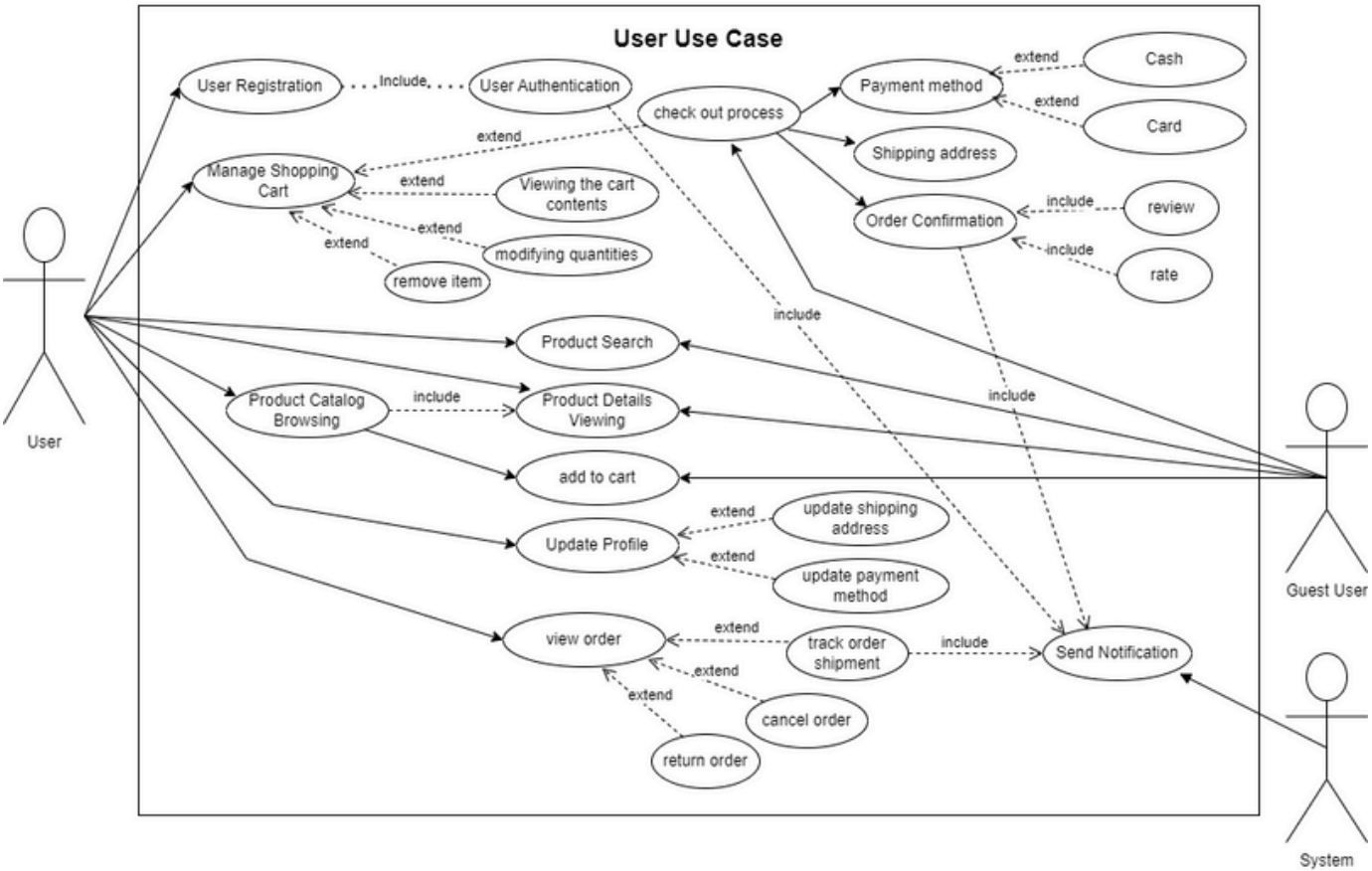
Activity Diagrams

Admin Diagram

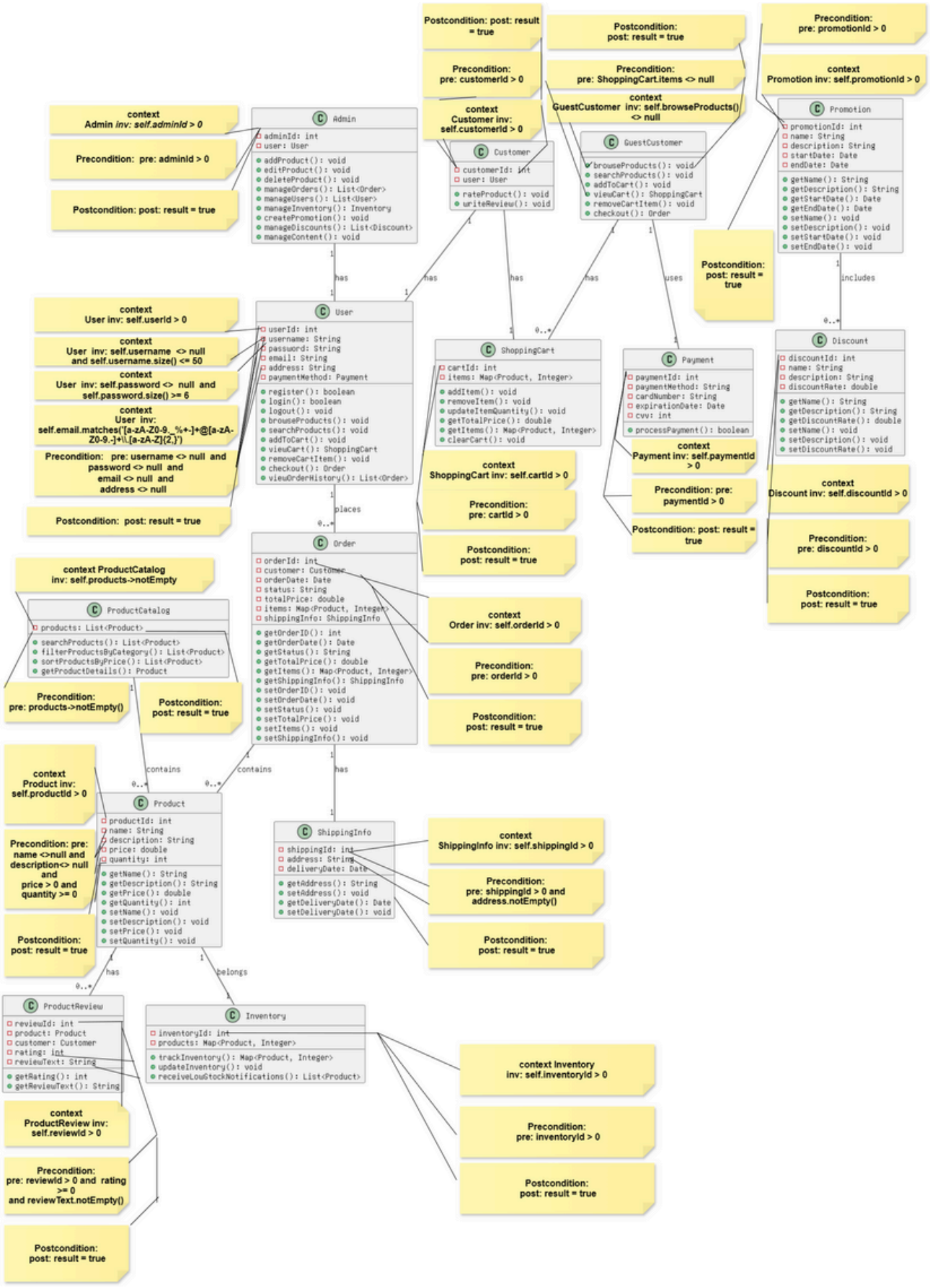


Use Case Diagram

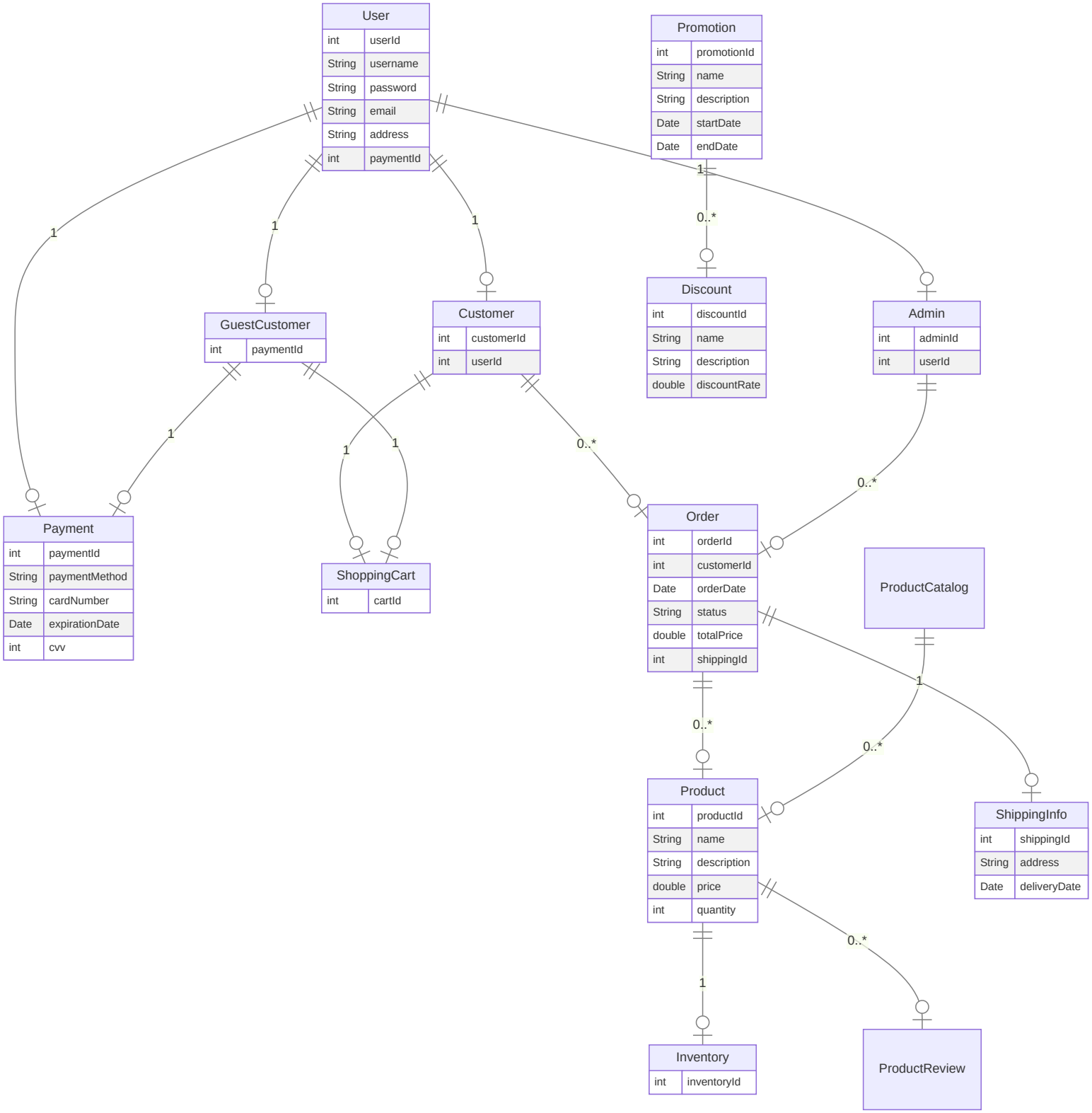




Object Constraint Language (OCL)



Entity Relation Diagram (ERD)



CONCLUSION

In conclusion, the e-commerce website project aims to fulfill the diverse requirements of users and administrators, providing a seamless online shopping experience while enabling efficient management of the platform. The comprehensive documentation presented here serves as a guide for understanding the project's scope, functionality, and architectural design.