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E-Commerce Part I

Project Scope

1. System Requirements and User Roles

***Key Users and Their Interactions:***

|  |  |
| --- | --- |
| **User Type** | **Main Interactions** |
| **Vendor** | Register/login, create/manage stores, add/edit/remove products, view orders |
| **Buyer** | Register/login, browse/search products, add to cart, checkout, leave reviews |
| **Admin** | (Optional) Oversee users, products, orders, and system health |

***Core Functional Requirements:***

* User registration and authentication (vendor/buyer)
* Store and product management (vendor)
* Product browsing, cart, and checkout (buyer)
* Order management and history
* Product reviews (verified/unverified)
* Password recovery via email
* Session-based cart management
* Secure payment and order confirmation
* Data validation and error handling.

2. User Interface (UI) Layout Planning:

***Navigation Structure:***

* **Top Navbar:** Home, All Products, Cart, Orders, Login/Register (or Logout), Vendor/Store options (if applicable)
* **Homepage:** Featured products, categories, search bar
* **Product Listing:** Grid of products, filter/sort options
* **Product Detail:** Product info, images, add to cart, reviews
* **Cart:** List of selected products, quantity update, remove, checkout
* **Vendor Dashboard:** Manage stores, manage products, view orders
* **Order History:** List of past orders, order details
* **Admin Panel:** (If implemented) User/product/order management

***UX Principles***

* Simple, consistent navigation
* Responsive design (usable on desktop/mobile)
* Clear feedback on actions (e.g., item added to cart, order confirmation)
* Accessible forms with validation and error messages.

3. Access Control and Data Security

***Access Control***

* **Authentication:** Only registered users can access buyer/vendor features
* **Authorization:** Vendors can only manage their own stores/products; buyers cannot access vendor/admin features
* **Admin Controls:** Only admins can access sensitive user/product/order management

***Data Security Measures***

* Password hashing and secure authentication
* CSRF protection on forms
* Input validation and sanitization
* HTTPS for data transmission (enforce SSL in production)
* Restrict access to sensitive data (e.g., user info, payment details)
* Compliance with privacy and payment standards (PCI-DSS for payments)
* Regular security updates and monitoring.

4. Failure and Recovery Planning

* **Form Validation Errors:** Display user-friendly error messages, preserve user input
* **Authentication Failures:** Inform users of incorrect credentials, lock accounts after repeated failures
* **Database/Server Errors:** Show generic error pages, log errors for admin review
* **Payment Failures:** Clearly inform users, allow retry, do not process order until payment confirmed
* **Session Expiry:** Prompt user to log in again, preserve cart if possible
* **Email Delivery Issues:** Retry sending, notify user if critical (e.g., password reset)
* **Unexpected Exceptions:** Log all exceptions, alert admin, ensure system stability.

5. Example Diagrams

***5.1 Use Case Diagram***

* **Actors:** Vendor, Buyer, Admin (optional)
* **Use Cases:** Register/Login, Manage Store, Manage Products, Browse Products, Add to Cart, Checkout, Leave Review, View Orders, Admin Management.

***5.2 Activity Diagram (Flow)***

* **Buyer Flow:** Login → Browse Products → View Product → Add to Cart → Checkout → Payment → Order Confirmation
* **Vendor Flow:** Login → Manage Store → Add/Edit Products → View Orders
* **Error Flows:** Login failure, payment failure, form validation errors.

***5.3 Class Diagram (Data Model)***

* **Entities:** User, Store, Product, Order, OrderItem, Review, Cart
* **Relationships:**
  + User (Vendor) 1..\* Store
  + Store 1..\* Product
  + User (Buyer) 1..\* Order
  + Order 1..\* OrderItem
  + Product 1..\* Review.

***5.4 ER Diagram (Database)***

* **Entities:** Customer, Product, Order, OrderItem, Payment, Store, Review
* **Relationships:** Customer places Order, Order contains OrderItems, OrderItem references Product, Payment linked to Order, Review linked to Product and Customer.

***5.5 Sequence Diagram***

* **Example:** Customer → Search Product → View Product → Add to Cart → Checkout → Payment → Order Confirmation.

***5.6 Data Flow Diagram***

* **Level 0:** User interacts with system, system interacts with database
* **Level 1:** Show flows for registration, product browsing, cart management, order processing, review submission.

6. Security and Access Control Plan

* Enforce strong password policies for users
* Limit access to admin/vendor features based on user roles
* Use secure session management and token-based authentication for sensitive operations
* Regularly audit and update dependencies and server software
* Backup data and have a disaster recovery plan
* Monitor logs for suspicious activity and set up alerts.

7. Planning Folder Structure

Planning/

├── requirements.md

├── ui-layout.md

├── access-and-security.md

├── failure-recovery.md

├── use-case-diagram.png

├── activity-diagram.png

├── class-diagram.png

├── er-diagram.png

├── sequence-diagram.png

├── data-flow-diagram.png

└── notes.txt