LONDON METROPOLITAN UNIVERSITY

Islington college
(इस्लिङ्टन कलेज)

Module Code & Module Title
CS5054NI Advanced Programming & Technologies

Assessment Type
50% Group Coursework

Semester
2024 Spring

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Project Title: Appliance Store
Assignment Due Date: Tuesday, May 14, 2024
Assignment Submission Date: Friday, May 10, 2024
Submitted to: Mr. Prithivi Maharjan
Word Count: Enter the total word count

I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.

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1. Introduction

Welcome to our group coursework on developing an e-commerce website for electronics and gadgets! We are required to follow the Model-View-Controller (MVC) pattern in our project. MVC is a basic architectural pattern that is frequently used in software development. The MVC pattern structures the application into three interconnected components: the model, view, and controller.

Our main goal is to create and run an e-commerce platform that makes good use of the MVC pattern to improve scalability, maintainability, and modularity. Our software needs to be divided into three different packages: model, view, and controller, in accordance with the project requirements.

Within the controller package, we will create Servlets responsible for handling incoming user requests and orchestrating the appropriate actions within the application. Encapsulating the data and business logic of our system, the model package will house all required model classes. In the meantime, the JSP, HTML, and CSS files that make up the presentation layer and render the user interface will be kept in the view package.

Following these recommendations and utilizing the MVC pattern will help us create a dependable and easy-to-use e-commerce site that caters to those who love electronics and gadgets. Together, let's set out on this mission to give our users a flawless online purchasing experience.

1.1. Aims

- Develop user-friendly ecommerce website.
- Implement the MVC Pattern.
- Enhance Modularity.
- Optimize Performance.

1.2. Objectives

- Design Database Schema.
- Evaluate Performance and User Experience.
- Provide easy shopping experience.

2. User Interface Design

UI designs are essential in software development which offer early feedback on project requirements with tangible representations of the product before development begins.

2.1. Wireframe

The wireframe is a like a rough blue print of how a system may look like to help visualize the structure of the system.

We used Balsamiq to design our application. Balsamiq is a tool used to design dynamic application (Balsamiq, 2024).

a) Home - Dashboard

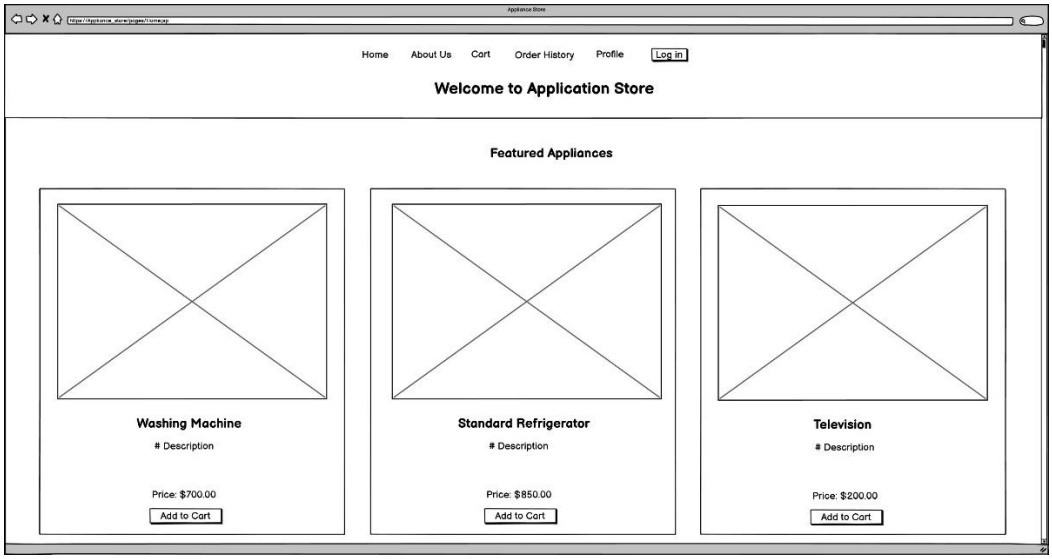


Figure 1: Home - Dashboard

b) Login

Figure 2: Login Page

c) Register

Figure 3: Registration Page

d) About Us

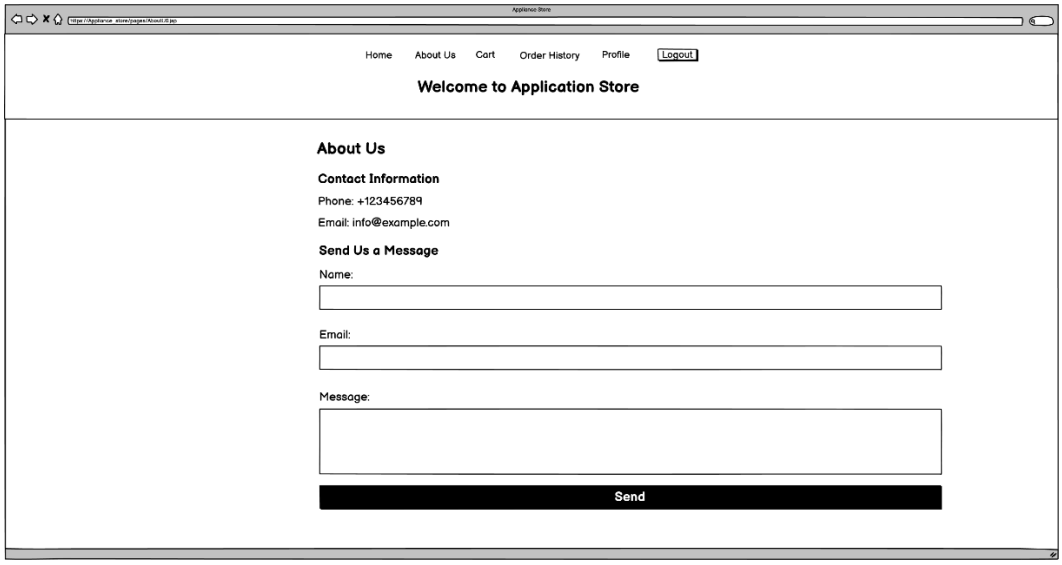


Figure 4: About Us page

e) Cart Page

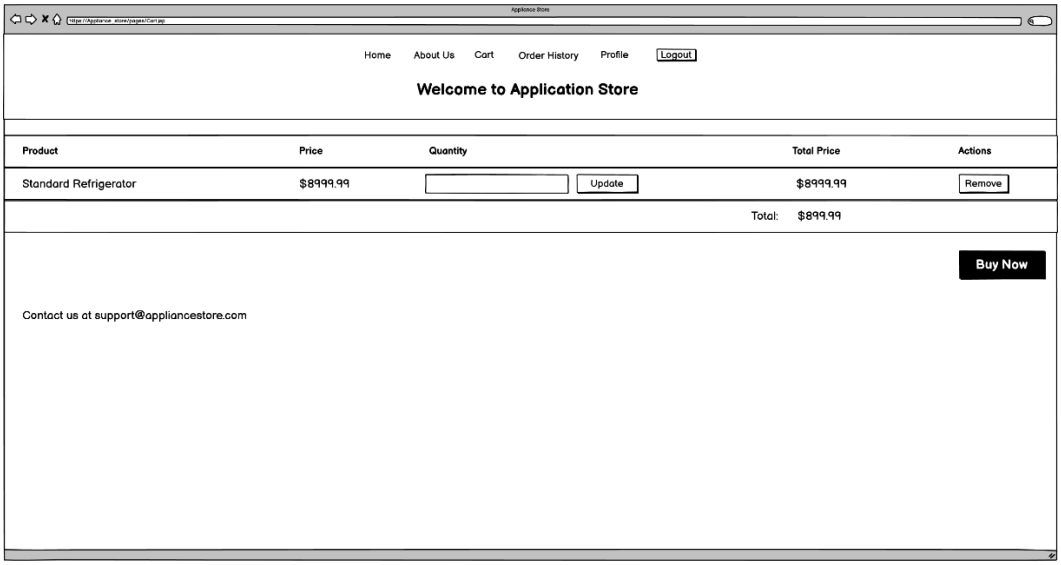


Figure 5: Cart Page

f) User Order

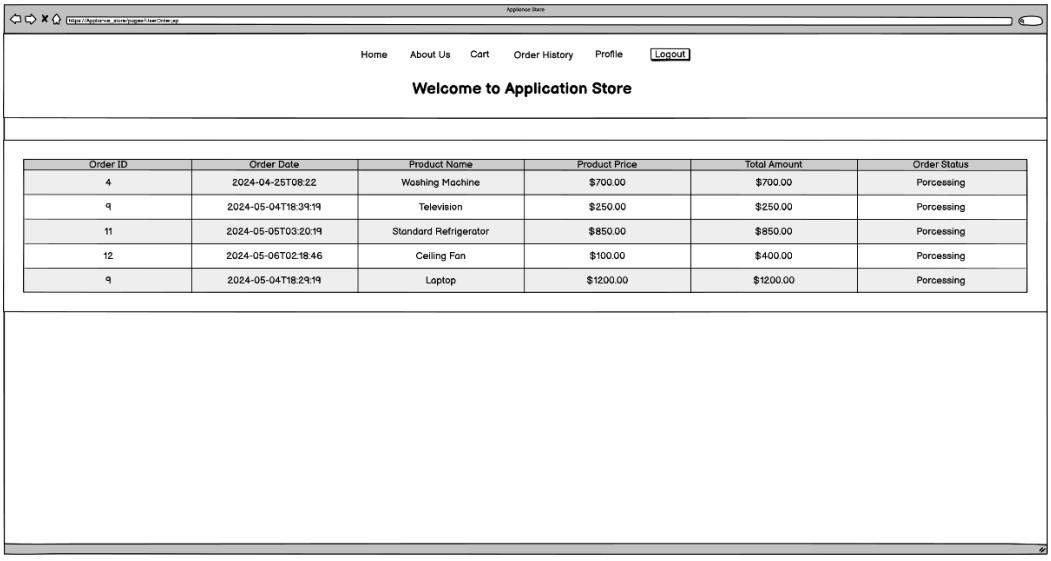


Figure 6: View User Order

g) User Profile

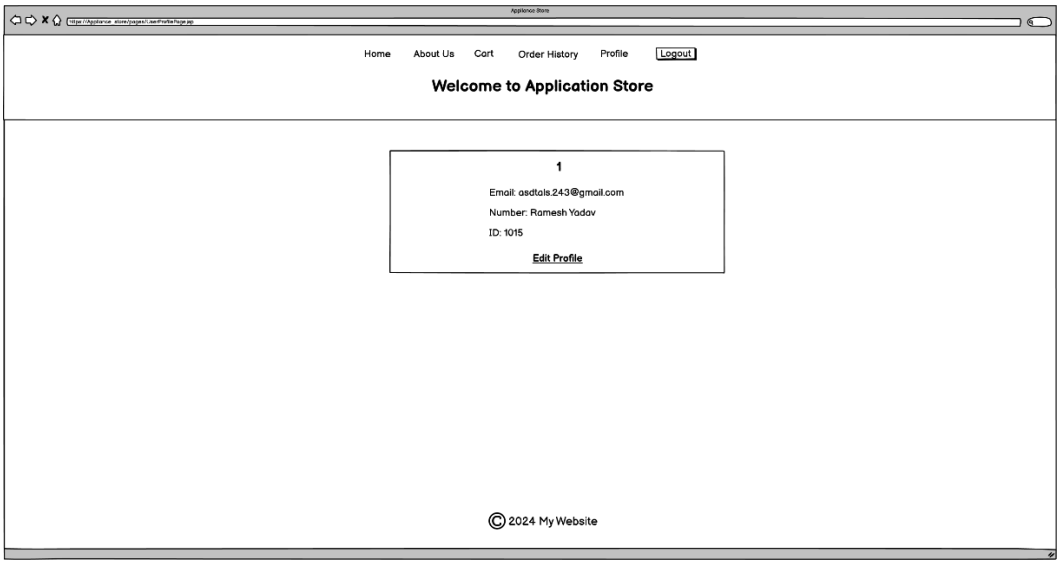


Figure 7: View or Edit Profile

h) Admin Dashboard – Product Management

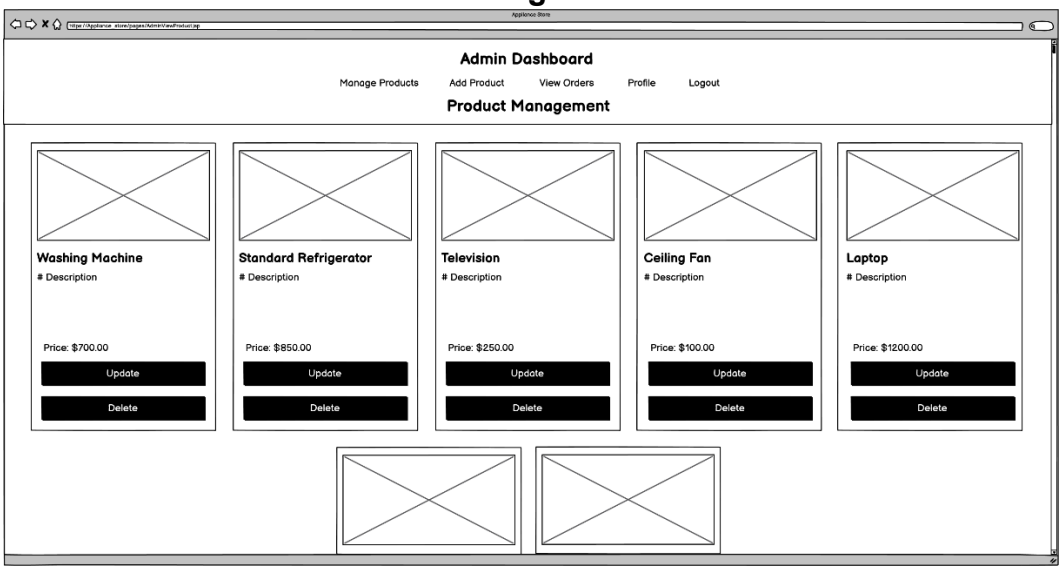


Figure 8: Admin Dashboard - Product Management

i) Admin Dashboard - Update Product

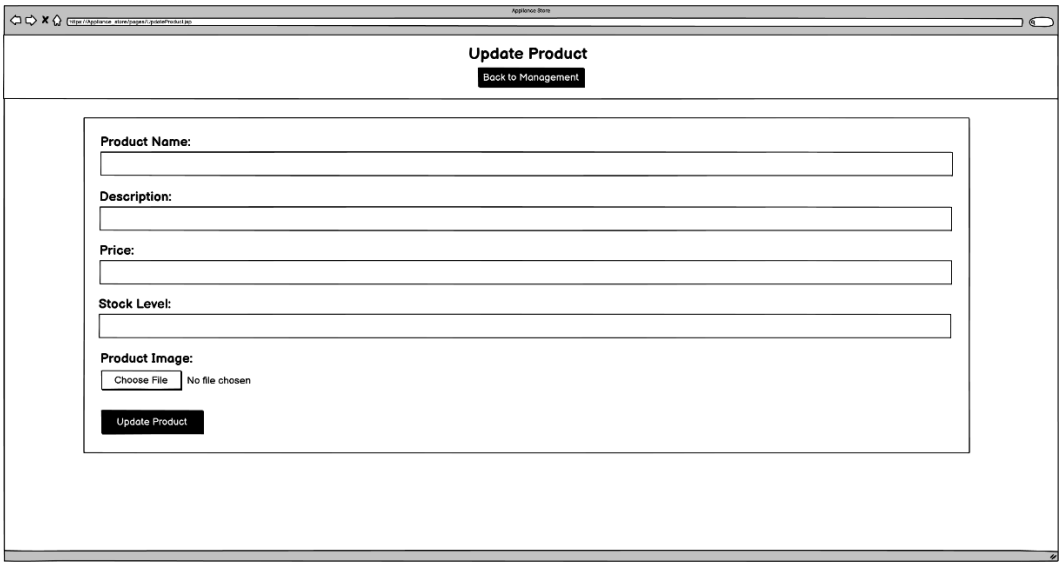


Figure 9: Admin - Update Product

j) Admin Dashboard – Add new product

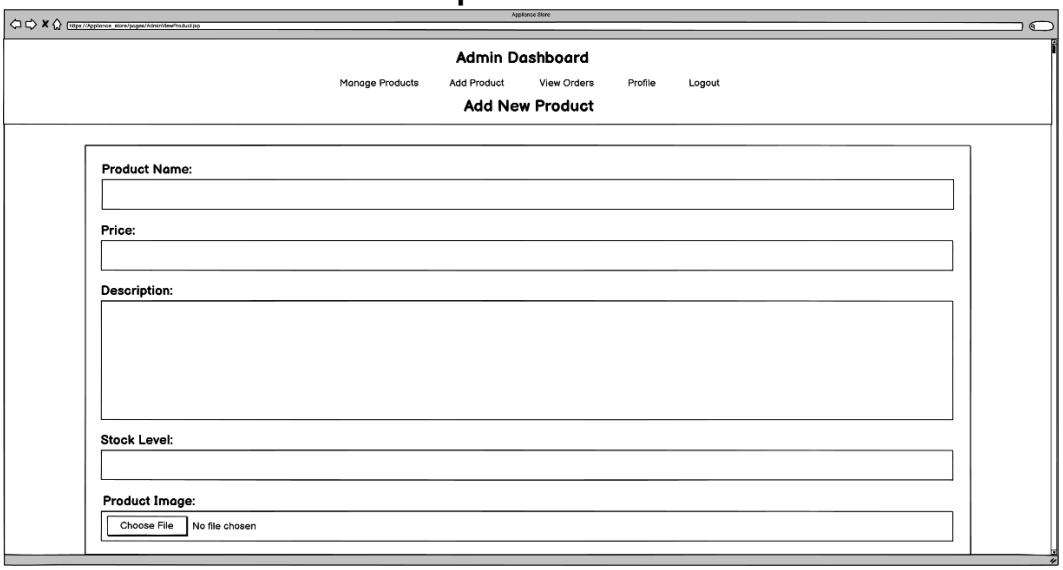
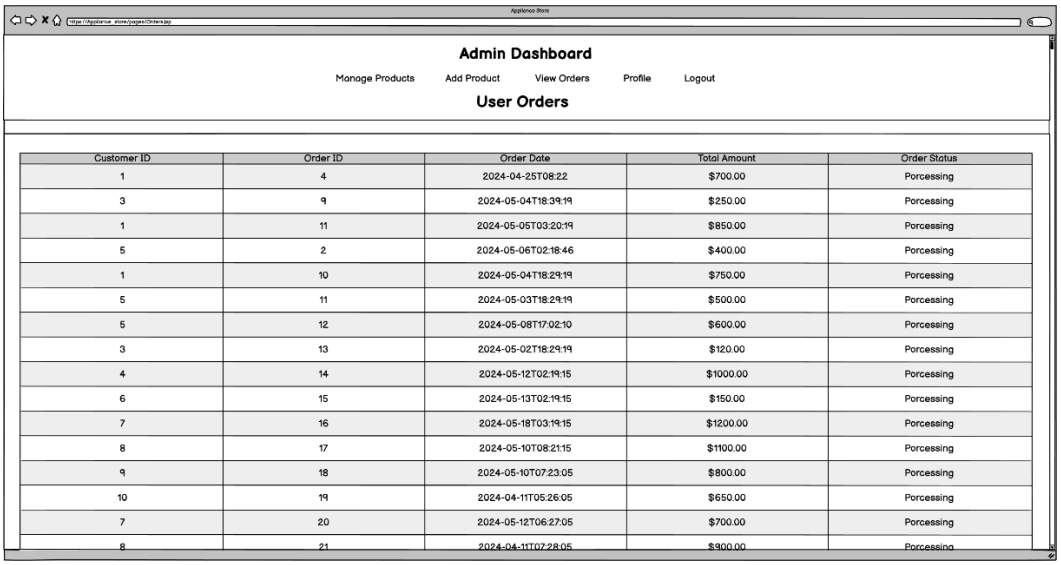


Figure 10: Admin Dashboard - Add productr

k) Admin Dashboard - User Orders



Admin Dashboard

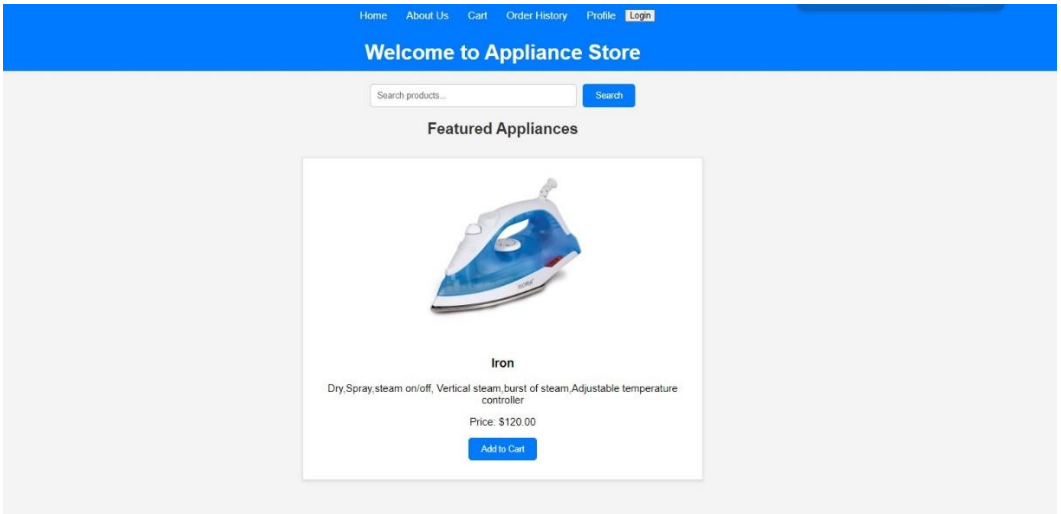
Manage Products Add Product View Orders Profile Logout

User Orders

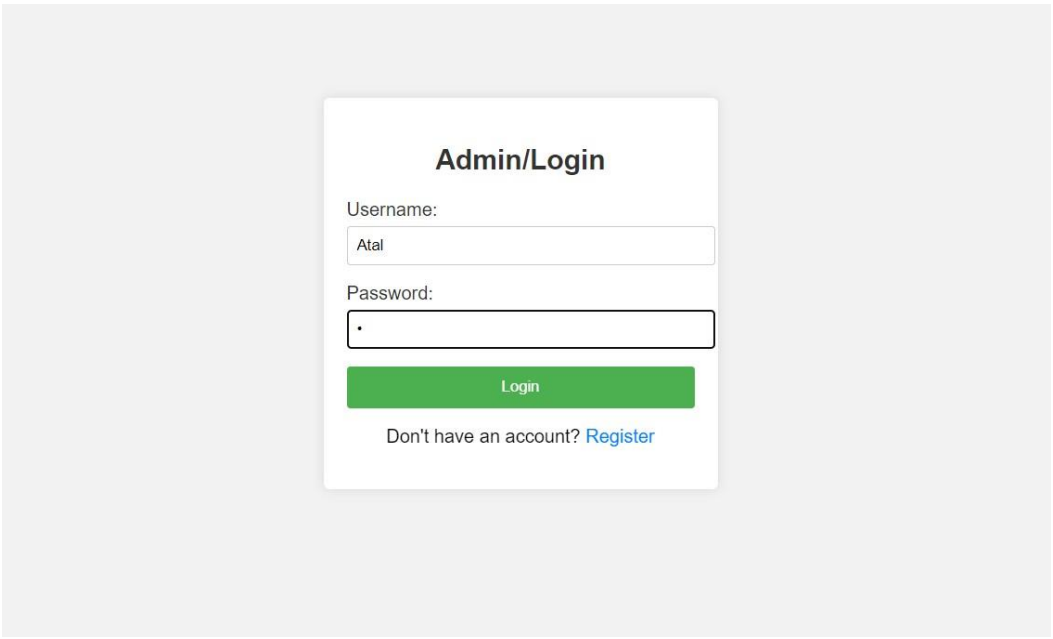
Customer ID	Order ID	Order Date	Total Amount	Order Status
1	4	2024-04-25T08:22	$700.00	Porcessing
3	9	2024-05-04T18:39:19	$250.00	Porcessing
1	11	2024-05-05T03:20:19	$850.00	Porcessing
5	2	2024-05-06T02:18:46	$400.00	Porcessing
1	10	2024-05-04T18:29:19	$750.00	Porcessing
5	11	2024-05-03T18:29:19	$500.00	Porcessing
5	12	2024-05-08T17:02:10	$600.00	Porcessing
3	13	2024-05-02T18:29:19	$120.00	Porcessing
4	14	2024-05-12T02:19:15	$1000.00	Porcessing
6	15	2024-05-13T02:19:15	$150.00	Porcessing
7	16	2024-05-18T03:19:15	$1200.00	Porcessing
8	17	2024-05-10T08:21:15	$1100.00	Porcessing
9	18	2024-05-10T07:23:05	$800.00	Porcessing
10	19	2024-04-11T05:26:05	$650.00	Porcessing
7	20	2024-05-12T06:27:05	$700.00	Porcessing
8	21	2024-04-11T07:28:05	$900.00	Porcessing

2.2. Actual Design

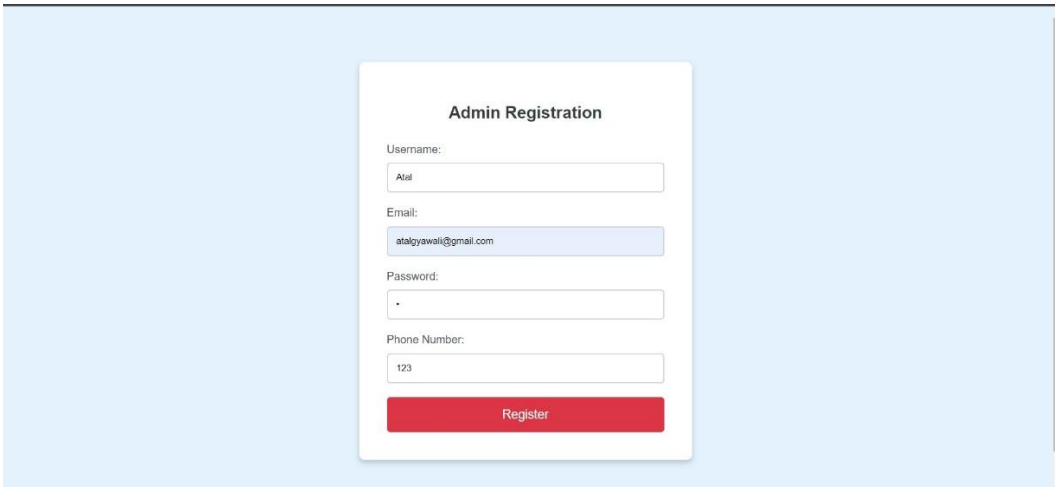
a) Home – Dashboard



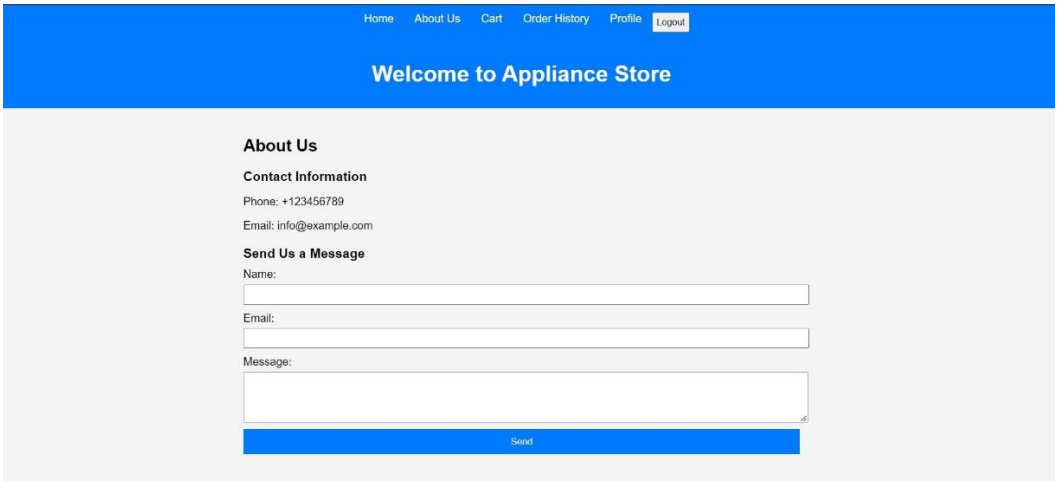
b) Login



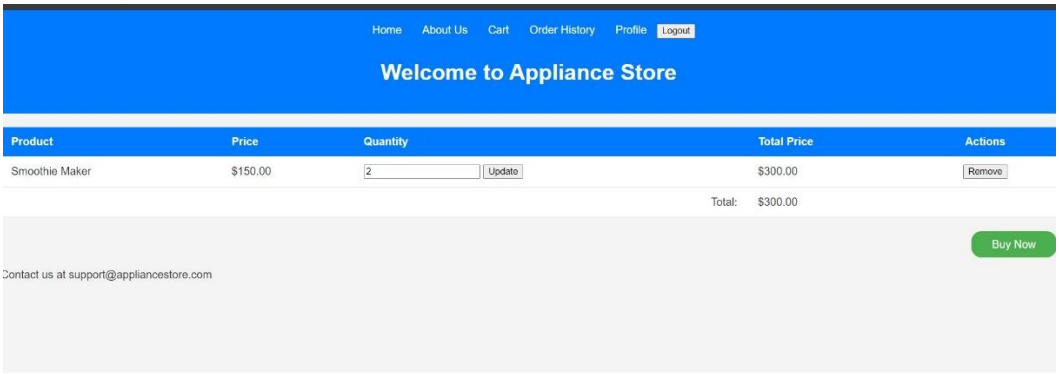
c) Register



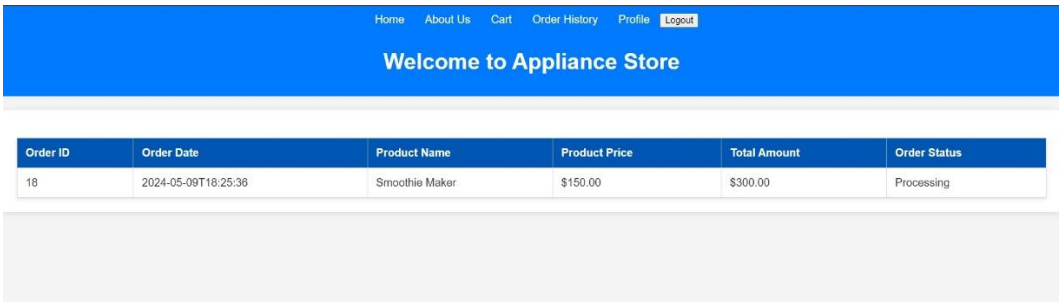
d) About Us



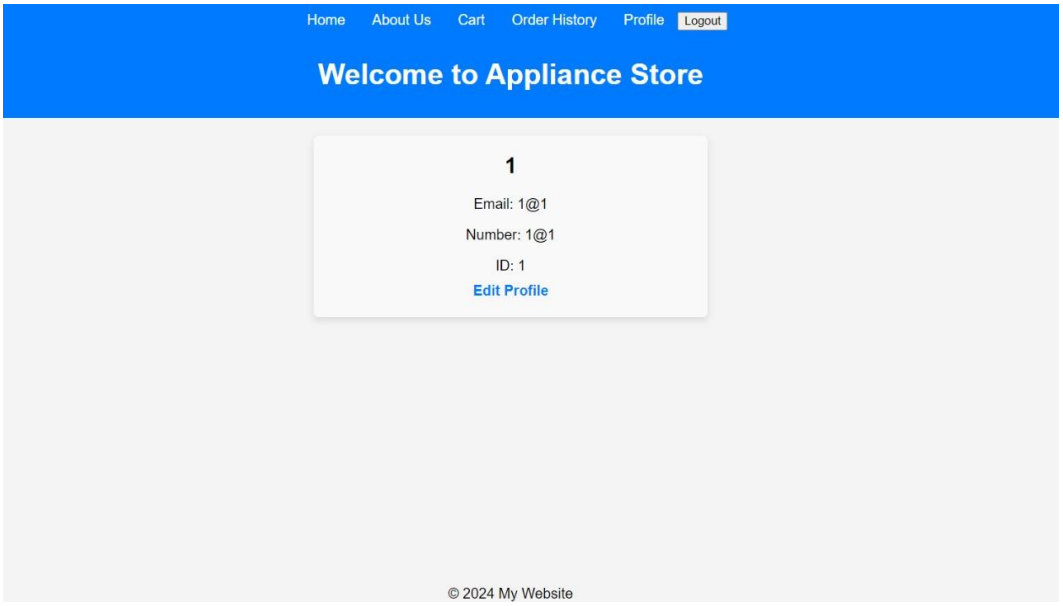
e) Cart Page



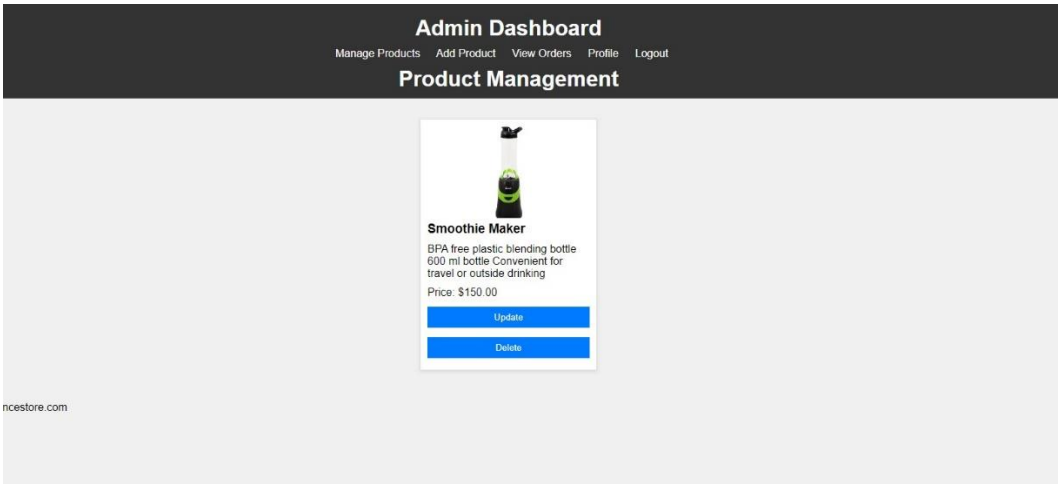
f) User Order



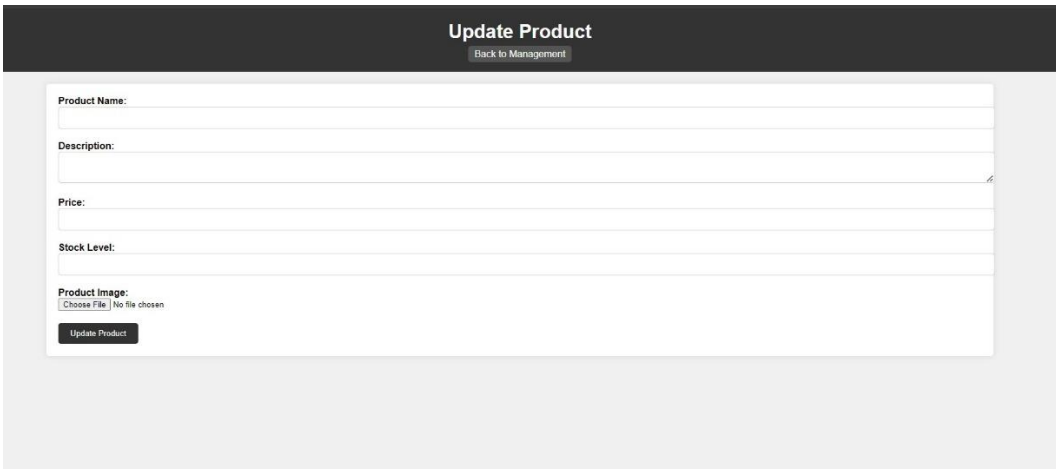
g) User Profile



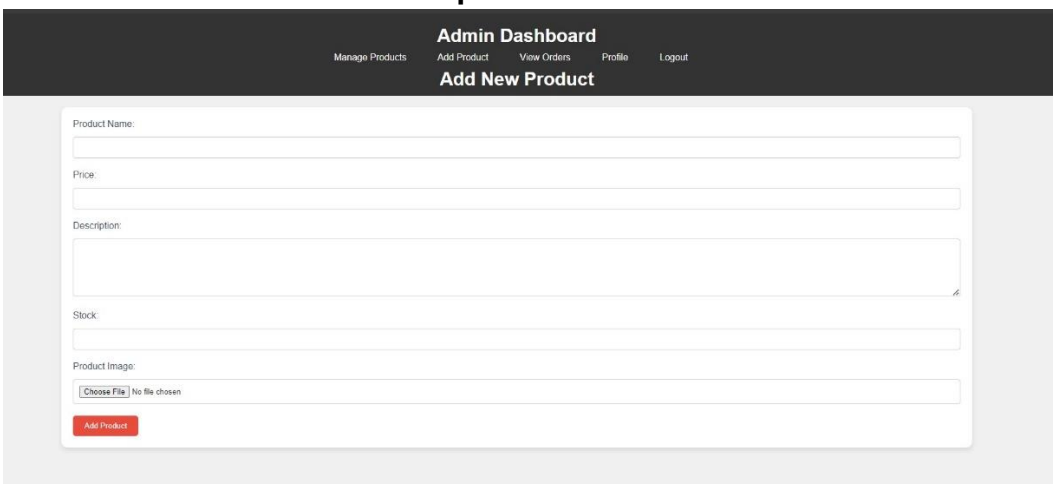
h) Admin Dashboard – Product Management



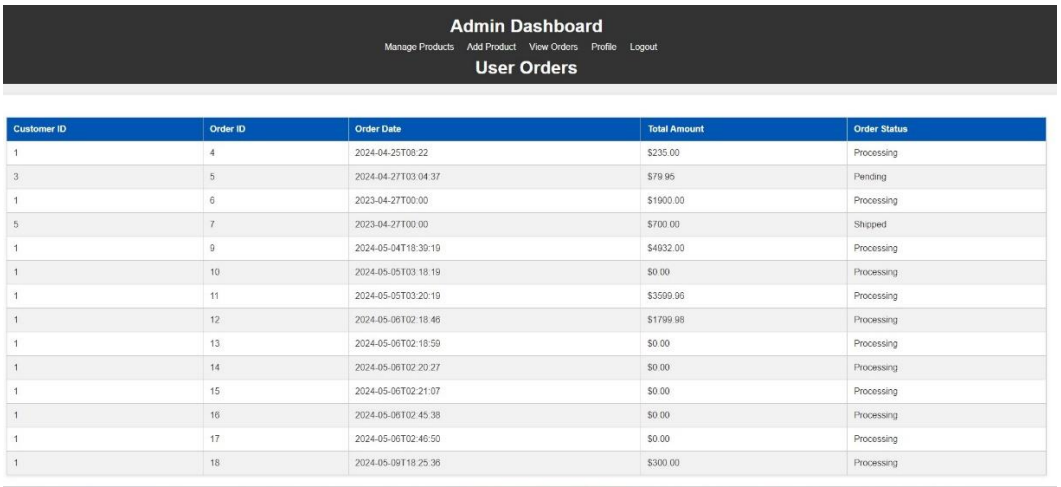
i) Update Product



j) Admin Dashboard – Add new product



k) Admin Dashboard – Users Order



Customer ID	Order ID	Order Date	Total Amount	Order Status
1	4	2024-04-25T08:22	$235.00	Processing
3	5	2024-04-27T03:04:37	$79.95	Pending
1	6	2023-04-27T00:00	$1900.00	Processing
5	7	2023-04-27T00:00	$700.00	Shipped
1	9	2024-05-04T18:39:19	$4932.00	Processing
1	10	2024-05-05T03:18:19	$0.00	Processing
1	11	2024-05-05T03:20:19	$3599.96	Processing
1	12	2024-05-06T02:18:46	$1799.98	Processing
1	13	2024-05-06T02:18:59	$0.00	Processing
1	14	2024-05-06T02:20:27	$0.00	Processing
1	15	2024-05-06T02:21:07	$0.00	Processing
1	16	2024-05-06T02:45:38	$0.00	Processing
1	17	2024-05-06T02:46:50	$0.00	Processing
1	18	2024-05-09T18:25:36	$300.00	Processing

3. Class Diagram

3.1. Overall Class Diagram

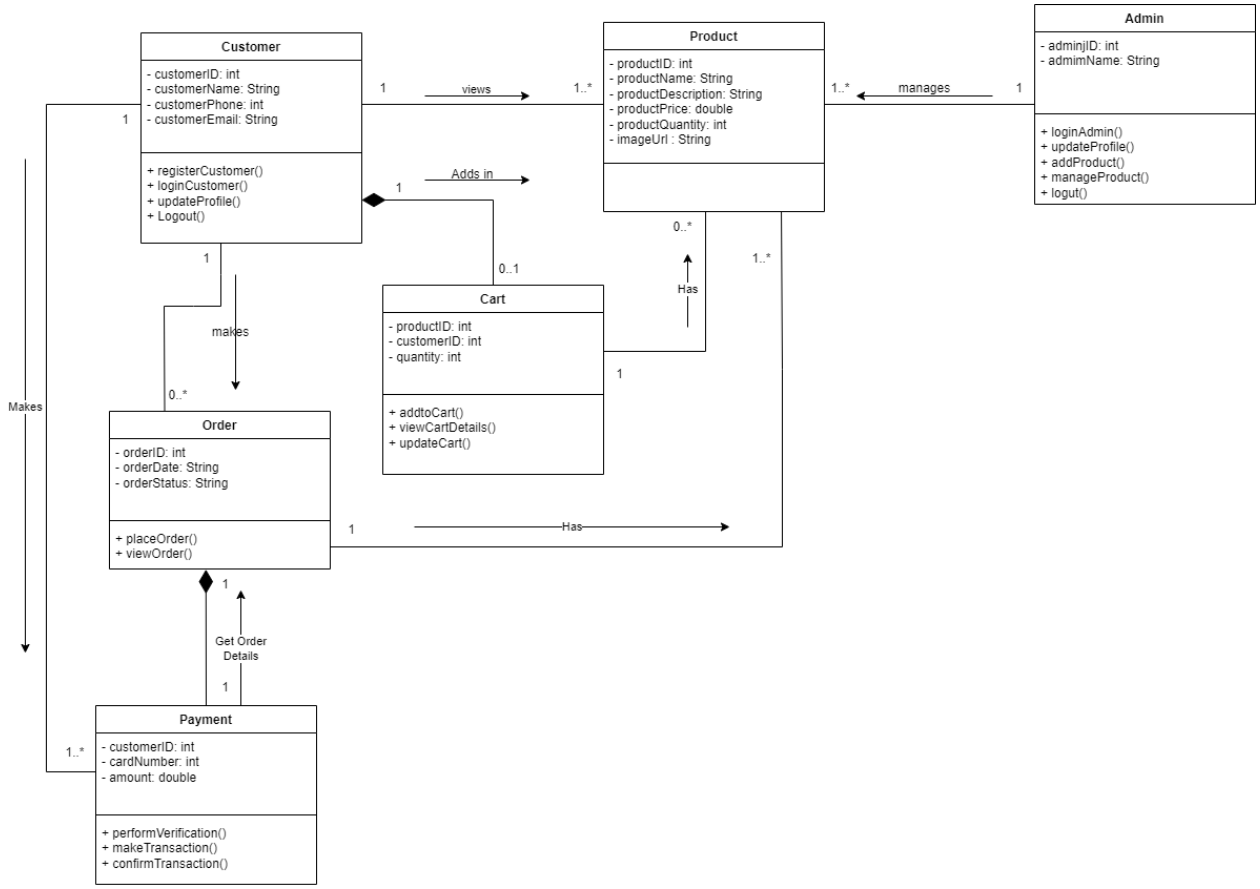


Figure 11: Class Diagram.

3.2. Individual Class Diagram

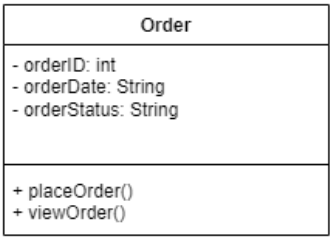


Figure 12:Order Class Diagram.

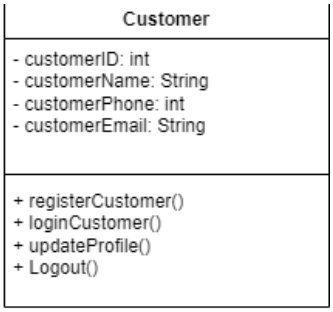


Figure 13:Customer Class Diagram.

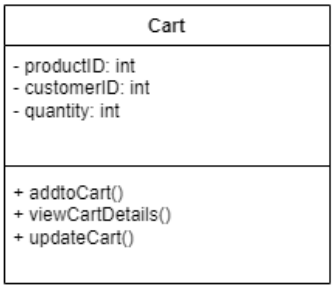


Figure 14:Cart Class Diagram.

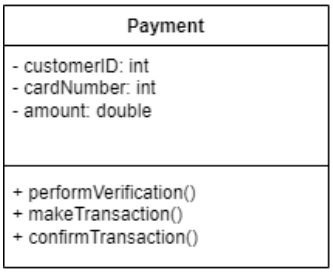


Figure 15:Payment Class Diagram.

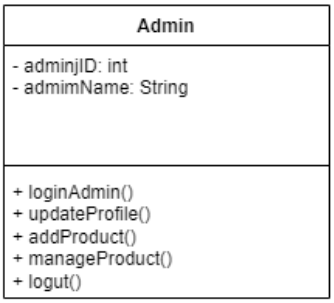


Figure 16:Admin Class Diagram.

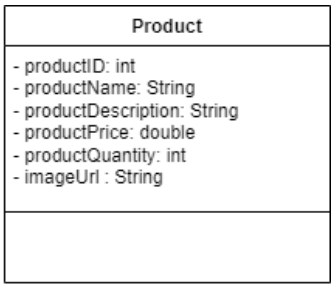


Figure 17:Product Class Diagram.

4. Method Description

- **User**

Method	Description
register()	It is a method used to create a new user account.
login()	It is a method used to log in the system.
updateAccount()	It is a method used to update the account.
orderProduct()	It is a method used to make order.
logout()	It is a method used to log out from the system.

- **Admin**

Method	Description
login()	It is a method used to log in the system as an admin.
addProduct()	It is a method which allows admin to add new product into the application.
updateProduct()	It is a method which allows admin to update product information.
viewProductOrder()	It is a method which allows admin to view all the product orders.
deleteProduct()	It is a method which allows admin to delete the existing product.
logout()	It is a method used to log out from the system.

- **Product**

Method	Description

addProduct()	It is a method used to add new products into the system.
updateProduct()	It is a method used to update product information.
deleteProduct()	It is a method used to delete product information from the system.

- **Order**

Method	**Description**
viewProductOrders()	It is a method which allows users to view all the product orders.
orderProduct()	It is a method which allows users to order their desire products.

5. Test Cases

Test 1

Test	**Register, Login and Logout**
Objective	To register and login into the system and then log out of the system.
Action	- Fill all the details such as name, email, contact, address, etc. - Click on the register button. - After the registration, login into the system.
Expected Result	The account is registered successfully. And after login, the admin dashboard is shown.
Actual Result	The account was registered successfully. And after login, the admin dashboard was shown.
Remarks	Success.

Table 1: Test 1 - Admin Registration and Login

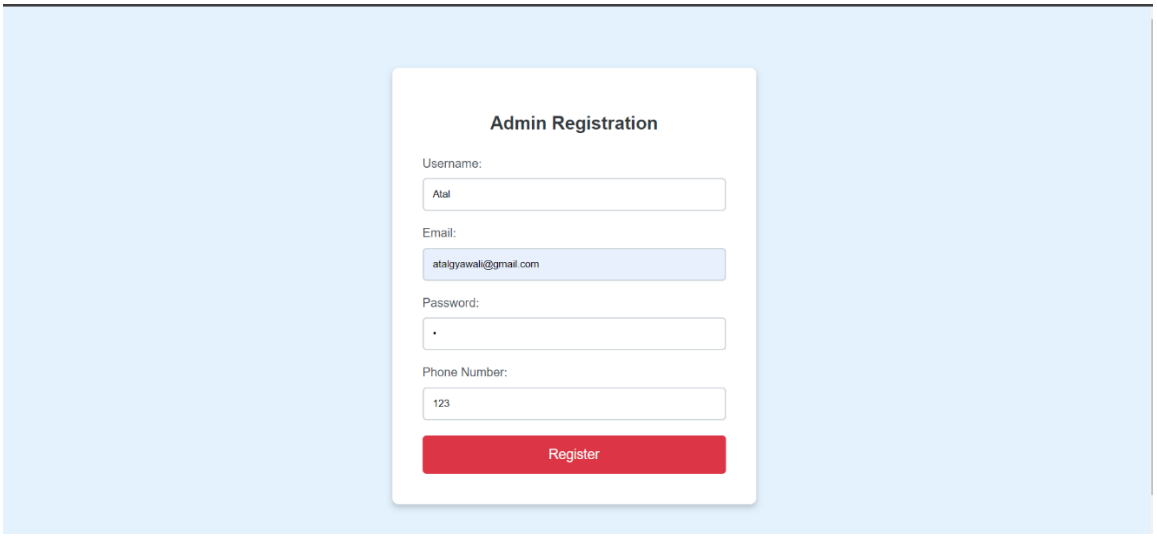


Figure 18: Test 1a - Admin Registration

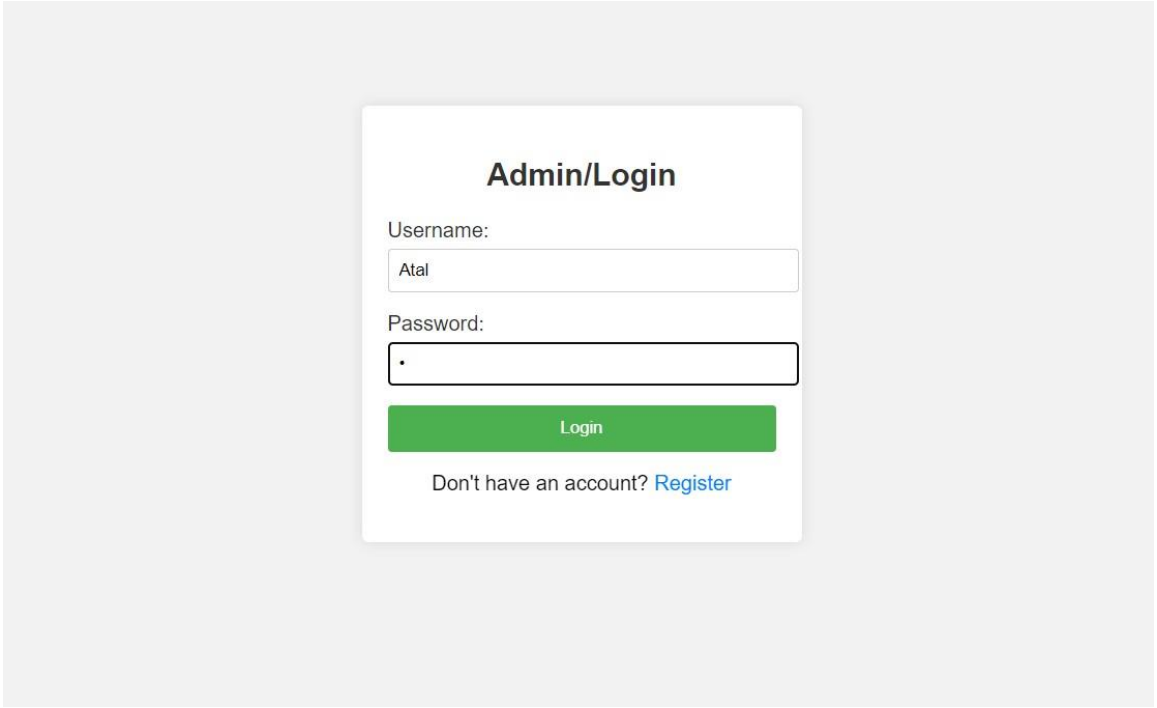


Figure 19: Test 1b - Admin login.

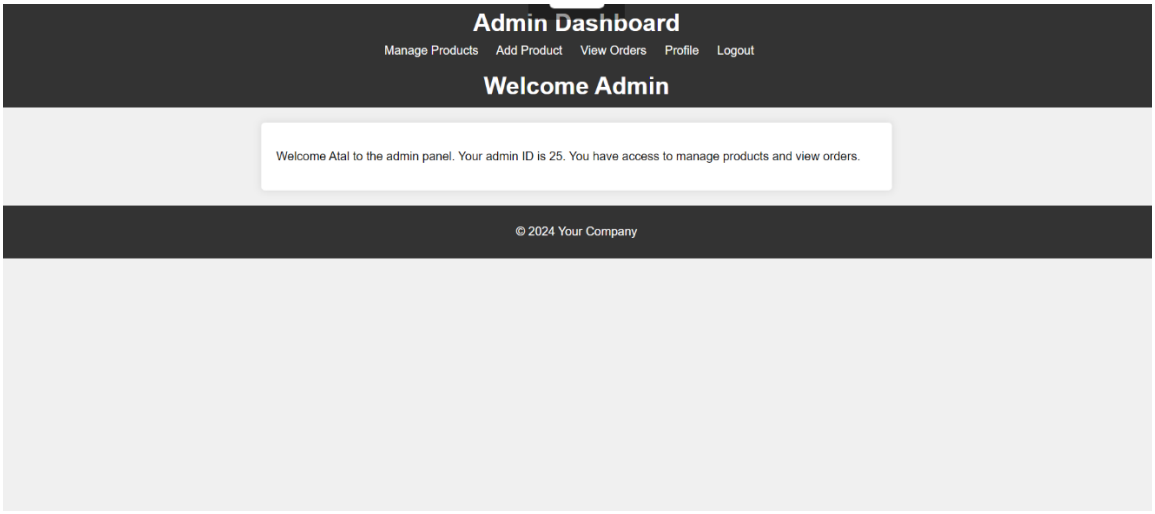


Figure 20: Test 1b - Admin Dashboard

Test 2

Test	**Edit Admin Profile and Logout**
Objective	To update admin profile.
Action	- Go to the profile section. - Click on the edit button. - Update information. - Click on logout button to logout from the system.
Expected Result	Admin account is updated successfully. After hitting logout, the admin dashboard should be shown confirmation message. And if it is yes user should be logged out.
Actual Result	Admin account was updated successfully. After pressing logout, the admin dashboard was shown confirmation message. By clicking yes user was logged out.
Remarks	Success.

Table 2: Test 2 - Edit Admin Profile and Logout

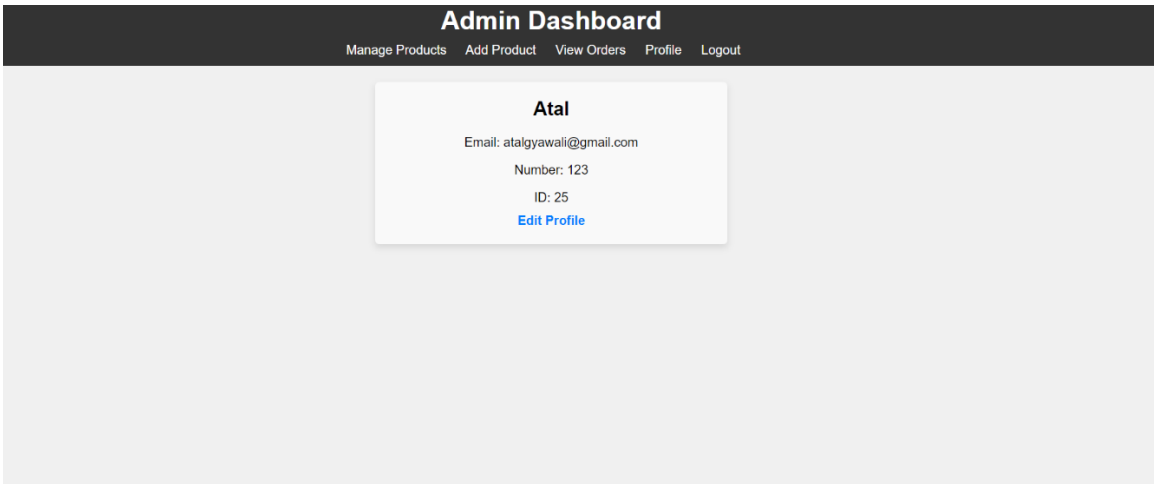


Figure 21: Test 2a - Edit Profile

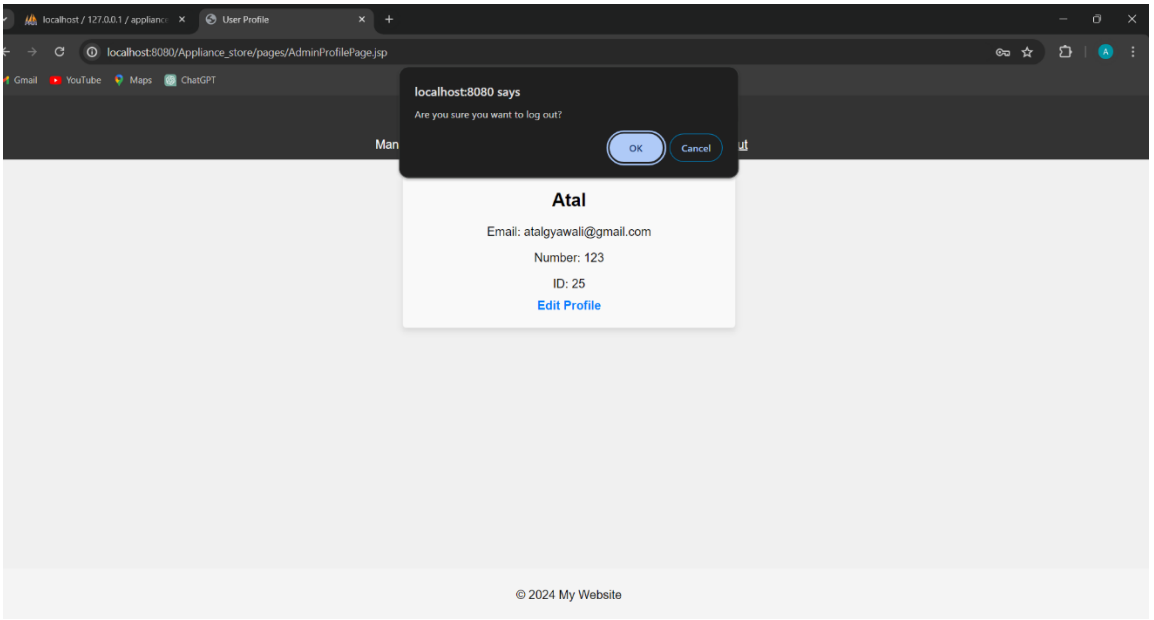


Figure 22: Test 2b - Logout

Test 3

Test	**Add new product**
Objective	To add new product.
Action	- Go to the add product section. - Fill the product details. - After that, click on add button.

Expected Result	The successful addition of product message is shown. After that, the product is available in the system.
Actual Result	The successful addition of product message was shown. After that, the product was available in the system.
Remarks	Success.

Table 3: Test 3 - Add Product

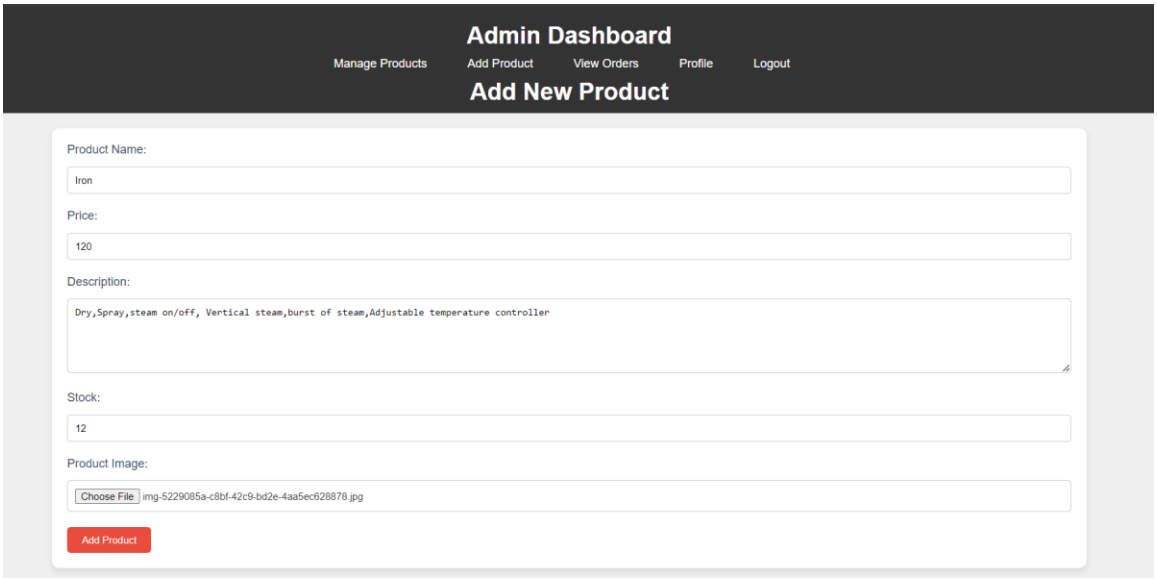


Figure 23: Test 3 - Add new product

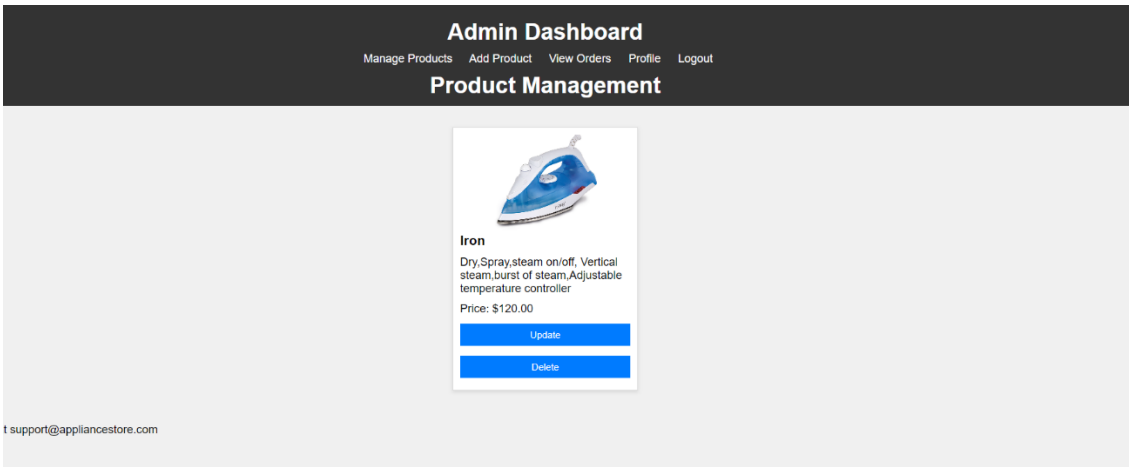


Figure 24: Test 3 - After adding the product

Test 4

Test	Manage Products
Objective	To update or delete the product.
Action	- Go to the management product section. - Click on update button for updation or click on delete button deletion.
Expected Result	In updation, the product details should be updated whereas in deletion, the product details should be removed from the system while showing confirmation messages.
Actual Result	In updation, the product details were updated whereas in deletion, the product details were removed from the system while showing confirmation messages.
Remarks	Success.

Table 4: Test 4 - Manage Products

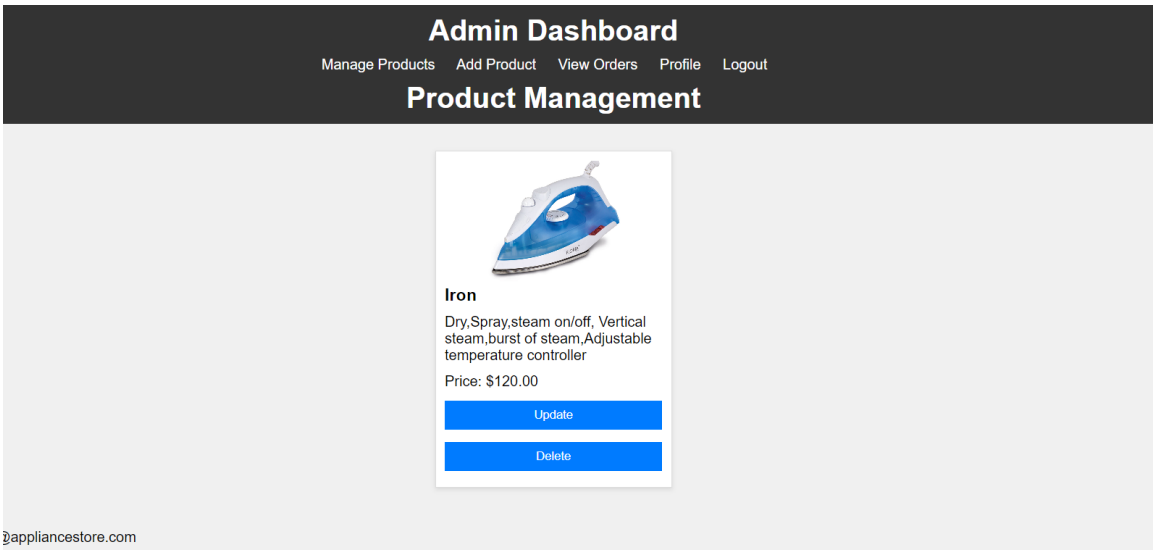


Figure 25: Test 4 – Product Management

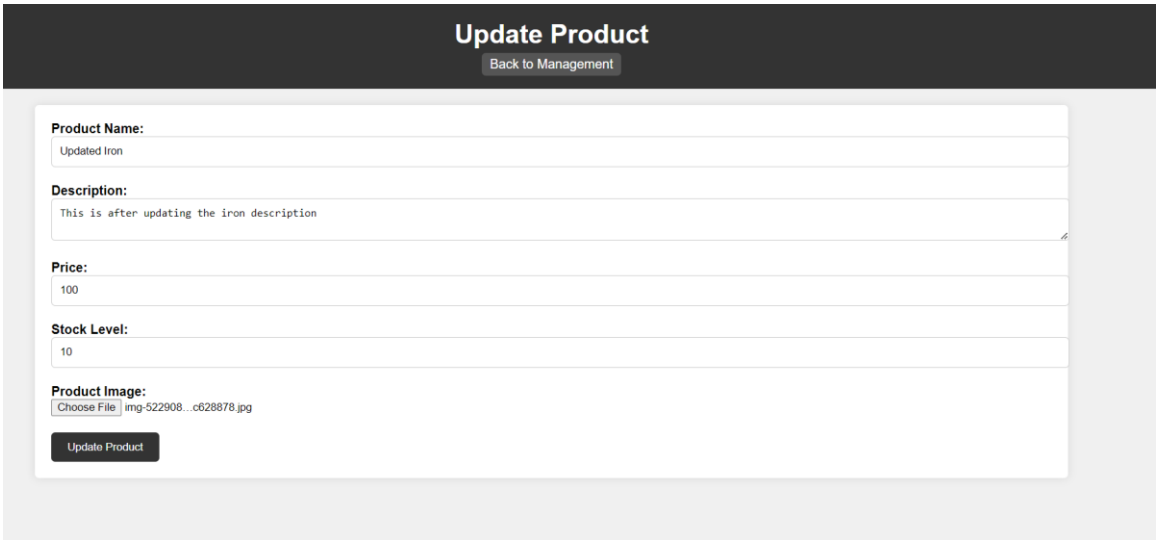


Figure 26: Test 4 - Update Product

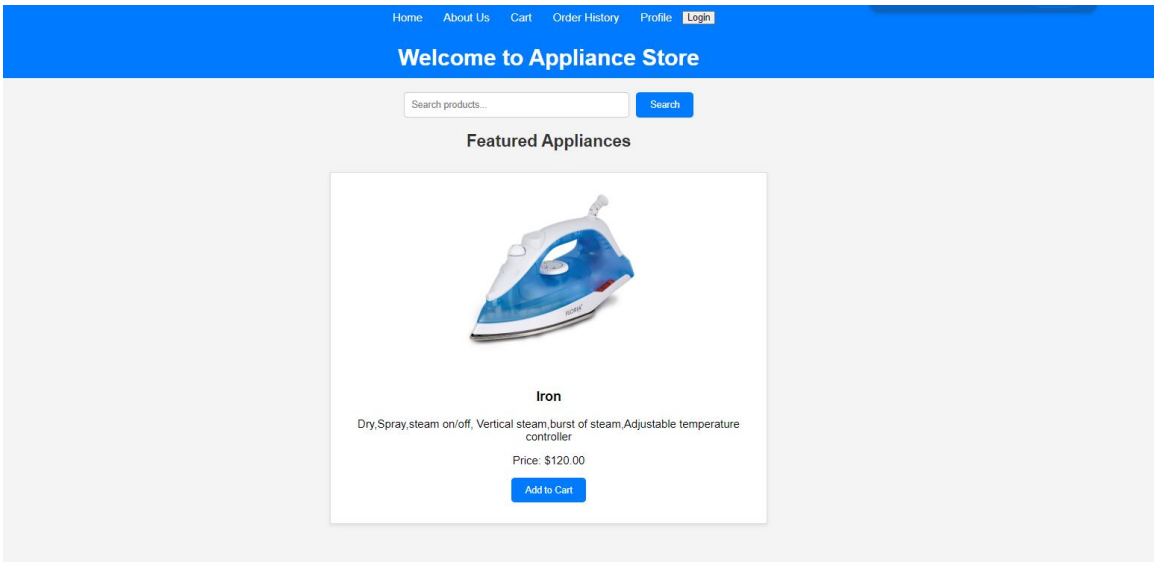


Figure 27: Test 4 - After Updating the Product

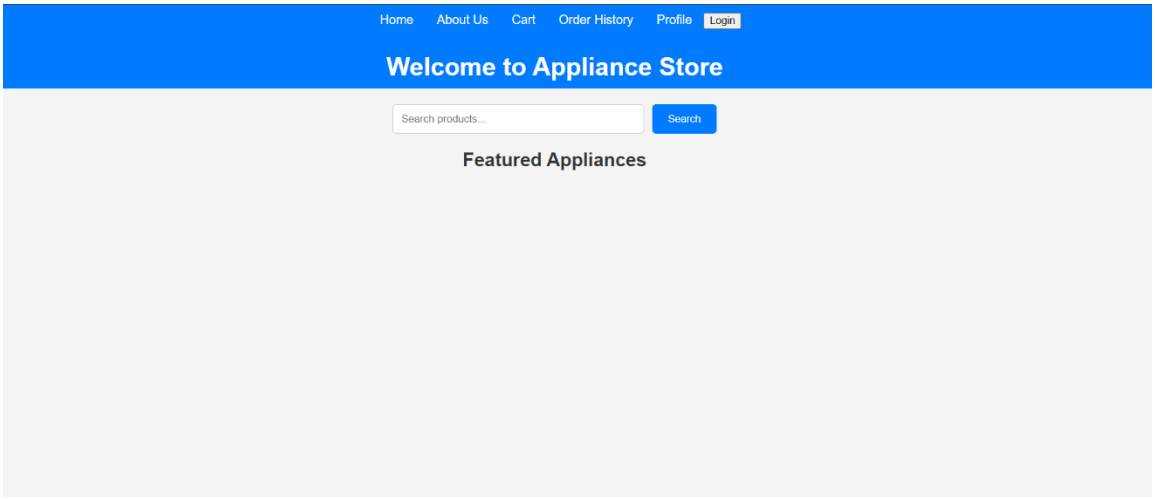


Figure 28: Test 4 - After deleting the product

Test 5

Test	**Buy or Order Product**
Objective	To order or buy product from Add to Cart.
Action	- Click on add to cart button to order or buy product. - After that, confirmation message to order the product is shown. Click on yes. - Then, set quantity and click on buy now button.
Expected Result	The order details should be shown after successful ordering.
Actual Result	The order details were shown after successful ordering.
Remarks	Success.

Table 5: Test 5 - Order a Product

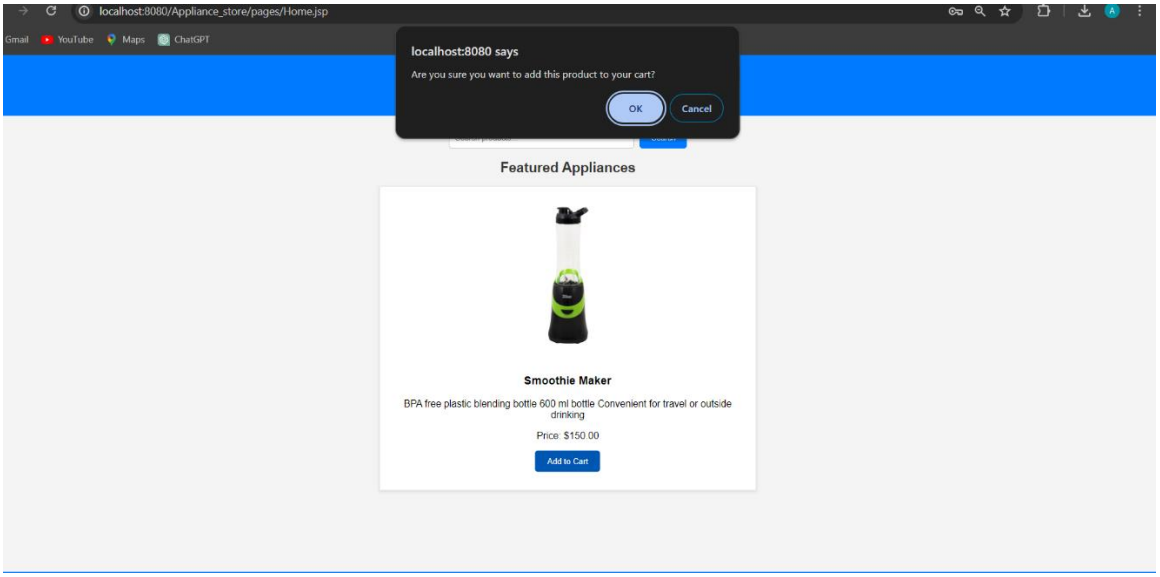


Figure 29: Test 5 - Adding product to cart

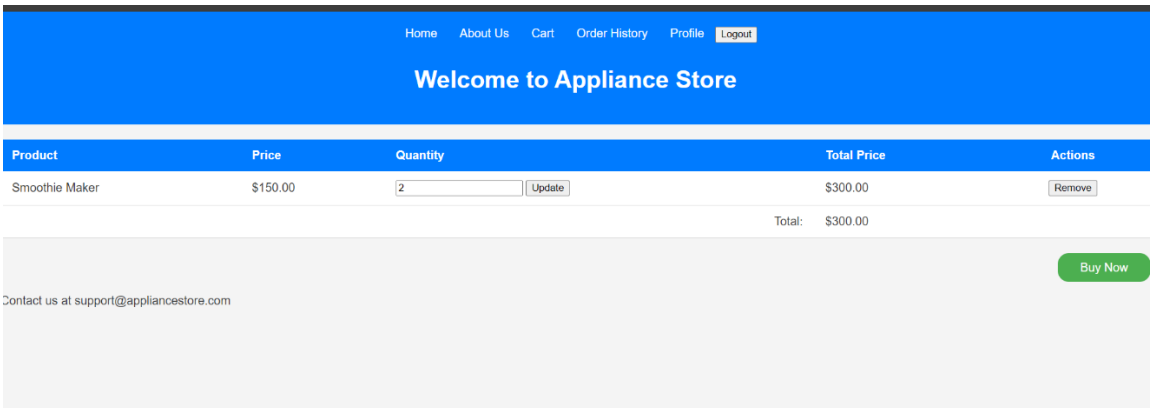


Figure 30: Test 5 - Setting the quantity

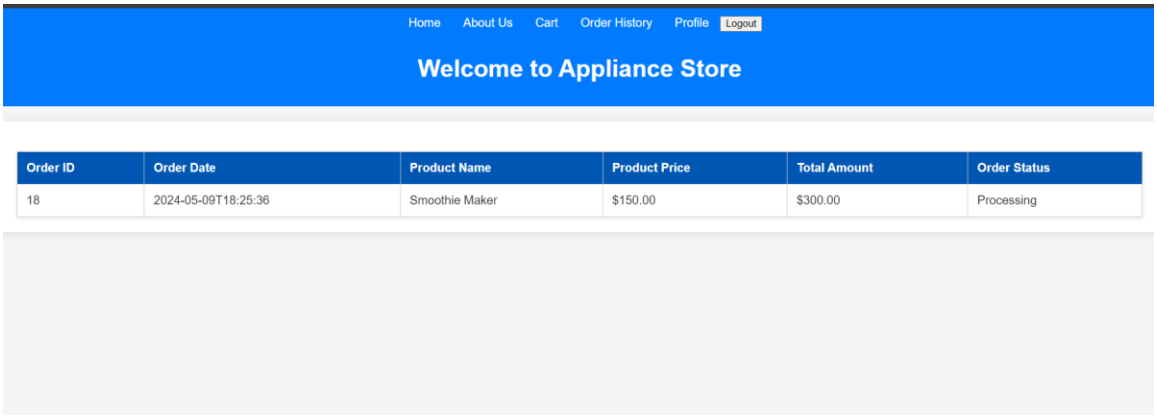


Figure 31: Order Details

6. Tools and Libraries

For the development of this system, various kinds of tools and libraries were used some of them are:

- Eclipse IDE
- Java Database Connectivity (JDBC)
- Apache Tomcat Server
- Balsamiq
- HTML
- CSS

7. Development Process

The development process of a software system involves several stages, each aimed at achieving the project's objectives while adhering to industry best practices and client requirements. Our system adopts a structured approach known as the Software Development Life Cycle (SDLC) which is designed to streamline software production, ensuring high quality while minimizing costs and time-to-market. The goal of the SDLC is to produce robust software that meets and exceeds all customer expectations and demands (Synopsys, 2024).

The development process of our system involved several steps:

a) **Feasibility Study**

It is the first and foremost phase in development process. In this step, the planning and research phase is conducted to analysis the working mechanism of the application. Also, a team is formed where each member is assigned with a specific task. The main objective of a team is to formulate a plan regarding the development process of system.
First, we spent considerable time on the research and study in our proposed system.

b) **Requirement Analysis and Specifications**

After the first step, our main focus shifted towards requirements and specifications where we gather needs of customers for a robust application for online shopping. We developed a document called as Software Requirements Specification (SRS).
The Software Requirements Specification (SRS) serves as a detailed guide for software development, ensuring clarity, accuracy, and collaboration among developers and stakeholders while mitigating risks for cost-effective solutions (Rosencrance, 2024).

c) Design and Prototype

For the development of a robust application, design and prototype play a vital role. They are used to imagine how a system looks like and function.
The design phase of system development deals with transforming the customer requirements described in the SRS documents into a form imaginable form using several designing tools. The software design process involves stages like UI design and architectural design (Nehra, 2024).
Thus, our next step after requirement gathering was the design process.

d) Development

In this process, the developers work on creating actual software through code. The development phase involves sub stages like frontend development, backend development and database connections (Bhatt, 2023).
These stages were completed one after another to ensure systematic development included in our system.

e) Testing

The testing phase is crucial in the development process to ensure smooth execution of the application as well as to discover ant errors, bugs, or flaws in the software (Doshi, 2023).
Our application had several testing phases like unit testing, integration testing and system testing to ensure the fine execution of our software.

f) Deployment

After the development and testing phase, next step is software deployment. This is only done after you have approved the product functionality and the stability of the product is proven (Patel, 2024).

g) Maintenance

After all the process are completed, the final step is maintenance of the system. This may include handling bugs that could not be fixed prior to release or resolving new issues that arise due to customer feedbacks. In comparison of smaller systems, larger systems may need longer maintenance stages (SynapseIndia, 2012).

8. Critical Analysis

For the development of our website, we had to use the MVC pattern which is an architecture pattern that separates an application into three main comp Model, View, and Controller, making it easier to manage and maintain the codebase. We also faced a lot of challenges during this coursework.

Like while adding the product there were a lot of issues during the storage process of the image of the product.

9. Conclusion

In the end, our team did a good job building an online store for electronics and gadgets, sticking to a certain way of organizing our work called the MVC pattern. This strengthened, simplified, and allowed for easy modification of our website. We split our work into different parts – like putting all the stuff about how things look in one place, and how things work in another. This made it easier for us to fix problems and make the website better.

We worked together to make sure people can sign in, put things in their shopping cart, and pay securely. From planning how the information is stored to making the website look nice, we paid attention to every detail. in the future, we want to keep improving our website by testing continuing our tests, writing down how everything works, and listening to what people say about it.

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