E-COMMERCE PROJECT

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Project Description

An **E-commerce application** built with **JavaFX** provides a desktop-based GUI for users to browse products, add items to the cart, and complete transactions. The backend, developed in Java, handles business logic, data storage, and processing.

Core Features

- GitHub Repository link: https://github.com/Knighler/OOPproject.git
- YouTube Video: https://youtu.be/vJtGlRv9Wq8

Core Features

Frontend (JavaFX)

- **Homepage**
  - A welcoming page displaying featured products and categories.
  - Implemented using JavaFX layouts like VBox, GridPane, and ScrollPane.
- **Product Details Page**
  - A detailed view of a product with an image, description, price, and "Buy Now" option.
  - Includes components like ImageView, Label, and Button.
- **Shopping Cart**
  - A separate page to view added items, total price, and checkout button.
  - Uses TableView for item details.
- **User Account Section**
  - Allows users to view their profile, order history, and update details.

Backend (Java)

- **Data Management**
    - A Product class to store product information (ID, name, price, description, stock).
    - A User class to manage user details.
    - A Cart class to manage items added by the user.

- **Business Logic**
    - Implemented using Java classes to handle operations like adding to the cart, checking stock, and calculating the total price.
- **Payment Processing**
    - Simulate payment processing logic.

Technology Stack

Frontend

- **JavaFX**: For building a responsive and modern user interface.
- **FXML**: This is used to define UI layout in XML format.
- **CSS**: For styling the JavaFX components.

Backend

- **Java**: For application logic and data processing.

Workflow

User Workflow

- The user registers/logs in.
- Browse the product catalog and view product details.
- Adds items to the cart and proceeds to checkout.

- Confirms the order and receives a summary.

Admin Workflow

- Admin adds, updates, or deletes products.
- Views Database

Problem Description

Challenges Faced in E-commerce Applications:

1. **User Navigation**
   - Users need an easy way to browse products and navigate between sections like the product catalog and cart.
2. **Data Management**
   - Efficiently storing, retrieving, and updating product and user data.
3. **Dynamic UI Updates**
   - The interface must reflect real-time changes, such as adding items to the cart.
4. **Order Processing**
   - Ensuring accurate calculations of prices and availability.

Detailed Solution

User Features

1. **Homepage**
   - Displays featured products with options to navigate to categories or a search bar for quick access.
2. **Product Details**
   - Displays detailed information about a selected product (image, description, price).
   - Adds an "Add to Cart" button with a click event to update the cart.

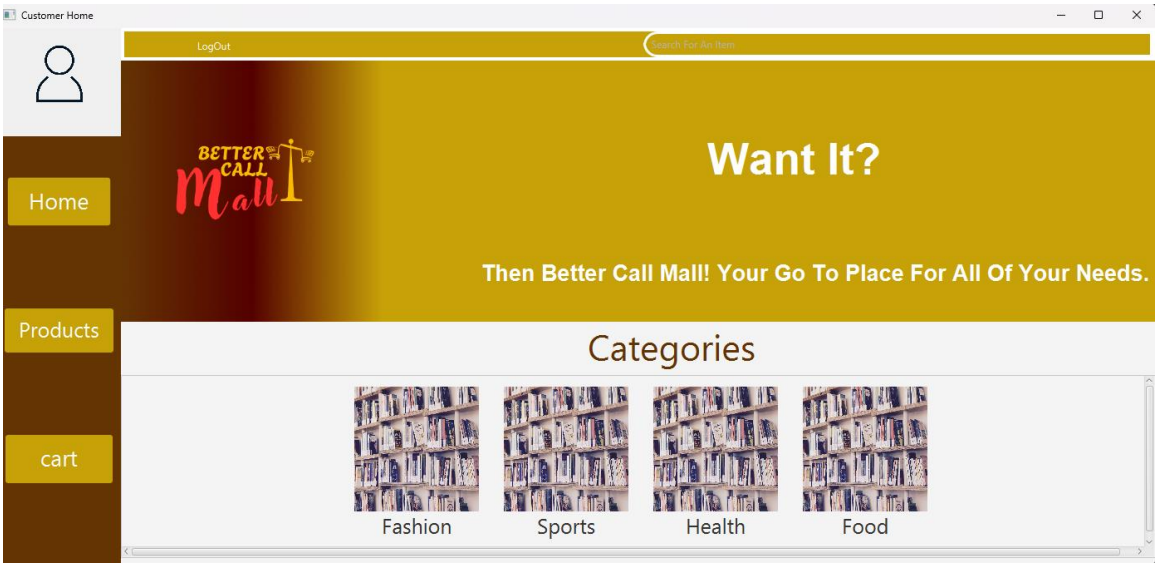
3. **Shopping Cart**
    - Shows a list of added items, their quantities, and the total price.
    - Implements a TableView to display cart details.
4. **Order Confirmation**
    - Simulates a payment process and generates an order summary.

Limitations

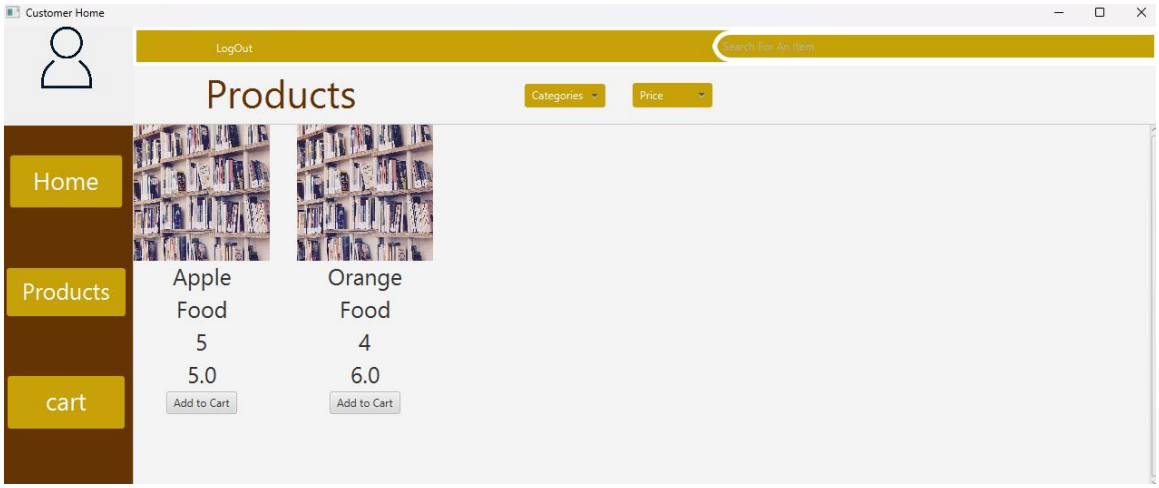
1. **Scalability**
    - The desktop application may struggle with very large datasets compared to web-based solutions.
2. **Payment Simulation**
    - Lacks real integration with payment gateways (e.g., PayPal).
3. **Multi-User Support**
    - Not optimized for concurrent access, as it is a desktop application.
4. **Platform Dependency**
    - Requires JavaFX runtime, which may not be pre-installed on all machines.

Sample Output

Customer Home Page Design



Product Page Design



Admin Database

Additional Information

Future Enhancements

- Adding a web-based version for broader access.
- Implementing machine learning algorithms for product recommendations.
- Real-time updates using WebSockets for live inventory tracking.

Future Testing Tools

- Use JUnit for unit testing backend logic.
- Perform GUI testing with TestFX.