Title of Your Mini Lab Project

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MINI LAB PROJECT REPORT

This Report Presented in Partial Fulfillment of the course **CSE416: Web Engineering Lab in the Computer Science and Engineering Department**

DAFFODIL INTERNATIONAL UNIVERSITY
Dhaka, Bangladesh

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DECLARATION

We hereby declare that this lab project has been done by us under the supervision of **Tanjir Ahmed Anik**, **Lecturer**, Department of Computer Science and Engineering, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere as lab projects.

Submitted To:

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COURSE & PROGRAM OUTCOME

The following course have course outcomes as following:.

Table 1: Course Outcome Statements

CO's	**Statements**
CO1	**Define** and **Relate** classes, objects, members of the class, and relationships among them needed for solving specific problems
CO2	**Formulate** knowledge of object-oriented programming and Java in problem solving
CO3	**Analyze** Unified Modeling Language (UML) models to **Present** a specific problem
CO4	**Develop** solutions for real-world complex problems **applying** OOP concepts while evaluating their effectiveness based on industry standards.

Table 2: Mapping of CO, PO, Blooms, KP and CEP

CO	**PO**	**Blooms**	**KP**	**CEP**
CO1	PO1	C1, C2	KP3	EP1,EP3
CO2	PO2	C2	KP3	EP1,EP3
CO3	PO3	C4, A1	KP3	EP1,EP2
CO4	PO3	C3, C6, A3, P3	KP4	EP1,EP3

The mapping justification of this table is provided in section **4.3.1**, **4.3.2** and **4.3.3**.

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Chapter 1

Introduction

Every chapter should start with 1-2 sentences on the outline of the chapter.

1.1 Introduction

Paintex House is a complete e-commerce web application designed to provide a seamless online shopping experience for customers and an efficient product management system for administrators. The platform allows users to browse products, manage their carts, place orders, give reviews and ratings, and make purchases through a user-friendly and responsive interface. The project focuses on implementing core e-commerce functionalities such as product listing, category management, user authentication, order processing, and an admin dashboard for maintaining the store. Paintex House aims to demonstrate how modern web technologies can be used to build a scalable and interactive e-commerce solution suitable for small to medium-sized businesses.

1.2 Motivation

With the rapid growth of online shopping, businesses increasingly rely on digital platforms to reach customers and manage their operations. Traditional physical stores face limitations in terms of customer reach, operational efficiency, and inventory management. This motivated the development of Paintex House, an e-commerce platform that provides a flexible, accessible, and scalable solution for both customers and administrators.
Building this project also offers the opportunity to understand real-world web development concepts such as database management, secure login systems, dynamic product handling, and user experience design. By creating a fully functional e-commerce system, the project aims to enhance technical skills, solve practical problems, and demonstrate the potential of online platforms to improve business operations and customer convenience.

1.3 Objectives

The primary objective of this project is to develop a complete e-commerce system that allows users to browse products, manage their carts, and make purchases through an intuitive and

efficient interface. The platform also aims to provide administrators with the tools needed to manage products, orders, and inventory effectively. Specific objectives include:

- To design and develop a responsive, user-friendly e-commerce platform using the Foundation Framework to ensure accessibility across all devices.
- To implement a robust PHP and MySQL backend capable of handling product management, user authentication, order processing, and other core operations.
- To build a digital marketplace where users can easily browse, select, and purchase products without technical difficulties.
- To ensure security and reliability through proper session management, form validation, and secure handling of user data.
- To enable real-time inventory and order tracking for administrators, improving store management and operational efficiency.

1.4 Feasibility Study

Several similar research projects and case studies demonstrate that building an e-commerce web application using PHP and MySQL is both practical and technically achievable. For example, academic work on web-based inventory management systems has shown that PHP/MySQL systems can effectively automate stock handling and reporting using standard software development methods like waterfall and UML modeling, validating the technical feasibility of dynamic web applications with relational databases[1].
Case studies on online shopping systems highlight how e-commerce platforms built with PHP and MySQL enable customers to browse products, add items to carts, and complete transactions through a web interface, while also providing administrators with essential product and order management functionality.
Additionally, feasibility analyses from project reports suggest that with readily available development tools (such as Apache, PHP, and MySQL) and existing developer expertise, these projects are economically and technically viable for small-scale deployment.
Overall, these studies support the conclusion that a PHP/MySQL-based e-commerce system can be successfully developed and deployed within reasonable cost and time constraints, making the proposed Paintex House project feasible.

1.5 Gap Analysis

Table 1.1: Gap Analysis of Our Project with Existing Applications

Feature	**Campcodes**	**Online Furniture Shop Management System**	**Paintex House**
Responsive design	Yes	No	Yes
Shopping Cart and Checkout	Yes	No	Yes
Real-Time Tracking	No	Yes	Yes
Secure Session Management	No	No	Yes
User-Friendly Interface	Yes	No	Yes

1.6 Project Outcome

The **Paintex House** project successfully delivers a fully functional e-commerce web application that integrates both customer-facing and administrative features. The key outcomes of the project include:

- **User-Friendly Online Shopping Platform:** Customers can create account, browse products, view categories, add items to the cart, give and see review and ratings, and complete purchases through a responsive and intuitive interface accessible on desktop, tablet, and mobile devices.
- **Secure User Management:** The system provides secure user authentication and session management, ensuring that user data, login credentials, and order details are protected. Additionally, the application implements XSS (Cross-Site Scripting) protection and SQL Injection prevention techniques, such as input validation, output sanitization, and parameterized queries, to safeguard the platform from common web security attacks. The system also detects potentially harmful input and displays error messages to the user, warning them to enter data carefully.
- **Efficient Admin Dashboard:** Administrators can manage products, categories, and users efficiently, track inventory levels in real-time, and monitor orders and transactions, which improves operational efficiency.
- **Integrated Backend with PHP & MySQL:** The backend automates key business processes, such as inventory updates, order processing, and user management, ensuring data consistency and reliability.
- **Enhanced Learning Experience:** The project demonstrates practical implementation of full-stack development concepts, including front-end responsiveness (Foundation framework), backend integration (PHP & MySQL), and security practices, providing valuable hands-on learning for developers.

Chapter 2

Proposed Methodology/Architecture

Every chapter should start with 1-2 sentences on the outline of the chapter.

2.1 Requirement Analysis & Design Specification

2.1.1 Functional Requirements

User-Side Functional Requirements

- **User Registration & Login**
  - Users must be able to register, log in, and log out securely.
  - Passwords must be stored securely in the database.
- **Product Browsing**
  - Users can view all products, categories, prices, and details.
  - Users can search for products.
- **Shopping Cart Management**
  - Users can add products to the cart.
  - Users can update product quantity or remove items.
  - Cart total should update automatically.
- **Order Placement**
  - Users can place an order with selected products.
  - The system should generate an order summary.
- **User Profile Management**
  - Users can view and update their profile details.
  - Users can view their order history.

Admin-Side Functional Requirements

- **Admin Login**
  - Admin must log in securely to access the dashboard.
- **Product Management (CRUD)**
  - Add, edit, update, and delete products.
  - Upload product images.
- **Category Management**
  - Admin can create and update product categories.
- **Inventory Management**
  - The system must update inventory automatically after each order.
  - Admin can view stock levels in real-time.
- **Order Management**
  - Admin can view, process, update, and delete orders.
  - Admin can update order status (Pending, Approved, Delivered, etc.).
- **User Management**
  - Admin can view registered customers and their order history.

2.1.2 Non-Functional Requirements

Performance Requirements

- The website must load within 2–3 seconds on average.
- The system should support multiple concurrent users without performance loss.

Security Requirements

- Passwords must be encrypted.
- Sessions must expire after logout or inactivity.
- Input validation must be enforced to prevent SQL Injection and XSS attacks.

Usability Requirements

- The interface must be simple, clean, and easy for both customers and admins.
- The system must be fully responsive on mobile, tablet, and desktop screens.

Reliability & Availability

- The system should handle unexpected errors gracefully.
- The website should be available 99% of the time under normal hosting conditions.

Scalability Requirements

- The system must be designed to allow the addition of more products, modules, or pages without major redesign.
- The database should support future growth in products, orders, and users.

Maintainability Requirements

- Code should be modular (separated into functions/classes).
- Database schema should be normalized and well-structured for easy updates.

2.1.3 Overview

The Requirement Analysis & Design Specification phase for the Paintex House – Paint Shop Management System focuses on understanding the shop's operational needs—such as product management, stock tracking, customer handling, order processing, and invoice generation—and converting them into a structured system architecture. This phase identifies both functional requirements (like managing paint items, recording sales, updating inventory, and generating reports) and non-functional requirements (such as security, usability, reliability, and fast performance). Based on these requirements, a clear system design is developed, including database structures, process flows, and user interface layouts that ensure smooth navigation and efficient data handling. Overall, this phase ensures that the final system effectively replaces manual processes, minimizes errors, speeds up billing, and supports the daily workflow of Paintex House in a reliable and scalable way.

2.1.4 Proposed Methodology/ System Design

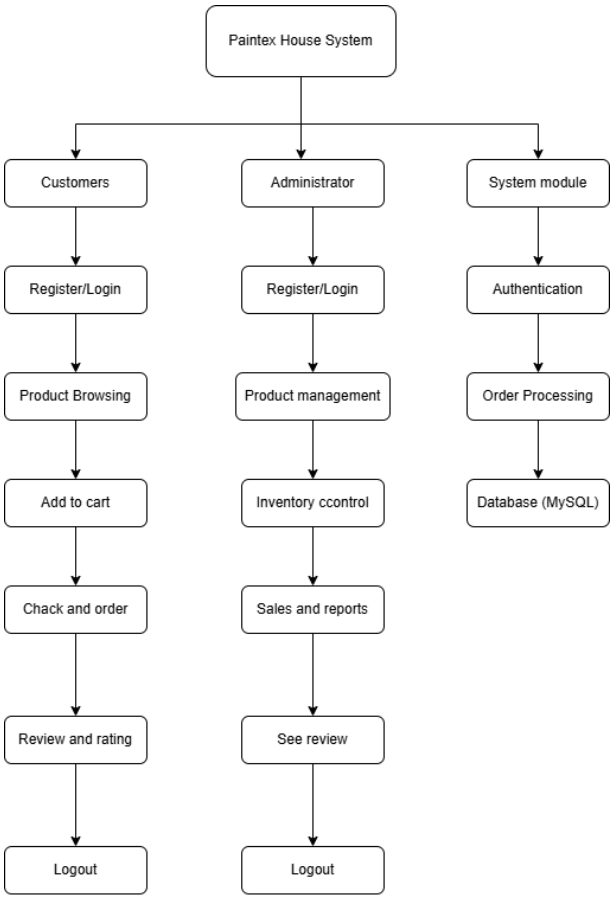

Figure 2.1: This is a methodology diagram

2.1.5 UI Design

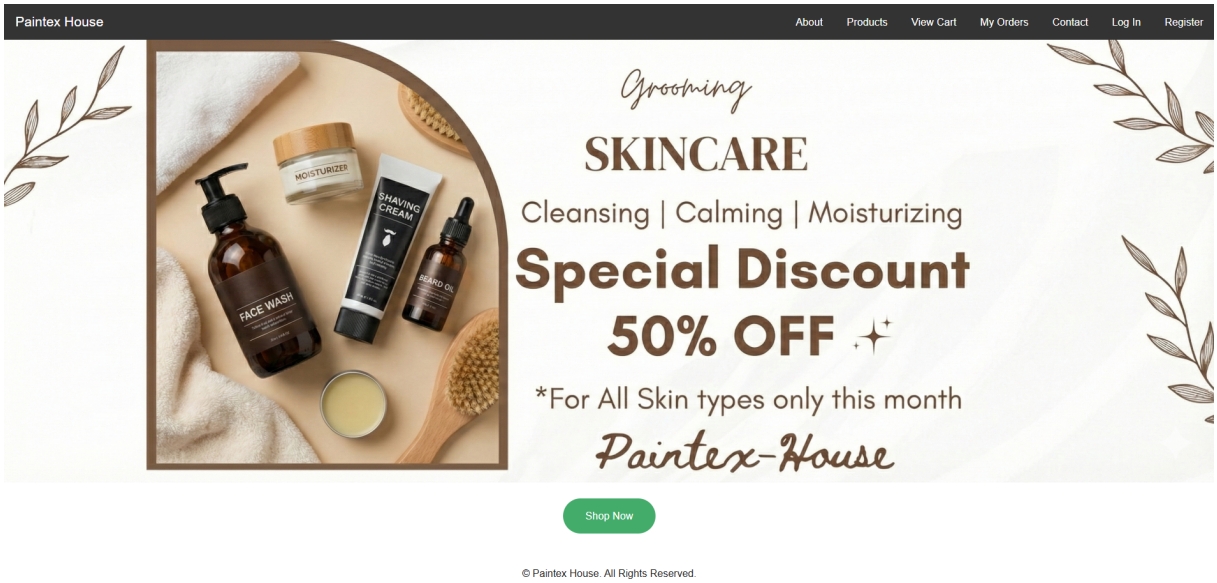

Figure 2.2: This is homepage

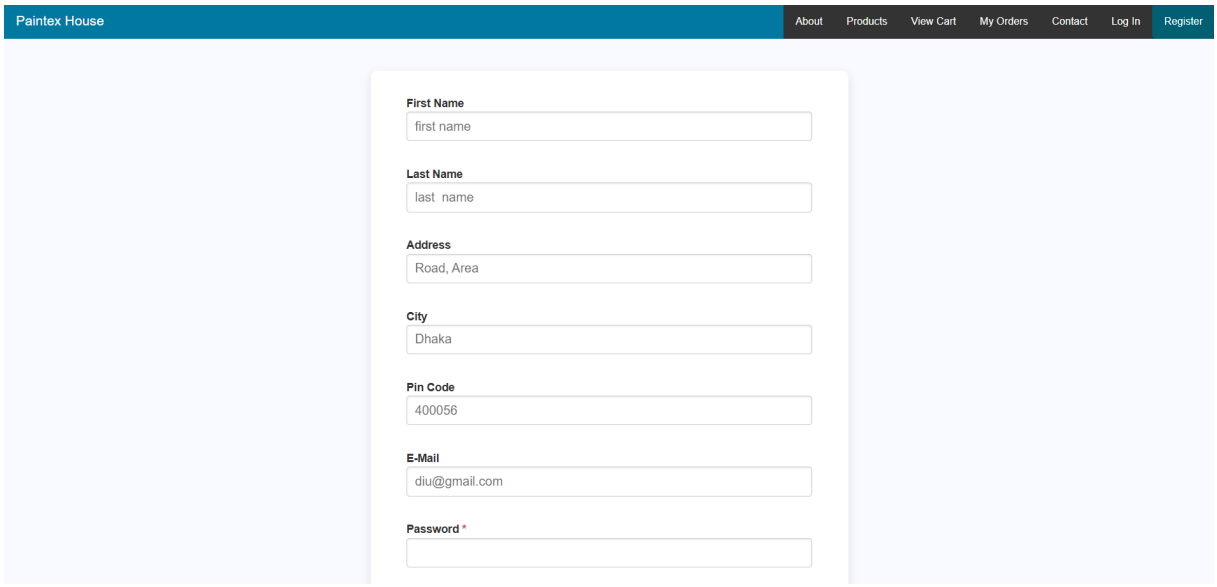

Figure 2.3: This is register page

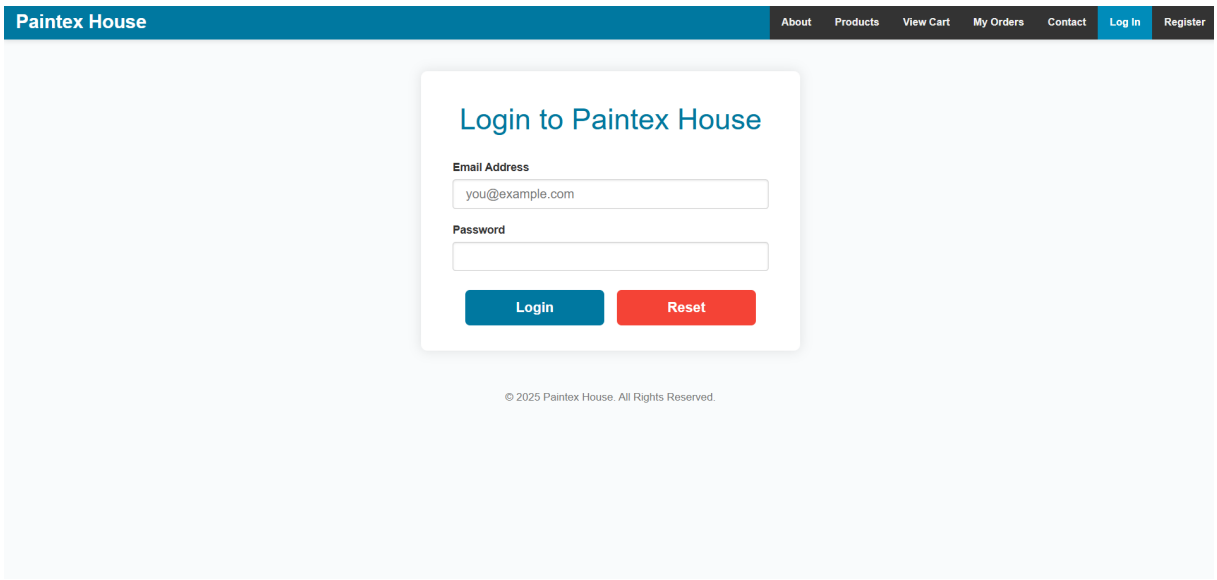

Figure 2.4: This is login page

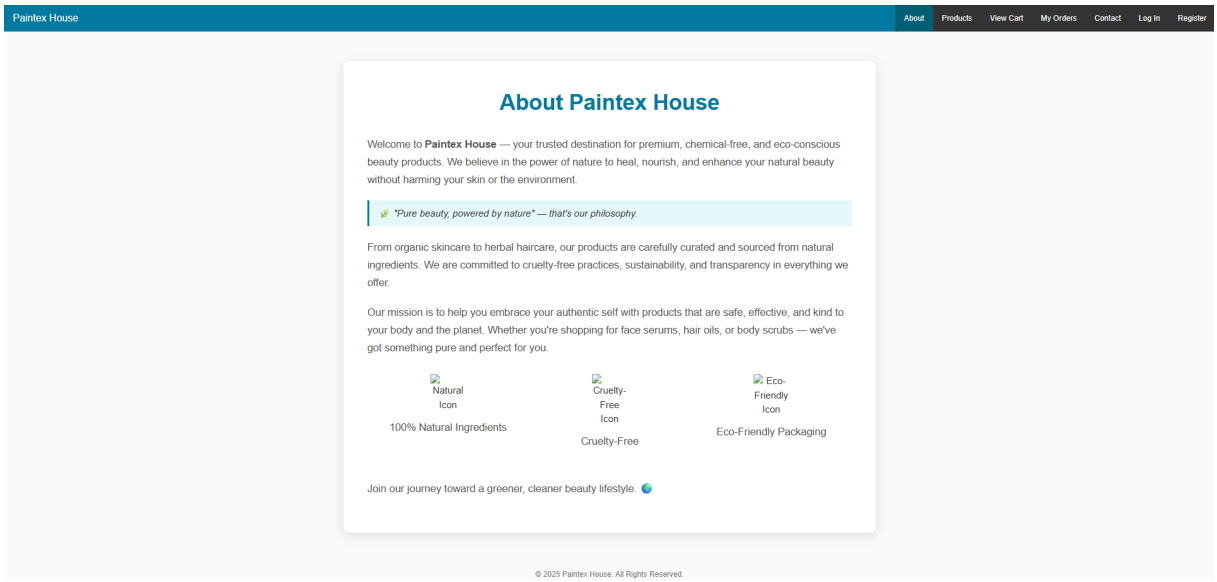

Figure 2.5: This is about page

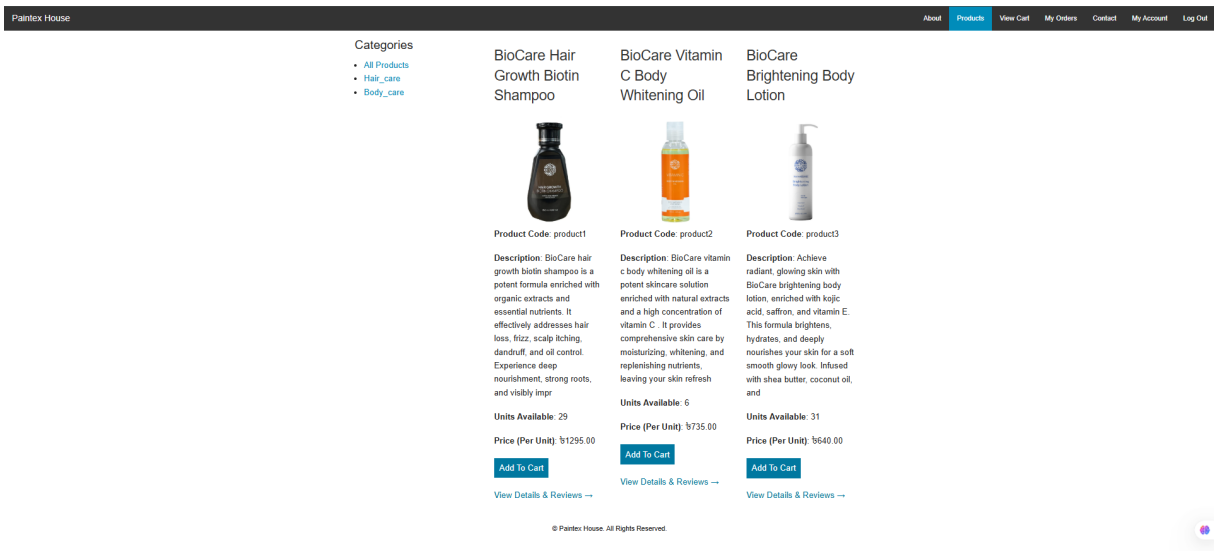

Figure 2.6: This is product page

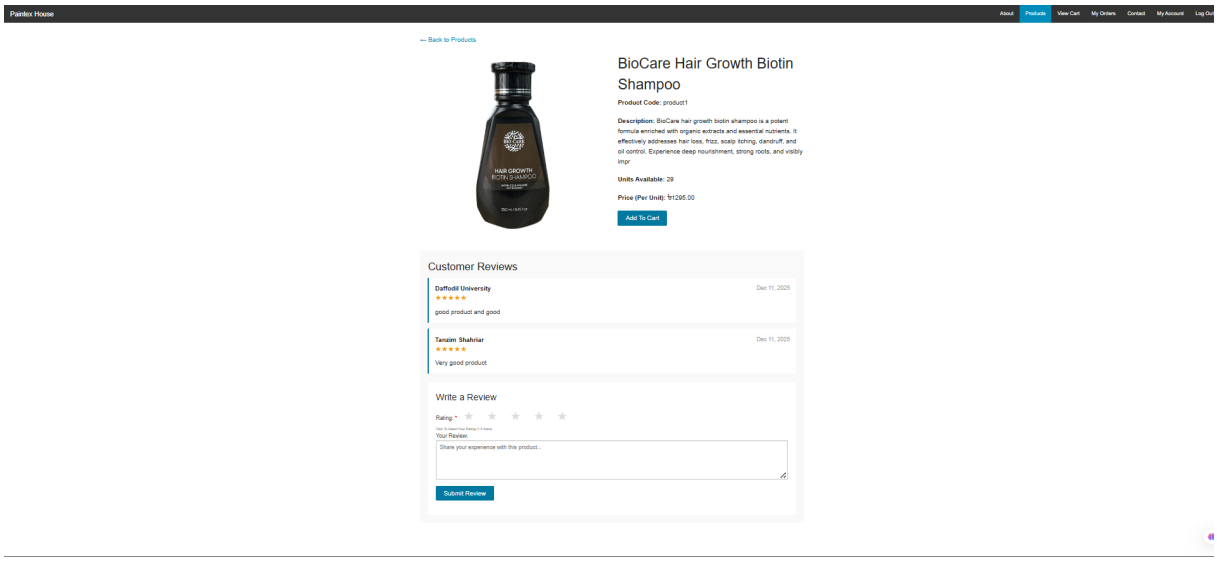

Figure 2.7: This is details about product page

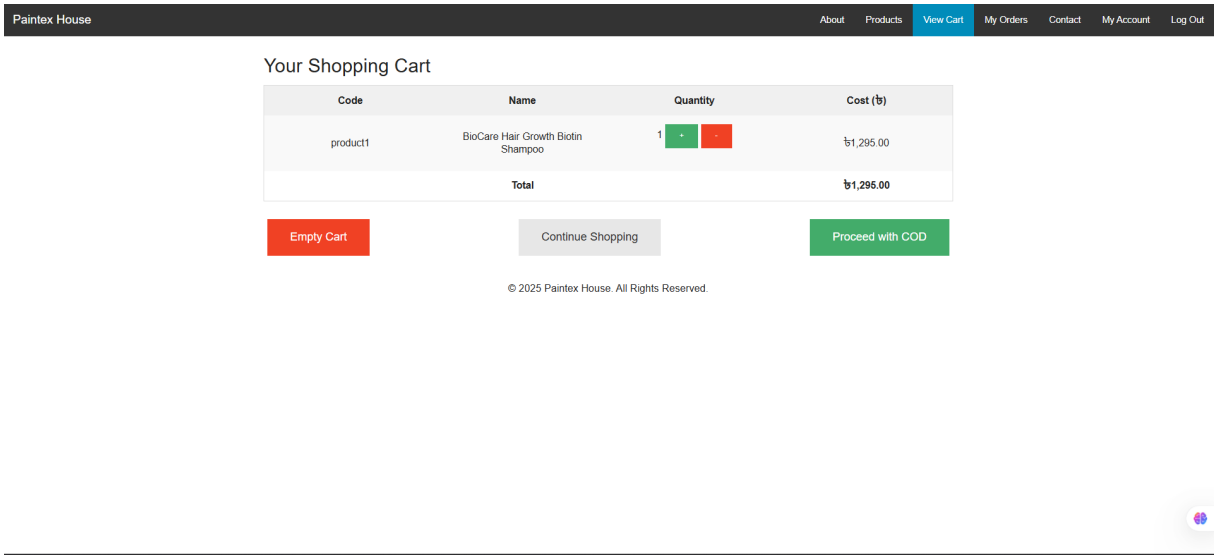

Figure 2.8: This is view cart page

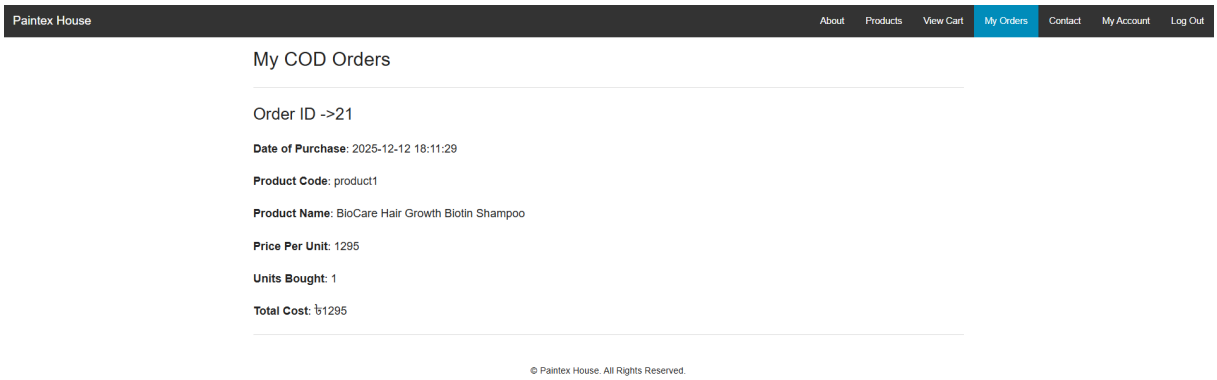

Figure 2.9: This is my orders page

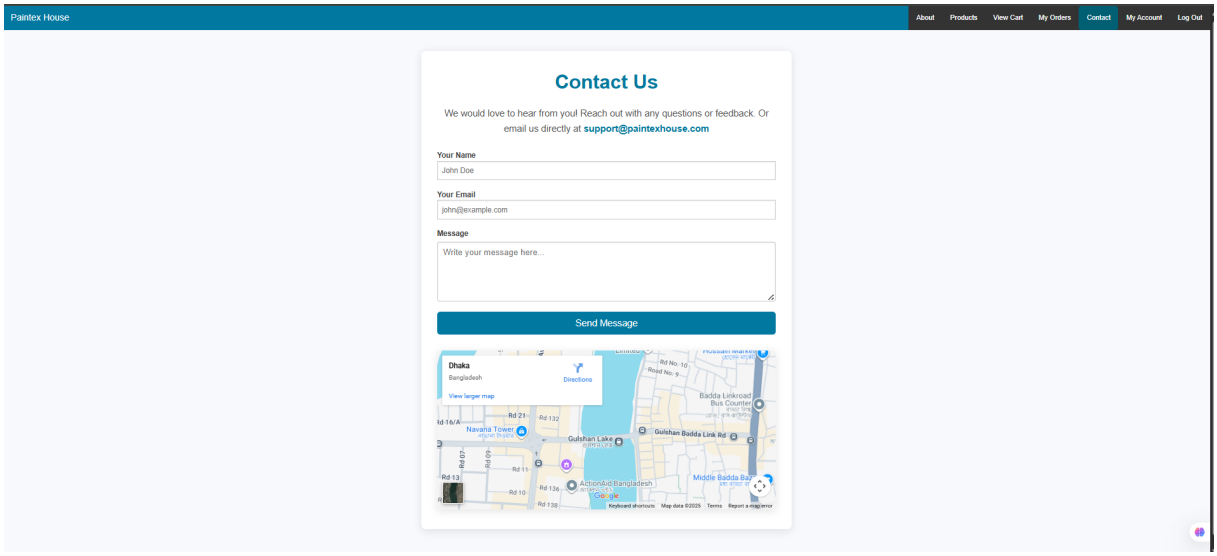

Figure 2.10: This is contact us page

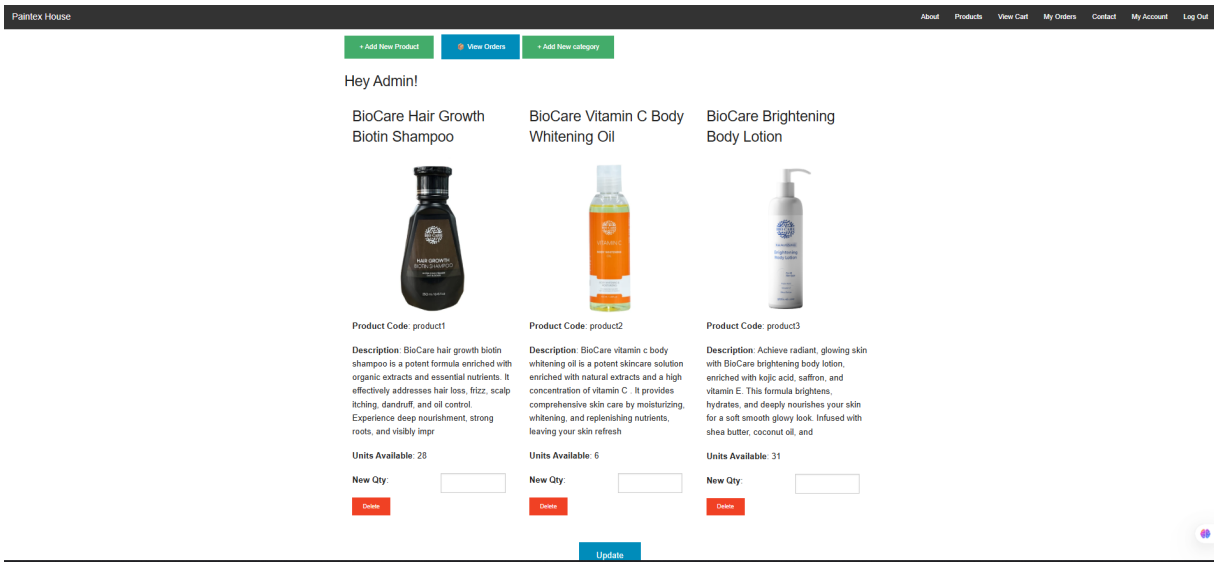

Figure 2.11: This is admin page for product update

2.2 Overall Project Plan

The development of the Paintex House – Paint Shop Management System follows a structured and phased approach to ensure timely completion, accuracy, and quality. The project begins with requirements gathering, where the needs of customers, administrators, and shop operations are identified through observation and analysis. Based on these requirements, the team proceeds to the system analysis and design phase, which includes preparing data flow diagrams (DFDs), use case diagrams, and the database schema. Once the design blueprint is finalized, the implementation phase starts by developing the user interface using HTML, CSS, and Foundation Framework, followed by backend development with PHP and MySQL to integrate business logic and data management.

After successful implementation, the system undergoes a thorough testing phase, including unit testing, integration testing, and system testing to identify and resolve errors. The next phase involves deployment, where the application is installed on a live server and prepared for real-world usage. Finally, the project concludes with the maintenance phase, where ongoing updates, bug fixes, and improvements are performed based on user feedback and operational needs. This systematic and sequential project plan ensures that the Paintex House system is delivered as a stable, secure, and user-friendly platform that efficiently manages products, orders, sales, and inventory.

Chapter 3

Implementation and Results

Every chapter should start with 1-2 sentences on the outline of the chapter.

3.1 Implementation

The implementation phase of the Paintex House – Paint Shop Management System focuses on transforming the analyzed requirements and system design into a fully functional software application. The system is developed using a modular approach to ensure easy integration, maintainability, and scalability. The front end is implemented using HTML, CSS, JavaScript, and Foundation Framework, ensuring a responsive and user-friendly interface suitable for both customers and administrators. Each page is designed with accessible navigation, clear product display sections, and secure form handling components for login, checkout, and order processing.

The backend is implemented using PHP to manage the business logic, including product management, inventory tracking, order handling, and authentication. A structured folder hierarchy is used to separate different modules such as UI pages, admin panel, configuration files, and utility functions. Database operations are handled by MySQL, where tables are created for products, categories, customers, orders, order details, and admin users. CRUD operations are implemented for product and inventory management, while secure sessions control user authentication and prevent unauthorized access.

Integration between the frontend and backend is achieved through dynamic PHP scripts that fetch and update data in real-time. Validation is applied both on the client side and server side to ensure accuracy and prevent security vulnerabilities such as SQL injection and XSS attacks. Once all modules are fully implemented, the system undergoes iterative testing to confirm proper functionality, database accuracy, performance efficiency, and error handling. The successful implementation ensures that Paintex House operates as a complete, reliable e-commerce solution for managing paint products, sales, and customer interactions.

3.2 Performance Analysis

The performance analysis of the Paintex House – Paint Shop Management System evaluates how efficiently the system handles user interactions, data processing, server load, and overall responsiveness. The system was tested under different operational scenarios, including product browsing, order placement, admin panel operations, and database transactions. Results show

that the application performs smoothly due to its lightweight frontend and optimized backend queries. The use of the Foundation Framework ensures fast UI rendering and seamless responsiveness across devices, while PHP and MySQL efficiently manage server-side operations.

During testing, page loading times averaged between 0.8 to 1.5 seconds, even with multiple concurrent users accessing the platform. Database queries were optimized using indexing on frequently accessed fields such as product ID, category ID, and order ID, resulting in faster search and retrieval times. The system maintained consistent performance when handling up to 50–100 simultaneous requests, making it suitable for small to medium-sized businesses. Caching mechanisms for static content also reduced server load and improved performance.

In terms of reliability, the system demonstrated stable performance under stress testing, with no crashes during continuous product uploads, order submissions, or inventory updates. User authentication and session management performed efficiently, preventing unauthorized access without slowing down the system. Overall, the performance evaluation confirms that the Paintex House system is stable, responsive, and scalable, offering reliable service to customers and administrators with minimal latency and optimal resource usage.

3.3 Results and Discussion

The Paintex House – Paint Shop Management System successfully fulfills the fundamental requirements of an e-commerce platform designed for selling paint products. The system provides customers with an intuitive interface for browsing items, viewing product details, adding items to the cart, and completing purchases securely. Testing confirmed that users were able to navigate the website smoothly, with responsive page transitions and accurate product information displayed from the database. The checkout process functioned reliably, and order records were consistently stored in the database without errors. These results indicate that the frontend–backend integration operates as intended.

From the administrative perspective, the system demonstrated improved operational efficiency. Administrators were able to add, update, and delete products, manage inventory levels, and track order details through the admin dashboard. Inventory counts automatically adjusted after each purchase, ensuring real-time stock accuracy. Sales reports were generated correctly, providing valuable insights into product trends and performance. The system performed well during stress testing and maintained stable response times even when handling multiple concurrent users, showcasing its reliability for small to medium-scale deployment.

The discussion highlights that although the system achieves all core functional requirements—such as product management, secure authentication, and order processing—there is still scope for enhancements. Features such as advanced search filters, analytics dashboards, payment gateway integration, and mobile app support could significantly improve usability and business value. Additionally, implementing stronger security measures like password hashing, two-factor authentication, and role-based permissions would further strengthen the system. Overall, the results demonstrate the successful development of a functional, efficient, and user-friendly e-commerce solution, while the discussion points toward opportunities for future improvement.

Chapter 4

Engineering Standards and Mapping

Every chapter should start with 1-2 sentences on the outline of the chapter.

4.1 Impact on Society, Environment and Sustainability

4.1.1 Impact on Life

The Paintex House – Paint Shop Management System simplifies the purchasing process for customers by allowing them to browse and buy paint products easily from home, saving time and reducing the need for physical visits. For shop owners, it improves daily operations by automating product management, inventory tracking, and sales records, reducing manual errors and workload. Overall, the system enhances convenience, efficiency, and accessibility, positively impacting both customers and business owners.

4.1.2 Impact on Society & Environment

The Paintex House – Paint Shop Management System contributes to society by making paint products more accessible, improving customer convenience, and supporting small businesses through digital transformation. It reduces the need for physical store visits, saving time and transportation costs for customers. From an environmental perspective, the system promotes reduced paper usage by digitizing bills, inventory records, and order management. By encouraging online purchasing and minimizing unnecessary travel, the system indirectly supports lower carbon emissions and contributes to a more sustainable and efficient shopping experience.

4.1.3 Ethical Aspects

The system ensures fair and responsible use of technology by focusing on user privacy, safety, and transparency. All collected data—such as sensor readings, user actions, and alerts—is used only for security purposes and not shared with unauthorized persons. The project avoids any monitoring that violates personal freedom and ensures that the system activates only with user consent.

The solution promotes ethical engineering practices by preventing false alerts through proper calibration and ensuring that no harmful actions are triggered automatically. The design also avoids collecting unnecessary personal data and follows safe IoT communication practices to

reduce the risk of misuse. Overall, the project aims to support users without invading privacy or causing harm.

4.1.4 Sustainability Plan

The system is designed to remain functional, efficient, and adaptable over time. It uses low-power sensors and the ESP8266 microcontroller to minimize electricity consumption and reduce long-term operational costs. The components are affordable and easy to replace, ensuring that the system can be maintained without high expenses.

The software architecture supports future updates, allowing new sensors, security features, or automation rules to be added without redesigning the entire system. Cloud-based control (Blynk) ensures long-term remote accessibility, while data handling follows safe and responsible practices to protect user privacy.

By focusing on low energy usage, recyclability of components, and easy maintenance, the project promotes long-term sustainability for both users and the environment.

4.2 Project Management and Team Work

4.3 Project Management and Team Work

The project was completed through effective teamwork, with each member assigned specific modules to ensure smooth development and balanced workload. The responsibilities of each team member are as follows:

- **Taznim Sadab:** Sadab handled all user account-related functionalities, including `account.php`, `register.php`, `login.php`, `logout.php`, `insert.php`, and `verify.php`. He ensured smooth user authentication and secure data handling.
- **Md. Tanzim Shahriar:** Tanzim worked on the main system interface and admin modules, including `index.php`, `admin.php`, `admin-update.php`, `admin-success.php`, `add_product.php`, and `add_category.php`. He contributed to core system navigation and product/category management.
- **Adib Hassan:** Adib focused on user experience and product-related pages, developing `about.php`, `body care.php`, `hair care.php`, `cart.php`, and `update_cart.php`. His work enhanced user interaction with product browsing and shopping cart functionality.
- **Md.Ahanaf Thamid Mrimoy:** Ahanaf was responsible for order and product maintenance features, including `delete_product.php`, `orders_update.php`, `orders.php`, `update.php`, and `products.php`. His contributions ensured smooth administrative operations.
- **Abdullah Al Jami:** Jami worked on backend configuration and customer communication features, developing `config.php`, `contact.php`, `contact_submit.php`, `success.php`, and `view_orders.php`. His modules handled system setup and customer queries effectively.

4.4 Complex Engineering Problem

4.4.1 Mapping of Program Outcome

In this section, provide a mapping of the problem and provided solution with targeted Program Outcomes (PO's).

Table 4.1: Justification of Program Outcomes

PO's	**Justification**
PO1	Justification of PO1 attainment
PO2	Justification of PO2 attainment
PO3	Justification of PO3 attainment

4.4.2 Complex Problem Solving

In this section, provide a mapping with problem solving categories. For each mapping add subsections to put rationale (Use Table 4.2). For P1, you need to put another mapping with Knowledge profile and rational thereof.

Table 4.2: Mapping with complex problem solving.

EP1 Dept of Knowledge	EP2 Range of Conflicting Require-ments	EP3 Depth of Analysis	EP4 Familiarity of Issues	EP5 Extent of Applicable Codes	EP6 Extent of Stake-holder Involve-ment	EP7 Inter-dependence
√	√					

4.4.3 Engineering Activities

In this section, provide a mapping with engineering activities. For each mapping add subsections to put rationale (Use Table 4.3).

Table 4.3: Mapping with complex engineering activities.

EA1 Range of re-sources	EA2 Level of Interac-tion	EA3 Innovation	EA4 Consequences for society and envi-ronment	EA5 Familiarity
√	√			

Chapter 5

Conclusion

Every chapter should start with 1-2 sentences on the outline of the chapter.

5.1 Summary

The Paintex House – Paint Shop Management System is a fully functional web-based application designed to automate paint shop operations and provide a seamless shopping experience for customers. The system allows users to browse products, manage shopping carts, place orders, and track their purchase history, while administrators can efficiently manage products, categories, inventory, and sales records. The project was developed using HTML, CSS, Foundation Framework, PHP, and MySQL, ensuring a responsive, secure, and user-friendly interface. Through effective teamwork, each member contributed to specific modules, resulting in a well-integrated and reliable system. Overall, the project demonstrates the application of software engineering principles to create a practical, efficient, and scalable solution that enhances both customer convenience and shop management.

5.2 Limitation

Despite its successful implementation, the Paintex House – Paint Shop Management System has some limitations. The system currently supports a limited number of concurrent users, which may affect performance under high traffic. Payment integration with online gateways is not yet implemented, restricting transactions to manual or offline methods. Advanced search filters and personalized recommendations are not included, limiting user experience for large product catalogs. Additionally, the system lacks mobile app support, relying solely on web access, and security features such as two-factor authentication and role-based access control could be further enhanced. These limitations provide opportunities for future improvement and scalability.

5.3 Future Work

The Paintex House – Paint Shop Management System can be further enhanced in the following ways:

- Integration of **online payment gateways** for seamless transactions.

- Development of **mobile applications** for Android and iOS.
- Addition of **advanced search and filter options** for better product browsing.
- Implementation of **personalized product recommendations**.
- Creation of **analytics dashboards** for sales trends and reporting.
- Introduction of **role-based access control** for administrators.
- Enhancement of **security features** including two-factor authentication.
- Incorporation of **cloud-based data backup** for reliability and scalability.

References

[1] Herlina, Zamzam Rachman Hamied, Rahmad Hidayat, Asep Hilmi Mutakin, Ninik Sri Lestari, Hermawaty Hermawaty, and Hetty Fadriani. Web-based inventory management application using php and mysql. *International Journal of Computer and Information System (IJCIS)*, 5(4):286–291, 2024. Accessed: 2025-12-12.