

# E-Commerce Grocery Shopping Platform with Personalized AI-Driven Product Suggestions

## Actors:

- **Customers:** Users who browse, purchase, and manage their grocery orders.
- **System Administrators:** Manage user accounts, product listings, and oversee system performance.
- **AI Recommendation Engine:** Analyzes customer behavior and preferences to suggest products.
- **Delivery Personnel:** Responsible for fulfilling and delivering customer orders.

## Preconditions:

- Users must register and create accounts to access personalized features and make purchases.
- The platform should have access to a reliable database of grocery products and inventory levels.
- The AI recommendation engine must be trained with historical purchase data and user interactions.

## Postconditions:

- Customers receive personalized product suggestions based on their preferences and purchase history.
- The system processes orders efficiently and updates inventory levels in real time.
- Administrators can generate reports on sales, inventory, and user behavior for strategic planning.

## Functional Requirements

### 1. User Authentication

- **Description:** Users can create accounts and log in to access personalized features.
- **Details:**
  - Users must provide an email and password to register.
  - The system must validate user credentials and manage sessions securely.
  - User profiles should store preferences, purchase history, and payment methods.

### 2. Product Catalog Management

- **Description:** The system provides a comprehensive catalog of grocery products.
- **Details:**
  - Products should be categorized (e.g., fruits, vegetables, dairy, etc.) for easy navigation.
  - Each product listing should include images, descriptions, prices, and stock availability.
  - Administrators can add, update, or remove products from the catalog.

### 3. Personalized Product Recommendations

- **Description:** The AI engine suggests products based on customer preferences and behavior.
- **Details:**
  - The system analyzes purchase history, browsing behavior, and customer ratings to generate suggestions.
  - Recommendations should be displayed on the homepage and product pages.
  - Users can provide feedback on recommendations to improve accuracy.

### 4. Shopping Cart Management

- **Description:** Users can add products to their shopping cart for purchase.
- **Details:**
  - Users can view, edit, or remove items in their cart before checkout.
  - The system should display total cost, including taxes and discounts.
  - Users can save items for later or create multiple carts for different shopping lists.

### 5. Checkout and Payment Processing

- **Description:** The system facilitates secure checkout and payment processing.
- **Details:**
  - Users can select delivery options and enter shipping addresses.
  - The platform should support multiple payment methods (e.g., credit cards, PayPal, etc.).
  - The system should generate order confirmation and receipt upon successful payment.

### 6. Order Tracking and History

- **Description:** Users can track the status of their orders and view order history.
- **Details:**
  - Users can receive notifications regarding order status (e.g., processing, out for delivery).
  - The system should maintain a history of past orders for easy reordering.
  - Users can provide feedback or ratings for each completed order.

### 7. Inventory Management

- **Description:** The system manages product stock levels and alerts administrators for low inventory.
- **Details:**
  - The platform should automatically update inventory levels after each purchase.
  - Administrators should receive notifications for products that need restocking.
  - Users should see real-time stock availability on product pages.

### 8. Promotions and Discounts

- **Description:** The system can offer promotions and discounts on selected products.

- **Details:**
  - Administrators can create and manage promotional campaigns (e.g., percentage off, buy one get one).
  - The system should automatically apply discounts during checkout.
  - Users should be notified of ongoing promotions on the homepage and product pages.

## 9. User Feedback and Support

- **Description:** Users can provide feedback and contact support for assistance.
- **Details:**
  - Users can submit inquiries or issues through a contact form.
  - The system should maintain a feedback database for tracking user concerns.
  - Administrators can respond to user inquiries via email or an integrated messaging system.

## 10. Analytics and Reporting

- **Description:** Administrators can access reports and analytics for business insights.
- **Details:**
  - The system should generate reports on sales performance, customer behavior, and inventory turnover.
  - Administrators can filter reports by date range, product category, or user demographics.
  - Insights should inform inventory management, marketing strategies, and customer engagement efforts.

# Delivery Checkpoints

**Total Duration:** 60 hours

**Delivery Checkpoints:** Every 10 hours

### 1. Checkpoint 1 (Hours 0-10):

- Implement user authentication and registration functionalities.
- Test account creation and login features.

### 2. Checkpoint 2 (Hours 10-20):

- Develop the product catalog management system.
- Test product listing, categorization, and search functionality.

### **3. Checkpoint 3 (Hours 20-30):**

- Implement personalized product recommendation engine.
- Test recommendations based on user behavior and feedback.

### **4. Checkpoint 4 (Hours 30-40):**

- Develop shopping cart management features.
- Test adding, editing, and removing items from the cart.

### **5. Checkpoint 5 (Hours 40-50):**

- Implement checkout and payment processing functionalities.
- Test payment methods and order confirmation processes.

### **6. Checkpoint 6 (Hours 50-60):**

- Finalize order tracking, inventory management, and reporting features.
- Conduct final testing, bug fixing, and prepare for deployment.