项目文档

# Functional Requirement

1.1 User Registration Function   
 Function ID: FR-01   
 Description: Customers can create a new account by providing personal information.   
 Input: Name, Email, PhoneNumber, Address, DateOfBirth, Username, Password   
 Output: A new UserAccount record stored in the database.   
  
1.2 User Login Function   
 Function ID: FR-02   
 Description: Users can authenticate and access their account using their username and password.   
 Input: Username, Password   
 Output: A session for the user with an updated LastLoginDate in the UserAccount.   
  
1.3 User Logout Function   
 Function ID: FR-03   
 Description: Users can terminate their session and securely log out of the system.   
 Input: User session   
 Output: Session termination and user redirected to the login page.   
  
1.4 View Product Catalog Function   
 Function ID: FR-04   
 Description: Users can browse available products, including product names, descriptions, prices, and categories.   
 Input: None (optional: category filter)   
 Output: A list of Product records with associated Category and Inventory details.   
  
1.5 Add Product to Cart Function   
 Function ID: FR-05   
 Description: Customers can add products to their shopping cart.   
 Input: CustomerID, ProductID, Quantity   
 Output: Updated ShoppingCart record with increased TotalItems and TotalCost. A new CartModificationRecord is created.   
  
1.6 View Shopping Cart Function   
 Function ID: FR-06   
 Description: Customers can view the contents of their shopping cart, including total quantity and cost.   
 Input: CustomerID   
 Output: ShoppingCart record with associated Product details and total cost.   
  
1.7 Modify Shopping Cart Function   
 Function ID: FR-07   
 Description: Customers can update the quantity of items in their shopping cart or remove items.   
 Input: CustomerID, ProductID, Quantity (or Action: remove)   
 Output: Updated ShoppingCart record with adjusted TotalItems and TotalCost. A new CartModificationRecord is created.   
  
1.8 Checkout Function   
 Function ID: FR-08   
 Description: Customers can proceed to checkout with their selected cart items, providing payment information and confirming the order.   
 Input: CustomerID, ShoppingCartID, PaymentMethodID, PaymentDetails (e.g., card number, expiration date)   
 Output: A new Order record, a new Payment record linked to the Order, and a new OrderConfirmationEmail sent to the customer.   
  
1.9 Order Confirmation Function   
 Function ID: FR-09   
 Description: After checkout, the system generates and sends an order confirmation email to the customer.   
 Input: OrderID, EmailContent   
 Output: A new OrderConfirmationEmail record with SendDate and Status updated.   
  
1.10 View Order History Function   
 Function ID: FR-10   
 Description: Customers can view their past orders, including order dates, total amounts, and statuses.   
 Input: CustomerID   
 Output: A list of Order records with associated Product and Payment details.   
  
1.11 Admin Product Management Function   
 Function ID: FR-11   
 Description: Administrators can add, update, or delete product information in the system.   
 Input: AdminID, ProductID, Name, Description, Price, CategoryID, InventoryID   
 Output: Updated Product records in the database.   
  
1.12 Admin Inventory Management Function   
 Function ID: FR-12   
 Description: Administrators can manage inventory levels, including restocking and setting reorder levels.   
 Input: AdminID, InventoryID, QuantityInStock, ReorderLevel, LastRestockedDate   
 Output: Updated Inventory record with current stock and restocking details.   
  
1.13 Admin Category Management Function   
 Function ID: FR-13   
 Description: Administrators can create, update, or delete product categories.   
 Input: AdminID, CategoryID, Name, Description, ParentCategoryID   
 Output: Updated Category records in the database.   
  
1.14 Admin User Account Management Function   
 Function ID: FR-14   
 Description: Administrators can manage user accounts, including activating, deactivating, or modifying account details.   
 Input: AdminID, UserID, Username, Password, AccountStatus   
 Output: Updated UserAccount record in the database.   
  
1.15 Admin Payment Management Function   
 Function ID: FR-15   
 Description: Administrators can manage payment records, including viewing and updating payment statuses.   
 Input: AdminID, PaymentID, PaymentMethodID, Amount, PaymentDate, PaymentStatus   
 Output: Updated Payment record in the database.   
  
1.16 Admin Plugin Management Function   
 Function ID: FR-16   
 Description: Administrators can manage plugins, including adding, updating, or removing plugins from the system.   
 Input: AdminID, PluginID, Name, Version, Description, DocumentationID   
 Output: Updated Plugin records in the database.   
  
1.17 Plugin Documentation Management Function   
 Function ID: FR-17  
 Description: Administrators can manage plugin documentation, ensuring it is up-to-date and accessible.   
 Input: AdminID, DocumentationID, PluginID, DocumentationContent, LastUpdatedDate   
 Output: Updated PluginDocumentation record in the database.   
  
1.18 Payment Method Management Function   
 Function ID: FR-18   
 Description: Administrators can define and manage available payment methods.   
 Input: AdminID, PaymentMethodID, MethodName, Description   
 Output: Updated PaymentMethod record in the database.   
  
1.19 Cart Modification Tracking Function   
 Function ID: FR-19   
 Description: The system records every modification made to a shopping cart for audit and tracking purposes.   
 Input: CartID, ProductID, Quantity, ActionTaken   
 Output: A new CartModificationRecord stored in the database.

# External Description

# Software Requirements Specification (SRS)   
## Chapter 2: External Interfaces   
  
This chapter outlines the external interfaces of the system, categorizing them into user interfaces, hardware interfaces, software interfaces, and communication interfaces. These interfaces define how the system interacts with users, external hardware, other software components, and communication channels.   
  
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### 2.1 User Interface   
  
The system provides a graphical user interface (GUI) for both customers and administrators to interact with the system.   
  
\*\*2.1.1 Customer User Interface\*\*   
- \*\*Description\*\*: The customer-facing interface allows users to register, log in, browse products, manage their shopping cart, and checkout.   
- \*\*Interaction Method\*\*: Web-based GUI using standard HTML, CSS, and JavaScript.   
- \*\*Inputs\*\*:   
 - Name, Email, PhoneNumber, Address, DateOfBirth, Username, Password (User Registration)   
 - Username, Password (User Login)   
 - CustomerID, ProductID, Quantity (Add Product to Cart)   
 - CustomerID (View Shopping Cart)   
 - CustomerID, ProductID, Quantity or Action (Modify Shopping Cart)   
 - CustomerID, ShoppingCartID, PaymentMethodID, PaymentDetails (Checkout)   
- \*\*Outputs\*\*:   
 - Confirmation of successful registration (e.g., welcome message or success screen)   
 - Login success or failure messages   
 - Display of product catalog with filtering options   
 - Visual representation of the shopping cart with total items and cost   
 - Confirmation of cart modifications (e.g., updated quantity or removed item)   
 - Confirmation of successful checkout (e.g., order summary screen)   
 - Display of order history with details   
  
\*\*2.1.2 Administrator User Interface\*\*   
- \*\*Description\*\*: The admin interface allows administrators to manage products, inventory, categories, user accounts, payment methods, and plugins.   
- \*\*Interaction Method\*\*: Web-based GUI with administrative privileges and access to advanced controls.   
- \*\*Inputs\*\*:   
 - AdminID, ProductID, Name, Description, Price, CategoryID, InventoryID (Admin Product Management)   
 - AdminID, InventoryID, QuantityInStock, ReorderLevel, LastRestockedDate (Admin Inventory Management)   
 - AdminID, CategoryID, Name, Description, ParentCategoryID (Admin Category Management)   
 - AdminID, UserID, Username, Password, AccountStatus (Admin User Account Management)   
 - AdminID, PaymentID, PaymentMethodID, Amount, PaymentDate, PaymentStatus (Admin Payment Management)   
 - AdminID, PluginID, Name, Version, Description, DocumentationID (Admin Plugin Management)   
 - AdminID, DocumentationID, PluginID, DocumentationContent, LastUpdatedDate (Plugin Documentation Management)   
 - AdminID, PaymentMethodID, MethodName, Description (Payment Method Management)   
- \*\*Outputs\*\*:   
 - Confirmation of successful product, inventory, category, user, payment, or plugin modifications   
 - Display of updated records (e.g., product listings, user account statuses, payment statuses)   
 - Feedback on plugin documentation updates   
  
\*\*2.1.3 Login / Logout Screens\*\*   
- \*\*Description\*\*: The system includes login and logout screens for user authentication and session management.   
- \*\*Interaction Method\*\*: Web-based GUI with form inputs and session tokens.   
- \*\*Inputs\*\*:   
 - Username, Password (Login)   
 - User session (Logout)   
- \*\*Outputs\*\*:   
 - Session creation and user redirection to the dashboard (Login)   
 - Session termination and redirection to the login page (Logout)   
  
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### 2.2 Hardware Interface   
  
No direct interaction with hardware devices is required for the current system. The system operates on standard web servers and does not interface with physical hardware such as payment terminals, barcode scanners, or IoT devices.   
  
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### 2.3 Software Interface   
  
The system interacts with several internal and external software components, including databases and potentially external APIs for payment processing.   
  
\*\*2.3.1 UserAccount Database\*\*   
- \*\*Description\*\*: Stores user account details including name, email, phone number, address, date of birth, username, password, and last login date.   
- \*\*Interaction Method\*\*: SQL-based queries for insert, update, and retrieve operations.   
- \*\*Inputs\*\*:   
 - Name, Email, PhoneNumber, Address, DateOfBirth, Username, Password (User Registration)   
 - Username, Password (User Login)   
 - UserID, Username, Password, AccountStatus (Admin User Account Management)   
- \*\*Outputs\*\*:   
 - A new or updated UserAccount record stored in the database   
  
\*\*2.3.2 Product Database\*\*   
- \*\*Description\*\*: Maintains records of products, including product name, description, price, and associated category and inventory details.   
- \*\*Interaction Method\*\*: SQL-based queries for insert, update, delete, and retrieve operations.   
- \*\*Inputs\*\*:   
 - ProductID, Name, Description, Price, CategoryID, InventoryID (Admin Product Management)   
 - Optional: category filter (View Product Catalog)   
- \*\*Outputs\*\*:   
 - A list of Product records with associated Category and Inventory details   
  
\*\*2.3.3 Inventory Database\*\*   
- \*\*Description\*\*: Tracks inventory levels for products, including quantity in stock, reorder level, and last restocked date.   
- \*\*Interaction Method\*\*: SQL-based queries for update and retrieve operations.   
- \*\*Inputs\*\*:   
 - AdminID, InventoryID, QuantityInStock, ReorderLevel, LastRestockedDate (Admin Inventory Management)   
- \*\*Outputs\*\*:   
 - Updated Inventory record with current stock and restocking details   
  
\*\*2.3.4 Category Database\*\*   
- \*\*Description\*\*: Stores information about product categories, including category name, description, and parent-child relationships.   
- \*\*Interaction Method\*\*: SQL-based queries for insert, update, delete, and retrieve operations.   
- \*\*Inputs\*\*:   
 - AdminID, CategoryID, Name, Description, ParentCategoryID (Admin Category Management)   
- \*\*Outputs\*\*:   
 - Updated Category records in the database   
  
\*\*2.3.5 ShoppingCart Database\*\*   
- \*\*Description\*\*: Maintains shopping cart data for each customer, including total items, total cost, and product associations.   
- \*\*Interaction Method\*\*: SQL-based queries for update and retrieve operations.   
- \*\*Inputs\*\*:   
 - CustomerID, ProductID, Quantity (Add Product to Cart)   
 - CustomerID (View Shopping Cart)   
 - CustomerID, ProductID, Quantity or Action (Modify Shopping Cart)   
- \*\*Outputs\*\*:   
 - Updated ShoppingCart record with adjusted TotalItems and TotalCost   
  
\*\*2.3.6 CartModificationRecord Database\*\*   
- \*\*Description\*\*: Logs all modifications made to a shopping cart for audit and tracking purposes.   
- \*\*Interaction Method\*\*: SQL-based insert operations.   
- \*\*Inputs\*\*:   
 - CartID, ProductID, Quantity, ActionTaken (Cart Modification Tracking)   
- \*\*Outputs\*\*:   
 - A new CartModificationRecord stored in the database   
  
\*\*2.3.7 Order Database\*\*   
- \*\*Description\*\*: Stores order records for customers, including order date, total amount, and status.   
- \*\*Interaction Method\*\*: SQL-based insert and retrieve operations.   
- \*\*Inputs\*\*:   
 - CustomerID, ShoppingCartID, PaymentMethodID, PaymentDetails (Checkout)   
 - OrderID, EmailContent (Order Confirmation)   
- \*\*Outputs\*\*:   
 - A new Order record stored in the database   
 - A new OrderConfirmationEmail record with SendDate and Status updated   
  
\*\*2.3.8 Payment Database\*\*   
- \*\*Description\*\*: Maintains payment records, including payment method, amount, date, and status.   
- \*\*Interaction Method\*\*: SQL-based insert, update, and retrieve operations.   
- \*\*Inputs\*\*:   
 - AdminID, PaymentID, PaymentMethodID, Amount, PaymentDate, PaymentStatus (Admin Payment Management)   
 - CustomerID, ShoppingCartID, PaymentMethodID, PaymentDetails (Checkout)   
- \*\*Outputs\*\*:   
 - A new Payment record linked to the Order   
 - Updated Payment record in the database   
  
\*\*2.3.9 Plugin Database\*\*   
- \*\*Description\*\*: Stores plugin information, including name, version, description, and associated documentation.   
- \*\*Interaction Method\*\*: SQL-based insert, update, and retrieve operations.   
- \*\*Inputs\*\*:   
 - AdminID, PluginID, Name, Version, Description, DocumentationID (Admin Plugin Management)   
- \*\*Outputs\*\*:   
 - Updated Plugin records in the database   
  
\*\*2.3.10 PluginDocumentation Database\*\*   
- \*\*Description\*\*: Stores the documentation for each plugin, including the content and last updated date.   
- \*\*Interaction Method\*\*: SQL-based insert and update operations.   
- \*\*Inputs\*\*:   
 - AdminID, DocumentationID, PluginID, DocumentationContent, LastUpdatedDate (Plugin Documentation Management)   
- \*\*Outputs\*\*:   
 - Updated PluginDocumentation record in the database   
  
\*\*2.3.11 PaymentMethod Database\*\*   
- \*\*Description\*\*: Stores available payment methods, including method name and description.   
- \*\*Interaction Method\*\*: SQL-based insert and update operations.   
- \*\*Inputs\*\*:   
 - AdminID, PaymentMethodID, MethodName, Description (Payment Method Management)   
- \*\*Outputs\*\*:   
 - Updated PaymentMethod record in the database   
  
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### 2.4 Communication Interface   
  
The system communicates with external systems and users through various communication channels, primarily via email and web protocols.   
  
\*\*2.4.1 Email Notification Service\*\*   
- \*\*Description\*\*: Sends order confirmation emails to customers after a successful checkout.   
- \*\*Interaction Method\*\*: SMTP or email API (e.g., SendGrid, Mailgun) for sending emails.   
- \*\*Inputs\*\*:   
 - OrderID, EmailContent (Order Confirmation Function)   
- \*\*Outputs\*\*:   
 - A new OrderConfirmationEmail record with SendDate and Status updated   
 - Email notification sent to the customer   
  
\*\*2.4.2 Web Communication (HTTP/HTTPS)\*\*   
- \*\*Description\*\*: The system uses HTTP/HTTPS protocols for user interactions, such as login, registration, and browsing the product catalog.   
- \*\*Interaction Method\*\*: RESTful API or direct web page navigation for data retrieval and modification.   
- \*\*Inputs\*\*:   
 - Username, Password (User Login)   
 - CustomerID, ProductID, Quantity (Add Product to Cart)   
- \*\*Outputs\*\*:   
 - Web page responses (e.g., login page, product catalog, shopping cart view)   
 - JSON/XML responses for API-based interactions   
  
\*\*2.4.3 Payment Gateway (Optional)\*\*   
- \*\*Description\*\*: If external payment gateways are integrated, the system will communicate with them to process payments.   
- \*\*Interaction Method\*\*: HTTPS-based API calls for payment processing.   
- \*\*Inputs\*\*:   
 - PaymentMethodID, PaymentDetails (Checkout)   
- \*\*Outputs\*\*:   
 - Payment confirmation or failure from the external gateway   
 - Updated Payment record in the database   
  
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### Summary of External Interfaces   
  
| Interface Type | Interface Name | Description | Communication Method |  
|--------------------------|------------------------------------|-----------------------------------------------------------------------------|--------------------------------------|  
| User Interface | Customer Interface | Allows customers to register, login, browse products, manage cart, checkout | Web-based GUI with form inputs |  
| User Interface | Admin Interface | Provides admin tools for managing products, inventory, users, payments, etc. | Web-based GUI with admin privileges |  
| Software Interface | UserAccount Database | Stores user account and login data | SQL queries |  
| Software Interface | Product Database | Maintains product details | SQL queries |  
| Software Interface | Inventory Database | Tracks product inventory levels | SQL queries |  
| Software Interface | Category Database | Stores product category information | SQL queries |  
| Software Interface | ShoppingCart Database | Maintains shopping cart data | SQL queries |  
| Software Interface | CartModificationRecord Database | Logs cart modifications for audit purposes | SQL insert operations |  
| Software Interface | Order Database | Stores order records for customers | SQL insert and retrieve operations |  
| Software Interface | Payment Database | Maintains payment records | SQL insert, update, and retrieve |  
| Software Interface | Plugin Database | Stores plugin information | SQL insert, update, and retrieve |  
| Software Interface | PluginDocumentation Database | Stores plugin documentation | SQL insert and update operations |  
| Software Interface | PaymentMethod Database | Stores available payment methods | SQL insert and update operations |  
| Communication Interface | Email Notification Service | Sends order confirmation emails to customers | SMTP or email API (e.g., SendGrid) |  
| Communication Interface | Web Communication | Handles user interactions via HTTP/HTTPS | RESTful API or web navigation |  
| Communication Interface | Payment Gateway (Optional) | Processes payments through external services | HTTPS-based API calls |  
  
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This chapter concludes the description of the external interfaces of the system, ensuring that all required inputs and outputs from the functional requirements are accounted for and clearly defined.