

# E-Commerce Database Management System

Design, Implementation & Analytics

## Presented to

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# Project Overview



## What We Built

- A complete relational database system for e-commerce operations
- 11 normalized tables with relationships and constraints
- Comprehensive SQL queries for operations and analytics
- Triggers for automated business processes
- Sample data for demonstration and testing



## Key Features

- User and role management
- Product catalog with categories
- Inventory management
- Order processing system
- Customer reviews and ratings
- Discount and promotion management
- Advanced analytical capabilities

# Problem Statement

## Challenges in E-Commerce Data Management °

- Handling complex product catalogs and categories
- Managing user accounts and authentication
- Processing orders and payments efficiently
- Maintaining inventory accuracy
- Tracking customer behavior and preferences
- Generating business insights from data
- Ensuring data integrity and consistency

# Our Solution

- 
- A comprehensive database schema addressing all these challenges
- Automated processes through triggers and constraints
- Advanced queries for business intelligence



# Database Schema Design

- Users → Orders → Order Items → Products
- Users → Shopping Cart → Products
- Users → Product Reviews → Products → Categories
- Products → Discounts
- Orders → Payment Methods
- Orders → Order Status Log
- Categories → Products

Categories → Categories (self-join for hierarchy)



# Key Tables & Structures

## Core Operational Tables

- Users & User Roles - Customer and admin management
- Products & Categories - Catalog organization
- Orders & Order Items - Transaction processing
- Shopping Cart - Session management
- Payment Methods - Transaction options

# Key Tables & Structures

## Support Tables

1. Discounts - Promotion management
2. Product Reviews - Customer feedback system
3. Order Status Log - Audit trail for orders



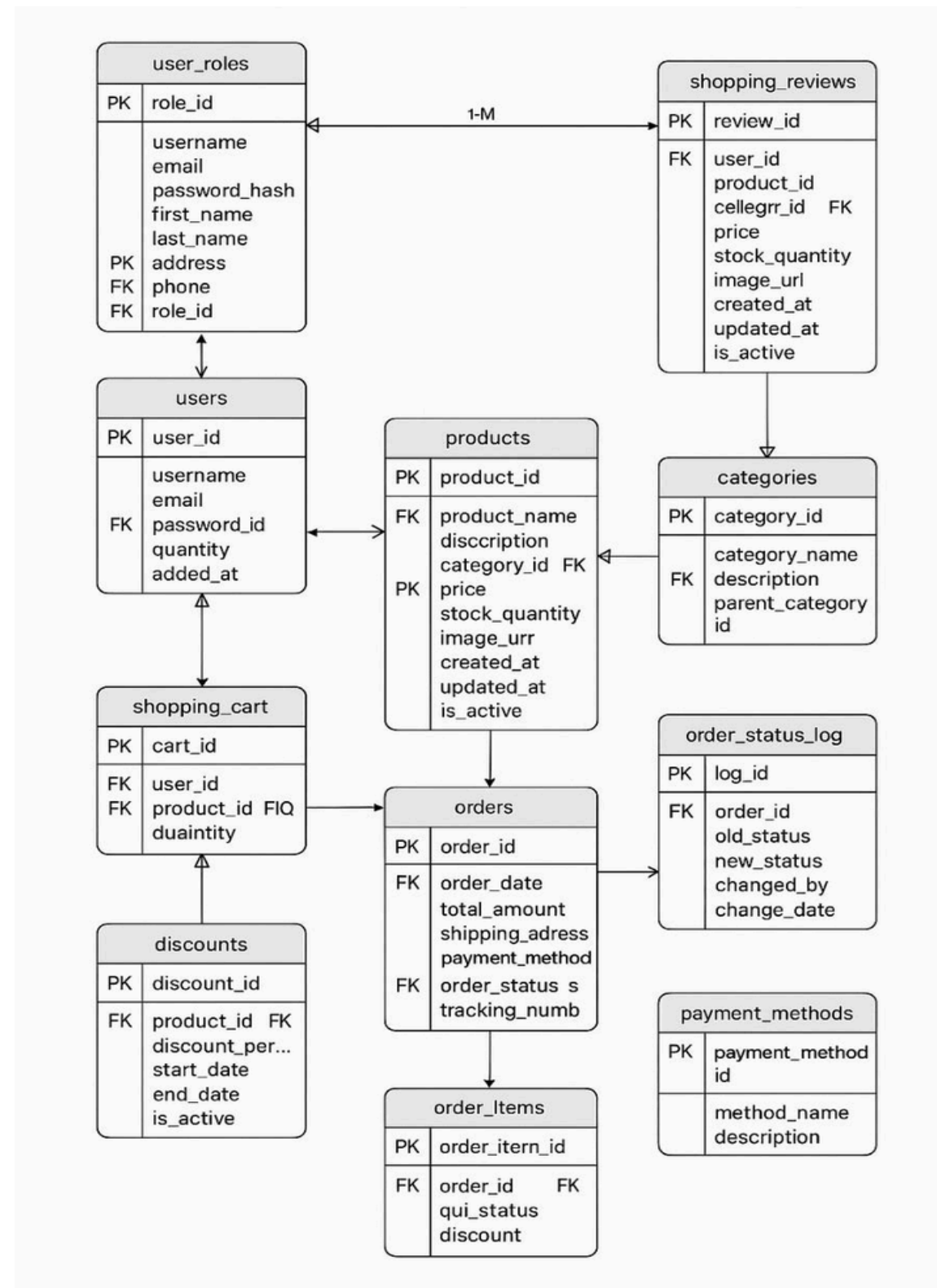
# Advanced Features

## Advanced Features

- Automatic stock updates (trigger)
- Dynamic rating calculations (trigger)
- Order audit trail (logging)
- Business analytics (advanced queries)

# Advanced Features

## ER Diagram:



# Key Technical Features

## Automation Examples

-- Auto-update inventory after orders

```
CREATE TRIGGER trg_update_stock  
AFTER INSERT ON order_items  
BEGIN  
    UPDATE products SET stock = stock - :NEW.quantity;  
END;
```

## Analytics Capabilities

- Customer lifetime value calculation
- Sales growth trends
- Product performance metrics
- Shopping behavior analysis

# Technical Implementation

- **Database System**

- Oracle Database 11g/12c/19c
- PL/SQL for stored procedures and triggers
- SQL for data manipulation and querying

- **Frontend Integration**

- Technology: Built with HTML and CSS.

**Design Principles:**

- Responsive design for various devices (mobile, desktop).
- Intuitive navigation and user flow.
- Modern and clean aesthetic.

**Current State:**

A static prototype demonstrating the look and feel of the final application.

# Business Value

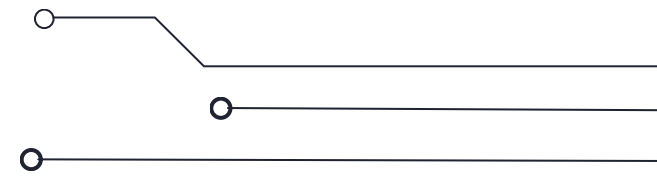
## Operational Benefits

- Efficient order processing
- Accurate inventory management
- Personalized customer experiences
- Data-driven decision making

## Sample Insight

- Customer Segmentation Query:
- Identifies VIP vs. regular customers
- Enables targeted marketing
- Improves retention strategies

# Applications & Future Use



## Immediate Applications

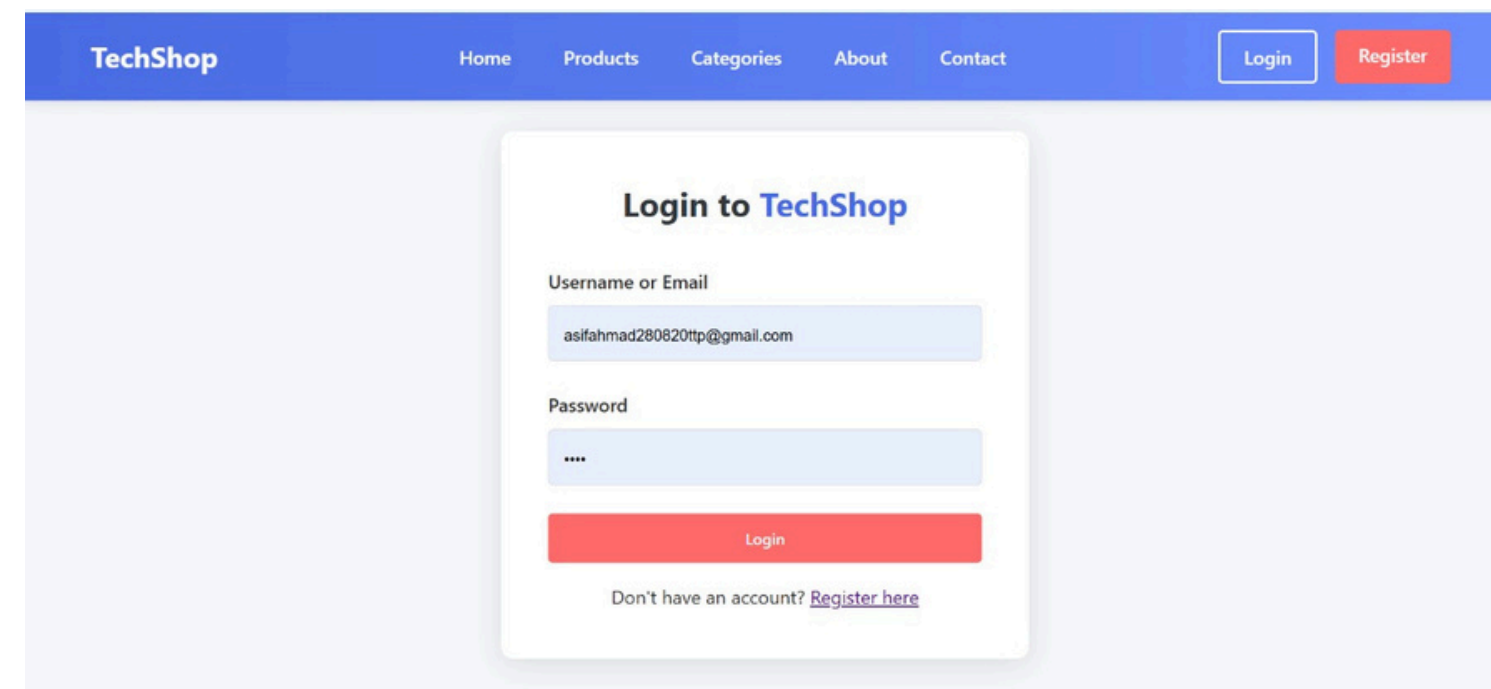
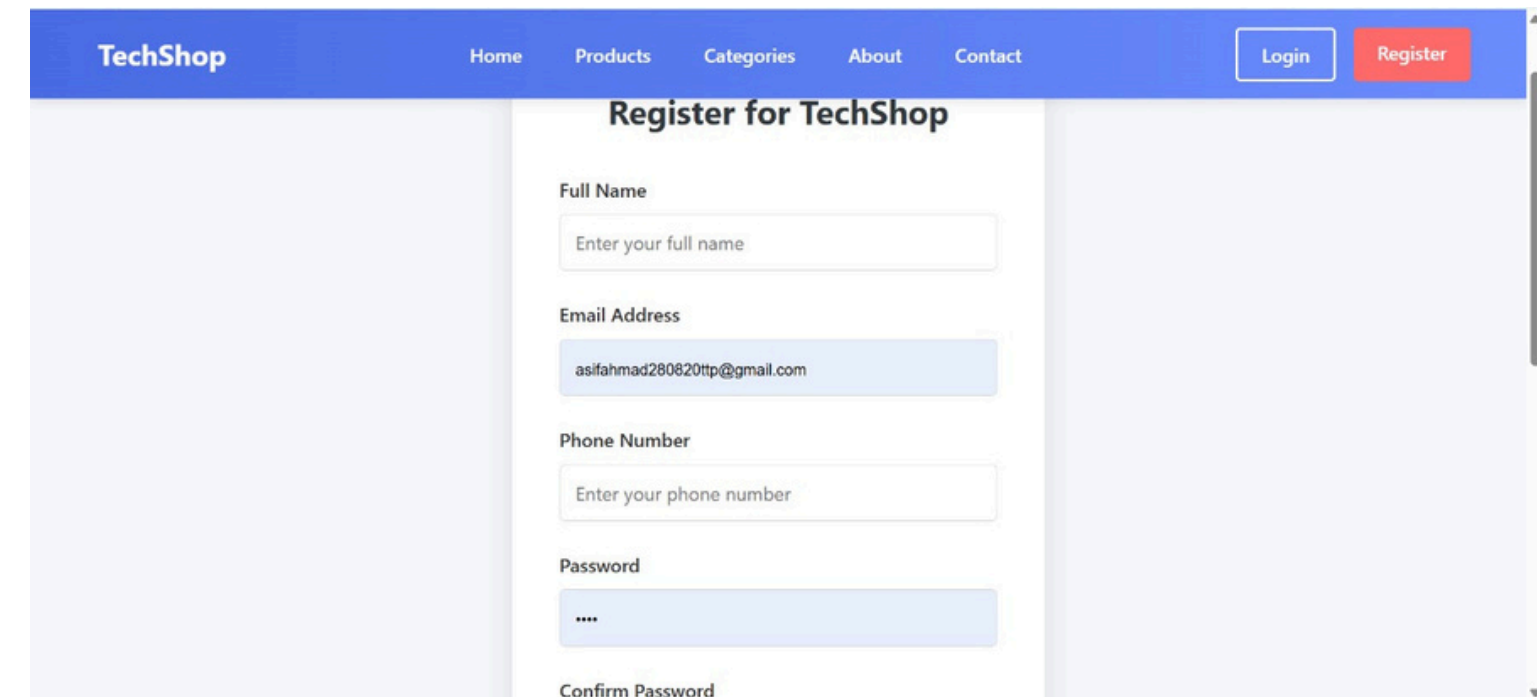
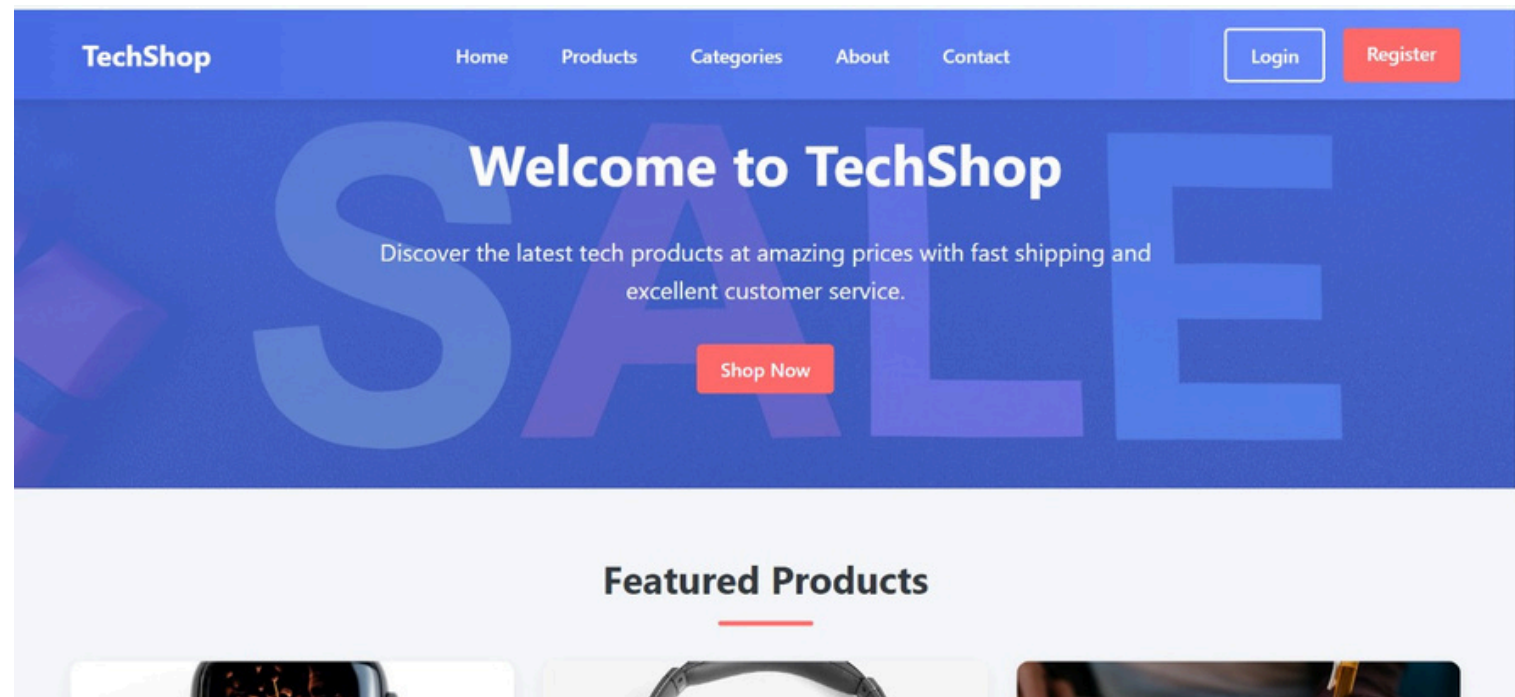
- Online retail stores
- Marketplace platforms
- Inventory management systems
- Business intelligence tool

## Future Enhancements

To create a fully functional application, we need to connect the UI to the Database:

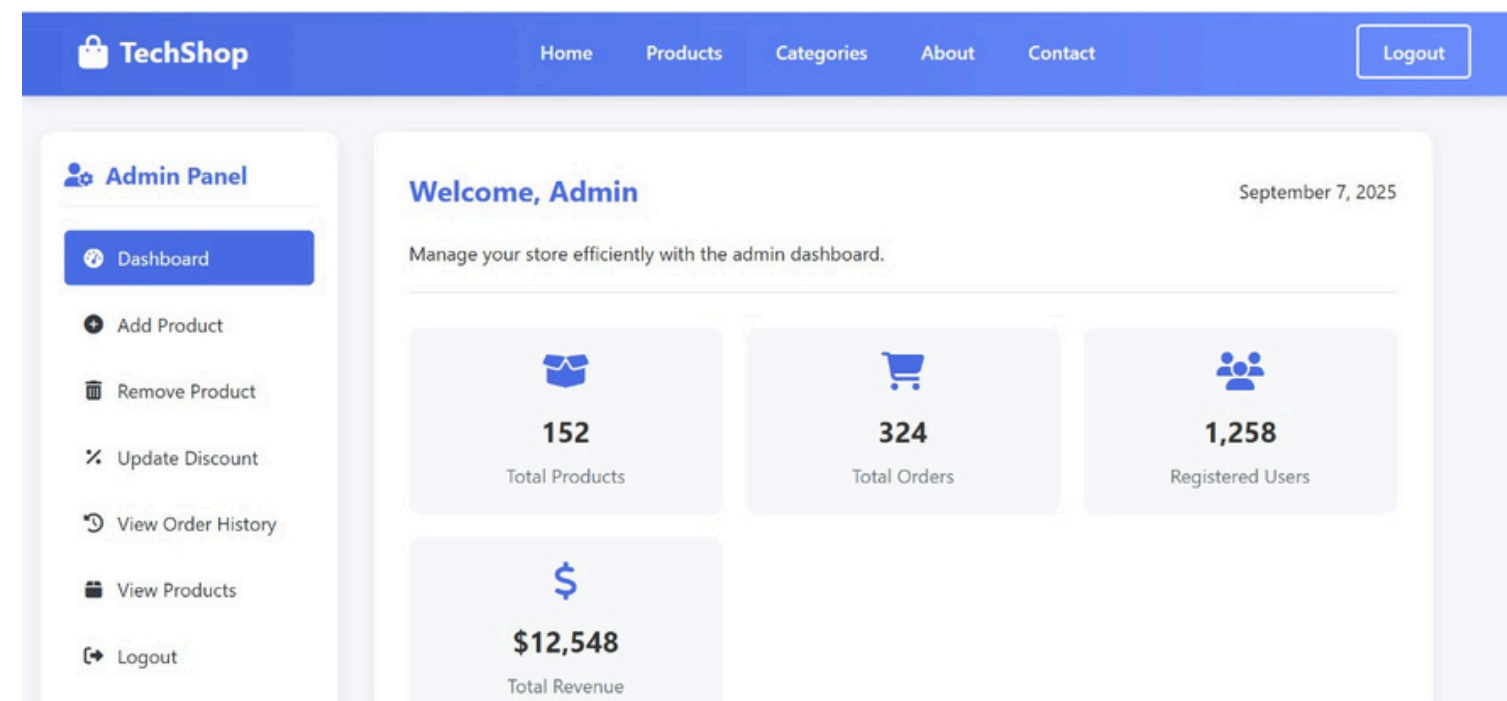
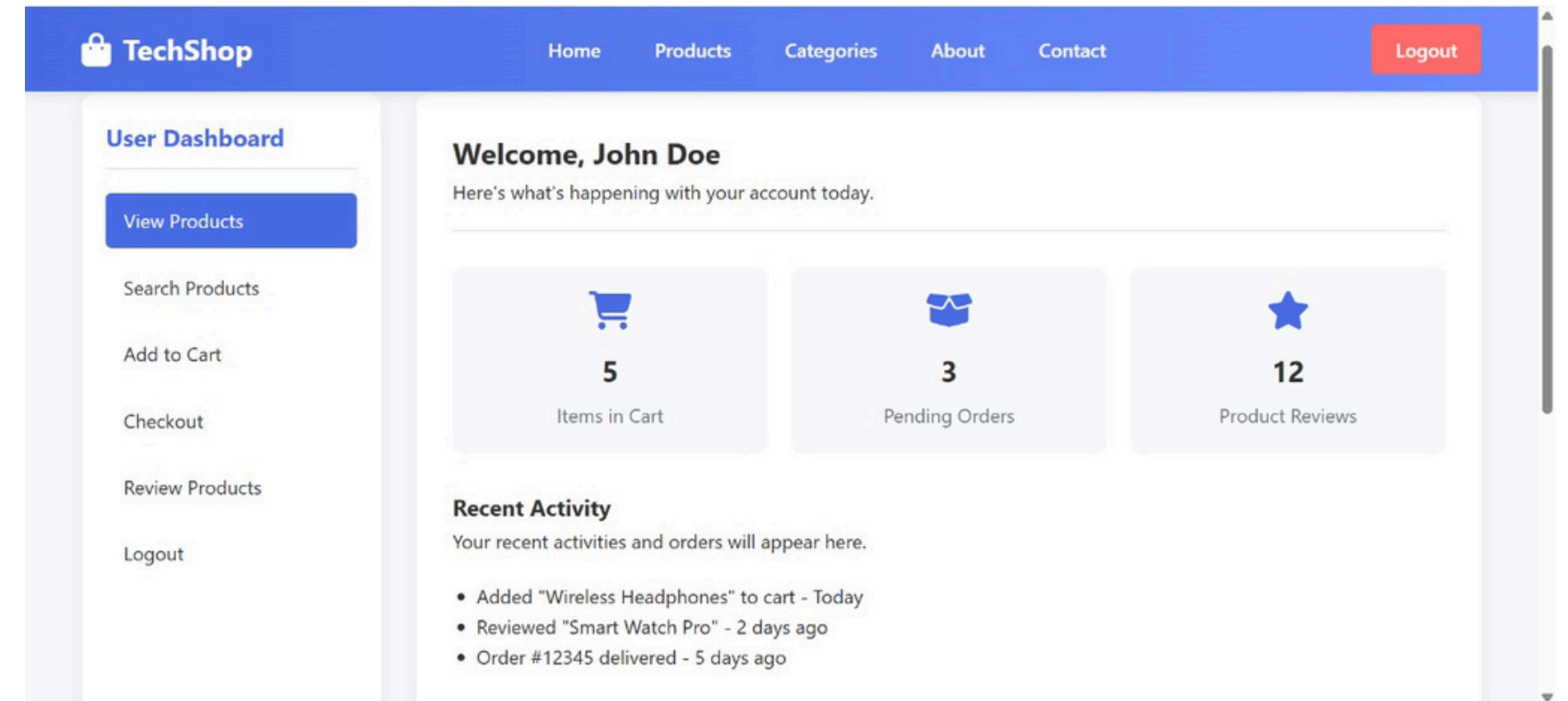
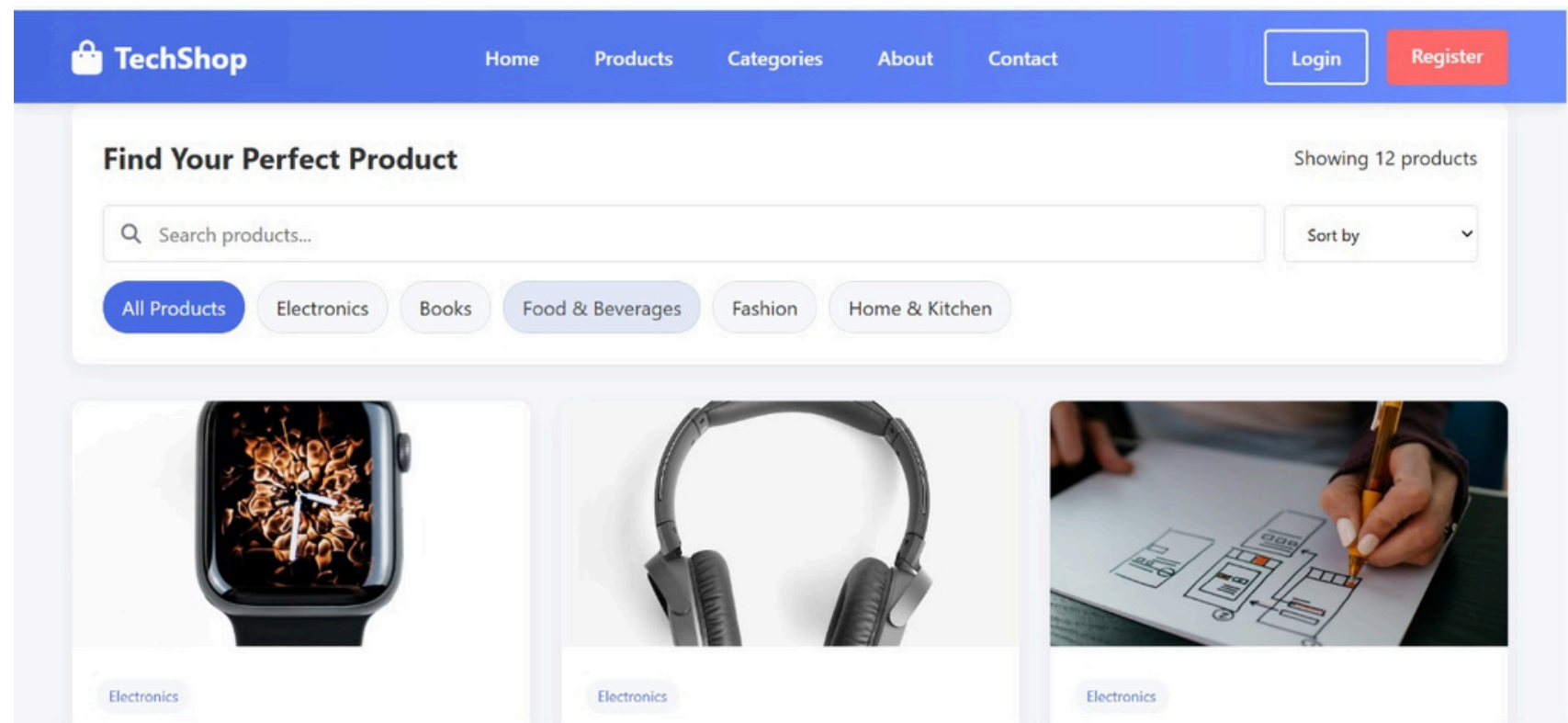
- Server-Side Technology: (e.g., Node.js, Python Django, PHP).
  - REST API: To handle operations (GET products, POST orders, etc.).
  - Middleware: Oracle Instant Client to connect the server to the database.
  - Authentication: Secure user login and session management.

# UI Snapshots - Home & Authentication



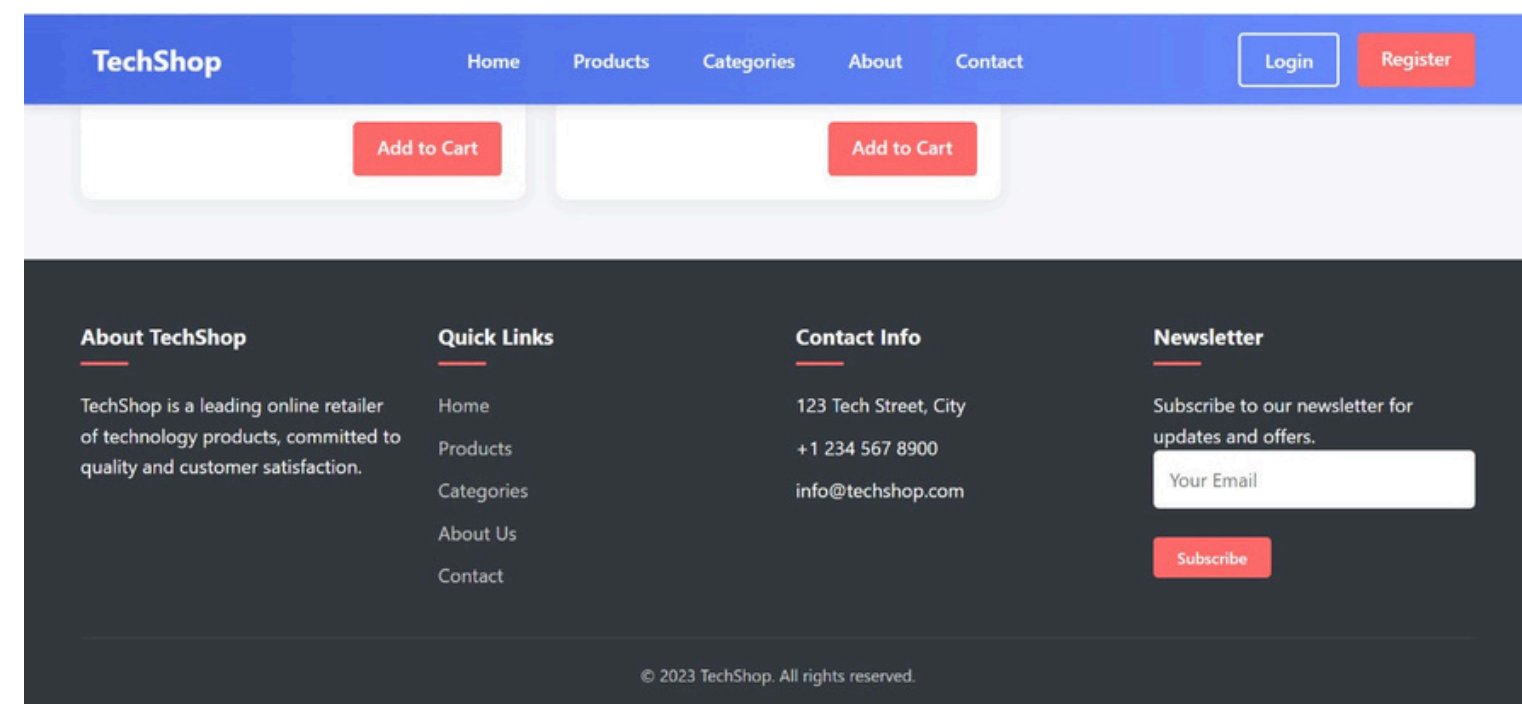
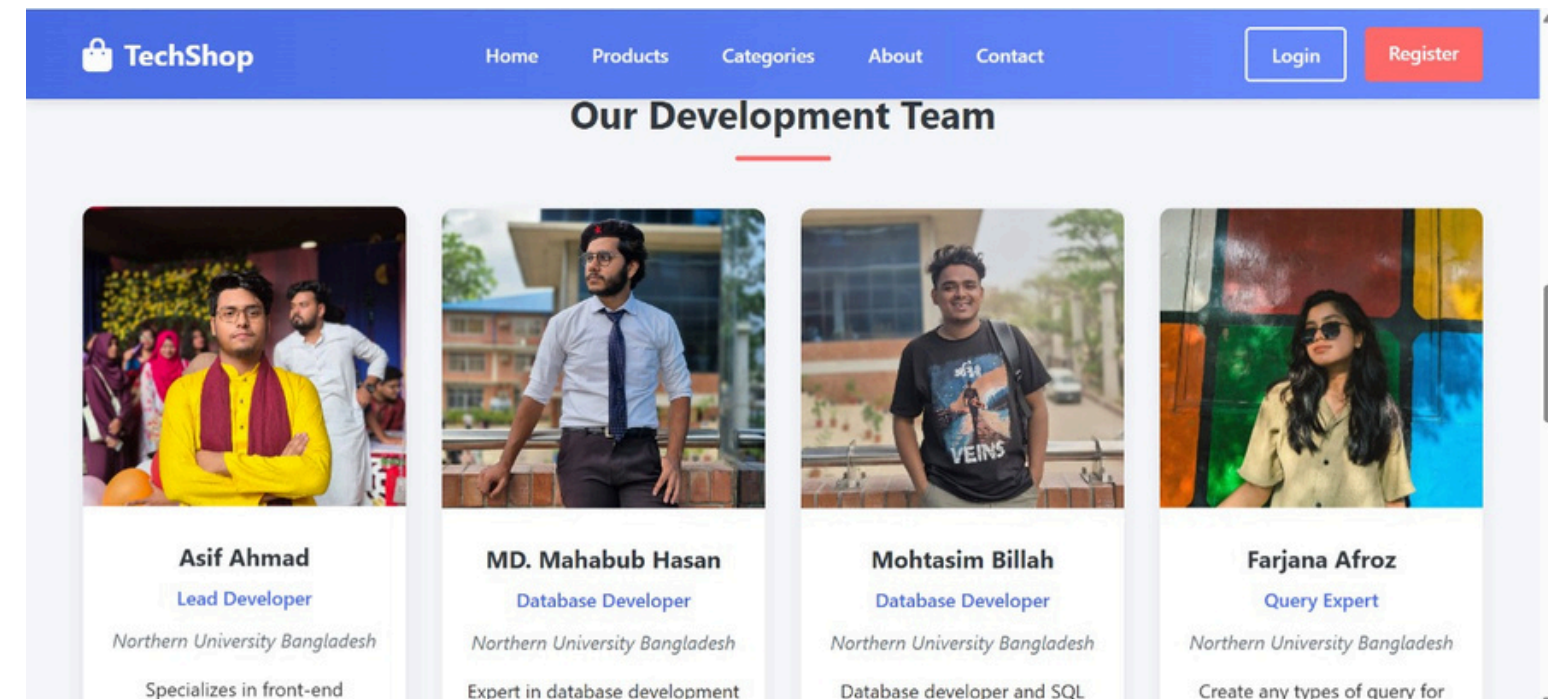
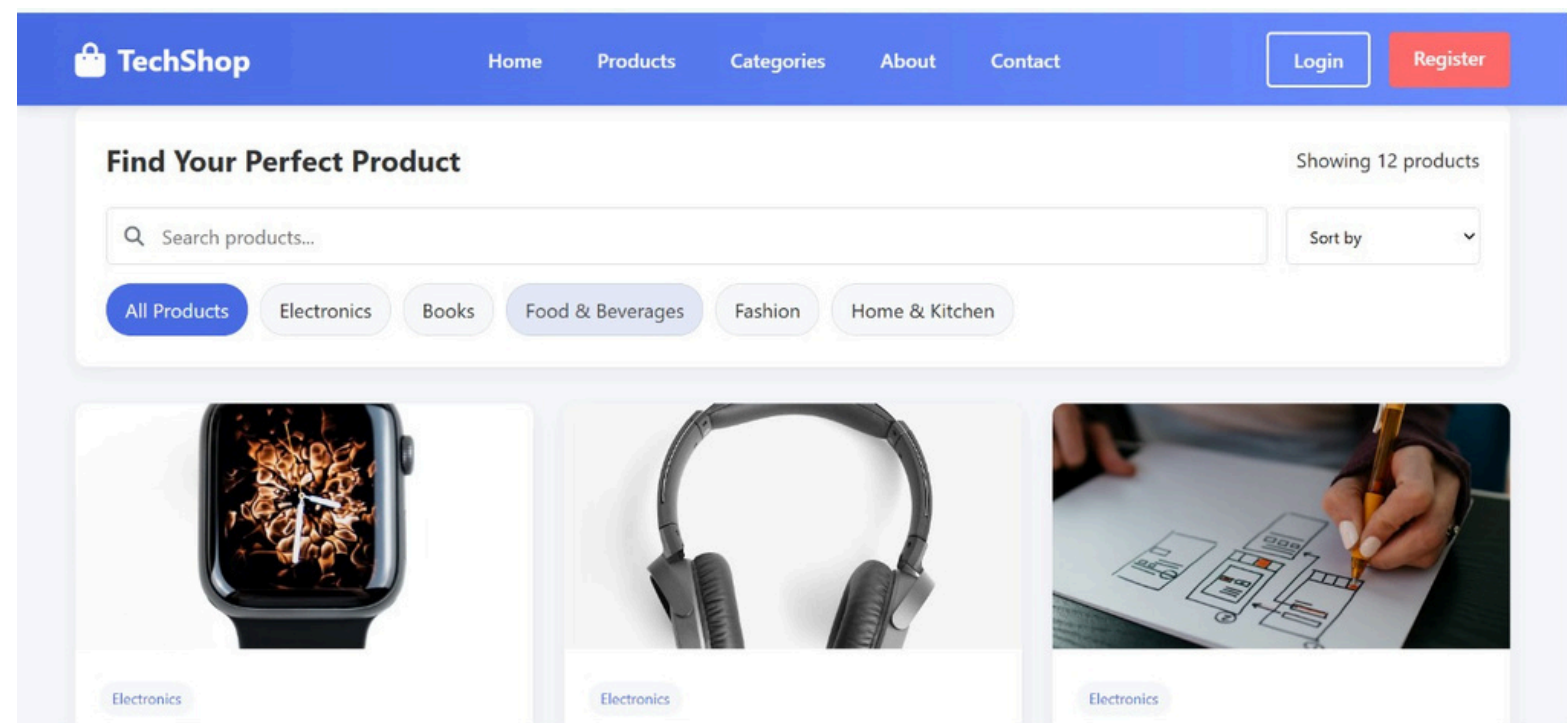


# UI Snapshots - Product & Dashboard Views





# UI Snapshots - Product & Dashboard Views



# Future Scope & Enhancements

To create a fully functional application, we need to connect the UI to the Database:

- Server-Side Technology: (e.g., Node.js, Python Django, PHP).
  - REST API: To handle operations (GET products, POST orders, etc.).
  - Middleware: Oracle Instant Client to connect the server to the database.
  - Authentication: Secure user login and session management.
- Phase 1: Connect product catalog & shopping cart.
- Phase 2: Implement user authentication.
- Phase 3: Develop order processing.
- Phase 4: Build admin dashboard.

The slide features a white background with decorative elements in the corners. The top-left and bottom-left corners contain overlapping geometric shapes in shades of blue and light blue. The top-right and bottom-right corners feature thin, dark blue circuit-like lines with small circles at their ends, resembling a printed circuit board layout.

Thank you