# Functional Requirement

# 1. Functional Requirements  
  
## 1.1 Product Management Function   
\*\*Function ID\*\*: FR-01   
\*\*Description\*\*: Administrators can add, modify, delete, or view products in the system.   
\*\*Input\*\*: Product details such as name, description, price, stock quantity, category, and image URL.   
\*\*Output\*\*: Updated product list or confirmation message for success or failure.  
  
## 1.2 Add Product Function   
\*\*Function ID\*\*: FR-02   
\*\*Description\*\*: Enables the administrator to add a new product to the system, including validation and saving to the database.   
\*\*Input\*\*: Product details including name, description, price, stock quantity, and category.   
\*\*Output\*\*: New product added to the database, with confirmation message and updated product list.  
  
## 1.3 Modify Product Information Function   
\*\*Function ID\*\*: FR-03   
\*\*Description\*\*: Allows the administrator to modify existing product details in the system.   
\*\*Input\*\*: Updated product information such as name, description, price, stock quantity, and category.   
\*\*Output\*\*: Modified product information saved in the database, with confirmation message and updated product list.  
  
## 1.4 Delete Product Function   
\*\*Function ID\*\*: FR-04   
\*\*Description\*\*: Enables the administrator to delete a product from the system after confirmation.   
\*\*Input\*\*: Product ID or product name selected for deletion.   
\*\*Output\*\*: Product removed from the database, with confirmation message and updated product list.  
  
## 1.5 View Product Details Function   
\*\*Function ID\*\*: FR-05   
\*\*Description\*\*: Displays detailed information of a specific product to the customer or administrator.   
\*\*Input\*\*: Product ID or product name selected for viewing.   
\*\*Output\*\*: Display of product details such as name, description, price, stock quantity, and associated images.  
  
## 1.6 Customer Registration Function   
\*\*Function ID\*\*: FR-06   
\*\*Description\*\*: Enables new customers to register in the system and receive a confirmation email.   
\*\*Input\*\*: Customer information including first name, last name, email, password, and contact number.   
\*\*Output\*\*: Registered customer account in the database, confirmation email sent, and success message displayed.  
  
## 1.7 Customer Login Function   
\*\*Function ID\*\*: FR-07   
\*\*Description\*\*: Allows a registered customer to log in using their verified email and password.   
\*\*Input\*\*: Customer's registered email and password.   
\*\*Output\*\*: Successful login and display of the account dashboard; or error message if login fails.  
  
## 1.8 View Product Catalog Function   
\*\*Function ID\*\*: FR-08   
\*\*Description\*\*: Displays the product catalog to customers and administrators, with options for filtering and searching.   
\*\*Input\*\*: Filter criteria such as category, price range, and keywords.   
\*\*Output\*\*: Displayed product catalog with relevant items based on the input criteria.  
  
## 1.9 Place Order Function   
\*\*Function ID\*\*: FR-09   
\*\*Description\*\*: Enables the customer to place an order after selecting products and completing the payment.   
\*\*Input\*\*: Selected product IDs and quantities, customer's chosen payment method, and validated customer session.   
\*\*Output\*\*: A new order created in the database, inventory updated, and a confirmation email sent to the customer.  
  
## 1.10 View Order History Function   
\*\*Function ID\*\*: FR-10   
\*\*Description\*\*: Displays a list of past orders for the customer or administrator, including detailed order information.   
\*\*Input\*\*: User's login session.   
\*\*Output\*\*: Displayed order history with order IDs, dates, total amounts, and statuses; optional detailed view of selected orders.  
  
## 1.11 Order Confirmation Function   
\*\*Function ID\*\*: FR-11   
\*\*Description\*\*: Sends a confirmation email to the customer after a successful order is placed.   
\*\*Input\*\*: Order details including product list, total amount, and estimated delivery time.   
\*\*Output\*\*: Confirmation email sent to the customer and order status updated to "confirmed".  
  
## 1.12 Payment Processing Function   
\*\*Function ID\*\*: FR-12   
\*\*Description\*\*: Handles the customer's payment transaction using the selected payment method.   
\*\*Input\*\*: Customer's payment details such as card number, expiration date, and CVV.   
\*\*Output\*\*: Updated order status (e.g., "paid") and confirmation message to the customer.  
  
## 1.13 Payment Verification Function   
\*\*Function ID\*\*: FR-13   
\*\*Description\*\*: Verifies the validity and success of a payment transaction through the associated payment plugin.   
\*\*Input\*\*: Transaction details from the payment plugin or gateway.   
\*\*Output\*\*: Updated order and payment statuses (e.g., "verified" or "unverified") and notification to the customer and administrator.  
  
## 1.14 Email Notification Configuration Function   
\*\*Function ID\*\*: FR-14   
\*\*Description\*\*: Allows the administrator to configure email notification settings, such as enabled/disabled status and recipient lists.   
\*\*Input\*\*: Email notification settings including notification types and recipient details.   
\*\*Output\*\*: Updated email notification configuration in the database and confirmation message.  
  
## 1.15 Send Order Confirmation Email Function   
\*\*Function ID\*\*: FR-15   
\*\*Description\*\*: Automatically sends a confirmation email to the customer after an order is successfully placed.   
\*\*Input\*\*: Valid order ID and customer email address.   
\*\*Output\*\*: Confirmation email sent to the customer and email sending status logged in the system.  
  
## 1.16 Plugin Installation Function   
\*\*Function ID\*\*: FR-16   
\*\*Description\*\*: Enables the administrator to install new plugins to extend system functionality.   
\*\*Input\*\*: Plugin file or plugin metadata (name, version, description).   
\*\*Output\*\*: Plugin installed and added to the plugin list in the database.  
  
## 1.17 Plugin Activation Function   
\*\*Function ID\*\*: FR-17   
\*\*Description\*\*: Activates a plugin after it has been installed, ensuring it is functional within the system.   
\*\*Input\*\*: Plugin ID and administrator confirmation for activation.   
\*\*Output\*\*: Plugin status updated to "active" in the database and displayed in the plugin list.  
  
## 1.18 Plugin Deactivation Function   
\*\*Function ID\*\*: FR-18   
\*\*Description\*\*: Deactivates a plugin without uninstalling it, making it no longer functional.   
\*\*Input\*\*: Plugin ID and administrator confirmation for deactivation.   
\*\*Output\*\*: Plugin status updated to "inactive" in the database and displayed in the plugin list.  
  
## 1.19 Plugin Uninstallation Function   
\*\*Function ID\*\*: FR-19   
\*\*Description\*\*: Removes a plugin from the system after deactivation and cleans up related configurations.   
\*\*Input\*\*: Plugin ID and administrator confirmation for uninstallation.   
\*\*Output\*\*: Plugin removed from the system and configuration data deleted from the database.  
  
## 1.20 Administrator Login Function   
\*\*Function ID\*\*: FR-20   
\*\*Description\*\*: Authenticates the administrator by validating their login credentials and role.   
\*\*Input\*\*: Administrator's username (email) and password.   
\*\*Output\*\*: Administrator redirected to the admin dashboard or shown an error message if login fails.  
  
## 1.21 Administrator Dashboard Access Function   
\*\*Function ID\*\*: FR-21   
\*\*Description\*\*: Provides the administrator with access to the dashboard containing system metrics and plugin statuses.   
\*\*Input\*\*: Administrator login session.   
\*\*Output\*\*: Displayed dashboard with system status, plugin statuses, and access to various management functions.  
  
## 1.22 Manage Customers Function   
\*\*Function ID\*\*: FR-22   
\*\*Description\*\*: Enables the administrator to add, modify, or delete customer records in the system.   
\*\*Input\*\*: Customer details such as name, email, contact number, and account status.   
\*\*Output\*\*: Updated customer list in the system with success or failure notification.  
  
## 1.23 Manage Orders Function   
\*\*Function ID\*\*: FR-23   
\*\*Description\*\*: Allows the administrator to add, modify, or delete orders, and update inventory and payment status accordingly.   
\*\*Input\*\*: Order details such as customer, product list, quantities, and payment method.   
\*\*Output\*\*: Updated order list in the system, inventory and payment status adjusted, and success or failure notification.  
  
## 1.24 Manage Payments Function   
\*\*Function ID\*\*: FR-24   
\*\*Description\*\*: Enables the administrator to manage payment records, including adding, modifying, or deleting payments.   
\*\*Input\*\*: Payment details such as order ID, amount, method, and transaction ID.   
\*\*Output\*\*: Updated payment list and corresponding order status, with success or failure notification.  
  
## 1.25 Manage Product Category Function   
\*\*Function ID\*\*: FR-25   
\*\*Description\*\*: Allows the administrator to add, modify, or delete product categories and reassign products if needed.   
\*\*Input\*\*: Category details such as name, description, and parent category.   
\*\*Output\*\*: Updated product category list in the database and success or failure notification.  
  
## 1.26 Manage Email Template Function   
\*\*Function ID\*\*: FR-26   
\*\*Description\*\*: Enables the administrator to create, modify, or delete email templates used for notifications.   
\*\*Input\*\*: Email template details such as name, subject, content, and placeholders for dynamic data.   
\*\*Output\*\*: Updated email template list in the database and success or failure notification.  
  
## 1.27 Manage Payment Method Function   
\*\*Function ID\*\*: FR-27   
\*\*Description\*\*: Allows the administrator to add, modify, or delete supported payment methods and their configurations.   
\*\*Input\*\*: Payment method configuration such as method name, description, and plugin-specific parameters.   
\*\*Output\*\*: Updated payment method list and configuration saved in the database, with success or failure notification.  
  
## 1.28 Manage Administrators Function   
\*\*Function ID\*\*: FR-28   
\*\*Description\*\*: Enables the administrator to add, modify, or delete other administrator accounts and update access control.   
\*\*Input\*\*: Administrator details such as first name, last name, email, password, and role.   
\*\*Output\*\*: Updated administrator list in the database, with success or failure notification.

# External Description

# 2. External Interfaces  
  
This chapter describes the external interfaces of the system, including user interfaces, hardware interfaces, software interfaces, and communication interfaces. These interfaces are critical to the system's functionality and interaction with external components.  
  
## 2.1 User Interface Output  
  
The system interacts with users through well-defined graphical user interfaces (GUIs) that support the following user types: \*\*administrators\*\* and \*\*customers\*\*. Each interface is designed to provide a seamless and intuitive experience for performing specific functions.  
  
- \*\*Product Management Interface\*\*   
 - \*\*Description\*\*: A GUI where administrators can perform actions such as adding, modifying, deleting, or viewing products.   
 - \*\*Input/Output\*\*: Input includes product details such as name, description, price, stock quantity, category, and image URL. Output is an updated product list or a success/failure message.  
  
- \*\*Customer Registration and Login Interface\*\*   
 - \*\*Description\*\*: A GUI that allows new customers to register and existing customers to log in.   
 - \*\*Input/Output\*\*: Input includes personal information like first name, last name, email, password, and contact number. Output includes confirmation of successful registration, login to the account dashboard, or error messages for failed attempts.  
  
- \*\*Product Catalog Interface\*\*   
 - \*\*Description\*\*: A GUI that displays the product catalog to users with options for filtering and searching.   
 - \*\*Input/Output\*\*: Input includes filter criteria like category, price range, and keywords. Output includes the displayed catalog with relevant items based on the filters.  
  
- \*\*Order Placement Interface\*\*   
 - \*\*Description\*\*: A GUI where customers can select products, specify quantities, and proceed with payment.   
 - \*\*Input/Output\*\*: Input includes selected product IDs and quantities, as well as a validated customer session. Output includes creation of a new order, updated inventory, and a confirmation message.  
  
- \*\*Order History Interface\*\*   
 - \*\*Description\*\*: A GUI that allows users to view their past orders.   
 - \*\*Input/Output\*\*: Input includes a valid user session. Output includes a list of orders with order IDs, dates, total amounts, and statuses, and an optional detailed view.  
  
- \*\*Administrator Login and Dashboard Interface\*\*   
 - \*\*Description\*\*: A GUI for administrator authentication and access to the system's administrative dashboard.   
 - \*\*Input/Output\*\*: Input includes the administrator's username and password. Output includes access to the admin dashboard or an error message if the login fails.  
  
- \*\*Customer and Administrator Product View Interface\*\*   
 - \*\*Description\*\*: A GUI that displays detailed product information.   
 - \*\*Input/Output\*\*: Input includes a selected product ID or name. Output includes the product's details like name, description, price, stock quantity, and images.  
  
- \*\*Plugin Management Interface\*\*   
 - \*\*Description\*\*: A GUI where administrators can install, activate, deactivate, or uninstall plugins.   
 - \*\*Input/Output\*\*: Input includes plugin metadata such as name, version, and description. Output includes updates to the plugin list and status changes (active/inactive/uninstalled).  
  
- \*\*Email Notification and Template Management Interface\*\*   
 - \*\*Description\*\*: A GUI for administrators to configure email notification settings and manage email templates.   
 - \*\*Input/Output\*\*: Input includes notification settings and template details (name, subject, content, placeholders). Output includes updated configurations and templates with success/failure messages.  
  
- \*\*User Management Interface (Customer and Administrator)\*\*   
 - \*\*Description\*\*: A GUI for administrators to manage customer and administrator accounts.   
 - \*\*Input/Output\*\*: Input includes user details such as name, email, contact number, password, and role. Output includes updated user lists and access control changes with confirmation.  
  
- \*\*Order and Payment Management Interface\*\*   
 - \*\*Description\*\*: A GUI where administrators can manage orders and payments, including status updates and inventory adjustments.   
 - \*\*Input/Output\*\*: Input includes order and payment details such as customer, product list, quantities, payment method, and transaction ID. Output includes updated order and payment lists with success/failure messages.  
  
- \*\*Product Category Management Interface\*\*   
 - \*\*Description\*\*: A GUI for administrators to manage product categories, including adding, modifying, deleting, and reassigning products.   
 - \*\*Input/Output\*\*: Input includes category details like name, description, and parent category. Output includes an updated category list with confirmation.  
  
## 2.2 Hardware Interface Output  
  
The system does not directly interact with any external hardware devices. Therefore, no hardware interfaces are defined for this system.  
  
## 2.3 Software Interface Output  
  
The system interacts with various external software components, including \*\*databases\*\*, \*\*payment plugins\*\*, and \*\*third-party email services\*\*.  
  
- \*\*Database Interface\*\*   
 - \*\*Description\*\*: The system uses a database to store and retrieve data, including products, customers, orders, payments, email templates, plugin configurations, and administrator accounts.   
 - \*\*Input/Output\*\*: Input includes data for insertion, modification, or deletion (e.g., product details, customer information, order records). Output includes confirmation of data updates or retrieval results.  
  
- \*\*Payment Plugin Interface\*\*   
 - \*\*Description\*\*: The system supports integration with third-party payment plugins (e.g., PayPal, Stripe) to handle and verify payment transactions.   
 - \*\*Input/Output\*\*: Input includes customer payment details (e.g., card number, expiration date, CVV) and transaction data from the payment gateway. Output includes updated order and payment statuses (e.g., "paid", "verified") and confirmation messages.  
  
- \*\*Email Notification Service Interface\*\*   
 - \*\*Description\*\*: The system communicates with an external email service to send confirmation emails to customers and administrators.   
 - \*\*Input/Output\*\*: Input includes the customer's email address and order details (e.g., product list, total amount, delivery time). Output includes the delivery status of the email and a log of the notification in the system.  
  
- \*\*Plugin Management Interface (Software-Level)\*\*   
 - \*\*Description\*\*: The system provides an API or software interface to handle plugin installation, activation, deactivation, and uninstallation.   
 - \*\*Input/Output\*\*: Input includes plugin metadata (e.g., name, version, description) and commands for managing plugin status. Output includes plugin status updates and logs of plugin operations.  
  
## 2.4 Communication Interface Output  
  
The system communicates with external components using network-based protocols to ensure data exchange and notification delivery.  
  
- \*\*Email Communication Interface\*\*   
 - \*\*Description\*\*: The system sends and receives email notifications using an SMTP or similar email communication protocol.   
 - \*\*Input/Output\*\*: Input includes the customer's email address and message content (e.g., confirmation message, order details). Output includes a confirmation that the email was sent successfully or an error message if the communication fails.  
  
- \*\*Web-Based Communication Interface\*\*   
 - \*\*Description\*\*: The system supports web-based interaction through HTTP/HTTPS protocols, allowing users to access the system via web browsers.   
 - \*\*Input/Output\*\*: Input includes user requests and session data transmitted over the web. Output includes HTML or JSON responses that render the GUI or provide data for system operations.  
  
- \*\*Payment Gateway Communication Interface\*\*   
 - \*\*Description\*\*: The system communicates with external payment gateways using secure APIs over HTTPS to process and verify transactions.   
 - \*\*Input/Output\*\*: Input includes customer payment data and transaction identifiers. Output includes transaction status and payment confirmation data returned from the gateway.  
  
- \*\*Plugin Communication Interface\*\*   
 - \*\*Description\*\*: The system communicates with installed plugins through predefined APIs or hooks to extend functionality dynamically.   
 - \*\*Input/Output\*\*: Input includes plugin commands and configuration data. Output includes plugin execution results and status updates.  
  
## 2.5 Summary of External Data Sources  
  
The following external data sources are used across the functional requirements and are covered in the interfaces described above:  
  
- \*\*Database\*\*: Used for storing and retrieving product, customer, order, payment, plugin, and administrator data.   
- \*\*Payment Plugin\*\*: Used for processing and verifying customer payments.   
- \*\*Email Service\*\*: Used for sending confirmation emails and managing notification templates.   
- \*\*Web Browser\*\*: Used for user access and interaction with the system.   
- \*\*Plugin APIs\*\*: Used for managing and extending system functionality.  
  
All of these data sources are clearly defined in the external interfaces section, ensuring consistency and clarity for developers and system integrators.