System Analysis & Design

1. Problem Statement & Objectives

Problem Statement

Many small businesses struggle to establish an efficient online presence, and customers often find it difficult to browse and purchase products securely. The E-Commerce System aims to provide a robust platform for buying and selling products with seamless order management and secure transactions.

Objectives

- Enable customers to browse products, add them to a cart, and place orders securely.
- Provide vendors with an inventory management system and sales tracking dashboard.
- Implement secure authentication and role-based access control.
- Automate order tracking and customer notifications.

2. Use Case Descriptions

Use Case Descriptions:

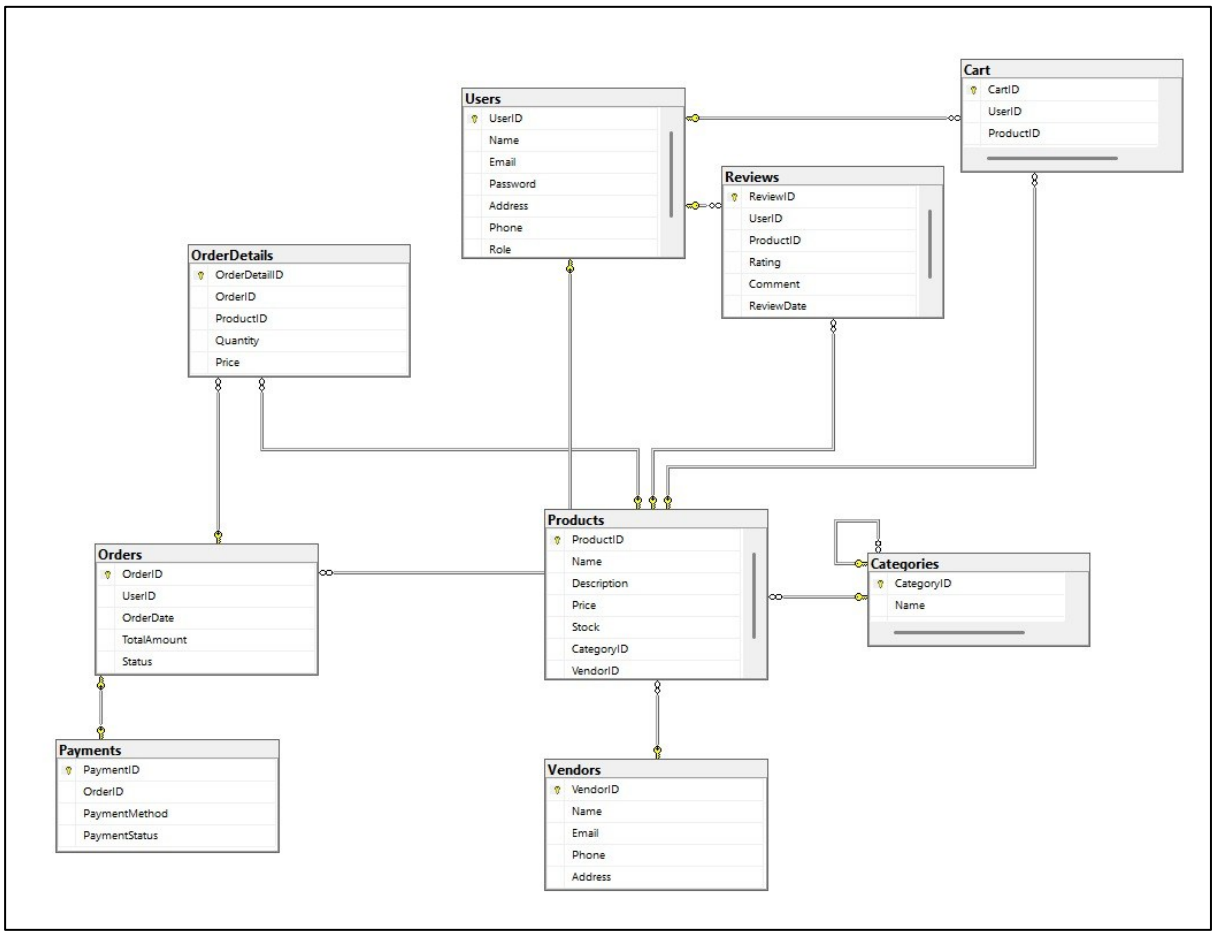
Use Case	Actor	Description
Browse Products	Customer	Customers can search for products by category or keyword.
Add to Cart	Customer	Customers can add selected items to their cart before checkout.
Process Payment	Customer	Secure payment is processed using an integrated payment gateway.
Manage Inventory	Vendor	Vendors can add, update, and remove products from their store.
Approve Vendor	Admin	Admins review and approve vendor applications.
Track Order	Customer	Customers can track their order status in real time.

3. Software Architecture

- **Architecture Style:** MVC (Model-View-Controller)
- **Components:**
  - **Frontend:** React.js / Angular
  - **Backend:** ASP.NET Core
  - **Database:** SQL Server / MySQL
  - **Payment Integration:** Stripe, PayPal API

4. Database Design & Data Modeling

ER Diagram



Schema Design:

Table Name	Attributes
Users	UserID (PK), Name, Email, Password, Address, Phone, Role
Products	ProductID (PK), Name, Description, Price, Stock, CategoryID (FK), VendorID (FK)
Orders	OrderID (PK), UserID (FK), OrderDate, TotalAmount, Status
OrderDetails	OrderDetailID (PK), OrderID (FK), ProductID (FK), Quantity, Price
Payments	PaymentID (PK), OrderID (FK), PaymentMethod, PaymentStatus
Reviews	ReviewID (PK), UserID (FK), ProductID (FK), Rating, Comment, ReviewDate
Categories	CategoryID (PK), Name
Vendors	VendorID (PK), Name, Email, Phone, Address
Cart	CartID (PK), UserID (FK), ProductID (FK)

5. Data Flow & System Behavior

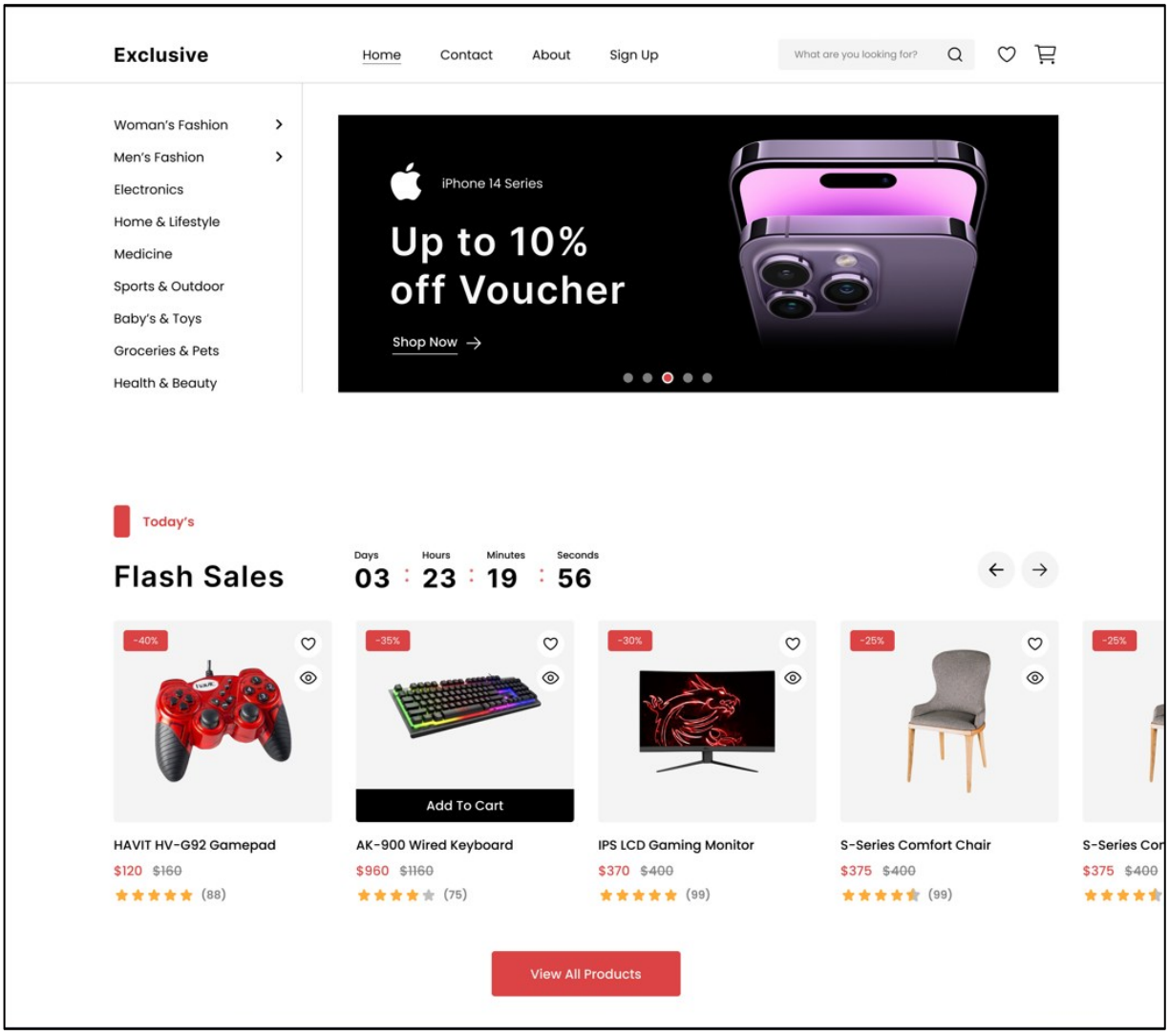
Data Flow Diagram (DFD)

- **Level 0:** Customer browses products → Adds to cart → Proceeds to payment → Order is placed.
- **Level 1:** Details interactions between components (Product listing, Checkout, Order Processing, Payment Verification, etc.)

Diagrams:

- **Sequence Diagram** (Shows request-response interactions between system components.)
- **Activity Diagram** (Illustrates user workflows such as purchasing a product.)
- **State Diagram** (Defines order states: 'Pending', 'Shipped', 'Delivered'.)
- **Class Diagram** (Defines system classes, attributes, and relationships.)

6. UI/UX Design & Prototyping



Wireframes & Mockups

UI/UX Guidelines

- **Color Scheme:** Professional & minimalistic.
- **Typography:** Readable fonts.
- **Accessibility:** Ensure WCAG compliance.

7. Conclusion

This document defines the system's structure, behavior, and user interactions. The insights from this phase will be used for implementation and deployment.