# Functional Requirement

1.1 Customer Registration Function   
 Function ID: FR-01   
 Description: Allows a new customer to register an account by providing valid personal information. The system validates the email format and password complexity, and sends a confirmation email.   
 Input: Name, Email, Password   
 Output: Active customer account with a confirmation email sent to the provided email address.  
  
1.2 Customer Login Function   
 Function ID: FR-02   
 Description: Authenticates a customer using their email and password. A successful login creates a session and redirects the customer to their account dashboard.   
 Input: Email, Password   
 Output: Active session for the customer, redirected to the account dashboard.  
  
1.3 Customer Logout Function   
 Function ID: FR-03   
 Description: Terminates an active customer session and clears session-related data.   
 Input: Active customer session   
 Output: Session terminated, customer redirected to login or home page.  
  
1.4 Product Information Viewing Function   
 Function ID: FR-04   
 Description: Allows a customer to view detailed product information, including name, description, price, and stock status.   
 Input: ProductID or search query   
 Output: Displayed product details including name, description, price, and availability.  
  
1.5 Add Product to Cart Function   
 Function ID: FR-05   
 Description: Enables a customer to add a selected product to their shopping cart, provided the product is in stock.   
 Input: ProductID, CustomerID (optional), Quantity   
 Output: Updated shopping cart with the added product and confirmation message.  
  
1.6 Create Order Function   
 Function ID: FR-06   
 Description: Allows a customer to proceed with checkout and create a new order after confirming their shipping details and selecting a payment method.   
 Input: CustomerID, ProductID list, Quantity list, Shipping Address, Payment Method   
 Output: Created order record, updated product inventory, and initiation of payment processing.  
  
1.7 View Order Details Function   
 Function ID: FR-07   
 Description: Enables a customer to view the details of a specific order, including product list, order status, and total amount.   
 Input: OrderID, CustomerID   
 Output: Displayed order details including product list, quantities, prices, date, and status.  
  
1.8 Update Order Status Function   
 Function ID: FR-08   
 Description: Allows an administrator to update the status of an order, such as from "Processing" to "Shipped" or "Delivered," and notify the customer via email.   
 Input: OrderID, New Status   
 Output: Updated order status and a notification email sent to the customer.  
  
1.9 Delete Order Function   
 Function ID: FR-09   
 Description: Enables an administrator to delete an order from the system if it is in a cancellable or deletable status and updates the inventory accordingly.   
 Input: OrderID, CustomerID, Current Order Status   
 Output: Deleted order record, updated product inventory, and a notification email sent to the customer.  
  
1.10 Create Payment Function   
 Function ID: FR-10   
 Description: Facilitates the creation of a payment record for a specific order after the customer confirms the payment method and provides the necessary payment details.   
 Input: OrderID, Payment Method, Payment Details (e.g., card information)   
 Output: Created payment record, updated order status to "Paid," and a confirmation email sent to the customer.  
  
1.11 Process Payment Function   
 Function ID: FR-11   
 Description: Processes the payment using the configured payment gateway API and updates the payment and order status accordingly.   
 Input: PaymentID, Transaction Details   
 Output: Processed payment record, updated order status, and logs for payment processing.  
  
1.12 View Payment History Function   
 Function ID: FR-12   
 Description: Allows a customer to view their historical payment records, including payment dates, amounts, and associated order information.   
 Input: CustomerID   
 Output: Displayed list of payment records with details such as date, amount, method, and order ID.  
  
1.13 Administrator Registration Function   
 Function ID: FR-13   
 Description: Enables a new administrator to register an account by providing valid personal information. The system validates the email format and password complexity and sends a confirmation email.   
 Input: Name, Email, Password   
 Output: Active administrator account with a confirmation email sent to the provided email address.  
  
1.14 Administrator Login Function   
 Function ID: FR-14   
 Description: Authenticates an administrator using their email and password. A successful login creates a session and redirects the administrator to the admin dashboard.   
 Input: Email, Password   
 Output: Active session for the administrator, redirected to the admin dashboard.  
  
1.15 Administrator Logout Function   
 Function ID: FR-15   
 Description: Terminates an active administrator session and clears session-related data.   
 Input: Active administrator session   
 Output: Session terminated, administrator redirected to login or home page.  
  
1.16 Add Product Function   
 Function ID: FR-16   
 Description: Enables an administrator to add a new product to the system database by providing product details and uploading an image.   
 Input: Product name, description, price, category, image   
 Output: New product record added to the database and a confirmation message displayed to the administrator.  
  
1.17 Update Product Information Function   
 Function ID: FR-17   
 Description: Allows an administrator to modify an existing product's details, such as name, description, price, or image.   
 Input: ProductID, updated product details, new image (optional)   
 Output: Updated product record in the database and a confirmation message displayed to the administrator.  
  
1.18 Delete Product Function   
 Function ID: FR-18   
 Description: Enables an administrator to delete a product from the system if it is not associated with any active orders.   
 Input: ProductID, current product status, list of associated orders   
 Output: Deleted product record from the database and a confirmation message displayed to the administrator.  
  
1.19 View Email Template Function   
 Function ID: FR-19   
 Description: Allows an administrator to view the content and structure of an email template used for notifications such as order confirmation or registration.   
 Input: TemplateID or template name   
 Output: Displayed email template content including subject, body, and placeholders for dynamic data.  
  
1.20 Send Order Confirmation Email Function   
 Function ID: FR-20   
 Description: Triggers the system to send a confirmation email to a customer after their order has been successfully processed.   
 Input: OrderID, CustomerID, Email Template   
 Output: Sent order confirmation email and a log entry for the email delivery status.  
  
1.21 Manage Plugin Function   
 Function ID: FR-21   
 Description: Enables an administrator to manage plugins by enabling, disabling, or configuring them based on system needs.   
 Input: PluginID, configuration parameters   
 Output: Updated plugin status or configuration in the database and a confirmation message to the administrator.  
  
1.22 View API Documentation Function   
 Function ID: FR-22   
 Description: Allows an administrator to view API documentation for the plugins integrated into the system.   
 Input: APID or API name   
 Output: Displayed API documentation in a structured format, including endpoints and usage examples.

# External Description

\*\*Chapter 2: External Interfaces\*\*  
  
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### 2.1 User Interface  
  
The system interacts with both \*\*customers\*\* and \*\*administrators\*\* through a series of user interfaces designed to support account management, product browsing, order creation, and administrative tasks.  
  
- \*\*Customer Registration Interface (FR-01)\*\*   
 - \*\*Description:\*\* A web-based form where new customers can input their \*\*Name\*\*, \*\*Email\*\*, and \*\*Password\*\*.   
 - \*\*Interaction Method:\*\* Form submission with real-time validation for email format and password complexity.   
 - \*\*Output:\*\* A confirmation message and a \*\*confirmation email\*\* sent to the customer’s email address.  
  
- \*\*Customer Login Interface (FR-02)\*\*   
 - \*\*Description:\*\* A login form where customers enter their \*\*Email\*\* and \*\*Password\*\* to authenticate.   
 - \*\*Interaction Method:\*\* Form submission with server-side authentication.   
 - \*\*Output:\*\* A successful login redirects the customer to the \*\*account dashboard\*\*; an error message is displayed for invalid credentials.  
  
- \*\*Customer Logout Interface (FR-03)\*\*   
 - \*\*Description:\*\* A logout button or menu option accessible after a customer has logged in.   
 - \*\*Interaction Method:\*\* Clicking or selecting the logout option terminates the session.   
 - \*\*Output:\*\* The customer is redirected to the \*\*login page\*\* or \*\*home page\*\*.  
  
- \*\*Product Information Interface (FR-04)\*\*   
 - \*\*Description:\*\* A product detail page or search result interface where customers can view information about a product.   
 - \*\*Interaction Method:\*\* Product details are displayed in a structured format after entering a \*\*ProductID\*\* or a \*\*search query\*\*.   
 - \*\*Output:\*\* Displays \*\*product name\*\*, \*\*description\*\*, \*\*price\*\*, \*\*stock status\*\*, and \*\*availability\*\*.  
  
- \*\*Add Product to Cart Interface (FR-05)\*\*   
 - \*\*Description:\*\* A button or interface element (e.g., “Add to Cart”) on the product detail page.   
 - \*\*Interaction Method:\*\* Customers click the button and optionally specify \*\*Quantity\*\*.   
 - \*\*Output:\*\* The shopping cart is updated with the product, and a \*\*confirmation message\*\* is displayed.  
  
- \*\*Create Order Interface (FR-06)\*\*   
 - \*\*Description:\*\* A checkout interface where customers confirm their \*\*shipping address\*\* and \*\*payment method\*\* before submitting the order.   
 - \*\*Interaction Method:\*\* Form submission with validation for shipping and payment details.   
 - \*\*Output:\*\* Displays a \*\*confirmation screen\*\* with order details and initiates \*\*payment processing\*\*.  
  
- \*\*View Order Details Interface (FR-07)\*\*   
 - \*\*Description:\*\* A page or modal where customers can view the details of a specific \*\*OrderID\*\*.   
 - \*\*Interaction Method:\*\* Customers select an order from a list or enter an \*\*OrderID\*\* directly.   
 - \*\*Output:\*\* Displays \*\*product list\*\*, \*\*quantities\*\*, \*\*prices\*\*, \*\*order date\*\*, and \*\*status\*\*.  
  
- \*\*Administrator Registration Interface (FR-13)\*\*   
 - \*\*Description:\*\* A form for new administrators to input their \*\*Name\*\*, \*\*Email\*\*, and \*\*Password\*\*.   
 - \*\*Interaction Method:\*\* Form submission with validation for email format and password complexity.   
 - \*\*Output:\*\* A confirmation message and a \*\*confirmation email\*\* sent to the administrator’s email.  
  
- \*\*Administrator Login Interface (FR-14)\*\*   
 - \*\*Description:\*\* A login form where administrators enter their \*\*Email\*\* and \*\*Password\*\* to access the admin dashboard.   
 - \*\*Interaction Method:\*\* Form submission with server-side authentication.   
 - \*\*Output:\*\* A successful login redirects the administrator to the \*\*admin dashboard\*\*; an error message is displayed for invalid credentials.  
  
- \*\*Administrator Logout Interface (FR-015)\*\*   
 - \*\*Description:\*\* A logout button or menu option accessible after an administrator has logged in.   
 - \*\*Interaction Method:\*\* Clicking or selecting the logout option terminates the session.   
 - \*\*Output:\*\* The administrator is redirected to the \*\*login page\*\* or \*\*home page\*\*.  
  
- \*\*Add Product Interface (FR-16)\*\*   
 - \*\*Description:\*\* A product creation form in the admin dashboard where administrators input \*\*product name\*\*, \*\*description\*\*, \*\*price\*\*, \*\*category\*\*, and upload a \*\*product image\*\*.   
 - \*\*Interaction Method:\*\* Form submission with server-side validation.   
 - \*\*Output:\*\* Displays a \*\*confirmation message\*\* upon successful product creation.  
  
- \*\*Update Product Information Interface (FR-17)\*\*   
 - \*\*Description:\*\* A form or modal where administrators can modify existing product details, including \*\*name\*\*, \*\*description\*\*, \*\*price\*\*, \*\*category\*\*, and optionally \*\*product image\*\*.   
 - \*\*Interaction Method:\*\* Select a \*\*ProductID\*\*, modify the fields, and submit the form.   
 - \*\*Output:\*\* Displays a \*\*confirmation message\*\* upon successful update.  
  
- \*\*Delete Product Interface (FR-18)\*\*   
 - \*\*Description:\*\* A confirmation dialog or button in the admin dashboard for deleting a product.   
 - \*\*Interaction Method:\*\* Select a \*\*ProductID\*\*, confirm the deletion based on product status and associated orders.   
 - \*\*Output:\*\* Displays a \*\*confirmation message\*\* upon successful deletion.  
  
- \*\*View Email Template Interface (FR-19)\*\*   
 - \*\*Description:\*\* A section in the admin dashboard where administrators can view and edit \*\*email templates\*\* used for notifications.   
 - \*\*Interaction Method:\*\* Search or select a \*\*TemplateID\*\* or \*\*template name\*\* to view the template content.   
 - \*\*Output:\*\* Displays the \*\*subject\*\*, \*\*body\*\*, and \*\*placeholders\*\* for dynamic data (e.g., customer name, order ID).  
  
- \*\*Manage Plugin Interface (FR-21)\*\*   
 - \*\*Description:\*\* A plugin management panel in the admin dashboard where administrators can \*\*enable\*\*, \*\*disable\*\*, or \*\*configure plugins\*\*.   
 - \*\*Interaction Method:\*\* Select a \*\*PluginID\*\* and modify its configuration parameters.   
 - \*\*Output:\*\* Displays a \*\*confirmation message\*\* upon successful plugin status or configuration update.  
  
- \*\*View API Documentation Interface (FR-22)\*\*   
 - \*\*Description:\*\* A documentation viewer in the admin dashboard where administrators can access \*\*API documentation\*\* for integrated plugins.   
 - \*\*Interaction Method:\*\* Select an \*\*APID\*\* or \*\*API name\*\* to view the structured documentation.   
 - \*\*Output:\*\* Displays \*\*endpoints\*\*, \*\*usage examples\*\*, \*\*request/response formats\*\*, and \*\*authentication methods\*\*.  
  
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### 2.2 Hardware Interface  
  
No direct interaction with hardware devices is required for the current system. The system is designed to operate in a \*\*software-only\*\* environment, with no dependencies on physical hardware such as printers, scanners, or IoT devices.  
  
- \*\*No hardware interfaces defined.\*\*  
  
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### 2.3 Software Interface  
  
The system interacts with various \*\*software components\*\*, including \*\*databases\*\*, \*\*third-party APIs\*\*, and \*\*external tools\*\*, to support its functionalities.  
  
- \*\*Database (System Database)\*\*   
 - \*\*Description:\*\* The system uses a relational database to store \*\*customer accounts\*\*, \*\*product records\*\*, \*\*order data\*\*, \*\*payment records\*\*, \*\*email templates\*\*, and \*\*plugin configurations\*\*.   
 - \*\*Interaction Method:\*\* CRUD (Create, Read, Update, Delete) operations via SQL or ORM (Object-Relational Mapping) queries.   
 - \*\*Inputs/Outputs:\*\*   
 - Input: Data from user interfaces or API calls.   
 - Output: Updated or retrieved records for display or processing.  
  
- \*\*Payment Gateway API (External Third-Party Service)\*\*   
 - \*\*Description:\*\* The system integrates with a \*\*payment gateway API\*\* (e.g., Stripe, PayPal) to process customer payments.   
 - \*\*Interaction Method:\*\* RESTful API calls to initiate and confirm payments.   
 - \*\*Inputs/Outputs:\*\*   
 - Input: \*\*Payment Method\*\*, \*\*Payment Details\*\*, and \*\*OrderID\*\*.   
 - Output: \*\*Processed Payment Record\*\*, \*\*updated Order Status\*\*, and \*\*logs\*\* for payment transactions.  
  
- \*\*Email Service API (External Third-Party Service)\*\*   
 - \*\*Description:\*\* The system uses an \*\*email service API\*\* (e.g., SendGrid, Amazon SES) to send \*\*confirmation emails\*\*, \*\*order status updates\*\*, and \*\*notifications\*\* to customers.   
 - \*\*Interaction Method:\*\* RESTful API calls with email templates and dynamic data.   
 - \*\*Inputs/Outputs:\*\*   
 - Input: \*\*Email Template\*\*, \*\*CustomerID\*\*, \*\*OrderID\*\*, and dynamic content (e.g., order details, customer name).   
 - Output: \*\*Email sent\*\* to the customer, and a \*\*log entry\*\* for delivery status.  
  
- \*\*Plugin APIs (Internal or External Plugins)\*\*   
 - \*\*Description:\*\* The system supports \*\*plugin-based extensions\*\* that can be managed and configured by administrators. Each plugin may expose its own API for integration.   
 - \*\*Interaction Method:\*\* RESTful or GraphQL API calls based on the plugin’s specifications.   
 - \*\*Inputs/Outputs:\*\*   
 - Input: \*\*PluginID\*\*, \*\*configuration parameters\*\*, and \*\*API requests\*\*.   
 - Output: \*\*Plugin status updates\*\*, \*\*configuration changes\*\*, and \*\*API responses\*\*.  
  
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### 2.4 Communication Interface  
  
The system communicates with \*\*external services\*\* and \*\*users\*\* through \*\*network-based protocols\*\* such as \*\*HTTP/HTTPS\*\*, \*\*email\*\*, and \*\*message queues\*\* (if applicable).  
  
- \*\*Email Communication (FR-01, FR-03, FR-08, FR-10, FR-20)\*\*   
 - \*\*Description:\*\* The system sends \*\*emails\*\* to customers for \*\*registration confirmation\*\*, \*\*logout notifications\*\*, \*\*order status updates\*\*, and \*\*payment confirmations\*\*.   
 - \*\*Interaction Method:\*\* Email is sent via a \*\*third-party email service API\*\* using a \*\*structured template\*\* with dynamic data insertion.   
 - \*\*Inputs/Outputs:\*\*   
 - Input: \*\*Email template\*\*, \*\*customer or order data\*\*, and \*\*email address\*\*.   
 - Output: \*\*Email delivery status\*\* and \*\*log entries\*\* for tracking.  
  
- \*\*Web Communication (HTTP/HTTPS)\*\*   
 - \*\*Description:\*\* The system uses \*\*HTTP/HTTPS\*\* protocols to serve web pages and APIs to both customers and administrators.   
 - \*\*Interaction Method:\*\* RESTful web services for API interactions and \*\*HTML/CSS/JavaScript\*\* for user-facing web pages.   
 - \*\*Inputs/Outputs:\*\*   
 - Input: HTTP requests with query parameters, headers, and payloads.   
 - Output: JSON or HTML responses, including \*\*session tokens\*\*, \*\*product data\*\*, \*\*order status\*\*, and \*\*payment records\*\*.  
  
- \*\*Payment Gateway Communication (FR-10, FR-11)\*\*   
 - \*\*Description:\*\* The system communicates with an external \*\*payment gateway API\*\* to handle \*\*payment creation\*\*, \*\*processing\*\*, and \*\*status updates\*\*.   
 - \*\*Interaction Method:\*\* RESTful API calls with secure authentication (e.g., API keys or OAuth tokens).   
 - \*\*Inputs/Outputs:\*\*   
 - Input: \*\*Payment Method\*\*, \*\*Payment Details\*\*, \*\*OrderID\*\*, and \*\*Transaction Details\*\*.   
 - Output: \*\*Payment confirmation\*\*, \*\*transaction logs\*\*, and \*\*updated order status\*\*.  
  
- \*\*Plugin Communication (FR-21, FR-22)\*\*   
 - \*\*Description:\*\* The system communicates with \*\*plugin APIs\*\* to manage plugin configurations and access their documentation.   
 - \*\*Interaction Method:\*\* RESTful or GraphQL API calls, depending on the plugin's interface.   
 - \*\*Inputs/Outputs:\*\*   
 - Input: \*\*PluginID\*\*, \*\*configuration parameters\*\*, and \*\*API requests\*\*.   
 - Output: \*\*Plugin status changes\*\*, \*\*configuration updates\*\*, and \*\*API documentation\*\* retrieval.  
  
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This chapter outlines the \*\*external interfaces\*\* the system must interact with, including \*\*user interfaces\*\*, \*\*software components\*\*, and \*\*communication protocols\*\*. Developers should ensure that these interfaces are clearly implemented and integrated to maintain system functionality and consistency with the defined \*\*functional requirements\*\*.