# Functional Requirement

1. Functional Requirements   
 1.1 Customer Account Creation   
 Function ID: FR-01   
 Description: The system allows a customer to create a new account by submitting their personal information, including username, password, email, and phone number. The system validates the input and generates a unique customer ID.   
 Input: PersonalInformation (FirstName, LastName, Email, Username, Password, PhoneNumber, ContactDetails)   
 Output: Customer (CustomerID, Username, Email, PhoneNumber, Address)  
  
 1.2 Customer Login   
 Function ID: FR-02   
 Description: The system authenticates a customer by verifying their email and password against the stored user account. A successful login establishes a session and displays the customer dashboard.   
 Input: Email, Password   
 Output: Customer session (authenticated status), Dashboard view  
  
 1.3 Customer Logout   
 Function ID: FR-03   
 Description: The system terminates the customer's active session and redirects them to the homepage or login page. The logout event is logged for auditing.   
 Input: Active session   
 Output: Terminated session, Redirect to homepage or login page  
  
 1.4 Update Customer Personal Information   
 Function ID: FR-04   
 Description: The system allows a logged-in customer to modify their personal details, such as name, phone number, and address. Changes are validated and saved in the database.   
 Input: Updated PersonalInformation (FirstName, LastName, PhoneNumber, Address)   
 Output: Updated Customer record in the database  
  
 1.5 View Purchase History   
 Function ID: FR-05   
 Description: The system retrieves and displays a customer’s historical purchases, including product details, quantity, total price, and purchase date.   
 Input: CustomerID   
 Output: List of PurchaseHistory records  
  
 1.6 Manage Cart   
 Function ID: FR-06   
 Description: The system allows a customer to add, remove, and update product quantities in their cart. The cart total is recalculated in real-time.   
 Input: CartID, ProductID, Quantity, Action (Add, Remove, Update)   
 Output: Updated Cart (ProductID, Quantity, SubTotal), Cart display  
  
 1.7 Checkout Order   
 Function ID: FR-07   
 Description: The system processes the customer's cart at checkout, confirms payment, creates an order, and clears the cart.   
 Input: CartID, ShippingAddress, PaymentMethodID   
 Output: New Order record, Cleared Cart, Order confirmation  
  
 1.8 Confirm Order   
 Function ID: FR-08   
 Description: The system confirms the order after successful payment processing, updates the order status, and logs the confirmation event.   
 Input: OrderID, PaymentInformation   
 Output: Confirmed Order status, Order confirmation message  
  
 1.9 Send Order Confirmation Email   
 Function ID: FR-09   
 Description: The system sends a confirmation email to the customer after an order is successfully confirmed.   
 Input: OrderID, CustomerEmail   
 Output: Email (Subject, Content, Timestamp), Email log entry  
  
 1.10 Admin Login   
 Function ID: FR-10   
 Description: The system authenticates an administrator by verifying their email and password. A successful login establishes an admin session and displays the admin dashboard.   
 Input: Email, Password   
 Output: Admin session (authenticated status), Admin dashboard  
  
 1.11 Admin Manage Inventory   
 Function ID: FR-11   
 Description: The system allows an administrator to add, update, or delete inventory records for products. Inventory alerts are triggered when stock falls below a threshold.   
 Input: ProductID, StockQuantity, ReorderLevel, Action (Add, Update, Delete)   
 Output: Updated Inventory record, Inventory alert (if applicable)  
  
 1.12 Admin Add Product   
 Function ID: FR-12   
 Description: The system allows an administrator to create a new product entry, including its name, description, price, category, and inventory quantity.   
 Input: Product (Name, Description, Price, CategoryID, InventoryID, Image)   
 Output: New Product record, Updated Inventory and Category associations  
  
 1.13 Admin Update Product Details   
 Function ID: FR-13   
 Description: The system allows an administrator to modify existing product details such as name, price, description, and category.   
 Input: ProductID, UpdatedProductDetails (Name, Description, Price, CategoryID)   
 Output: Updated Product record, Updated Inventory and Category associations  
  
 1.14 Admin Delete Product   
 Function ID: FR-14   
 Description: The system allows an administrator to delete a product, which removes the product record and updates the inventory accordingly.   
 Input: ProductID, Confirmation to delete   
 Output: Deleted Product record, Updated Inventory  
  
 1.15 Admin Categorize Products   
 Function ID: FR-15   
 Description: The system allows an administrator to assign or change the category of a product.   
 Input: ProductID, CategoryID   
 Output: Updated Product record, Updated Category association  
  
 1.16 Admin Manage User Accounts   
 Function ID: FR-16   
 Description: The system allows an administrator to create, update, or delete user accounts.   
 Input: UserAccount (Username, Email, Password, Role), Action (Create, Update, Delete)   
 Output: Updated or deleted UserAccount record  
  
 1.17 Admin Manage Payment Methods   
 Function ID: FR-17   
 Description: The system allows an administrator to add, update, or delete available payment methods for the store.   
 Input: PaymentMethod (MethodType, AccountDetails), Action (Add, Update, Delete)   
 Output: Updated or deleted PaymentMethod record  
  
 1.18 Admin Install Plugin   
 Function ID: FR-18   
 Description: The system allows an administrator to install a plugin, which extends the system’s functionality.   
 Input: Plugin file (Name, Version, Description)   
 Output: Installed Plugin record, Updated Plugin status  
  
 1.19 Admin Configure Plugin   
 Function ID: FR-19   
 Description: The system allows an administrator to configure plugin settings after installation.   
 Input: PluginID, Configuration parameters (e.g., API keys, enable/disable features)   
 Output: Updated Plugin configuration in the database  
  
 1.20 Admin Manage System Settings   
 Function ID: FR-20   
 Description: The system allows an administrator to configure and update system-wide settings, such as site configuration, payment gateway, and email settings.   
 Input: SystemSettings (Key, Value), Action (Update or Add)   
 Output: Updated or added SystemSettings record  
  
 1.21 Admin View System Logs   
 Function ID: FR-21   
 Description: The system allows an administrator to view all logged system activities for auditing and monitoring purposes.   
 Input: Filter criteria (e.g., date range, user, event type)   
 Output: List of SystemLogs, System log access record  
  
 1.22 Admin Manage System Logs   
 Function ID: FR-22   
 Description: The system allows an administrator to perform actions such as filtering, exporting, or clearing system logs.   
 Input: SystemLogs, Action (Filter, Export, Clear)   
 Output: Filtered or exported logs, Cleared logs (if applicable)  
  
 1.23 View Product Catalog   
 Function ID: FR-23   
 Description: The system displays a list of available products grouped by category, allowing the customer to search, filter, and view product details.   
 Input: Search term, Category filter, Price range   
 Output: Displayed product list, Product detail view  
  
 1.24 View Order Details   
 Function ID: FR-24   
 Description: The system retrieves and displays detailed information about a specific order, such as product list, total cost, payment status, and shipping information.   
 Input: OrderID   
 Output: Displayed Order details, Order status  
  
 1.25 Cancel Order   
 Function ID: FR-25   
 Description: The system allows a customer to cancel an order if it is in a cancellable state (e.g., pending or processing). The system updates the inventory accordingly.   
 Input: OrderID, Confirmation to cancel   
 Output: Updated Order status (Canceled), Updated Inventory  
  
 1.26 Manage Order Status   
 Function ID: FR-26   
 Description: The system tracks and updates the status of an order (e.g., pending, confirmed, shipped) based on system events or admin actions.   
 Input: OrderID, StatusName, StatusDescription   
 Output: Updated OrderStatus record, Order status display  
  
 1.27 Generate Sales Report   
 Function ID: FR-27   
 Description: The system allows an administrator to generate a sales report based on selected filters such as date range and category.   
 Input: Date range, Category filter, Export format (e.g., PDF, Excel)   
 Output: Generated sales report, Log of report generation  
  
 1.28 Modify User Permissions   
 Function ID: FR-28   
 Description: The system allows an administrator to modify user roles and permissions to control access to system features.   
 Input: UserID, UpdatedPermissions (e.g., role, feature access)   
 Output: Updated User record with new permissions, Log of permission change

# External Description

# 2. External Interfaces  
  
This section describes the external interfaces that the system interacts with during its operation. These interfaces include user interfaces, hardware interfaces, software interfaces (such as databases and APIs), and communication interfaces (such as email and messaging). Each interface is defined clearly, including the purpose, interaction method, and relevant inputs/outputs.  
  
---  
  
## 2.1 User Interface  
  
The system provides a user interface for both customers and administrators to interact with the application. The user interface includes web-based dashboards, forms, and navigation menus that allow users to perform various operations such as account creation, login, product browsing, order management, etc.  
  
### 2.1.1 Customer Dashboard  
- \*\*Description\*\*: A web-based interface that displays customer-specific information such as purchase history, cart contents, and order status.  
- \*\*Interaction Method\*\*: Web browser access via HTTP(S) protocol.  
- \*\*Inputs\*\*:  
 - User credentials (email, password)  
- \*\*Outputs\*\*:  
 - Display of dashboard content (e.g., cart, recent orders, profile settings)  
 - Interactive elements (buttons, links, form fields)  
  
### 2.1.2 Admin Dashboard  
- \*\*Description\*\*: A web-based interface that allows administrators to manage inventory, users, products, and system settings.  
- \*\*Interaction Method\*\*: Web browser access via HTTP(S) protocol.  
- \*\*Inputs\*\*:  
 - Admin credentials (email, password)  
- \*\*Outputs\*\*:  
 - Display of admin controls (inventory list, user list, payment methods, logs, etc.)  
 - Interactive elements (forms, tables, buttons)  
  
### 2.1.3 Product Catalog View  
- \*\*Description\*\*: A web page or section that displays available products grouped by category, allowing customers to search, filter, and view product details.  
- \*\*Interaction Method\*\*: Web browser access via HTTP(S) protocol.  
- \*\*Inputs\*\*:  
 - Search term  
 - Category filter  
 - Price range  
- \*\*Outputs\*\*:  
 - Displayed product list with images, descriptions, and pricing  
 - Product detail view on click  
  
### 2.1.4 Order Details View  
- \*\*Description\*\*: A web-based interface that shows detailed information about a specific order, including items, total cost, payment status, and shipping information.  
- \*\*Interaction Method\*\*: Web browser access via HTTP(S) protocol.  
- \*\*Inputs\*\*:  
 - Order ID  
- \*\*Outputs\*\*:  
 - Display of order summary and itemized breakdown  
 - Status indicators (e.g., confirmed, shipped, canceled)  
  
---  
  
## 2.2 Hardware Interface  
  
Currently, the system does not interact directly with any external hardware devices. Therefore, this section contains no defined hardware interfaces.  
  
---  
  
## 2.3 Software Interface  
  
The system interacts with several internal and external software components, including databases, third-party APIs, and other systems.  
  
### 2.3.1 Database System  
- \*\*Description\*\*: The system stores all data in one or more relational databases, including customer accounts, products, orders, inventory, logs, and system settings.  
- \*\*Interaction Method\*\*: Structured Query Language (SQL) over a database connection (e.g., MySQL, PostgreSQL).  
- \*\*Inputs\*\*:  
 - SQL queries for data retrieval, updates, and deletion  
- \*\*Outputs\*\*:  
 - Data records (customer info, product details, order statuses, etc.)  
 - Database transaction logs  
  
### 2.3.2 Payment Gateway API  
- \*\*Description\*\*: The system communicates with an external payment gateway (e.g., PayPal, Stripe) to process payments during checkout.  
- \*\*Interaction Method\*\*: RESTful API calls using HTTPS.  
- \*\*Inputs\*\*:  
 - Payment method ID  
 - Payment amount  
 - Card details or payment token  
- \*\*Outputs\*\*:  
 - Payment confirmation or error response  
 - Transaction ID for record-keeping  
  
### 2.3.3 Email Service API  
- \*\*Description\*\*: The system uses an email service API (e.g., SendGrid, SMTP) to send order confirmation emails and other notifications.  
- \*\*Interaction Method\*\*: RESTful API calls using HTTPS.  
- \*\*Inputs\*\*:  
 - Order ID  
 - Customer email address  
 - Email subject and body  
- \*\*Outputs\*\*:  
 - Confirmation of email delivery  
 - Log entry of sent email  
  
### 2.3.4 Plugin Management System  
- \*\*Description\*\*: The system allows plugins to be installed, configured, and managed. Plugins may extend functionality such as reporting, security, or user interface enhancements.  
- \*\*Interaction Method\*\*: File upload and configuration through the admin interface.  
- \*\*Inputs\*\*:  
 - Plugin file (name, version, description)  
 - Configuration parameters (API keys, enable/disable features)  
- \*\*Outputs\*\*:  
 - Installed plugin record  
 - Updated plugin configuration  
  
### 2.3.5 Logging System  
- \*\*Description\*\*: The system logs events such as user logins, order confirmations, and system errors into a centralized logging system for auditing and monitoring.  
- \*\*Interaction Method\*\*: Structured logging format (JSON, XML) via HTTP or direct database write.  
- \*\*Inputs\*\*:  
 - Event type (login, order confirmation, error)  
 - Timestamp, user ID, event message  
- \*\*Outputs\*\*:  
 - Log entries stored in a database or log file  
 - Access logs for audit purposes  
  
---  
  
## 2.4 Communication Interface  
  
The system communicates with external entities through various network-based communication channels, primarily via web and email.  
  
### 2.4.1 Web Browser Communication  
- \*\*Description\*\*: The system communicates with web browsers to render user interfaces and receive user input.  
- \*\*Interaction Method\*\*: HTTP/HTTPS protocol.  
- \*\*Inputs\*\*:  
 - User actions (clicks, form submissions, selections)  
- \*\*Outputs\*\*:  
 - Dynamic content rendering (HTML, JavaScript)  
 - Real-time updates (e.g., cart changes, order status)  
  
### 2.4.2 Email Notification  
- \*\*Description\*\*: The system sends email notifications to users for events such as order confirmation, account verification, and system alerts.  
- \*\*Interaction Method\*\*: SMTP or third-party email API (e.g., SendGrid, Mailgun).  
- \*\*Inputs\*\*:  
 - Order ID  
 - Customer email address  
 - Email template (subject, body)  
- \*\*Outputs\*\*:  
 - Sent email message  
 - Log entry of sent email  
  
### 2.4.3 System Logs Communication  
- \*\*Description\*\*: The system communicates with a logging server or central log storage system to store system events and audit trails.  
- \*\*Interaction Method\*\*: HTTP or direct database insertion.  
- \*\*Inputs\*\*:  
 - Log message, timestamp, user ID, event type  
- \*\*Outputs\*\*:  
 - Stored log entry  
 - Audit trail for system activity  
  
---  
  
## Summary of External Interfaces  
  
| Interface Type | Description | Interaction Method |  
|----------------------|-----------------------------------------------------------------------------|----------------------------|  
| User Interface | Web-based dashboards, forms, and views for customer and admin interactions | HTTP(S), JavaScript |  
| Software Interface | Databases, payment gateways, email services, and plugin systems | SQL, REST, SMTP, File |  
| Communication Interface | Email notifications, system logs, and real-time updates | HTTP(S), SMTP, JSON |  
  
All external data sources mentioned in the functional requirements are accounted for and clearly defined within this chapter. This ensures consistency and clarity for developers, testers, and stakeholders involved in the project.