# Functional Requirement

1.1 Product Creation Function   
Function ID: FR-01   
Description: Administrators can create new products in the system by providing necessary details such as name, description, price, and inventory level.   
Input: Product details including Name, Description, Price, Inventory, and Status.   
Output: A new Product entry in the database with the provided details.  
  
1.2 Product Update Function   
Function ID: FR-02   
Description: Administrators can modify the details of an existing product, such as name, description, price, or inventory level.   
Input: ProductID and updated details including Name, Description, Price, Inventory, and Status.   
Output: Updated Product entry in the database with the modified details.  
  
1.3 Product Deletion Function   
Function ID: FR-03   
Description: Administrators can delete a product from the system. Deletion is only allowed if the product is not associated with any active order or payment.   
Input: ProductID.   
Output: The selected Product is removed from the database.  
  
1.4 Product View Function   
Function ID: FR-04   
Description: Users (Administrators and Customers) can view the details of a specific product, such as name, description, price, and inventory level.   
Input: ProductID.   
Output: Displayed Product information in a non-editable format.  
  
1.5 Inventory Management Function   
Function ID: FR-05   
Description: Administrators can adjust the inventory level of a product by adding or subtracting the quantity.   
Input: ProductID and quantity change (positive or negative).   
Output: Updated inventory level of the selected Product in the database.  
  
1.6 Product Search Function   
Function ID: FR-06   
Description: Users (Administrators and Customers) can search for products based on criteria such as name, category, or price range.   
Input: Search criteria including Name, Category, or Price Range.   
Output: A list of Products matching the search criteria.  
  
1.7 Customer Registration Function   
Function ID: FR-07   
Description: Administrators can create new customer accounts by providing personal information such as name, email, password, address, and phone number.   
Input: Customer details including Name, Email, Password, Address, and PhoneNumber.   
Output: A new Customer entry in the database with the provided details.  
  
1.8 Customer Information Update Function   
Function ID: FR-08   
Description: Administrators can update the information of an existing customer, such as name, email, address, or phone number.   
Input: CustomerID and updated details including Name, Email, Address, and PhoneNumber.   
Output: Updated Customer entry in the database with the modified details.  
  
1.9 Customer Account Deletion Function   
Function ID: FR-09   
Description: Administrators can delete a customer account from the system. Deletion is only allowed if the customer is not associated with any active order or payment.   
Input: CustomerID.   
Output: The selected Customer account is removed from the database.  
  
1.10 Customer Profile View Function   
Function ID: FR-10   
Description: Users (Administrators and Customers) can view the profile information of a specific customer, such as name, email, address, and phone number.   
Input: CustomerID.   
Output: Displayed Customer profile in a non-editable format.  
  
1.11 Order Placement Function   
Function ID: FR-11   
Description: Customers can place an order for selected products after confirming the order details and completing the payment process.   
Input: CustomerID, ProductID list, and quantity for each product.   
Output: A new Order entry in the database with associated OrderItems and updated inventory levels.  
  
1.12 Order Cancellation Function   
Function ID: FR-12   
Description: Customers or Administrators can cancel an order if it is in an eligible state (e.g., not yet shipped or processed).   
Input: OrderID.   
Output: The selected Order is updated to "Canceled" in the database, and inventory levels are adjusted accordingly.  
  
1.13 Order Details View Function   
Function ID: FR-13   
Description: Users (Administrators and Customers) can view the details of a specific order, including products, quantities, total price, and order status.   
Input: OrderID.   
Output: Displayed Order details in a non-editable format.  
  
1.14 Order Status Tracking Function   
Function ID: FR-14   
Description: Users (Administrators and Customers) can track the current status of an order, including shipping and payment status.   
Input: OrderID.   
Output: Displayed Order status and related tracking information in a non-editable format.  
  
1.15 Payment Processing Function   
Function ID: FR-15   
Description: The system processes a payment for a selected order through a configured Plugin.   
Input: OrderID and Payment details including PaymentMethod and Amount.   
Output: A new Payment entry in the database and an updated Order status to "Paid".  
  
1.16 Payment Confirmation Function   
Function ID: FR-16   
Description: The system confirms a payment after receiving a confirmation from a third-party payment gateway via the Plugin.   
Input: PaymentID and confirmation data from the Plugin.   
Output: Updated Payment status to "Confirmed" in the database and Order status to "Paid".  
  
1.17 Order Confirmation Email Sending Function   
Function ID: FR-17   
Description: The system sends an order confirmation email to the customer using the configured Email template and Plugin.   
Input: OrderID and Customer email address.   
Output: Email sent to the customer with order details, and the Order status updated to "Confirmation Email Sent".  
  
1.18 Email Template Management Function   
Function ID: FR-18   
Description: Administrators can create, update, or delete email templates used for system notifications (e.g., order confirmation).   
Input: EmailTemplate details including TemplateName, Subject, and Content.   
Output: Updated EmailTemplate entry in the database or deletion of the selected template.  
  
1.19 Administrator Registration Function   
Function ID: FR-19   
Description: Administrators can register a new administrator account with the system by providing personal and role-based information.   
Input: Administrator details including Name, Email, Password, and Role.   
Output: A new Admin entry in the database with the provided details.  
  
1.20 Administrator Information Update Function   
Function ID: FR-20   
Description: Administrators can update their own or other administrator accounts with new information such as name, email, or role.   
Input: AdminID and updated details including Name, Email, and Role.   
Output: Updated Admin entry in the database with the modified details.  
  
1.21 Administrator Account Deletion Function   
Function ID: FR-21   
Description: Administrators can delete an administrator account from the system if it is not associated with any active orders or payments.   
Input: AdminID.   
Output: The selected Admin account is removed from the database.  
  
1.22 Plugin Management Function   
Function ID: FR-22   
Description: Administrators can install, update, or uninstall plugins to extend system functionality.   
Input: Plugin details including Name, Version, Description, and Source (for installation).   
Output: Updated Plugin entry in the database or removal of the selected plugin.  
  
1.23 Plugin Configuration Function   
Function ID: FR-23   
Description: Administrators can configure settings for an installed plugin, such as API keys or endpoints.   
Input: PluginID and configuration details including API keys and endpoints.   
Output: Updated Plugin configuration in the database and the Plugin is reloaded to apply changes.  
  
1.24 Plugin Information View Function   
Function ID: FR-24   
Description: Administrators can view the details of an installed plugin, such as name, version, and status.   
Input: PluginID.   
Output: Displayed Plugin information in a non-editable format.  
  
1.25 Order Item Management Function   
Function ID: FR-25   
Description: Users (Administrators and Customers) can manage order items by adding, updating, or removing them from an order.   
Input: OrderID and OrderItem details including ProductID, Quantity, and Subtotal.   
Output: Updated OrderItem entry in the database and adjusted inventory levels for affected products.  
  
1.26 Email Management Function   
Function ID: FR-26   
Description: Administrators can update or delete email records associated with customer communications or system notifications.   
Input: EmailID and updated details including Email content or recipient information.   
Output: Updated or deleted Email entry in the database.

# External Description

# 2. External Interfaces   
  
## 2.1 User Interface Output   
The system provides a set of user interfaces for administrators and customers to interact with the system functionalities. These interfaces are designed to allow data input, modification, and viewing of system information in a non-editable format when appropriate.   
  
\*\*Role and Interaction Method:\*\*   
- \*\*Administrators:\*\*   
 - \*\*Product Management Interface:\*\* Administrators can input and update product details such as Name, Description, Price, Inventory, and Status. This interface supports creation, modification, and deletion of product records.   
 - \*\*Customer Management Interface:\*\* Administrators can input and update customer details such as Name, Email, Address, and PhoneNumber. This interface supports creation, modification, and deletion of customer records.   
 - \*\*Order Management Interface:\*\* Administrators can view Order details including products, quantities, total price, and order status. This interface supports cancellation and tracking of orders.   
 - \*\*Administrator Management Interface:\*\* Administrators can register, update, or delete other admin accounts by providing Name, Email, Password, and Role.   
 - \*\*Plugin Management Interface:\*\* Administrators can install, update, or uninstall plugins by providing Name, Version, Description, and Source. They can also configure plugins by specifying API keys and endpoints.   
 - \*\*Email Template Management Interface:\*\* Administrators can create, update, or delete email templates by providing TemplateName, Subject, and Content.   
  
- \*\*Customers:\*\*   
 - \*\*Product View Interface:\*\* Customers can view product details such as Name, Description, Price, and Inventory by providing ProductID.   
 - \*\*Order Placement Interface:\*\* Customers can select products and specify quantities to place an order. This interface requires inputs such as CustomerID, ProductID list, and quantity for each product.   
 - \*\*Order Cancellation Interface:\*\* Customers can cancel an order by providing OrderID.   
 - \*\*Order Details Interface:\*\* Customers can view Order details including products, quantities, total price, and order status by providing OrderID.   
 - \*\*Order Status Tracking Interface:\*\* Customers can track the current status of an order, including shipping and payment status, by providing OrderID.   
  
\*\*Output Description:\*\*   
- All interfaces output data in a user-friendly format, typically as web-based forms or data tables.   
- For viewing functionalities (e.g., Product View, Order Details), data is displayed in a non-editable format.   
- For management functionalities (e.g., Product Creation, Order Cancellation), the system updates the database and provides confirmation or status messages to the user.   
  
## 2.2 Hardware Interface Output   
No direct interaction with hardware devices is required for the functionalities described in the system. The system does not rely on specialized hardware for processing, storage, or communication.   
  
\*\*Role and Interaction Method:\*\*   
- The system is expected to run on standard server hardware and client devices (e.g., desktops, mobile phones) and does not require any specific hardware components for its operation.   
- The Plugin Management and Configuration functionalities may indirectly interact with hardware via external systems or APIs, but this is abstracted at the software level and does not require direct hardware interface definitions.   
  
## 2.3 Software Interface Output   
The system interacts with several external software components, including a database, third-party payment gateway, and email service plugin. These interfaces are essential for storing, retrieving, and processing data, as well as extending the system’s functionality.   
  
### 2.3.1 Database Interface   
\*\*Description:\*\*   
The system stores and retrieves data from a database. This includes Product, Customer, Order, OrderItem, Payment, EmailTemplate, and Plugin records.   
  
\*\*Interaction Method:\*\*   
- \*\*Product Creation/Update/Deletion:\*\* The system inserts, updates, or deletes a Product record in the database using the provided inputs (e.g., Name, Description, Price, Inventory, Status, ProductID).   
- \*\*Customer Registration/Update/Deletion:\*\* The system inserts, updates, or deletes a Customer record in the database using the provided inputs (e.g., Name, Email, Password, Address, PhoneNumber, CustomerID).   
- \*\*Order Placement/Item Management/Cancellation:\*\* The system inserts, updates, or deletes Order, OrderItem, and Inventory records in the database using inputs such as CustomerID, ProductID, Quantity, OrderID, and Subtotal.   
- \*\*Payment Processing/Confirmation:\*\* The system inserts a Payment record and updates the Order status to "Paid" when a payment is processed or confirmed.   
- \*\*Email Template Management:\*\* The system inserts, updates, or deletes EmailTemplate records using TemplateName, Subject, and Content.   
- \*\*Plugin Management/Configuration:\*\* The system inserts, updates, or deletes Plugin records using Name, Version, Description, Source, and configuration details such as API keys and endpoints.   
  
\*\*Data Flow:\*\*   
- The system reads and writes records in the database as part of its core functionality.   
- Inventory levels are updated in the database when a product is created, updated, or when an order is placed or canceled.   
- Payment status is updated in the database after successful processing or confirmation.   
- Email templates are stored in the database and used when sending system notifications.   
  
### 2.3.2 Payment Gateway Interface (via Plugin)   
\*\*Description:\*\*   
The system processes payments through a configured plugin that interacts with an external payment gateway. This plugin is responsible for handling payment transactions and confirming their success or failure.   
  
\*\*Interaction Method:\*\*   
- The system sends \*\*Payment details\*\* (OrderID, PaymentMethod, Amount) to the plugin for processing.   
- The plugin communicates with the external payment gateway to execute the transaction.   
- The system receives \*\*confirmation data\*\* (e.g., PaymentID, transaction status) from the plugin after the payment is processed.   
  
\*\*Data Flow:\*\*   
- Payment data is sent to the plugin for initiation.   
- The plugin sends a confirmation back to the system, which is then used to update the Payment and Order records in the database.   
  
### 2.3.3 Email Service Interface (via Plugin)   
\*\*Description:\*\*   
The system sends emails to customers using a configured plugin that connects to an email service. This includes order confirmation emails and system notifications.   
  
\*\*Interaction Method:\*\*   
- The system sends \*\*OrderID and Customer email address\*\* to the plugin to trigger the sending of an email.   
- The plugin uses the configured email template and external email service to send the message.   
- The system receives a confirmation from the plugin that the email was sent successfully.   
  
\*\*Data Flow:\*\*   
- Email content is generated based on the configured template and the associated Order data.   
- The plugin sends the email to the customer and updates the Order status to "Confirmation Email Sent" in the database.   
  
### 2.3.4 Plugin Management Interface   
\*\*Description:\*\*   
The system allows administrators to manage plugins, including installation, configuration, and uninstallation. Plugins extend the system's functionality, such as payment and email processing.   
  
\*\*Interaction Method:\*\*   
- \*\*Installation:\*\* The system accepts Plugin details (Name, Version, Description, Source) and installs the plugin.   
- \*\*Configuration:\*\* The system accepts PluginID and configuration details (e.g., API keys, endpoints) and updates the plugin configuration in the database.   
- \*\*Uninstallation:\*\* The system removes the Plugin record from the database and uninstalls the plugin.   
  
\*\*Data Flow:\*\*   
- Plugin information is stored in the database.   
- Configuration changes are saved and the plugin is reloaded to apply new settings.   
  
## 2.4 Communication Interface Output   
The system communicates with external services and users via various communication channels, primarily through email notifications and plugin-based interactions.   
  
### 2.4.1 Email Notification Interface   
\*\*Description:\*\*   
The system sends email notifications to customers using the configured email plugin. This includes order confirmation emails and other system-generated messages.   
  
\*\*Interaction Method:\*\*   
- The system triggers an email notification by providing \*\*OrderID and Customer email address\*\* to the email plugin.   
- The plugin generates the email using the configured template and sends it to the recipient.   
  
\*\*Data Flow:\*\*   
- The email is sent to the customer's email address.   
- The system updates the Order status to "Confirmation Email Sent" once the email is successfully sent.   
  
### 2.4.2 Web-Based Communication Interface   
\*\*Description:\*\*   
The system is accessed via a web-based interface, allowing users to interact with it through web browsers.   
  
\*\*Interaction Method:\*\*   
- Users (Administrators and Customers) interact with the system using HTTP/HTTPS protocols via web browsers.   
- The system processes incoming requests and returns appropriate web pages or API responses.   
  
\*\*Data Flow:\*\*   
- Requests are received via the web interface and processed by the system.   
- Responses (e.g., web pages, JSON data) are sent back to the user's browser for display.   
  
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\*\*Cross-Check Summary:\*\*   
All external data sources and interfaces referenced in the functional requirements are clearly defined in this section:   
- \*\*Database:\*\* Covers all entity records (Product, Customer, Order, OrderItem, Payment, EmailTemplate, Plugin).   
- \*\*Payment Gateway Plugin:\*\* Processes and confirms payments using OrderID, PaymentMethod, and Amount.   
- \*\*Email Service Plugin:\*\* Sends order confirmation emails using OrderID and Customer email address.   
- \*\*Web Interface:\*\* Supports user interaction for all functionalities.   
- \*\*Plugin Management and Configuration:\*\* Allows for dynamic extension of system capabilities.   
  
Each external interface is described with its role, inputs, outputs, and interaction methods to ensure clarity and ease of implementation.