项目文档

# Functional Requirement

1.1 Customer Account Creation Function   
 Function ID: FR-01   
 Description: Customers can create an account by providing personal information such as name, email, password, address, and phone number.   
 Input: Name, Email, Password, Address, PhoneNumber.   
 Output: A new Customer entity with unique CustomerID stored in the database.  
  
1.2 Customer Login Function   
 Function ID: FR-02   
 Description: Customers can securely log in by entering their registered email and password.   
 Input: Email, Password.   
 Output: A validated session for the Customer, allowing access to the system.  
  
1.3 Customer Logout Function   
 Function ID: FR-03   
 Description: Customers can terminate their current session by logging out.   
 Input: Active session of the Customer.   
 Output: Session terminated and user redirected to the login page.  
  
1.4 View Personal Information Function   
 Function ID: FR-04   
 Description: Customers can view their stored personal information including name, address, and phone number.   
 Input: CustomerID.   
 Output: Displayed personal information of the Customer.  
  
1.5 Update Personal Information Function   
 Function ID: FR-05   
 Description: Customers can modify their personal information such as address or phone number.   
 Input: CustomerID, updated fields (e.g., Address, PhoneNumber).   
 Output: Updated Customer entity in the database.  
  
1.6 Add Product to Shopping Cart Function   
 Function ID: FR-06   
 Description: Customers can add a specific quantity of a Product to their Shopping Cart.   
 Input: CustomerID, ProductID, Quantity.   
 Output: A new CartItem entity with SubTotal and associated with the Customer's Shopping Cart.  
  
1.7 Update Shopping Cart Function   
 Function ID: FR-07   
 Description: Customers can modify the quantity of a CartItem in their Shopping Cart or remove it.   
 Input: CartItemID, new Quantity or action to remove.   
 Output: Updated CartItem entity or removed CartItem from the Shopping Cart.  
  
1.8 View Shopping Cart Summary Function   
 Function ID: FR-08   
 Description: Customers can view the total cost and quantity of items in their Shopping Cart.   
 Input: CartID.   
 Output: Summary of the Shopping Cart including TotalCost and list of CartItems.  
  
1.9 Remove Product from Shopping Cart Function   
 Function ID: FR-09   
 Description: Customers can remove a specific CartItem from their Shopping Cart.   
 Input: CartItemID.   
 Output: CartItem removed from the Shopping Cart.  
  
1.10 Place Order Function   
 Function ID: FR-10   
 Description: Customers can place an order for all items in their Shopping Cart.   
 Input: CartID, CustomerID.   
 Output: A new Order entity with OrderDate, TotalCost, and Status, and associated OrderItems.  
  
1.11 View Purchase History Function   
 Function ID: FR-11   
 Description: Customers can view their historical orders, including order details and dates.   
 Input: CustomerID.   
 Output: List of Order entities and related OrderItems for the Customer.  
  
1.12 Manage Payment Function   
 Function ID: FR-12   
 Description: Customers can store and manage their payment information for future transactions.   
 Input: CustomerID, PaymentMethod, Amount.   
 Output: A new or updated Payment entity stored in the database.  
  
1.13 Trigger Order Email Confirmation Function   
 Function ID: FR-13   
 Description: After an order is placed, the system automatically triggers an email confirmation.   
 Input: OrderID, CustomerID.   
 Output: A new Email Confirmation entity with EmailContent and SendDate.  
  
1.14 Admin Inventory Management Function   
 Function ID: FR-14   
 Description: Administrators can manage inventory levels, including updating the quantity of a Product in stock.   
 Input: AdminID, InventoryID, new QuantityInStock.   
 Output: Updated Inventory entity in the database.  
  
1.15 Admin Product Management Function   
 Function ID: FR-15   
 Description: Administrators can add, update, or delete Product entities.   
 Input: AdminID, ProductID (optional), Name, Description, Price, InventoryID.   
 Output: A new, updated, or deleted Product entity in the database.  
  
1.16 Admin Category Management Function   
 Function ID: FR-16   
 Description: Administrators can add, update, or delete Category entities.   
 Input: AdminID, CategoryID (optional), Name, Description.   
 Output: A new, updated, or deleted Category entity in the database.  
  
1.17 Send Email Confirmation Function   
 Function ID: FR-17   
 Description: Administrators can manually send email confirmations for orders.   
 Input: AdminID, OrderID, CustomerID, EmailContent.   
 Output: A new Email Confirmation entity with SendDate.  
  
1.18 Plugin Registration Function   
 Function ID: FR-18   
 Description: Plugins can be registered with the system to extend its functionality.   
 Input: PluginID, Name, Description, Version, Configuration.   
 Output: A new Plugin entity registered in the system.  
  
1.19 Plugin Configuration Function   
 Function ID: FR-19   
 Description: Plugins can be configured to modify their behavior within the system.   
 Input: PluginID, Configuration.   
 Output: Updated Plugin entity with new Configuration settings.

# External Description

# 2. External Interfaces  
  
This chapter describes the external interfaces of the system. These interfaces define how the system interacts with external entities, including users, hardware, software, and communication protocols. The interfaces are categorized into four sections: User Interfaces, Hardware Interfaces, Software Interfaces, and Communication Interfaces.  
  
## 2.1 User Interface  
  
The system provides a user-friendly interface for both \*\*Customers\*\* and \*\*Administrators\*\*. These interfaces are designed to support the core functionalities of the system and ensure ease of use and accessibility for all users.  
  
### 2.1.1 Customer Account Creation Interface   
- \*\*Purpose\*\*: Allows customers to create a new account by entering personal details.   
- \*\*Input\*\*: Name, Email, Password, Address, PhoneNumber.   
- \*\*Output\*\*: A new account creation screen or confirmation message.   
- \*\*Interaction Method\*\*: Web-based or mobile form submission.   
  
### 2.1.2 Customer Login Interface   
- \*\*Purpose\*\*: Enables customers to securely log in to their accounts using registered email and password.   
- \*\*Input\*\*: Email, Password.   
- \*\*Output\*\*: Dashboard or home page of the system upon successful login.   
- \*\*Interaction Method\*\*: Web-based or mobile login form.   
  
### 2.1.3 Customer Logout Interface   
- \*\*Purpose\*\*: Terminates the active session of a logged-in customer.   
- \*\*Input\*\*: Active session of the Customer.   
- \*\*Output\*\*: Redirects the user to the login page or displays a logout confirmation.   
- \*\*Interaction Method\*\*: Web-based or mobile button click.   
  
### 2.1.4 View Personal Information Interface   
- \*\*Purpose\*\*: Displays the stored personal information of a customer, such as name, address, and phone number.   
- \*\*Input\*\*: CustomerID.   
- \*\*Output\*\*: A screen showing the personal details of the customer.   
- \*\*Interaction Method\*\*: Web-based or mobile page load.   
  
### 2.1.5 Update Personal Information Interface   
- \*\*Purpose\*\*: Allows customers to modify their personal information.   
- \*\*Input\*\*: CustomerID, updated fields (e.g., Address, PhoneNumber).   
- \*\*Output\*\*: A confirmation message or updated information on the user interface.   
- \*\*Interaction Method\*\*: Web-based or mobile form submission.   
  
### 2.1.6 Add Product to Shopping Cart Interface   
- \*\*Purpose\*\*: Enables customers to add a specific quantity of a product to their shopping cart.   
- \*\*Input\*\*: CustomerID, ProductID, Quantity.   
- \*\*Output\*\*: A confirmation message or updated shopping cart display.   
- \*\*Interaction Method\*\*: Web-based or mobile button click or form submission.   
  
### 2.1.7 Update Shopping Cart Interface   
- \*\*Purpose\*\*: Provides the ability for customers to modify the quantity of items in their cart or remove items.   
- \*\*Input\*\*: CartItemID, new Quantity or action to remove.   
- \*\*Output\*\*: Updated cart display reflecting the changes.   
- \*\*Interaction Method\*\*: Web-based or mobile cart interface with buttons for modification.   
  
### 2.1.8 View Shopping Cart Summary Interface   
- \*\*Purpose\*\*: Displays the total cost and quantity of items in the customer’s shopping cart.   
- \*\*Input\*\*: CartID.   
- \*\*Output\*\*: Cart summary screen with TotalCost and list of CartItems.   
- \*\*Interaction Method\*\*: Web-based or mobile cart summary page.   
  
### 2.1.9 Remove Product from Shopping Cart Interface   
- \*\*Purpose\*\*: Allows customers to remove a specific item from their shopping cart.   
- \*\*Input\*\*: CartItemID.   
- \*\*Output\*\*: Updated shopping cart display after item removal.   
- \*\*Interaction Method\*\*: Web-based or mobile cart interface with remove button.   
  
### 2.1.10 View Purchase History Interface   
- \*\*Purpose\*\*: Displays the customer’s historical orders, including order details and dates.   
- \*\*Input\*\*: CustomerID.   
- \*\*Output\*\*: List of past orders and related OrderItems.   
- \*\*Interaction Method\*\*: Web-based or mobile history page.   
  
### 2.1.11 Manage Payment Interface   
- \*\*Purpose\*\*: Allows customers to store and manage their payment information.   
- \*\*Input\*\*: CustomerID, PaymentMethod, Amount.   
- \*\*Output\*\*: Updated payment information display or confirmation message.   
- \*\*Interaction Method\*\*: Web-based or mobile payment management form.   
  
### 2.1.12 Admin Inventory Management Interface   
- \*\*Purpose\*\*: Enables administrators to manage inventory levels of products.   
- \*\*Input\*\*: AdminID, InventoryID, new QuantityInStock.   
- \*\*Output\*\*: Updated inventory display or confirmation message.   
- \*\*Interaction Method\*\*: Web-based or mobile admin dashboard.   
  
### 2.1.13 Admin Product Management Interface   
- \*\*Purpose\*\*: Allows administrators to add, update, or delete product entities in the system.   
- \*\*Input\*\*: AdminID, ProductID (optional), Name, Description, Price, InventoryID.   
- \*\*Output\*\*: Updated product list or confirmation message.   
- \*\*Interaction Method\*\*: Web-based or mobile admin interface with product management options.   
  
### 2.1.14 Admin Category Management Interface   
- \*\*Purpose\*\*: Enables administrators to manage product categories, including adding, updating, or deleting categories.   
- \*\*Input\*\*: AdminID, CategoryID (optional), Name, Description.   
- \*\*Output\*\*: Updated category list or confirmation message.   
- \*\*Interaction Method\*\*: Web-based or mobile admin dashboard for category management.   
  
### 2.1.15 Plugin Configuration Interface   
- \*\*Purpose\*\*: Allows administrators or system developers to configure plugins for extended functionality.   
- \*\*Input\*\*: PluginID, Configuration.   
- \*\*Output\*\*: Updated plugin settings or confirmation message.   
- \*\*Interaction Method\*\*: Web-based or mobile admin panel for plugin configuration.   
  
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## 2.2 Hardware Interface  
  
The system does not directly interact with any external hardware devices. However, it is expected to be compatible with a wide range of hardware platforms, including desktop computers, laptops, and mobile devices. The system must support the following hardware requirements:  
  
- \*\*Desktop/Laptop\*\*: Minimum screen resolution of 1024x768, compatible with modern web browsers (e.g., Chrome, Firefox, Safari).   
- \*\*Mobile Devices\*\*: Responsive design to support smartphones and tablets with screen sizes ranging from 3.5 inches to 12 inches.   
- \*\*Supported Operating Systems\*\*: Windows, macOS, Linux, iOS, and Android.   
  
No specific hardware communication protocols are defined in the functional requirements, and therefore no hardware interfaces are detailed beyond compatibility considerations.  
  
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## 2.3 Software Interface  
  
The system interacts with several external software components and databases to perform its functions. These interfaces are essential for data storage, retrieval, and integration with third-party services.  
  
### 2.3.1 Database Interface   
- \*\*Purpose\*\*: Stores and retrieves data for the system, including Customer, Product, Order, CartItem, Inventory, Category, and Email Confirmation entities.   
- \*\*Interaction Method\*\*: SQL or NoSQL queries depending on the database type used.   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: Data to be stored (e.g., CustomerID, ProductID, OrderID, EmailContent).   
 - \*\*Output\*\*: Retrieved or modified data from the database (e.g., Customer entity, Order details, CartItem list).   
  
### 2.3.2 Shopping Cart Software Module   
- \*\*Purpose\*\*: Manages the shopping cart functionality for customers, including adding, updating, and removing items.   
- \*\*Interaction Method\*\*: Internal module calls or API endpoints.   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: CustomerID, ProductID, Quantity, CartItemID.   
 - \*\*Output\*\*: Updated CartItem or Cart summary.   
  
### 2.3.3 Email Notification Service   
- \*\*Purpose\*\*: Sends email confirmations to customers after placing an order or when manually triggered by an administrator.   
- \*\*Interaction Method\*\*: Integration with an external email service or internal SMTP server.   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: CustomerID, OrderID, EmailContent.   
 - \*\*Output\*\*: Confirmation that the email has been sent or stored in the Email Confirmation table.   
  
### 2.3.4 Plugin Management Module   
- \*\*Purpose\*\*: Manages the registration and configuration of plugins to extend system functionality.   
- \*\*Interaction Method\*\*: Internal API or module-based integration.   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: PluginID, Name, Description, Version, Configuration.   
 - \*\*Output\*\*: Registered or updated Plugin entity in the system.   
  
### 2.3.5 Admin Dashboard Module   
- \*\*Purpose\*\*: Provides a centralized interface for administrators to manage inventory, products, categories, and other system configurations.   
- \*\*Interaction Method\*\*: Internal module calls or API endpoints.   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: AdminID, InventoryID, ProductID, CategoryID, Configuration.   
 - \*\*Output\*\*: Updated inventory, product, or category data.   
  
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## 2.4 Communication Interface  
  
The system supports communication through various channels, primarily via the web and email notifications, to ensure seamless interaction with users and external services.  
  
### 2.4.1 Web Communication Interface   
- \*\*Purpose\*\*: Facilitates user access to the system through web browsers.   
- \*\*Interaction Method\*\*: HTTP/HTTPS protocols, RESTful API endpoints for client-server communication.   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: User input via web forms or API requests.   
 - \*\*Output\*\*: Web page responses or JSON/XML formatted API responses.   
  
### 2.4.2 Email Communication Interface   
- \*\*Purpose\*\*: Sends email confirmations to customers for order placements or other system-generated notifications.   
- \*\*Interaction Method\*\*: SMTP protocol for sending emails or integration with a third-party email service (e.g., SendGrid, Amazon SES).   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: OrderID, CustomerID, EmailContent.   
 - \*\*Output\*\*: Email sent to the customer or stored in the Email Confirmation table.   
  
### 2.4.3 Plugin Communication Interface   
- \*\*Purpose\*\*: Enables plugins to interact with the system and extend its functionality.   
- \*\*Interaction Method\*\*: Plugin-specific API or event-based hooks.   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: PluginID, Configuration.   
 - \*\*Output\*\*: System responses based on plugin actions or updated Plugin entity.   
  
### 2.4.4 Session Management Interface   
- \*\*Purpose\*\*: Manages user sessions during login and logout operations.   
- \*\*Interaction Method\*\*: Cookie-based or token-based session handling (e.g., JWT).   
- \*\*Inputs/Outputs\*\*:   
 - \*\*Input\*\*: Email, Password (for login); Active session (for logout).   
 - \*\*Output\*\*: Session token or cookie created or destroyed based on the action.   
  
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This chapter outlines all the external interfaces required for the system to function as per the functional requirements. Each interface is clearly defined, categorized, and described with its interaction method and relevant data flow. These interfaces will guide the development and integration of the system with external resources.