# Functional Requirement

1. Functional Requirements   
 1.1 Customer Account Creation Function   
 Function ID: FR-01   
 Description: Customers can register and create an account with the system by providing personal information such as name, email, and password.   
 Input: Customer's name, email, password, and address.   
 Output: A new customer account with associated information stored in the database.   
  
 1.2 Customer Login Function   
 Function ID: FR-02   
 Description: Registered customers can log in to their account using their email and password.   
 Input: Email and password provided by the customer.   
 Output: A successful login session with the system, and the login event recorded in the activity log.   
  
 1.3 Customer Logout Function   
 Function ID: FR-03   
 Description: Customers can log out of their account to end their session.   
 Input: Customer selects the "Logout" option from the user interface.   
 Output: The session is terminated, and the logout event is recorded in the activity log.   
  
 1.4 Product Catalog Display Function   
 Function ID: FR-04   
 Description: The system displays a categorized and searchable product catalog for customers to browse available products.   
 Input: Customer navigates to the product catalog section.   
 Output: A dynamically updated list of products with their names, descriptions, prices, and availability.   
  
 1.5 Product Addition to Cart Function   
 Function ID: FR-05   
 Description: Customers can add selected products to their shopping cart with a specified quantity.   
 Input: Product ID, quantity, and the customer's cart.   
 Output: Updated shopping cart with the newly added product and quantity.   
  
 1.6 Cart Quantity Update Function   
 Function ID: FR-06   
 Description: Customers can modify the quantity of products in their shopping cart.   
 Input: Cart item ID and new quantity.   
 Output: Updated cart with adjusted quantity and recalculated total cost.   
  
 1.7 Cart Total Cost Calculation Function   
 Function ID: FR-07   
 Description: The system calculates and displays the total cost of all items in the shopping cart.   
 Input: Product prices and quantities in the customer's cart.   
 Output: Total cost displayed on the cart page for the customer to review.   
  
 1.8 Order Confirmation Function   
 Function ID: FR-08   
 Description: Customers can confirm their orders after reviewing the cart contents and selected payment method.   
 Input: Cart contents, payment method, and customer confirmation.   
 Output: A confirmed order stored in the system, and inventory updated to reflect the reduction in stock.   
  
 1.9 Order Confirmation Email Function   
 Function ID: FR-09   
 Description: After an order is confirmed, the system sends an email confirmation to the customer.   
 Input: Customer's email address, order details, and confirmation number.   
 Output: An email notification with order details sent to the customer's email address.   
  
 1.10 Inventory Management Function   
 Function ID: FR-10   
 Description: Administrators can manage the inventory by adding, updating, or removing products.   
 Input: Product details such as name, description, price, and quantity.   
 Output: Updated inventory with the latest product information stored in the database.   
  
 1.11 Product Categorization Function   
 Function ID: FR-11   
 Description: Administrators can assign products to specific categories to improve navigation and organization.   
 Input: Product ID and category ID or name.   
 Output: Updated product database with the correct category assignment.   
  
 1.12 Product Details Update Function   
 Function ID: FR-12   
 Description: Administrators can update product information such as price, description, or stock quantity.   
 Input: Product ID and updated information (e.g., new price, updated description).   
 Output: Updated product details stored in the database.   
  
 1.13 Administrator Login Function   
 Function ID: FR-13   
 Description: Administrators can log in to the system using their email and password to access the control panel.   
 Input: Email and password provided by the administrator.   
 Output: A successful admin login session, and the login event recorded in the activity log.   
  
 1.14 Administrator Logout Function   
 Function ID: FR-14   
 Description: Administrators can log out of their account to end their session securely.   
 Input: Administrator selects the "Logout" option from the admin interface.   
 Output: The admin session is terminated, and the logout event is recorded in the activity log.   
  
 1.15 Purchase History Display Function   
 Function ID: FR-15   
 Description: Customers can view their purchase history, including previous orders and details.   
 Input: Customer ID and filter criteria (e.g., date range, product).   
 Output: A list of past orders with details such as product names, quantities, and total cost.   
  
 1.16 Payment Information Management Function   
 Function ID: FR-16   
 Description: Customers can manage their payment information by adding, editing, or deleting payment methods.   
 Input: Payment details (e.g., card number, expiration date, billing address) and action (add/edit/delete).   
 Output: Updated customer account with stored payment information, and validation results displayed.   
  
 1.17 Plugin Installation Function   
 Function ID: FR-17   
 Description: Administrators can install plugins from the system’s plugin repository to extend system functionality.   
 Input: Plugin ID and confirmation to install.   
 Output: Plugin installed and activated, and the system updated to reflect the new functionality.   
  
 1.18 Plugin API Documentation Access Function   
 Function ID: FR-18   
 Description: Administrators can access the API documentation for installed plugins to understand their integration and usage.   
 Input: Plugin ID and search/filter criteria.   
 Output: Displayed API documentation with endpoints, methods, and usage examples.   
  
 1.19 Transaction Processing Function   
 Function ID: FR-19   
 Description: The system processes transactions during checkout, including payment execution and inventory updates.   
 Input: Cart contents, selected payment method, and customer confirmation.   
 Output: A processed transaction with quantity and cost recorded, and inventory updated accordingly.   
  
 1.20 Email Notification Sending Function   
 Function ID: FR-20   
 Description: The system can send email notifications to customers for events such as order confirmations or password resets.   
 Input: Recipient email address, message content, and subject.   
 Output: Email notification sent to the customer, and the event recorded in the system logs.   
  
 1.21 User Activity Log Display Function   
 Function ID: FR-21   
 Description: Administrators can view and filter user activity logs to track user actions such as login, logout, and cart updates.   
 Input: Filter criteria such as user ID, action type, or date range.   
 Output: A structured log of user activities displayed for review by the administrator.

# External Description

# 2. External Interfaces  
  
This section describes the external interfaces that the system interacts with to fulfill its functional requirements. These interfaces include user interfaces, hardware interfaces, software interfaces (including databases and third-party systems), and communication interfaces such as email or web services.  
  
---  
  
## 2.1 User Interface  
  
### 2.1.1 Customer Login/Logout UI  
- \*\*Description\*\*: The system provides a user interface for customers to log in and log out.  
- \*\*Interaction Method\*\*: Web-based interface where users enter their email and password to authenticate. A "Logout" button is available on the user dashboard.  
- \*\*Input\*\*: Email address and password for login; user action (clicking "Logout") for logout.  
- \*\*Output\*\*: Display of login form, success message upon login, and confirmation message upon logout.  
- \*\*Purpose\*\*: Enables secure user authentication and session management.  
  
---  
  
### 2.1.2 Product Catalog UI  
- \*\*Description\*\*: The system presents a user interface for browsing and searching products.  
- \*\*Interaction Method\*\*: Web-based interface with filters, search bar, and product listing.  
- \*\*Input\*\*: User navigation to the catalog page, search queries, and filter selections.  
- \*\*Output\*\*: Dynamically updated list of products with name, description, price, and availability.  
- \*\*Purpose\*\*: Facilitates customer product discovery and selection.  
  
---  
  
### 2.1.3 Shopping Cart UI  
- \*\*Description\*\*: The system provides a user interface for managing items in the shopping cart.  
- \*\*Interaction Method\*\*: Web-based interface with buttons to add/remove items, adjust quantities, and view total cost.  
- \*\*Input\*\*: User interaction to add, remove, or update item quantities.  
- \*\*Output\*\*: Updated cart display showing current items, quantities, and total cost.  
- \*\*Purpose\*\*: Supports seamless online purchasing experience.  
  
---  
  
### 2.1.4 Order Confirmation UI  
- \*\*Description\*\*: The system provides a user interface for confirming orders.  
- \*\*Interaction Method\*\*: Web-based interface where users review cart contents and select payment method.  
- \*\*Input\*\*: User confirmation of order and selected payment method.  
- \*\*Output\*\*: Display of confirmation screen and success message.  
- \*\*Purpose\*\*: Ensures accurate order processing and customer confirmation.  
  
---  
  
### 2.1.5 Purchase History UI  
- \*\*Description\*\*: The system provides a user interface for viewing purchase history.  
- \*\*Interaction Method\*\*: Web-based interface with filters by date range, product, or other criteria.  
- \*\*Input\*\*: User filter criteria (e.g., date range, product).  
- \*\*Output\*\*: List of past orders with product names, quantities, and total cost.  
- \*\*Purpose\*\*: Allows customers to track their previous purchases.  
  
---  
  
### 2.1.6 Payment Information Management UI  
- \*\*Description\*\*: The system provides a user interface for managing payment methods.  
- \*\*Interaction Method\*\*: Web-based interface where users can add, edit, or delete payment details.  
- \*\*Input\*\*: User input of payment information and selection of action (add/edit/delete).  
- \*\*Output\*\*: Updated payment information stored in the system and validation results displayed.  
- \*\*Purpose\*\*: Enables secure and flexible payment management.  
  
---  
  
### 2.1.7 Admin Dashboard UI  
- \*\*Description\*\*: The system provides a user interface for administrators to manage inventory, plugins, and user activity logs.  
- \*\*Interaction Method\*\*: Web-based interface with sections for product management, plugin installation, and activity log viewing.  
- \*\*Input\*\*: User actions such as adding a product, installing a plugin, or filtering logs.  
- \*\*Output\*\*: Dynamic display of product data, plugin status, and user activity logs.  
- \*\*Purpose\*\*: Enables efficient administration and monitoring of the system.  
  
---  
  
### 2.1.8 Plugin API Documentation UI  
- \*\*Description\*\*: The system provides a user interface for accessing plugin API documentation.  
- \*\*Interaction Method\*\*: Web-based interface with search and filter functionality.  
- \*\*Input\*\*: User input of plugin ID or search terms.  
- \*\*Output\*\*: Displayed API documentation including endpoints, methods, and usage examples.  
- \*\*Purpose\*\*: Supports developers and administrators in integrating and utilizing plugins.  
  
---  
  
### 2.1.9 Email Notification UI  
- \*\*Description\*\*: The system provides a user interface for sending email notifications.  
- \*\*Interaction Method\*\*: Web-based interface where administrators can compose and send emails.  
- \*\*Input\*\*: Recipient email address, message content, and subject.  
- \*\*Output\*\*: Confirmation of email sent and event logged.  
- \*\*Purpose\*\*: Enables automated communication with users.  
  
---  
  
### 2.1.10 User Activity Log UI  
- \*\*Description\*\*: The system provides a user interface for viewing and filtering user activity logs.  
- \*\*Interaction Method\*\*: Web-based interface with filters by user ID, action type, or date range.  
- \*\*Input\*\*: Filter criteria (e.g., user ID, action type, date range).  
- \*\*Output\*\*: Structured log of user activities for review.  
- \*\*Purpose\*\*: Provides visibility into user behavior and system usage patterns.  
  
---  
  
## 2.2 Hardware Interface  
  
\*\*No hardware interfaces are used in this system.\*\*  
  
---  
  
## 2.3 Software Interface  
  
### 2.3.1 Database Interface  
- \*\*Description\*\*: The system interacts with a relational database to store and retrieve customer, product, order, and activity data.  
- \*\*Interaction Method\*\*: SQL-based database access through application programming interfaces (APIs) or direct database calls.  
- \*\*Input\*\*: Data from functional requirements such as customer information, product details, order records, etc.  
- \*\*Output\*\*: Data retrieved for use in various functions (e.g., login, cart updates, order processing).  
- \*\*Purpose\*\*: Ensures persistent storage and retrieval of critical system data.  
  
### 2.3.2 Email Service Interface  
- \*\*Description\*\*: The system communicates with an external email service to send transactional emails such as order confirmations and password reset links.  
- \*\*Interaction Method\*\*: RESTful API calls to an email service provider (e.g., SendGrid, Amazon SES).  
- \*\*Input\*\*: Recipient email address, message content, and subject line.  
- \*\*Output\*\*: Email notification sent to the recipient, with confirmation of delivery.  
- \*\*Purpose\*\*: Enables automated email communication with users.  
  
### 2.3.3 Payment Gateway Interface  
- \*\*Description\*\*: The system interacts with a payment gateway to process payments during checkout.  
- \*\*Interaction Method\*\*: RESTful API integration with a payment service provider (e.g., Stripe, PayPal).  
- \*\*Input\*\*: Payment method details (e.g., card number, expiration date), cart contents, and customer confirmation.  
- \*\*Output\*\*: Payment confirmation, transaction ID, and any error messages.  
- \*\*Purpose\*\*: Enables secure and reliable payment processing.  
  
### 2.3.4 Plugin Repository Interface  
- \*\*Description\*\*: The system interacts with a plugin repository to install and manage plugins.  
- \*\*Interaction Method\*\*: RESTful API calls to a plugin management system.  
- \*\*Input\*\*: Plugin ID and installation confirmation.  
- \*\*Output\*\*: Plugin installed and activated, with system updates reflecting new functionality.  
- \*\*Purpose\*\*: Extends system capabilities through modular additions.  
  
---  
  
## 2.4 Communication Interface  
  
### 2.4.1 Email Communication Interface  
- \*\*Description\*\*: The system sends email notifications to customers for events such as order confirmations, password resets, and account updates.  
- \*\*Interaction Method\*\*: SMTP protocol or RESTful API for sending emails.  
- \*\*Input\*\*: Recipient email address, message content, and subject.  
- \*\*Output\*\*: Email notification sent to the recipient, and event recorded in the system logs.  
- \*\*Purpose\*\*: Provides timely and relevant communication to users.  
  
### 2.4.2 Web Browsing Interface  
- \*\*Description\*\*: The system allows users to interact with it via web browsers.  
- \*\*Interaction Method\*\*: HTTP/HTTPS protocol for client-server communication.  
- \*\*Input\*\*: User requests via web browser (e.g., login, product search, order placement).  
- \*\*Output\*\*: HTML pages rendered in the browser with dynamic content based on user actions.  
- \*\*Purpose\*\*: Enables broad accessibility and usability across devices.  
  
### 2.4.3 API Communication Interface  
- \*\*Description\*\*: The system provides APIs for internal and external integrations.  
- \*\*Interaction Method\*\*: RESTful API using JSON format for data exchange.  
- \*\*Input\*\*: API requests containing parameters such as product IDs, user credentials, and cart details.  
- \*\*Output\*\*: API responses with structured data (e.g., product listings, order statuses, user activity logs).  
- \*\*Purpose\*\*: Supports integration with other systems and enables programmatic access to system functionalities.  
  
---  
  
## Summary of External Interfaces  
  
| Interface Type | Description | Input | Output |  
|----------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------|  
| User Interface | All user-facing interactions (login, product browsing, cart, etc.) | User inputs (email, password, search terms, etc.) | Screen displays, confirmation messages, updated views |  
| Software Interface | Interaction with databases, email services, payment gateways, and plugins | Data from functional requirements (e.g., customer info, product data)| Stored data, API responses, payment confirmations, plugin activation |  
| Communication Interface | Email, web browsing, and API communications | Email addresses, web requests, API calls | Emails, web pages, API responses |  
  
All external interfaces have been clearly defined and mapped to the functional requirements to ensure consistency and clarity for developers and stakeholders.