# Functional Requirement

### Chapter 1: Functional Requirements   
#### 1.1 Customer Registration Function   
\*\*Function ID:\*\* FR-01   
\*\*Description:\*\* Enables new customers to register by providing personal information. Validates input, checks email uniqueness, creates customer profile, and sends confirmation email.   
\*\*Input:\*\* FirstName, LastName, Email, Password, Phone, Address.   
\*\*Output:\*\* New records in Customer, Account, and Contact Information entities; confirmation email sent.   
  
#### 1.2 Customer Login Function   
\*\*Function ID:\*\* FR-02   
\*\*Description:\*\* Authenticates registered customers using email and password. Initiates session upon successful validation.   
\*\*Input:\*\* Email, Password.   
\*\*Output:\*\* Active customer session; redirect to homepage/shopping cart.   
  
#### 1.3 Customer Logout Function   
\*\*Function ID:\*\* FR-03   
\*\*Description:\*\* Terminates active customer sessions and clears session data.   
\*\*Input:\*\* Active session token.   
\*\*Output:\*\* Session terminated; redirect to login page/homepage.   
  
#### 1.4 Customer Account Management Function   
\*\*Function ID:\*\* FR-04   
\*\*Description:\*\* Allows customers or administrators to update, suspend, or delete accounts. Handles associated data cleanup.   
\*\*Input:\*\* AccountID, updated fields (e.g., Password, Email), action type (update/suspend/delete).   
\*\*Output:\*\* Modified Customer/Account entities; notifications; cleanup of linked Shopping Cart/Order/Payment entities if deleted.   
  
#### 1.5 Add to Shopping Cart Function   
\*\*Function ID:\*\* FR-05   
\*\*Description:\*\* Adds selected products to the customer’s shopping cart after inventory availability checks.   
\*\*Input:\*\* ProductID, CustomerID, Quantity (default=1).   
\*\*Output:\*\* New/modified Shopping Cart entity record; cart display updated.   
  
#### 1.6 Modify Shopping Cart Function   
\*\*Function ID:\*\* FR-06   
\*\*Description:\*\* Adjusts quantities or removes items in the shopping cart. Validates against inventory limits.   
\*\*Input:\*\* CartID, updated Quantity or removal flag.   
\*\*Output:\*\* Updated Shopping Cart entity; recalculated total price.   
  
#### 1.7 View Shopping Cart Function   
\*\*Function ID:\*\* FR-07   
\*\*Description:\*\* Displays items, quantities, prices, and total cost in the customer’s cart.   
\*\*Input:\*\* CustomerID.   
\*\*Output:\*\* Shopping Cart entity data with product details and total price.   
  
#### 1.8 Place Order Function   
\*\*Function ID:\*\* FR-08   
\*\*Description:\*\* Processes checkout by creating orders, deducting inventory, processing payments, and clearing cart items.   
\*\*Input:\*\* CustomerID, Payment Information, Shipping/Billing details.   
\*\*Output:\*\* New Order and Order Item entities; updated Inventory; cleared Shopping Cart items; confirmation email.   
  
#### 1.9 View Order History Function   
\*\*Function ID:\*\* FR-09   
\*\*Description:\*\* Lists customer’s past orders with details (e.g., status, items, prices).   
\*\*Input:\*\* CustomerID.   
\*\*Output:\*\* Order and Order Item entity data filtered by CustomerID.   
  
#### 1.10 Order Confirmation Function   
\*\*Function ID:\*\* FR-10   
\*\*Description:\*\* Automatically generates and sends order confirmation emails post-payment.   
\*\*Input:\*\* OrderID.   
\*\*Output:\*\* Confirmation email; Order entity status updated to "Confirmed".   
  
#### 1.11 Administrator Login Function   
\*\*Function ID:\*\* FR-11   
\*\*Description:\*\* Authenticates administrators using credentials and initiates admin-specific sessions.   
\*\*Input:\*\* Username, Password.   
\*\*Output:\*\* Active administrator session; redirect to admin dashboard.   
  
#### 1.12 Administrator Logout Function   
\*\*Function ID:\*\* FR-12   
\*\*Description:\*\* Terminates active administrator sessions.   
\*\*Input:\*\* Active admin session token.   
\*\*Output:\*\* Session terminated; redirect to login page/homepage.   
  
#### 1.13 Manage Products Function   
\*\*Function ID:\*\* FR-13   
\*\*Description:\*\* Allows administrators to add, edit, or delete products. Validates inputs and handles inventory associations.   
\*\*Input:\*\* Product details (ProductName, Description, Price, CategoryID), action type (add/update/delete).   
\*\*Output:\*\* Added/updated/deleted Product entity; linked Inventory updates if deleted.   
  
#### 1.14 Manage Inventory Function   
\*\*Function ID:\*\* FR-14   
\*\*Description:\*\* Updates product stock levels or adds new inventory records.   
\*\*Input:\*\* ProductID, Quantity, Location.   
\*\*Output:\*\* Added/updated Inventory entity record.   
  
#### 1.15 Manage Orders Function   
\*\*Function ID:\*\* FR-15   
\*\*Description:\*\* Updates order statuses (e.g., to "shipped" or "canceled"), triggers refunds, and adjusts inventory.   
\*\*Input:\*\* OrderID, updated Status, refund flag (if canceled).   
\*\*Output:\*\* Modified Order entity; Inventory restocked if canceled; Payment Information refund processed.   
  
#### 1.16 Manage Payment Information Function   
\*\*Function ID:\*\* FR-16   
\*\*Description:\*\* Stores, updates, or deletes customer payment methods. Validates card details.   
\*\*Input:\*\* CardNumber, ExpiryDate, CVV, Billing Address, action type (add/update/delete).   
\*\*Output:\*\* Added/updated/deleted Payment Information entity record.   
  
#### 1.17 Manage Contact Information Function   
\*\*Function ID:\*\* FR-17   
\*\*Description:\*\* Handles customer contact details (e.g., phone, address). Validates formats and uniqueness.   
\*\*Input:\*\* Phone, Address, action type (add/update/delete).   
\*\*Output:\*\* Added/updated/deleted Contact Information entity record.   
  
#### 1.18 Manage Category Function   
\*\*Function ID:\*\* FR-18   
\*\*Description:\*\* Creates, edits, or deletes product categories. Reassigns products if categories are deleted.   
\*\*Input:\*\* CategoryName, Description, action type (add/update/delete).   
\*\*Output:\*\* Added/updated/deleted Category entity; Product entity reassignments if needed.   
  
#### 1.19 Manage Administrator Function   
\*\*Function ID:\*\* FR-19   
\*\*Description:\*\* Adds, edits, or deletes administrator accounts. Validates permissions and uniqueness.   
\*\*Input:\*\* Admin credentials (Username, Password, Role), action type (add/update/delete).   
\*\*Output:\*\* Added/updated/deleted Administrator entity record.   
  
#### 1.20 Manage Order Item Function   
\*\*Function ID:\*\* FR-20   
\*\*Description:\*\* Modifies or removes items within orders (admin-only). Adjusts inventory and order totals.   
\*\*Input:\*\* OrderItemID, updated Quantity or removal flag.   
\*\*Output:\*\* Updated Order Item entity; Order total recalculated; Inventory restocked if items removed.

# External Description

### Chapter 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 derived from the functional requirements and ensure seamless interaction between the system and external entities.  
  
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### 2.1 User Interface  
  
#### 2.1.1 Customer Registration Interface   
\*\*Description:\*\*   
A user interface that allows new customers to input personal information (FirstName, LastName, Email, Password, Phone, Address) and submit the registration form.   
\*\*Interaction Method:\*\*   
- Input: Users enter data into form fields.   
- Output: Confirmation of successful registration and a redirect to the login page.   
  
#### 2.1.2 Customer Login Interface   
\*\*Description:\*\*   
A user interface that enables customers to enter their email and password to authenticate.   
\*\*Interaction Method:\*\*   
- Input: Users submit their email and password.   
- Output: Successful login results in an active session and redirection to the homepage or shopping cart.   
  
#### 2.1.3 Customer Logout Interface   
\*\*Description:\*\*   
A user interface that terminates the active customer session.   
\*\*Interaction Method:\*\*   
- Input: Session token.   
- Output: Termination of the session and redirection to the login page or homepage.   
  
#### 2.1.4 Customer Account Management Interface   
\*\*Description:\*\*   
A user interface that allows customers to update their account details, such as password, email, phone, or address.   
\*\*Interaction Method:\*\*   
- Input: Updated fields (e.g., Password, Email).   
- Output: Confirmation of the update and reflection of changes in the user profile.   
  
#### 2.1.5 Shopping Cart Interface   
\*\*Description:\*\*   
A user interface that displays the contents of the customer’s shopping cart, including item details, quantities, and total price.   
\*\*Interaction Method:\*\*   
- Input: Customer adds or modifies items in the cart.   
- Output: Updated cart display with recalculated totals.   
  
#### 2.1.6 Order Placement Interface   
\*\*Description:\*\*   
A user interface that allows customers to review their order, enter payment and shipping details, and confirm the order.   
\*\*Interaction Method:\*\*   
- Input: Customer provides payment information, shipping, and billing details.   
- Output: Order confirmation, cart clearing, and redirection to a confirmation page.   
  
#### 2.1.7 Administrator Login Interface   
\*\*Description:\*\*   
A user interface that authenticates administrators using their credentials (Username, Password).   
\*\*Interaction Method:\*\*   
- Input: Administrator enters their username and password.   
- Output: Successful login results in an active session and redirection to the admin dashboard.   
  
#### 2.1.8 Administrator Logout Interface   
\*\*Description:\*\*   
A user interface that terminates the active administrator session.   
\*\*Interaction Method:\*\*   
- Input: Session token.   
- Output: Termination of the session and redirection to the login page.   
  
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### 2.2 Hardware Interface  
  
\*\*Description:\*\*   
The system does not interact directly with external hardware devices beyond standard computer peripherals (e.g., keyboard, mouse, monitor). All hardware interactions are mediated through the operating system and standard input/output mechanisms.  
  
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### 2.3 Software Interface  
  
#### 2.3.1 Customer and Account Database   
\*\*Description:\*\*   
A database interface responsible for storing and managing customer and account-related data.   
\*\*Interaction Method:\*\*   
- Inputs: Customer registration details (FirstName, LastName, Email, Password, Phone, Address), account updates, and deletions.   
- Outputs: Creation, modification, or deletion of records in the Customer, Account, and Contact Information entities.   
  
#### 2.3.2 Product and Inventory Database   
\*\*Description:\*\*   
A database interface responsible for storing and managing product and inventory-related data.   
\*\*Interaction Method:\*\*   
- Inputs: Product details (ProductName, Description, Price, CategoryID), inventory updates (ProductID, Quantity, Location).   
- Outputs: Addition, modification, or deletion of records in the Product and Inventory entities.   
  
#### 2.3.3 Order and Payment Database   
\*\*Description:\*\*   
A database interface responsible for storing and managing order and payment-related data.   
\*\*Interaction Method:\*\*   
- Inputs: Order details (CustomerID, Payment Information, Shipping/Billing details), order status updates (OrderID, updated Status).   
- Outputs: Creation, modification, or deletion of records in the Order, Order Item, and Payment Information entities.   
  
#### 2.3.4 Email Service API   
\*\*Description:\*\*   
An external API interface used to send confirmation emails (e.g., registration, order confirmation).   
\*\*Interaction Method:\*\*   
- Inputs: Recipient email address, email content, and subject.   
- Outputs: Confirmation of successful email delivery.   
  
#### 2.3.5 Payment Processing API   
\*\*Description:\*\*   
An external API interface used to process customer payments and refunds.   
\*\*Interaction Method:\*\*   
- Inputs: Payment details (CardNumber, ExpiryDate, CVV, Billing Address), refund requests.   
- Outputs: Payment confirmation or refund processing status.   
  
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### 2.4 Communication Interface  
  
#### 2.4.1 Email Notifications   
\*\*Description:\*\*   
A communication interface used to send automated emails (e.g., registration confirmation, order confirmation, password reset requests).   
\*\*Interaction Method:\*\*   
- Inputs: Recipient email address, email content, and subject.   
- Outputs: Email sent to the recipient.   
  
#### 2.4.2 Order Confirmation Email   
\*\*Description:\*\*   
A communication interface that sends an email to the customer after a successful order placement.   
\*\*Interaction Method:\*\*   
- Inputs: OrderID, customer email address.   
- Outputs: Confirmation email sent to the customer.   
  
#### 2.4.3 Refund Notifications   
\*\*Description:\*\*   
A communication interface used to notify customers of refunds processed for canceled orders.   
\*\*Interaction Method:\*\*   
- Inputs: Customer email address, refund details.   
- Outputs: Refund notification email sent to the customer.   
  
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This chapter ensures that all external interfaces are clearly defined and aligned with the functional requirements. Developers can use this information to design and implement the system’s interaction with external entities effectively.