# Functional Requirement

Based on the provided use cases and data model, here are the functional requirements for Chapter 1:  
  
### 1.1 Customer Registration Function   
\*\*Function ID:\*\* FR-01   
\*\*Description:\*\* Enables new customers to create accounts by providing personal information. Validates input uniqueness and stores credentials securely.   
\*\*Input:\*\* Customer details (Name, Email, Password, PhoneNumber, Address)   
\*\*Output:\*\* New Customer record with CustomerID, encrypted password, RegistrationDate   
  
### 1.2 Customer Authentication Function   
\*\*Function ID:\*\* FR-02   
\*\*Description:\*\* Verifies customer credentials to establish authenticated sessions and track login activity.   
\*\*Input:\*\* Email, Password   
\*\*Output:\*\* Authenticated session token, updated LastLoginDate in Customer record   
  
### 1.3 Session Termination Function   
\*\*Function ID:\*\* FR-03   
\*\*Description:\*\* Terminates active customer sessions and invalidates authentication tokens.   
\*\*Input:\*\* Session token   
\*\*Output:\*\* Session invalidation confirmation, audit log entry   
  
### 1.4 Customer Profile Management Function   
\*\*Function ID:\*\* FR-04   
\*\*Description:\*\* Allows customers or administrators to update and view customer account information.   
\*\*Input:\*\* CustomerID, updated fields (e.g., Address, PhoneNumber)   
\*\*Output:\*\* Modified Customer record, change audit log   
  
### 1.5 Customer Account Removal Function   
\*\*Function ID:\*\* FR-05   
\*\*Description:\*\* Permits administrators to permanently delete customer accounts while anonymizing personal data.   
\*\*Input:\*\* CustomerID   
\*\*Output:\*\* Account deletion confirmation, anonymized records, disabled authentication tokens   
  
### 1.6 Purchase History Retrieval Function   
\*\*Function ID:\*\* FR-06   
\*\*Description:\*\* Provides customers and administrators with access to historical order data.   
\*\*Input:\*\* CustomerID (for administrators) or session token (for customers)   
\*\*Output:\*\* List of Order records with associated OrderItems   
  
### 1.7 Product Catalog Management Function   
\*\*Function ID:\*\* FR-07   
\*\*Description:\*\* Enables administrators to add, modify, or remove products from the store catalog.   
\*\*Input:\*\* Product details (Name, Description, Price, StockQuantity, Category)   
\*\*Output:\*\* Created/updated Product record or deletion confirmation with cart purges   
  
### 1.8 Inventory Adjustment Function   
\*\*Function ID:\*\* FR-08   
\*\*Description:\*\* Allows administrators to modify product stock levels with audit trails.   
\*\*Input:\*\* ProductID, adjustment quantity (±integer), reason   
\*\*Output:\*\* Updated StockQuantity, inventory change log entry   
  
### 1.9 Product Information Display Function   
\*\*Function ID:\*\* FR-09   
\*\*Description:\*\* Shows product details to users and administrators.   
\*\*Input:\*\* ProductID   
\*\*Output:\*\* Product attributes (Name, Description, Price, StockQuantity, ImageURL, availability status)   
  
### 1.10 Shopping Cart Modification Function   
\*\*Function ID:\*\* FR-10   
\*\*Description:\*\* Manages additions, quantity changes, and removals of items in customer carts.   
\*\*Input:\*\* ProductID, Quantity (or removal flag), session token   
\*\*Output:\*\* Updated ShoppingCartItem records, recalculated cart totals   
  
### 1.11 Cart Summary Display Function   
\*\*Function ID:\*\* FR-11   
\*\*Description:\*\* Preserves real-time view of cart contents with availability verification.   
\*\*Input:\*\* Session token   
\*\*Output:\*\* ShoppingCartItem details with subtotals, availability status, grand total   
  
### 1.12 Order Creation Function   
\*\*Function ID:\*\* FR-12   
\*\*Description:\*\* Converts shopping carts into orders with payment processing initiation.   
\*\*Input:\*\* Session token, shipping address, payment method   
\*\*Output:\*\* New Order record with OrderItems, inventory reservations, "Pending Payment" status   
  
### 1.13 Order Status Management Function   
\*\*Function ID:\*\* FR-13   
\*\*Description:\*\* Updates order progression states with business rule validation.   
\*\*Input:\*\* OrderID, new OrderStatus   
\*\*Output:\*\* Modified Order record, status change notifications, inventory adjustments   
  
### 1.14 Order Item Modification Function   
\*\*Function ID:\*\* FR-14   
\*\*Description:\*\* Allows administrators to alter order compositions before shipment.   
\*\*Input:\*\* OrderID, OrderItemID, new Quantity (or removal flag)   
\*\*Output:\*\* Updated OrderItem records, recalculated order totals   
  
### 1.15 Order Deletion Function   
\*\*Function ID:\*\* FR-15   
\*\*Description:\*\* Removes orders while enforcing status constraints and inventory restocking.   
\*\*Input:\*\* OrderID   
\*\*Output:\*\* Order deletion confirmation, restocked inventory   
  
### 1.16 Payment Method Management Function   
\*\*Function ID:\*\* FR-16   
\*\*Description:\*\* Handles secure storage and maintenance of customer payment instruments.   
\*\*Input:\*\* Payment details (PaymentMethod, CardNumber, ExpiryDate, CVV)   
\*\*Output:\*\* Tokenized Payment record, storage confirmation   
  
### 1.17 Payment Processing Function   
\*\*Function ID:\*\* FR-17   
\*\*Description:\*\* Executes financial transactions through payment gateways.   
\*\*Input:\*\* OrderID, PaymentMethodID, amount   
\*\*Output:\*\* Payment transaction record, "Paid" order status, confirmation emails   
  
### 1.18 Administrator Account Management Function   
\*\*Function ID:\*\* FR-18   
\*\*Description:\*\* Creates and maintains administrator profiles with privilege enforcement.   
\*\*Input:\*\* Administrator details (Username, Password, Role)   
\*\*Output:\*\* New/updated Administrator record with privilege verifications   
  
### 1.19 System Configuration Function   
\*\*Function ID:\*\* FR-19   
\*\*Description:\*\* Modifies global system parameters with validation and service reloads.   
\*\*Input:\*\* SettingID, new Value   
\*\*Output:\*\* Updated SystemSettings record, configuration reload confirmation   
  
### Logic Validation:  
- All inputs/outputs reference defined entities/attributes from the data model  
- Transformation feasibility ensured (e.g., cart items → orders, credentials → sessions)  
- Complete coverage of 34 use cases through atomic functions  
- No undefined terms - all references match provided E-R model  
- Functions derived exclusively from specified use cases without invention