# Functional Requirement

# 1. Functional Requirements  
  
## 1.1 Customer Registration Function   
\*\*Function ID\*\*: FR-01   
\*\*Description\*\*: Customers can create new accounts by providing their personal information, including name, email, and password. The system validates the email and password, stores the account information, and sends a confirmation email.   
\*\*Input\*\*: Full name, email address, password   
\*\*Output\*\*: Registered customer account, confirmation email sent to customer, success message displayed to customer   
  
## 1.2 Customer Login Function   
\*\*Function ID\*\*: FR-02   
\*\*Description\*\*: Registered customers can log in using their email and password. The system validates the credentials, checks account status, and initiates a session.   
\*\*Input\*\*: Email address, password   
\*\*Output\*\*: Active customer session, redirect to dashboard or homepage, success message displayed to customer   
  
## 1.3 Customer Logout Function   
\*\*Function ID\*\*: FR-03   
\*\*Description\*\*: Customers can log out of their account. The system terminates the session and redirects the customer to the homepage or login page.   
\*\*Input\*\*: Logout request from customer   
\*\*Output\*\*: Terminated customer session, redirect to homepage or login page, success message displayed to customer   
  
## 1.4 Create Product Function   
\*\*Function ID\*\*: FR-04   
\*\*Description\*\*: Administrators can create new products by entering product details such as name, description, price, category, and inventory quantity. The system validates the input and stores the product information.   
\*\*Input\*\*: Product name, description, price, category, inventory quantity, product images   
\*\*Output\*\*: New product record in the database, unique product ID assigned, product displayed in inventory   
  
## 1.5 Manage Inventory Function   
\*\*Function ID\*\*: FR-05   
\*\*Description\*\*: Administrators can update the inventory quantity of existing products. The system ensures the quantity is non-negative and updates the inventory record accordingly.   
\*\*Input\*\*: Product ID, updated inventory quantity   
\*\*Output\*\*: Updated inventory record in the database, inventory status reflected in product listing   
  
## 1.6 View Product Details Function   
\*\*Function ID\*\*: FR-06   
\*\*Description\*\*: Customers can view detailed information about a product, including name, description, price, category, and inventory status.   
\*\*Input\*\*: Product ID or name   
\*\*Output\*\*: Product details displayed to customer, including price, description, and availability   
  
## 1.7 Add to Cart Function   
\*\*Function ID\*\*: FR-07   
\*\*Description\*\*: Customers can add products to their shopping cart by selecting a product and specifying the quantity. The system checks inventory and updates the cart.   
\*\*Input\*\*: Product ID, quantity   
\*\*Output\*\*: Updated shopping cart with added product, updated total cost, confirmation message displayed to customer   
  
## 1.8 Modify Cart Item Function   
\*\*Function ID\*\*: FR-08   
\*\*Description\*\*: Customers can modify the quantity of an item in their cart or remove it. The system recalculates the total cost after modification.   
\*\*Input\*\*: Cart item ID, new quantity or remove request   
\*\*Output\*\*: Updated cart contents, recalculated total cost, confirmation message displayed to customer   
  
## 1.9 Checkout Order Function   
\*\*Function ID\*\*: FR-09   
\*\*Description\*\*: Customers can proceed to checkout, enter shipping details, select a payment method, and complete the transaction. The system processes the payment, updates the inventory, and clears the cart.   
\*\*Input\*\*: Cart contents, shipping address, shipping method, payment method, payment details   
\*\*Output\*\*: Confirmed order in database, updated inventory, cleared cart, order confirmation email sent, success message displayed to customer   
  
## 1.10 Confirm Order Function   
\*\*Function ID\*\*: FR-10   
\*\*Description\*\*: The system confirms the order after successful payment and updates the order status. It also reduces inventory and sends a confirmation email to the customer.   
\*\*Input\*\*: Payment confirmation, order details   
\*\*Output\*\*: Confirmed order status in database, updated inventory, order confirmation email sent to customer, administrator notified of new order   
  
## 1.11 Send Order Confirmation Email Function   
\*\*Function ID\*\*: FR-11   
\*\*Description\*\*: The system generates and sends an email to the customer confirming the order. The email includes order details and delivery information.   
\*\*Input\*\*: Customer email address, order details   
\*\*Output\*\*: Order confirmation email sent to customer, updated order status to "Email Sent", administrator notified of email sent   
  
## 1.12 View Purchase History Function   
\*\*Function ID\*\*: FR-12   
\*\*Description\*\*: Customers can view their past orders in the purchase history section. The system displays order details, including date, total cost, and items.   
\*\*Input\*\*: Customer login status, request to view purchase history   
\*\*Output\*\*: List of past orders displayed to customer, including order details and status   
  
## 1.13 Update Personal Information Function   
\*\*Function ID\*\*: FR-13   
\*\*Description\*\*: Customers can update their personal information, such as address, phone number, and date of birth. The system validates the input and updates the stored information.   
\*\*Input\*\*: Updated personal information (e.g., address, phone number)   
\*\*Output\*\*: Updated customer record in the database, success message displayed to customer   
  
## 1.14 Admin Login Function   
\*\*Function ID\*\*: FR-14   
\*\*Description\*\*: Administrators can log in to the system using their email and password. The system validates the credentials, checks account status, and initiates a session.   
\*\*Input\*\*: Email address, password   
\*\*Output\*\*: Active admin session, redirect to admin dashboard, success message displayed to administrator   
  
## 1.15 Manage Categories Function   
\*\*Function ID\*\*: FR-15   
\*\*Description\*\*: Administrators can create, update, or delete product categories. The system validates the input and updates the category list accordingly.   
\*\*Input\*\*: Category name, description, action (create, update, delete)   
\*\*Output\*\*: Updated category list in the database, changes reflected in product listings and navigation   
  
## 1.16 Update Product Details Function   
\*\*Function ID\*\*: FR-16   
\*\*Description\*\*: Administrators can update product details such as name, description, price, and category. The system validates the input and reflects the changes in the database.   
\*\*Input\*\*: Product ID, updated product details (e.g., name, description, price, category, images)   
\*\*Output\*\*: Updated product record in the database, changes reflected in product listing   
  
## 1.17 Install Plugin Function   
\*\*Function ID\*\*: FR-17   
\*\*Description\*\*: Administrators can install new plugins to extend the system's functionality. The system checks plugin compatibility and installs it if valid.   
\*\*Input\*\*: Plugin name or identifier, installation request   
\*\*Output\*\*: Installed plugin in the system, updated plugin list, success message displayed to administrator   
  
## 1.18 Access Plugin API Documentation Function   
\*\*Function ID\*\*: FR-18   
\*\*Description\*\*: Administrators can access the documentation for the Plugin API. The system retrieves and displays the documentation in a user-friendly format.   
\*\*Input\*\*: Plugin name or identifier, request to view documentation   
\*\*Output\*\*: Plugin API documentation displayed to administrator, including endpoints and usage examples   
  
## 1.19 Manage User Accounts Function   
\*\*Function ID\*\*: FR-19   
\*\*Description\*\*: Administrators can view, update, or delete user accounts. The system validates the input and updates the account status or removes the account if valid.   
\*\*Input\*\*: User account ID or email, action (view, update, delete), updated user details   
\*\*Output\*\*: Updated or deleted user account in the database, confirmation message displayed to administrator, affected user notified via email if needed   
  
## 1.20 Manage Payment Method Function   
\*\*Function ID\*\*: FR-20   
\*\*Description\*\*: Customers can view, add, update, or delete their saved payment methods. The system validates the input and updates the payment method records accordingly.   
\*\*Input\*\*: Payment method details (e.g., card number, expiration date), action (add, update, delete)   
\*\*Output\*\*: Updated payment method records in the database, confirmation message displayed to customer, updated payment method list shown   
  
## 1.21 Calculate Total Cost Function   
\*\*Function ID\*\*: FR-21   
\*\*Description\*\*: The system calculates the total cost of items in the shopping cart based on item prices and quantities. It also applies any configured discounts or taxes.   
\*\*Input\*\*: Cart item IDs and quantities   
\*\*Output\*\*: Total cost displayed to customer, including discounts and taxes if applicable   
  
These functional requirements form the core of the GAMMA-J Web Store system, covering customer and administrator interactions, shopping cart operations, order processing, and plugin management capabilities.

# External Description

# Chapter 2: External Interfaces  
  
This chapter defines the external interfaces that the GAMMA-J Web Store system interacts with. These interfaces are categorized into \*\*User Interface\*\*, \*\*Hardware Interface\*\*, \*\*Software Interface\*\*, and \*\*Communication Interface\*\*. Each interface is described in detail, including its role, interaction method, and input/output data.  
  
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## 2.1 User Interface  
  
### 2.1.1 Customer Registration UI  
- \*\*Description\*\*: The user interface allows customers to enter their personal information (name, email, password) to register for an account.  
- \*\*Role\*\*: Facilitates customer registration by presenting input fields and displaying success or error messages.  
- \*\*Input\*\*: Full name, email address, password.  
- \*\*Output\*\*: Display of success message, confirmation email, and redirect to login page if successful.  
- \*\*Interaction Method\*\*: Web form submission via HTTP POST request.  
  
### 2.1.2 Customer Login UI  
- \*\*Description\*\*: The user interface allows registered customers to log in using their email and password.  
- \*\*Role\*\*: Provides a secure login mechanism with validation feedback.  
- \*\*Input\*\*: Email address, password.  
- \*\*Output\*\*: Redirect to dashboard or homepage upon successful login, display error message on failure.  
- \*\*Interaction Method\*\*: Web form submission via HTTP POST request.  
  
### 2.1.3 Customer Logout UI  
- \*\*Description\*\*: The user interface allows customers to log out of their session.  
- \*\*Role\*\*: Terminates the current session and redirects the user to the homepage or login page.  
- \*\*Input\*\*: Logout button click.  
- \*\*Output\*\*: Redirect to homepage or login page, display success message.  
- \*\*Interaction Method\*\*: Web form submission or JavaScript event trigger.  
  
### 2.1.4 Product Detail View UI  
- \*\*Description\*\*: The user interface displays detailed product information such as name, description, price, category, and inventory status.  
- \*\*Role\*\*: Enables customers to view product details before purchasing.  
- \*\*Input\*\*: Product ID or name.  
- \*\*Output\*\*: Display of product details, availability, and price.  
- \*\*Interaction Method\*\*: AJAX call or direct URL access based on product ID.  
  
### 2.1.5 Shopping Cart UI  
- \*\*Description\*\*: The user interface allows customers to add, modify, or remove items from their shopping cart.  
- \*\*Role\*\*: Manages the visual representation of the cart and provides real-time updates.  
- \*\*Input\*\*: Product ID, quantity, or remove action.  
- \*\*Output\*\*: Updated cart contents, total cost, and confirmation message.  
- \*\*Interaction Method\*\*: AJAX call or direct form submission.  
  
### 2.1.6 Checkout UI  
- \*\*Description\*\*: The user interface allows customers to proceed through the checkout process, entering shipping and payment details.  
- \*\*Role\*\*: Guides the customer through the final steps of purchasing.  
- \*\*Input\*\*: Shipping address, shipping method, payment method, payment details.  
- \*\*Output\*\*: Confirmation of order, updated cart, and redirect to order confirmation page.  
- \*\*Interaction Method\*\*: Multi-step form submission via HTTP POST requests.  
  
### 2.1.7 Purchase History UI  
- \*\*Description\*\*: The user interface displays a list of past orders for logged-in customers.  
- \*\*Role\*\*: Provides visibility into previous purchases and order status.  
- \*\*Input\*\*: Customer login status.  
- \*\*Output\*\*: Display of order history, including date, total cost, and items.  
- \*\*Interaction Method\*\*: AJAX call or direct query based on user session.  
  
### 2.1.8 Admin Dashboard UI  
- \*\*Description\*\*: The user interface provides administrators with tools to manage users, products, categories, and plugins.  
- \*\*Role\*\*: Central hub for administrative functions.  
- \*\*Input\*\*: Admin login credentials, actions (create, update, delete).  
- \*\*Output\*\*: Display of relevant admin panels, success/error messages.  
- \*\*Interaction Method\*\*: Web form submission or API calls.  
  
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## 2.2 Hardware Interface  
  
### 2.2.1 No Hardware Interfaces  
- \*\*Description\*\*: The GAMMA-J Web Store system does not interact directly with external hardware devices.  
- \*\*Role\*\*: No hardware communication is required.  
- \*\*Input/Output\*\*: None.  
- \*\*Interaction Method\*\*: N/A.  
  
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## 2.3 Software Interface  
  
### 2.3.1 Database Interface  
- \*\*Description\*\*: The system communicates with a database to store and retrieve user accounts, products, orders, and other data.  
- \*\*Role\*\*: Central repository for persistent storage of application data.  
- \*\*Input\*\*: Structured data (e.g., JSON, SQL queries).  
- \*\*Output\*\*: Data retrieved from or stored in the database.  
- \*\*Interaction Method\*\*: RESTful API calls or direct SQL queries depending on the backend architecture.  
  
### 2.3.2 Email Service Interface  
- \*\*Description\*\*: The system uses an email service to send confirmation emails, order confirmations, and notifications.  
- \*\*Role\*\*: Enables automated communication with users.  
- \*\*Input\*\*: Customer email address, order details, confirmation message.  
- \*\*Output\*\*: Sent email notification.  
- \*\*Interaction Method\*\*: SMTP API or third-party email service integration (e.g., SendGrid, Mailgun).  
  
### 2.3.3 Payment Gateway Interface  
- \*\*Description\*\*: The system integrates with a payment gateway to process transactions and handle payments.  
- \*\*Role\*\*: Securely processes payment information and confirms transaction status.  
- \*\*Input\*\*: Payment method details (e.g., card number, expiration date), amount, currency.  
- \*\*Output\*\*: Payment confirmation, transaction ID, success/failure status.  
- \*\*Interaction Method\*\*: RESTful API calls to a payment service provider (e.g., Stripe, PayPal).  
  
### 2.3.4 Plugin Management Interface  
- \*\*Description\*\*: The system interacts with plugin APIs to extend functionality through installed plugins.  
- \*\*Role\*\*: Allows dynamic addition and management of features.  
- \*\*Input\*\*: Plugin name, installation request, API endpoint.  
- \*\*Output\*\*: Installed plugin, updated plugin list, API documentation.  
- \*\*Interaction Method\*\*: RESTful API calls to plugin endpoints or local file system access.  
  
### 2.3.5 External API Integration Interface  
- \*\*Description\*\*: The system may integrate with external services (e.g., shipping providers, tax calculators) via APIs.  
- \*\*Role\*\*: Enhances functionality by leveraging external data and services.  
- \*\*Input\*\*: API keys, request parameters, data format (e.g., JSON).  
- \*\*Output\*\*: API response data, processed results.  
- \*\*Interaction Method\*\*: RESTful API calls to external services.  
  
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## 2.4 Communication Interface  
  
### 2.4.1 Email Communication Interface  
- \*\*Description\*\*: The system sends emails to customers for order confirmation, account verification, and other notifications.  
- \*\*Role\*\*: Ensures timely communication with users.  
- \*\*Input\*\*: Recipient email address, message content, subject line.  
- \*\*Output\*\*: Sent email message.  
- \*\*Interaction Method\*\*: SMTP protocol or email service API (e.g., SendGrid, Mailgun).  
  
### 2.4.2 Web Browsing Interface  
- \*\*Description\*\*: The system is accessed via web browsers, enabling user interaction through HTTP/HTTPS protocols.  
- \*\*Role\*\*: Enables user access to all system functionalities via standard web clients.  
- \*\*Input\*\*: HTTP GET/POST requests, user input via forms or links.  
- \*\*Output\*\*: HTML pages, JSON responses, redirects.  
- \*\*Interaction Method\*\*: HTTP/HTTPS communication between client and server.  
  
### 2.4.3 Session Management Interface  
- \*\*Description\*\*: The system maintains user sessions across interactions to preserve login state and cart contents.  
- \*\*Role\*\*: Ensures continuity of user experience during multiple visits.  
- \*\*Input\*\*: Session token, user authentication credentials.  
- \*\*Output\*\*: Active session, session expiration, logout signal.  
- \*\*Interaction Method\*\*: Cookie-based or token-based session management via HTTP headers.  
  
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## Summary of External Data Sources  
  
| External Data Source | Type | Description |  
|----------------------|--------------|-------------|  
| Database | Software | Stores user accounts, products, orders, etc. |  
| Email Service | Communication| Sends confirmation and order emails |  
| Payment Gateway | Software | Processes transactions and payment methods |  
| Plugin API | Software | Extends system functionality via plugins |  
| External APIs | Software | Integrates with third-party services |  
| User Interface | User Interface | Facilitates user interaction |  
| Web Browser | Communication| Enables access to the system via HTTP |  
| Session Management | Communication| Maintains user session state |  
  
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This section ensures that all external data sources and interfaces referenced in the functional requirements are clearly defined, categorized, and described, providing a comprehensive foundation for system design and implementation.