项目文档

# Functional Requirement

1.1 Customer Registration Function   
 Function ID: FR-01   
 Description: A new customer can register an account by providing their personal information. The system must verify the email and ensure the username is unique.   
 Input: Name, Email, Password, Address, PhoneNumber   
 Output: A new account with status "Active" is created, and a confirmation email is sent to the customer.   
  
1.2 Customer Login Function   
 Function ID: FR-02   
 Description: A registered customer can log in using their username and password. The system must verify the credentials and update the login status in the account.   
 Input: Username, Password   
 Output: Account status updated to "Logged In" if credentials are correct; otherwise, an authentication error is returned.   
  
1.3 Customer Logout Function   
 Function ID: FR-03   
 Description: A logged-in customer can log out, and the system must update the login status of the account accordingly.   
 Input: Customer session token   
 Output: Account status updated to "Logged Out".   
  
1.4 Product Viewing Function   
 Function ID: FR-04   
 Description: A customer can view product details, including name, description, price, and category.   
 Input: ProductID or search criteria (e.g., name, category)   
 Output: Display of product information to the customer.   
  
1.5 ShoppingCart Creation and Modification Function   
 Function ID: FR-05   
 Description: A customer can create or modify their shopping cart by adding or removing products. The system must calculate and update the total cost.   
 Input: CartID, ProductID, Quantity, Action (Add or Remove)   
 Output: Updated shopping cart with modified items and recalculated total cost.   
  
1.6 CartItem Management Function   
 Function ID: FR-06   
 Description: The system allows the customer to manage individual items in their shopping cart, such as updating the quantity or removing an item.   
 Input: CartItemID, Quantity (optional), Action (Update or Remove)   
 Output: Updated CartItem or removal of the CartItem from the shopping cart.   
  
1.7 Order Placement Function   
 Function ID: FR-07   
 Description: A logged-in customer can place an order by confirming the items in their shopping cart and providing payment details. The system must create a new order and transfer the cart items to order items.   
 Input: CartID, PaymentMethod, PaymentAmount   
 Output: A new Order with associated OrderItems and a new Payment record.   
  
1.8 OrderItem Management Function   
 Function ID: FR-08   
 Description: The system allows the administrator to manage individual items in an order, such as updating the quantity or removing an item.   
 Input: OrderItemID, Quantity (optional), Action (Update or Remove)   
 Output: Updated OrderItem or removal of the OrderItem from the order.   
  
1.9 Payment Processing Function   
 Function ID: FR-09   
 Description: The system processes a customer's payment for an order using the specified payment method. The payment status must be updated accordingly.   
 Input: OrderID, PaymentMethod, PaymentAmount   
 Output: A new Payment record with status "Processed" or an error message if the payment fails.   
  
1.10 Order Confirmation and Email Notification Function   
 Function ID: FR-10   
 Description: After a successful payment, the system must confirm the order and send an email confirmation to the customer.   
 Input: OrderID, CustomerEmail   
 Output: Order status updated to "Confirmed", and an EmailConfirmation record is created.   
  
1.11 Inventory Management Function   
 Function ID: FR-11   
 Description: An administrator can manage inventory levels, including updating product quantities and setting reorder thresholds.   
 Input: InventoryID, ProductID, Quantity, ReorderLevel   
 Output: Updated Inventory record with new product quantity and reorder level.   
  
1.12 Product Categorization Function   
 Function ID: FR-12   
 Description: An administrator can assign or modify the category of a product.   
 Input: ProductID, CategoryID   
 Output: Updated Product record with the new CategoryID, and the Category entity is linked to the Product.   
  
1.13 Purchase History Retrieval Function   
 Function ID: FR-13   
 Description: A customer can view their purchase history, including details of previous orders and their status.   
 Input: CustomerID   
 Output: A list of PurchaseHistory records with associated Order details.   
  
1.14 Plugin Development and Management Function   
 Function ID: FR-14   
 Description: An administrator can develop or manage plugins to extend system functionality.   
 Input: PluginID, Name, Version, Description, AdminID   
 Output: A new or updated Plugin record is stored, and the plugin is available for use within the system.   
  
1.15 User Account Management Function   
 Function ID: FR-15   
 Description: An administrator can manage user accounts, including activating, deactivating, or resetting passwords for both customers and other administrators.   
 Input: AccountID, Action (Activate, Deactivate, Reset Password)   
 Output: Updated Account record with the new status or password.

# External Description

2. External Interfaces   
2.1 User Interface Output   
The system provides the following user interfaces for customer and administrator interaction:   
  
- \*\*Customer Registration Interface\*\*: Allows customers to input personal information (Name, Email, Password, Address, PhoneNumber) and register an account. The system verifies the email and ensures the username is unique. Output includes confirmation of account creation and a confirmation email sent to the customer.   
- \*\*Customer Login Interface\*\*: Enables registered customers to input their \*\*Username\*\* and \*\*Password\*\* to log in. The system verifies the credentials and updates the account status to "Logged In".   
- \*\*Customer Logout Interface\*\*: Requires a \*\*Customer session token\*\* to log out. The system updates the account status to "Logged Out".   
- \*\*Product Viewing Interface\*\*: Provides a search or selection method for customers to view product details (Name, Description, Price, Category) based on \*\*ProductID\*\* or search criteria.   
- \*\*Shopping Cart Interface\*\*: Enables customers to manage their shopping cart by adding or removing products. Inputs include \*\*CartID\*\*, \*\*ProductID\*\*, \*\*Quantity\*\*, and \*\*Action\*\* (Add or Remove). Output includes the updated shopping cart and recalculated total cost.   
- \*\*CartItem Management Interface\*\*: Allows customers to update or remove individual items in their shopping cart. Inputs include \*\*CartItemID\*\*, \*\*Quantity\*\* (optional), and \*\*Action\*\* (Update or Remove). Output includes updated or removed \*\*CartItem\*\* details.   
- \*\*Order Placement Interface\*\*: A logged-in customer confirms their shopping cart and provides \*\*PaymentMethod\*\* and \*\*PaymentAmount\*\*. The system creates a new \*\*Order\*\*, transfers \*\*CartItems\*\* to \*\*OrderItems\*\*, and records the \*\*Payment\*\*.   
- \*\*OrderItem Management Interface\*\*: Provides an administrative interface to update or remove individual items in an order. Inputs include \*\*OrderItemID\*\*, \*\*Quantity\*\* (optional), and \*\*Action\*\* (Update or Remove). Output includes updated or removed \*\*OrderItem\*\* details.   
- \*\*Purchase History Interface\*\*: Enables customers to view their purchase history by inputting their \*\*CustomerID\*\*. Output includes a list of \*\*PurchaseHistory\*\* records with associated \*\*Order\*\* details.   
  
2.2 Hardware Interface Output   
The system does not directly interact with hardware devices. Therefore, no specific hardware interfaces are defined at this stage.   
  
2.3 Software Interface Output   
The system interacts with the following software components and databases:   
  
- \*\*Database (User Accounts)\*\*: Stores and retrieves \*\*Account\*\* records.   
 - \*\*Inputs\*\*: Name, Email, Password, Address, PhoneNumber (for registration); AccountID, Action (Activate, Deactivate, Reset Password) (for account management).   
 - \*\*Outputs\*\*: Updated \*\*Account\*\* records with statuses such as "Active", "Logged In", or "Logged Out".   
- \*\*Database (Shopping Cart and Cart Items)\*\*: Stores and retrieves \*\*Cart\*\*, \*\*CartItem\*\*, and \*\*TotalCost\*\* records.   
 - \*\*Inputs\*\*: CartID, ProductID, Quantity, Action (Add or Remove) (for cart modification); CartItemID, Quantity (optional), Action (Update or Remove) (for item management).   
 - \*\*Outputs\*\*: Updated \*\*Cart\*\* and \*\*CartItem\*\* records, including recalculated \*\*TotalCost\*\*.   
- \*\*Database (Orders and Order Items)\*\*: Stores and retrieves \*\*Order\*\* and \*\*OrderItem\*\* records.   
 - \*\*Inputs\*\*: CartID, PaymentMethod, PaymentAmount (for order placement); OrderItemID, Quantity (optional), Action (Update or Remove) (for item management).   
 - \*\*Outputs\*\*: New \*\*Order\*\* and \*\*OrderItem\*\* records, along with a \*\*Payment\*\* record.   
- \*\*Database (Inventory Management)\*\*: Stores and retrieves \*\*Inventory\*\* records, including product quantities and reorder thresholds.   
 - \*\*Inputs\*\*: InventoryID, ProductID, Quantity, ReorderLevel.   
 - \*\*Outputs\*\*: Updated \*\*Inventory\*\* records.   
- \*\*Database (Product Categorization)\*\*: Stores and retrieves \*\*Product\*\* and \*\*Category\*\* records.   
 - \*\*Inputs\*\*: ProductID, CategoryID.   
 - \*\*Outputs\*\*: Updated \*\*Product\*\* records with the new \*\*CategoryID\*\*.   
- \*\*Database (Plugin Management)\*\*: Stores and retrieves \*\*Plugin\*\* records.   
 - \*\*Inputs\*\*: PluginID, Name, Version, Description, AdminID.   
 - \*\*Outputs\*\*: Updated or newly created \*\*Plugin\*\* records.   
- \*\*Database (Email Confirmation)\*\*: Records \*\*EmailConfirmation\*\* events.   
 - \*\*Inputs\*\*: OrderID, CustomerEmail.   
 - \*\*Outputs\*\*: A new \*\*EmailConfirmation\*\* record is created when an order is confirmed.   
  
2.4 Communication Interface Output   
The system communicates with external services and entities through the following interfaces:   
  
- \*\*Email Notification Service\*\*: Sends confirmation emails to customers after registration or order confirmation.   
 - \*\*Inputs\*\*: Customer Email (for registration); CustomerEmail, OrderID (for order confirmation).   
 - \*\*Outputs\*\*: Confirmation emails with appropriate content.   
- \*\*Payment Gateway Integration\*\*: Processes customer payments using the specified \*\*PaymentMethod\*\*.   
 - \*\*Inputs\*\*: OrderID, PaymentMethod, PaymentAmount.   
 - \*\*Outputs\*\*: A new \*\*Payment\*\* record with status "Processed" if the transaction is successful; otherwise, an error message.   
  
All external interfaces are designed to ensure seamless interaction between the system and its users, as well as with supporting software and communication services. Developers are expected to implement these interfaces using standardized and secure methods to maintain system integrity and user experience.