# Functional Requirement

# 1. Functional Requirements  
  
## 1.1 Customer Management Function   
Function ID: FR-01   
Description: Administrators can create, manage, view, and delete customer records. This includes editing customer information and checking for existing records.   
Input: Customer details (name, email, address, phone number), customer ID for management operations, confirmation inputs for deletion.   
Output: Updated or newly created customer records in the database, confirmation messages, error messages for invalid operations.  
  
## 1.2 Product Management Function   
Function ID: FR-02   
Description: Administrators can add, update, and delete product records. The system ensures product details are valid and checks for existing products.   
Input: Product details (name, description, price, stock, category), product ID for update and deletion, confirmation inputs for deletion.   
Output: Updated or newly added product records in the database, confirmation messages, error messages for invalid operations.  
  
## 1.3 Product Catalog Display Function   
Function ID: FR-03   
Description: The system displays a list of available products to users, with the ability to search and filter using built-in or plugin-based functionality.   
Input: User search or filter criteria, product data from the database.   
Output: Displayed product catalog with filtered or full product list, error messages for invalid input, warning for plugin unavailability.  
  
## 1.4 Order Placement Function   
Function ID: FR-04   
Description: Customers can place orders by submitting products in their cart, selecting a payment method, and confirming the order. The system validates cart data and processes payments.   
Input: Customer-selected products, payment method, confirmation to place order.   
Output: A new order record in the database, updated product stock, a new payment record, a notification to the customer, and a confirmation message.  
  
## 1.5 Order Management Function   
Function ID: FR-05   
Description: Administrators or customers can modify existing orders, including product quantities or shipping details. The system recalculates totals and updates payment and notification status as needed.   
Input: Selected order, modified order details (product quantities, shipping address), confirmation for modifications.   
Output: Updated order record in the database, updated payment status, a notification to the customer, and a confirmation message.  
  
## 1.6 Order Cancellation Function   
Function ID: FR-06   
Description: Customers or administrators can cancel an order if it is in a cancellable state. The system updates the order status and initiates a refund if a payment has been made.   
Input: Selected order, confirmation for cancellation.   
Output: Updated order status (canceled), refund or voided payment if applicable, a notification to the customer, and a confirmation message.  
  
## 1.7 Payment Processing Function   
Function ID: FR-07   
Description: The system processes payments for orders using available payment methods. It validates the payment method, calculates fees, and updates the order and payment status accordingly.   
Input: Selected order, selected payment method, plugin-based validation and calculation data.   
Output: Updated payment status in the database, updated order status, a notification to the customer, and a confirmation message.  
  
## 1.8 Payment Status View Function   
Function ID: FR-08   
Description: Customers or administrators can view the status of a payment associated with an order. The system retrieves and displays the current payment status.   
Input: Selected order or payment, user authentication status.   
Output: Displayed payment status (e.g., pending, completed, failed), a notification if the status has changed, and error messages for technical failures.  
  
## 1.9 Payment Record Deletion Function   
Function ID: FR-09   
Description: Administrators can delete a payment record from the system. The system checks for dependencies and confirms the deletion.   
Input: Selected payment record, confirmation for deletion.   
Output: Deleted payment record from the database, confirmation message, and error messages for invalid deletions.  
  
## 1.10 Order Detail Management Function   
Function ID: FR-10   
Description: Administrators or customers can add, edit, or remove order details (itemized product information) for an order. The system recalculates totals if needed and sends notifications for changes.   
Input: Selected order, modified or new order detail information (product ID, quantity, unit price), confirmation for modifications.   
Output: Updated order detail records in the database, updated order total, a notification to the customer if needed, and a confirmation message.  
  
## 1.11 Plugin Management Function   
Function ID: FR-11   
Description: Administrators can install, update, and uninstall plugins. The system validates plugin compatibility and manages configurations.   
Input: Plugin file or identifier, confirmation for uninstallation or update.   
Output: Installed, updated, or uninstalled plugin in the system, a notification to the administrator, and a confirmation message.  
  
## 1.12 Notification Management Function   
Function ID: FR-12   
Description: Administrators can send, view, and delete notifications. The system ensures notifications are delivered to the correct recipients and logs the activity.   
Input: Notification content, recipient information, notification ID for viewing or deletion, confirmation for deletion.   
Output: Sent or deleted notification, displayed notification list, a log of notification attempts, and a confirmation message.  
  
## 1.13 Administrator Management Function   
Function ID: FR-13   
Description: Administrators can manage other administrator accounts, including editing roles and permissions or removing accounts. The system ensures at least one administrator remains active.   
Input: Selected administrator, modified administrator details (role, username), confirmation for removal.   
Output: Updated or deleted administrator records, confirmation messages, and error messages for invalid operations.  
  
## 1.14 Administrator Log Viewing Function   
Function ID: FR-14   
Description: Administrators can view logs of previous administrative actions. The system retrieves and displays logs in a structured format with filtering options.   
Input: Log filter or search criteria, request to view logs.   
Output: Displayed administrator log entries, error messages for invalid input, and a prompt if no logs are selected.  
  
## 1.15 Order History Viewing Function   
Function ID: FR-15   
Description: Customers or administrators can view the history of orders placed by a customer. The system retrieves and displays the order details without making any changes.   
Input: Selected customer or order, request to view order history.   
Output: Displayed order history with details, error messages if the order is not found, and a prompt if no order is selected.

# External Description

# 2. External Interfaces  
  
This chapter defines the external interfaces of the system, including user interfaces, hardware interfaces, software interfaces, and communication interfaces. These interfaces describe how the system interacts with external entities such as users, hardware, other software systems, and communication protocols.  
  
## 2.1 User Interface  
  
The system provides a user interface for both administrators and customers to interact with the functionalities. The interface includes forms, buttons, tables, and modals to manage customer records, product records, orders, and notifications.  
  
### 2.1.1 Customer Management UI   
- \*\*Description\*\*: A form-based interface for administrators to create, view, edit, and delete customer records.   
- \*\*Inputs\*\*: Customer details (name, email, address, phone number), customer ID, and confirmation inputs for deletion.   
- \*\*Outputs\*\*: Updated or newly created customer records, confirmation messages, and error messages.   
  
### 2.1.2 Product Management UI   
- \*\*Description\*\*: A form-based interface for administrators to add, update, and delete product records.   
- \*\*Inputs\*\*: Product details (name, description, price, stock, category), product ID, and confirmation inputs for deletion.   
- \*\*Outputs\*\*: Updated or newly added product records, confirmation messages, and error messages.   
  
### 2.1.3 Product Catalog UI   
- \*\*Description\*\*: A searchable and filterable interface for users to browse available products.   
- \*\*Inputs\*\*: Search or filter criteria provided by the user.   
- \*\*Outputs\*\*: A list of products based on the search or filter, error messages for invalid input, and a warning if plugins are unavailable.   
  
### 2.1.4 Order Placement UI   
- \*\*Description\*\*: A user interface for customers to submit their orders, select a payment method, and confirm the transaction.   
- \*\*Inputs\*\*: Selected products, payment method, and confirmation to place order.   
- \*\*Outputs\*\*: A confirmation message, a summary of the order, and a notification to the customer.   
  
### 2.1.5 Order Management UI   
- \*\*Description\*\*: A form-based interface for administrators or customers to modify existing orders, such as adjusting product quantities or updating shipping details.   
- \*\*Inputs\*\*: Selected order, modified order details, and confirmation for modifications.   
- \*\*Outputs\*\*: Updated order details, confirmation messages, and notifications to the customer.   
  
### 2.1.6 Order Cancellation UI   
- \*\*Description\*\*: An interface for administrators or customers to cancel orders that are in a cancellable state.   
- \*\*Inputs\*\*: Selected order and confirmation for cancellation.   
- \*\*Outputs\*\*: Updated order status, confirmation messages, and notifications for cancellations or refunds.   
  
### 2.1.7 Payment Status View UI   
- \*\*Description\*\*: A display interface for users to view the current status of a payment associated with an order.   
- \*\*Inputs\*\*: Selected order or payment.   
- \*\*Outputs\*\*: Displayed payment status (e.g., pending, completed, failed), notifications for status changes, and error messages for technical failures.   
  
### 2.1.8 Notification Management UI   
- \*\*Description\*\*: A dashboard interface for administrators to send, view, and delete notifications.   
- \*\*Inputs\*\*: Notification content, recipient information, notification ID, and confirmation for deletion.   
- \*\*Outputs\*\*: Sent or deleted notifications, displayed notification list, and a log of notification attempts.   
  
### 2.1.9 Administrator Management UI   
- \*\*Description\*\*: A user interface for administrators to manage other administrator accounts, including editing roles and permissions or removing accounts.   
- \*\*Inputs\*\*: Selected administrator, modified details (role, username), and confirmation for removal.   
- \*\*Outputs\*\*: Updated or deleted administrator records, confirmation messages, and error messages for invalid operations.   
  
### 2.1.10 Administrator Log Viewing UI   
- \*\*Description\*\*: A structured interface for administrators to view and filter logs of previous administrative actions.   
- \*\*Inputs\*\*: Log filter or search criteria and request to view logs.   
- \*\*Outputs\*\*: Displayed log entries, error messages for invalid input, and a prompt if no logs are selected.   
  
### 2.1.11 Order History Viewing UI   
- \*\*Description\*\*: A read-only interface for administrators or customers to view the history of orders placed by a specific customer.   
- \*\*Inputs\*\*: Selected customer or order and a request to view order history.   
- \*\*Outputs\*\*: Displayed order history with detailed information, error messages if the order is not found, and a prompt if no order is selected.   
  
## 2.2 Hardware Interface  
  
The system does not require direct interaction with any specific hardware devices. All hardware dependencies are abstracted through the software and communication interfaces. Therefore, no hardware interface is defined for this system.  
  
## 2.3 Software Interface  
  
The system interacts with various software components, including the database and external plugins used for payment processing and product catalog filtering.  
  
### 2.3.1 Database Interface   
- \*\*Description\*\*: The system communicates with a relational database to store and retrieve data related to customers, products, orders, and notifications.   
- \*\*Inputs\*\*: Data to be stored (e.g., customer details, product information, order records), queries to retrieve data (e.g., order history, product catalog).   
- \*\*Outputs\*\*: Updated or retrieved records in the database, error messages for invalid database operations.   
- \*\*Interaction Method\*\*: SQL queries or ORM (Object-Relational Mapping) commands are used to interact with the database.   
  
### 2.3.2 Payment Plugin Interface   
- \*\*Description\*\*: The system supports plugin-based payment processing. Administrators can install, update, or uninstall payment plugins.   
- \*\*Inputs\*\*: Selected payment method, plugin file or identifier, confirmation for uninstallation or update.   
- \*\*Outputs\*\*: Updated payment method status, installed or uninstalled plugin, confirmation messages, and error messages for invalid plugin operations.   
- \*\*Interaction Method\*\*: The system uses a plugin architecture to load and execute external payment processing plugins.   
  
### 2.3.3 Product Catalog Plugin Interface   
- \*\*Description\*\*: The system supports plugin-based functionality for product catalog filtering and searching.   
- \*\*Inputs\*\*: User-defined filter or search criteria, plugin-based logic for filtering.   
- \*\*Outputs\*\*: Filtered product catalog results, warnings for plugin unavailability, and error messages for invalid filtering logic.   
- \*\*Interaction Method\*\*: The system dynamically loads plugins to perform filtering and searching based on user input.   
  
## 2.4 Communication Interface  
  
The system uses communication interfaces to interact with external systems or users through network-based methods.  
  
### 2.4.1 Email Notification Interface   
- \*\*Description\*\*: The system sends email notifications to users regarding order status, payment confirmation, and other relevant updates.   
- \*\*Inputs\*\*: Notification content and recipient email addresses.   
- \*\*Outputs\*\*: Email sent to the recipient, a log of the notification attempt, and confirmation message for the administrator.   
- \*\*Interaction Method\*\*: The system uses an email service API to send messages via SMTP or other email protocols.   
  
### 2.4.2 Web Communication Interface   
- \*\*Description\*\*: The system is accessible through web browsers, and all user interactions occur via HTTP/HTTPS protocols.   
- \*\*Inputs\*\*: User requests from the web browser, including form submissions and API calls.   
- \*\*Outputs\*\*: Web page responses, JSON or XML data for API calls, and error messages for invalid requests.   
- \*\*Interaction Method\*\*: RESTful API or web pages are served through a web server using HTTP/HTTPS.   
  
### 2.4.3 Plugin Communication Interface   
- \*\*Description\*\*: The system communicates with external plugins to perform additional functionalities, such as payment processing and filtering.   
- \*\*Inputs\*\*: Plugin identifiers, configuration data, and execution commands.   
- \*\*Outputs\*\*: Plugin responses, updated system state, and error messages if the plugin fails.   
- \*\*Interaction Method\*\*: The system uses a defined plugin architecture to load, execute, and communicate with plugins using standard data formats (e.g., JSON).   
  
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This section has defined all external interfaces required by the system, ensuring consistency with the functional requirements and providing clear descriptions of each interface and its role. Developers can use this information to correctly implement the system and its interactions with external entities.