Capstone Project: Electronic Devices Online Shop

1. Requirements

Functional Requirements

1. User Registration and Authentication

- Users must be able to create an account by providing personal details such as name, email, password, and contact information.

- Users must be able to log in and log out securely.

- Password recovery and reset functionality must be available.

2. Product Catalog Management

- Administrators must be able to add, update, and delete product details such as name, description, price, specifications, and images.

- Users must be able to view a catalog of electronic devices.

3. Product Search and Filtering

- Users must be able to search for products using keywords.

- Users must be able to filter products by categories, price range, brand, and specifications.

4. Product Sorting

- Users must be able to sort products by various criteria such as price (low to high, high to low), popularity, and newest arrivals.

5. Product Details

- Users must be able to view detailed information about a product, including specifications, price, reviews, and images.

6. Shopping Cart

- Users must be able to add products to a shopping cart.

- Users must be able to view and manage the contents of their shopping cart (add/remove products, update quantities).

7. Checkout and Payment

- Users must be able to proceed to checkout, provide shipping information, and select a payment method.

- The system must integrate with payment gateways to process payments securely.

8. Order Management

- Users must be able to view their order history and order status.

- Administrators must be able to manage orders, update order status, and handle returns and refunds.

9. User Reviews and Ratings

- Users must be able to leave reviews and rate products.

- Reviews and ratings must be displayed on the product details page.

10. Notifications

- Users must receive email notifications for account creation, password reset, order confirmation, shipping updates, and promotions.

Non-Functional Requirements

1. Security

- The system must ensure secure handling of user data through encryption and secure communication protocols (HTTPS).

- Access controls must be implemented to restrict access to administrative functions.

2. Performance

- The system should be able to handle high traffic with minimal latency.

- Search and filter operations must return results within an acceptable time frame (e.g., under 2 seconds).

3. Scalability

- The system should be scalable to handle an increasing number of users and products without performance degradation.

4. Usability

- The user interface must be intuitive and easy to navigate.

- The design must be responsive to provide a good user experience on both desktop and mobile devices.

5. Availability

- The system should be available 99.9% of the time, with minimal downtime for maintenance.

6. Maintainability

- The system must be designed in a modular way to facilitate easy maintenance and updates.

2. Use Case Design

Use Case 1: User Registration

- Actors: User

- Preconditions: None

- Main Flow:

1. User navigates to the registration page.

2. User enters personal details (name, email, password, contact information).

3. User submits the registration form.

4. System validates the information and creates a new user account.

5. System sends a confirmation email to the user.

- Postconditions: User account is created, and the user is logged in.

Use Case 2: Product Search

- Actors: User

- Preconditions: User is on the homepage or catalog page.

- Main Flow:

1. User enters a keyword in the search bar.

2. User submits the search query.

3. System retrieves products matching the search criteria.

4. System displays the search results to the user.

- Postconditions: Search results are displayed.

Use Case 3: Add Product to Shopping Cart

- Actors: User

- Preconditions: User is viewing a product details page.

- Main Flow:

1. User clicks the "Add to Cart" button.

2. System adds the product to the user's shopping cart.

3. System updates the shopping cart icon with the number of items.

- Postconditions: Product is added to the shopping cart.

3. Objects, Classes, and Relationships

Identified Objects and Classes

1. User

- Attributes: userID, name, email, password, contactInfo

- Methods: register(), login(), logout(), resetPassword()

2. Product

- Attributes: productID, name, description, price, specifications, images, category, brand

- Methods: addProduct(), updateProduct(), deleteProduct(), viewProductDetails()

3. ShoppingCart

- Attributes: cartID, userID, products (list of Product), totalPrice

- Methods: addProduct(), removeProduct(), updateQuantity(), viewCart()

4. Order

- Attributes: orderID, userID, products (list of Product), totalAmount, orderStatus, shippingInfo

- Methods: placeOrder(), cancelOrder(), viewOrderStatus()

5. Review

- Attributes: reviewID, userID, productID, rating, comment, date

- Methods: addReview(), deleteReview(), viewReviews()

Relationships

- A User can have multiple Orders.

- A User can have multiple Reviews.

- A User can have one ShoppingCart.

- A Product can have multiple Reviews.

- An Order contains multiple Products.

- A ShoppingCart contains multiple Products.

4. Class Diagram

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| User |

+----------------+

| userID |

| name |

| email |

| password |

| contactInfo |

+----------------+

| register() |

| login() |

| logout() |

| resetPassword()|

+----------------+

+-------------+

| ShoppingCart |

| 1 | cartID |

| | userID |

| | products |

| | totalPrice |

| +----------------+

| | addProduct() |

| | removeProduct() |

| | updateQuantity()|

| | viewCart() |

| +----------------+

+-------------+

+------|---------| Order |

| | orderID |

| | userID |

| | products |

| | totalAmount |

| | orderStatus |

| | shippingInfo |

| +----------------+

| | placeOrder() |

| | cancelOrder() |

| | viewOrderStatus()|

| +----------------+

+-------------+

+------|---------| Product |

| | productID |

| | name |

| | description |

| | price |

| | specifications|

| | images |

| | category |

| | brand |

| +--------------+

| | addProduct() |

| | updateProduct()|

| | deleteProduct()|

| | viewProductDetails()|

| +--------------+

+-------------+

+------|---------| Review |

| | reviewID |

| | userID |

| | productID |

| | rating |

| | comment |

| | date |

| +-------------+

| | addReview() |

| | deleteReview()|

| | viewReviews()|

| +-------------+

5. CRC Cards

User

- Responsibilities:

- Register

- Login

- Logout

- Reset Password

- Collaborators:

- ShoppingCart

- Order

- Review

Product

- Responsibilities:

- Add Product

- Update Product

- Delete Product

- View Product Details

- Collaborators:

- Review

- ShoppingCart

- Order

ShoppingCart

- Responsibilities:

- Add Product

- Remove Product

- Update Quantity

- View Cart

- Collaborators:

- User

- Product

Order

- Responsibilities:

- Place Order

- Cancel Order

- View Order Status

- Collaborators:

- User

- Product

Review

- Responsibilities:

- Add Review

- Delete Review

- View Reviews

- Collaborators:

- User

- Product