Shipment Management System

Submitted By

Md Jahid Hasan Palah

Student Id: 191-35-428

Supervised By

Mr. Khalid Been Badruzzaman Biplob

Lecturer (Senior Scale)

This project report has been submitted in fulfilment of the requirements for the degree of **Bachelor of Science in Software Engineering**

APPROVAL

This project titled on "**Shipment Management System**", submitted by **Md. Jahid Hasan Palah (ID: 191-35-428)** to the Department of Software Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Software Engineering and approval as to its style and contents.

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Department of Software Engineering
Faculty of Science and Information Technology
Daffodil International University

Internal Examiner 2

Khalid Been Md Badruzzaman
Lecturer (Senior Scale)
Department of Software Engineering
Faculty of Science and Information Technology
Daffodil International University

External Examiner

Dr. Md. Sazzadur Rahman
Professor
Institute of Information Technology
Jahangirnagar University

DECLARATION

I hereby declare that the work in this project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Daffodil International University or any other institution.

(Supervisor's Signature)

Full Name : Mr. Khalid Been Badruzzaman Biplob

Position : Lecturer (Senior Scale)

Date : 16 January 2024

Jahid

(Student's Signature)

Full Name : Md Jahid Hasan Palah

ID Number : 191-35-428

Date : 16 January 2024

Shipment Management System

Md Jahid Hasan Palah

Project submitted in fulfillment of the requirements
for the award of the degree of
Bachelor of Science/Master of Science

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Finally, we would want to express our gratitude to our parents for their unwavering love and support, without which we could not have progressed as far as we have.

DEDICATION

I so certify that I completed this project under the supervision of "**Mr. Khalid Been Badruzzaman Biplob,**" "**Lecturer (Senior Scale),**" Daffodil International University's Department of Software Engineering. Additionally, I affirm that neither my complete record nor any part of it has been submitted for credit toward my degree elsewhere.

ABSTRACT

A Shipment Management System (SMS) is a software solution that helps businesses manage the process of shipping goods efficiently. It integrates with carriers, tracks shipments in real-time, and automates order processing, documentation, and delivery notifications. Key features include order and inventory management, route optimization, shipment tracking, and analytics. The system improves efficiency, reduces costs, enhances customer experience, and ensures compliance with regulations. It integrates with e-commerce platforms and third-party carriers to streamline logistics operations.

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CHAPTER 1 INTRODUCTION

1.1 Background

This project aims to develop a **Shipment Management System** to streamline logistics for businesses. By integrating with multiple carriers, providing real-time tracking, and optimizing shipping routes, the system will reduce costs, improve delivery times, and enhance customer satisfaction. Designed for small to mid-sized businesses, the system will scale for larger enterprises and incorporate AI for predictive analytics and machine learning for route optimization. The goal is to improve operational efficiency and support growth in logistics and e-commerce.

1.1.1 Context and Relevance

This project falls within the logistics and supply chain management industry, which is crucial to global commerce, especially with the rise of e-commerce. The growing demand for faster, more efficient shipping has driven the need for advanced solutions that can optimize operations.

Trends:

- **E-commerce Growth**: Increased online shopping demands faster, reliable shipping.
- **AI & Automation**: Automation and AI are improving route optimization, tracking, and inventory management.
- **Sustainability**: The industry is focusing on reducing carbon footprints and using eco-friendly practices.

Challenges:

- **Rising Costs**: Higher fuel prices and faster delivery expectations are increasing shipping costs.
- **Complexity**: Managing multiple carriers and delivery routes is becoming more difficult.
- **Delays & Inaccuracies**: Delivery delays and inventory issues affect customer satisfaction.

Opportunities:

- **Integrated Solutions**: Systems that consolidate order, carrier, and tracking management are in demand.
- **AI**: Predictive analytics and machine learning can optimize routes and inventory.
- **Cross-Border Logistics**: Growing global trade presents opportunities for more efficient international shipping

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1.1.2 Problem Identification

Businesses, especially small to mid-sized ones, struggle with managing shipments efficiently across multiple carriers, leading to high costs, delays, and poor customer satisfaction. Existing solutions are often fragmented, lacking integration between order management, tracking, and carrier systems, which results in inefficiencies.

Limitations of Existing Solutions:

- **Lack of Integration**: Many systems operate in silos, creating data gaps and errors.
- **Limited Tracking**: Real-time, cross-carrier tracking is often unavailable or incomplete.
- **Inefficient Routing**: Few systems optimize shipping routes or costs effectively.
- **Manual Processes**: Many solutions still require significant manual input, leading to delays and errors.

1.1.3 Purpose and Justification

This project is crucial for improving the efficiency of shipment management, particularly for small to mid-sized businesses. The **Shipment Management System** will streamline operations by integrating multiple carriers, providing real-time tracking, and optimizing routes, reducing costs and improving delivery times.

Justification:

- **Cost Savings**: Optimizing routes and automating processes will reduce shipping costs.
- **Increased Efficiency**: Automation and real-time tracking improve operational speed and accuracy.
- **Better Customer Experience**: Faster deliveries and visibility into shipments will boost customer satisfaction.
- **Scalability**: The system grows with the business, supporting both small and larger enterprises.
- **Competitive Edge**: AI-driven insights provide better forecasting and route optimization.

1.1.4 Scope

2 Enhanced Tracking Features

3 Integration Capabilities

4 Data Analytics

5 Customer Interface

6 Scalable Solutions

1.2 Project Planning and Initiation

Feasibility Study

Conducting a market feasibility analysis for a shipment business involves several key steps to evaluate the potential for success. Here's a structured approach we follow:

1. Industry Overview: We analyze the current state of the shipping industry, including trends, growth rates, and key players.
2. Identification: Define our target customers (e.g., e-commerce businesses, manufacturers, individual consumers) and their shipping needs.
3. A technical feasibility analysis for a shipment business assesses the necessary technology, infrastructure, and resources are available to support the operational requirements of a shipment business.
4. In financial feasibility analysis for a shipment business we assesses the necessary financial viability of starting and operating a shipment business.

Phase 1 Preliminary Analysis & Project Scope Definition:

Preliminary Analysis:

This phase focuses on identifying challenges and opportunities in current shipment management processes. Key activities include:

- **Stakeholder Interviews**: Gathering insights from business owners and logistics managers.
- **System Review**: Analyzing existing systems to identify limitations.
- **Competitive Analysis**: Evaluating market solutions to identify gaps.

Project Scope Definition:

The project aims to develop a **Shipment Management System** that automates and optimizes shipment processes for small to mid-sized businesses, with scalability for larger enterprises.

Phase 2 Market Feasibility Analysis (or Market Research):

In this phase, the focus shifts to evaluating the potential demand for the **Shipment Management System** within the market. The objective is to determine whether there is a viable market for the system, understand the needs and preferences of potential customers, and assess the competitive landscape. This analysis will guide the development of a system that meets market demands and ensure.

Phase 3 Technical Feasibility Analysis:

The **Technical Feasibility Analysis** focuses on assessing the technical viability of developing the **Shipment Management System**. The goal is to determine if the system can be built with the available technologies, resources, and expertise.

Key activities include:

- **Technology Evaluation**: Reviewing the required tech stack (e.g., programming languages, frameworks).
- **Integration Feasibility**: Assessing the ability to integrate with carriers, APIs, and other systems.
- **Scalability & Performance**: Ensuring the system can handle growth and large data volumes.
- **Security & Compliance**: Addressing security needs and regulatory compliance.
- **Resource Assessment**: Evaluating available technical resources to ensure timely delivery.

Phase 4 Financial Feasibility Analysis:

The **Financial Feasibility Analysis** assesses the financial viability of the **Shipment Management System** project, ensuring it's financially sustainable.

Key activities include:

- **Cost Estimation**: Estimating development, infrastructure, and maintenance costs.
- **Revenue Forecasting**: Projecting potential revenue from subscriptions or licensing.
- **Break-Even Analysis**: Identifying when the project will cover costs and generate profits.
- **Funding Requirements**: Determining investment or financing needs.
- **Risk Assessment**: Evaluating financial risks and mitigation strategies

1.3 Target User Profile and Tentative Elicitation Process

1.3.1 Target User

1. **E-commerce Businesses**
2. **Small and Medium Enterprises**
3. **Manufacturers**
4. **Individual Consumers**

1.3.2 User profile

Table 0: User Profile for Business owners, logistics managers, and staff in small to mid-sized enterprises

User Class	**Note on Characteristics**
Type of users	Business owners, logistics managers, and staff in small to mid-sized enterprises.
Age range	25-50 years old.
Frequency of use	Daily or weekly, depending on business size and shipping volume.
Mandatory	Yes, essential for managing and optimizing shipment processes.
Computer experience	Basic to intermediate, with familiarity in using business management software.
Education	High school to college-level education, with some users having a background in logistics or business management.
goal	To streamline shipment processes, reduce costs, improve delivery times, and enhance customer satisfaction.
Language skills	Primarily English
Number of users	Typically 5-50 users.
Training	Basic training on the system's features and functions required for effective use.
Others system use	Users may also use inventory management, ERP systems, or e-commerce platforms.
Way of working	Collaborative, often involving multiple team members across departments.

1.3.3 Elicitation Process

In the shipment business, the tentative elicitation process can help gather requirements and insights from stakeholders involved in logistics, operations, and customer service.

1. Identify Stakeholders: Include logistics managers, warehouse staff, shipping carriers, clients, and regulatory bodies.
2. Define Objectives: Understand specific needs like shipment tracking, cost management, or customer service improvements.
3. Choose Techniques: Use interviews, focus groups, surveys, and site visits.

1.4 Project Block Diagram

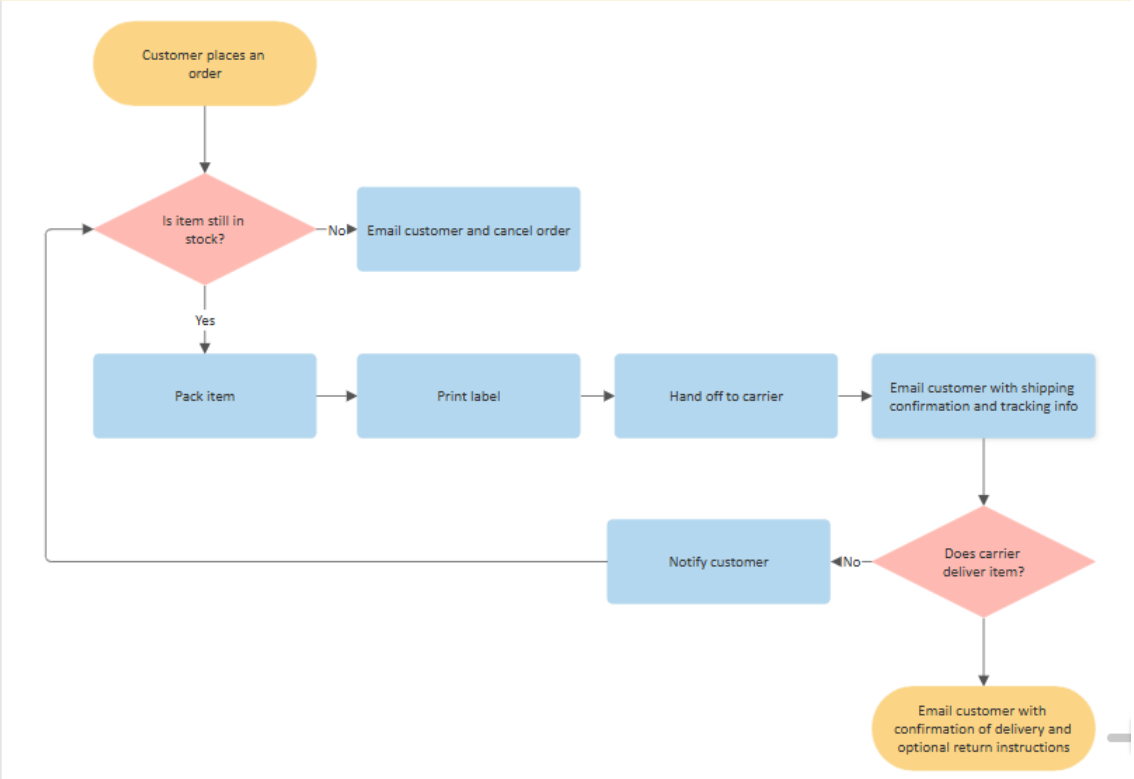

Figure 1: System_Block_Diagram

1.5 System Requirements

1.5.1 Hardware Requirements

Component	Specification
Processor (CPU)	Quad-core 3.0 GHz or higher (e.g., Intel Xeon or AMD Ryzen)
RAM	16 GB or higher
Storage	500 GB SSD or higher for fast data access (RAID configuration recommended for redundancy)
Operating System	Windows 11

1.5.2 Software Requirements

1 Visual Studio Code

2. Web Browser

1.5.3 Constraints and Dependencies

Constraints

- **Budget**: Limited funds may impact features, cloud storage, and scaling.
- **Time**: Tight timelines may limit advanced features and testing.
- **Scalability**: Initially designed for small to medium businesses.
- **Internet**: Requires stable connections for real-time tracking.
- **Integration**: Potential challenges with third-party carrier API compatibility.

Dependencies

- **Carrier APIs**: Reliant on third-party APIs (e.g., FedEx, UPS) for tracking and shipping.
- **Payment Gateways**: Requires integration with external gateways (e.g., PayPal).
- **Cloud Services**: Dependent on cloud platforms for hosting and storage.
- **External Libraries**: Uses open-source libraries for route optimization, AI, and reporting.
- **Mobile Support**: If app-based, depends on iOS/Android SDKs.

1.6 Project Scheduling

Project Planning	7 Days
Analysis	10 Days
Designing	12 Days
Coding	27 Days
Testing	8 Days

1.7 Summary

This chapter is about Background, Project Planning and Initiation, Target User Profile and Tentative Elicitation Process, Project Block Diagram and System Requirements.

CHAPTER 2 DESIGN AND IMPLEMENTATION

2.1 Introduction

This chapter describes the design and implementation of the Shipment Management System, covering its architecture, key components, and design considerations like scalability and security. It outlines the development process from requirements to deployment, and the technologies used, including machine learning for route optimization. Challenges encountered during development and their solutions are also discussed.

2.2 Functional Requirements

The essential features and functionalities that the Shipment Management System must have in order to achieve its stated goals are outlined in the functional requirements. With an emphasis on user interface, system procedures, and integrations, these requirements outline the intended behavior of the system.

FR01	**Registration**
Description	Before use the shipment management system manager and customers must be registered first.
Stakeholder	Manager, Customer

FR02	**Login**
Description	Manager and Customers must login before using the Shipment management system
Stakeholder	Manager, Customer, Admin

FR03	**Create Shipment**
Description	Customers must fill all the necessary blocks before using the Shipment management system
Stakeholder	Customer

FR04	**Shipment Tracking**
Description	Manager and Customers must place order before Shipment Tracking

Stakeholder	Manager, Customer, Admin

FR05	**Shipment History**
Description	Customers can see his Shipment History.
Stakeholder	Customer

FR06	**Make Payment**
Description	Customers must place order before Make Payment
Stakeholder	Customer

FR07	**Manage Shipment**
Description	Manager can manage shipment.
Stakeholder	Manager

FR08	**View Report**
Description	Admin can see all report
Stakeholder	Admin

FR09	**Deliver Shipment**
Description	Delivery-man can deliver orders
Stakeholder	Deliveryman

FR10	**Return**
Description	Customer can return their orders.
Stakeholder	Customer, Deliveryman

2.3 Non-Functional Requirements

The system's performance, security, usability, and other characteristics that guarantee its efficacy and user pleasure are defined by non-functional criteria. The Shipment Management System's primary non-functional requirements are listed below.

2.3.1 Performance

- **Response Time**: Under 3 seconds for user requests.
- **Scalability**: Support growing users and transactions without performance loss.
- **Throughput**: Handle high volume of simultaneous users and transactions.

2.3.2 Reliability

- **Uptime**: 99.9% system availability.
- **Fault Tolerance**: Continuous operation during failures with automatic recovery.

2.3.3 Portability

- **Cross-Platform Support**: Works on Windows, macOS, Linux, iOS, and Android.
- **Browser Compatibility**: Functions on major browsers like Chrome, Firefox, Safari, and Edge.
- **Responsive Design**: Optimized for desktops, tablets, and smartphones.

2.3.4 Maintainability:

- **Modularity:** Easy updates and feature additions.
- **Documentation:** Clear documentation for users and developers.

2.4 Object-oriented System design using UML

2.4.1 Use Case Diagram

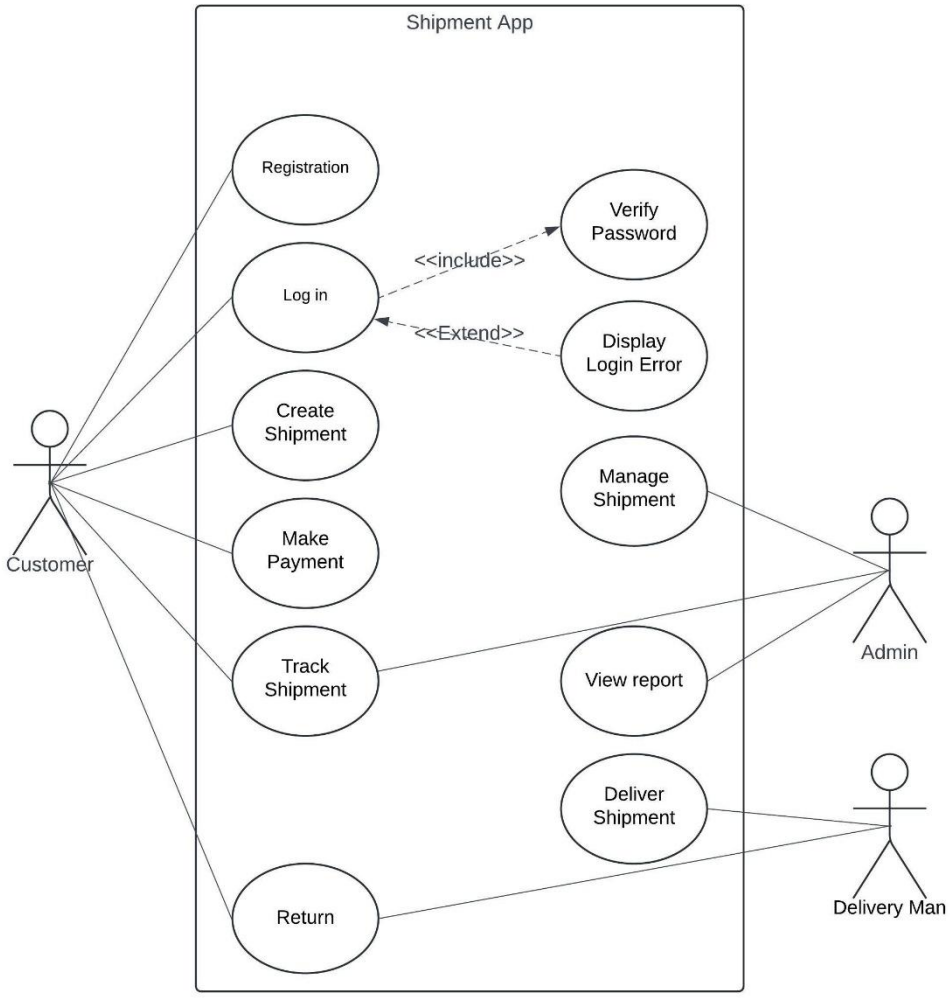

Figure 2: Diagram of the use case

2.4.2 Case Description

Description of the Case 01: Enrollment

Use Case	Registration
Objective	In order to log in to the system, users can register.
Prerequisite	Installing the app is required for users to register.

<table>
<tr><td>End Condition for Success</td><td>Notification: Your registration has been successful!</td></tr>
<tr><td>End Condition Failed</td><td>Notification: “Submission Not Submitted”</td></tr>
<tr><td>Principal Performers:

Secondary Performers:</td><td>Customer</td></tr>
<tr><td>Set Off</td><td>User will request a registration form to fill up</td></tr>
<tr><td>Overview/Primary Success Situation</td><td>
<table>
<tr><td>a.</td><td>Click the "Registration" icon.</td></tr>
<tr><td>b.</td><td>Give the registration form.</td></tr>
<tr><td>c.</td><td>Enter the data.</td></tr>
<tr><td>d.</td><td>Click the "Submit" icon.</td></tr>
<tr><td>e.</td><td>Data stored</td></tr>
<tr><td>f.</td><td>The details are saved and shown by the system!

Your registration has been successful! Alert</td></tr>
</table>
</td></tr>
<tr><td>Different Flows</td><td>
<table>
<tr><td>1.1</td><td>Error in the System</td></tr>
<tr><td></td><td>1.1.a. Give It Another Go!</td></tr>
<tr><td>4.1</td><td>The user did not complete the information!</td></tr>
<tr><td></td><td>4.1.a. System-checked and alerted with "Please! Fill Up the Box."</td></tr>
<tr><td>5.1</td><td>The system didn't react.</td></tr>
<tr><td></td><td>5.1.a. Display the Error Message.</td></tr>
<tr><td>6.1</td><td>The information is not saved by the system.</td></tr>
<tr><td></td><td>6.1.a. "Details did not save" is the notification.</td></tr>
</table>
</td></tr>
<tr><td>Quality Standards</td><td>In half an hour, the user will complete all the information.</td></tr>
</table>

Description of the Case 02: Login

Use Case	Sign in
Objective	To log in to the system, users must first register.
Prerequisite	To register, users need to install the Hotel Management app.
End Condition for Success	Notification: You have successfully logged in!
End Condition Failed	Message: " Sign in Error"
Principal Performers: Secondary Performers:	Customer
Set Off	User will request a registration form to fill up
Overview/Primary Success Situation	a. Click the "Login" icon. b. Give the login form. c. Enter the data. d. Click the "Login" icon. e. Go into the system f. Successfully login!!! Notify
Different Flows	1.1 Verify Password System Error
Quality Standards	In half an hour, the user will complete all the information.

Description of the Case 03: Create Shipment

Use Case	Create Shipment
Objective	The technology allows users to create shipments.
Prerequisite	Users must registration in the system.

<table>
<tr><td>End Condition for Success</td><td>Notification: !!!Order Successful!!!</td></tr>
<tr><td>End Condition Failed</td><td>Notification: “Order Fail”</td></tr>
<tr><td>Principal Performers:

Secondary Performers:</td><td>Client</td></tr>
<tr><td>Set Off</td><td>User will request a Create Order</td></tr>
<tr><td>Overview/Primary Success Situation</td><td><table>
<tr><td>a.</td><td>Click the "Create Order" icon.</td></tr>
<tr><td>b.</td><td>Give Order details</td></tr>
<tr><td>c.</td><td>Enter the data.</td></tr>
<tr><td>d.</td><td>Click “Confirm Order” icon.</td></tr>
<tr><td>e.</td><td>Data stored</td></tr>
<tr><td>f.</td><td>The system saves the details and shows them!!!

Successfully Ordered!!! Notify</td></tr>
</table></td></tr>
<tr><td>Different Flows</td><td><table>
<tr><td>1.1</td><td>Cancel Order</td></tr>
<tr><td>6.1</td><td>The information is not saved by the system.</td></tr>
<tr><td>6.1.a</td><td>Notification: "Canceled Order"</td></tr>
</table></td></tr>
<tr><td>Quality Standards</td><td></td></tr>
</table>

Description of the Case 04: Make Payments

Use Case	Make Payments
Objective	Users can Make Payments in to the system.
Prerequisite	Users must Create Order.
End Condition for Success	Notification: !!!Payment Successful!!!
End Condition Failed	Notification: “Payment not Successful”

<table>
<tr><td>Principal Performers:

Secondary Performers:</td><td>Customer</td></tr>
<tr><td>Set Off</td><td>User will request a payment form to fill up</td></tr>
<tr><td>Overview/Primary Success Situation</td><td><table>
<tr><td>1.</td><td>Click “Make Payment” icon</td></tr>
<tr><td>2.</td><td>Give payment form</td></tr>
<tr><td>3.</td><td>Enter the data.</td></tr>
<tr><td>4.</td><td>Click “Pay” icon.</td></tr>
<tr><td>6.</td><td>Notification: !!!Payment Successful!!!</td></tr>
</table></td></tr>
<tr><td>Different Flows</td><td><table>
<tr><td>1.1</td><td>Error in the System</td></tr>
<tr><td></td><td>1.1.a. Give it another go!</td></tr>
<tr><td>4.1</td><td>The user did not complete the information.</td></tr>
<tr><td></td><td>4.1.a. Verified by the system and informed by “Please! Fill Up the Box”.</td></tr>
<tr><td>5.1</td><td>The system didn't react.</td></tr>
<tr><td></td><td>5.1.a. Display the error message.</td></tr>
<tr><td>6.1</td><td>The information is not saved by the system.</td></tr>
<tr><td></td><td>6.1.a. "Details did not save" is the notification.</td></tr>
</table></td></tr>
<tr><td>Quality Standards</td><td>In half an hour, the user will complete all the information.</td></tr>
</table>

Description of the Case 05: Track Shipment

Use Case	Track Shipment
Objective	The technology allows users to track shipments.
Prerequisite	Users must Create Shipment
End Condition for Success	
End Condition Failed	Notification: “Wrong Tracking ID”

Principal Performers: Secondary Performers:	Customer Administrator
Set Off	
Overview/Primary Success Situation	1. Click “Track Order” icon 2. Enter Tracking ID 3. Click “Submit” icon. 4. Show Tracking details
Different Flows	1.1 Wrong Tracking ID 2.1 The user Did not fill up the details!
Quality Standards	

Description of the Case 06: Manage Shipment

Use Case	Manage Shipment
Objective	Admin can Manage Shipment in to the system.
Prerequisite	Admin must login in to the system.
End Condition for Success	Notification: !!!Order Updated!!!
End Condition Failed	
Principal Performers: Secondary Performers:	Admin
Set Off	

Overview/Primary Success Situation	1. Click “Manage Shipment” icon 2. Update Information 3. Click “Submit” icon. 4. Successfully Updated!!! Notify
Different Flows	1.1 System Error
Quality Standards	

Description of the Case 07: View Report

Use Case	View Report
Objective	Admin can view all the report.
Prerequisite	Admin must login in to the system
End Condition for Success	
End Condition Failed	Notification: “System error”
Principal Performers: Secondary Performers:	Admin
Set Off	
Overview/Primary Success Situation	1. Click “View Report” icon 6. The details are saved and shown by the system!

Different Flows	<table><tr><td>1.1</td><td>Error in the System</td></tr><tr><td></td><td>1.1.a. Give it another go!</td></tr><tr><td>5.1</td><td>The system didn't react.</td></tr><tr><td></td><td>5.1.a. Show Error Message.</td></tr></table>
Quality Standards	

Description of the Case 08: Delivery Shipment

Use Case	Delivery Shipment
Objective	Deliveryman can deliver order to the Customer.
Prerequisite	Users must Order.
End Condition for Success	Notification: !!!Successfully Delivered!!!
End Condition Failed	Notification: “Delivery failed”
Principal Performers: Secondary Performers:	Deliveryman Customer
Set Off	
Overview/Primary Success Situation	<table><tr><td>1.</td><td>Click “Delivery Completed” icon</td></tr><tr><td>2.</td><td>Successfully Delivereded!!! Notify</td></tr></table>
Different Flows	<table><tr><td>1.1</td><td>Delivery failed</td></tr><tr><td></td><td>1.1.a. Try Again!!</td></tr></table>
Quality Standards	User need to wait for the next day

Description of the Case 09: Return

<table>
<tr><td>Use Case</td><td>Return</td></tr>
<tr><td>Objective</td><td>Users can return the product</td></tr>
<tr><td>Prerequisite</td><td>Orders must be delivered to users.</td></tr>
<tr><td>End Condition for Success</td><td>Notification: !!!Successfully Returned!!!</td></tr>
<tr><td>End Condition Failed</td><td>Notification: “Return unsuccessful”</td></tr>
<tr><td>Principal Performers:

Secondary Performers:</td><td>Customer

Deliveryman</td></tr>
<tr><td>Set Off</td><td>User will request a return form to fill up</td></tr>
<tr><td>Overview/Primary Success Situation</td><td>
<table>
<tr><td>1.</td><td>Click “Return” icon</td></tr>
<tr><td>2.</td><td>Enter the data.</td></tr>
<tr><td>3.</td><td>Click “Submit” icon.</td></tr>
<tr><td>4.</td><td>Data stored</td></tr>
<tr><td>5.</td><td>The details are saved and shown by the system!

Your registration has been successful! Alert</td></tr>
</table>
</td></tr>
<tr><td>Different Flows</td><td>
<table>
<tr><td>1.1</td><td>Error in the System</td></tr>
<tr><td></td><td>1.1.a. Give it another go!</td></tr>
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<tr><td>5.1</td><td>The system didn't react.</td></tr>
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<tr><td></td><td>6.1.a. "Details did not save" is the notification.</td></tr>
</table>
</td></tr>
<tr><td>Quality Standards</td><td>In half an hour, the user will complete all the information.</td></tr>
</table>

2.4.3 Activity Diagram

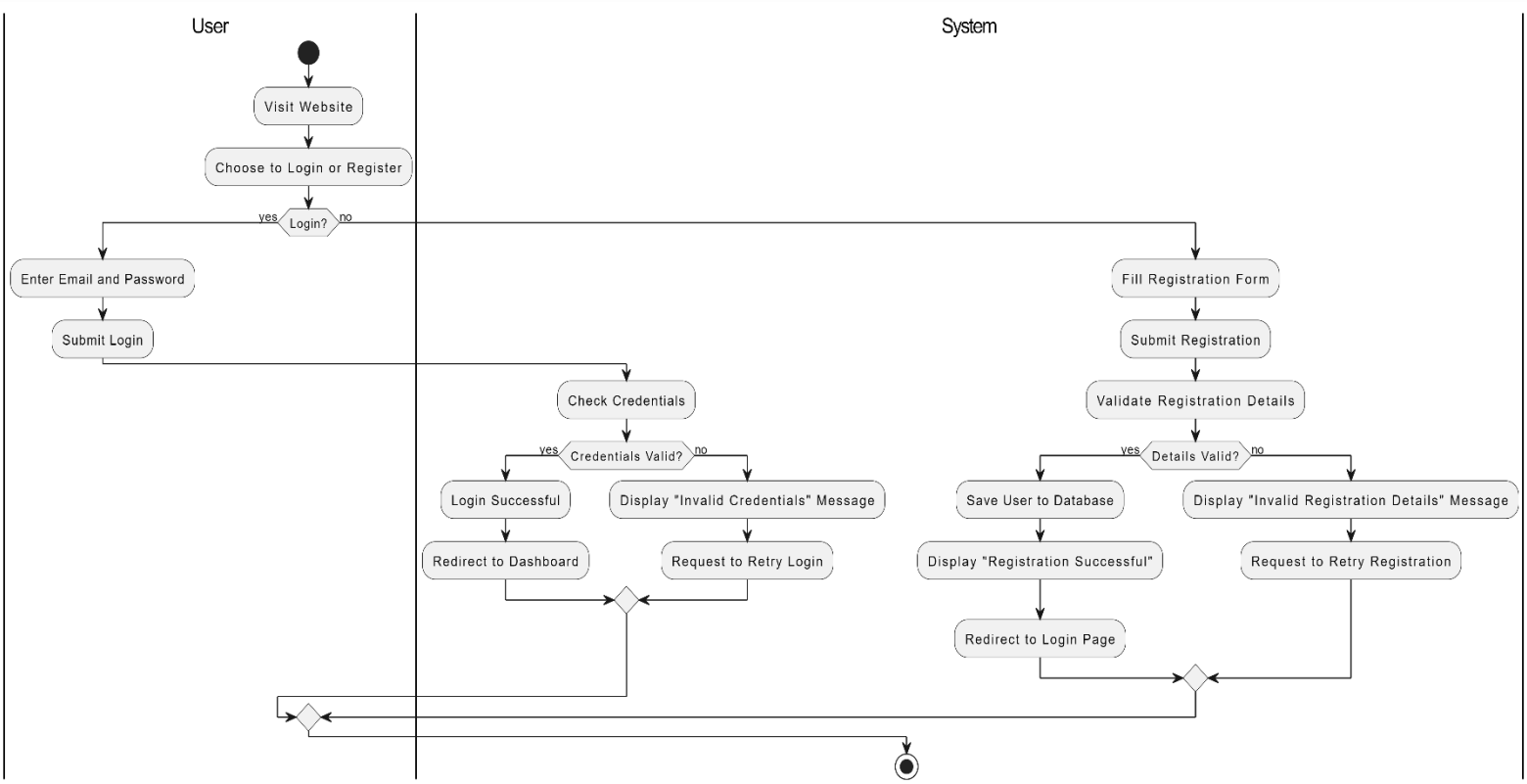

Figure 3: Registration

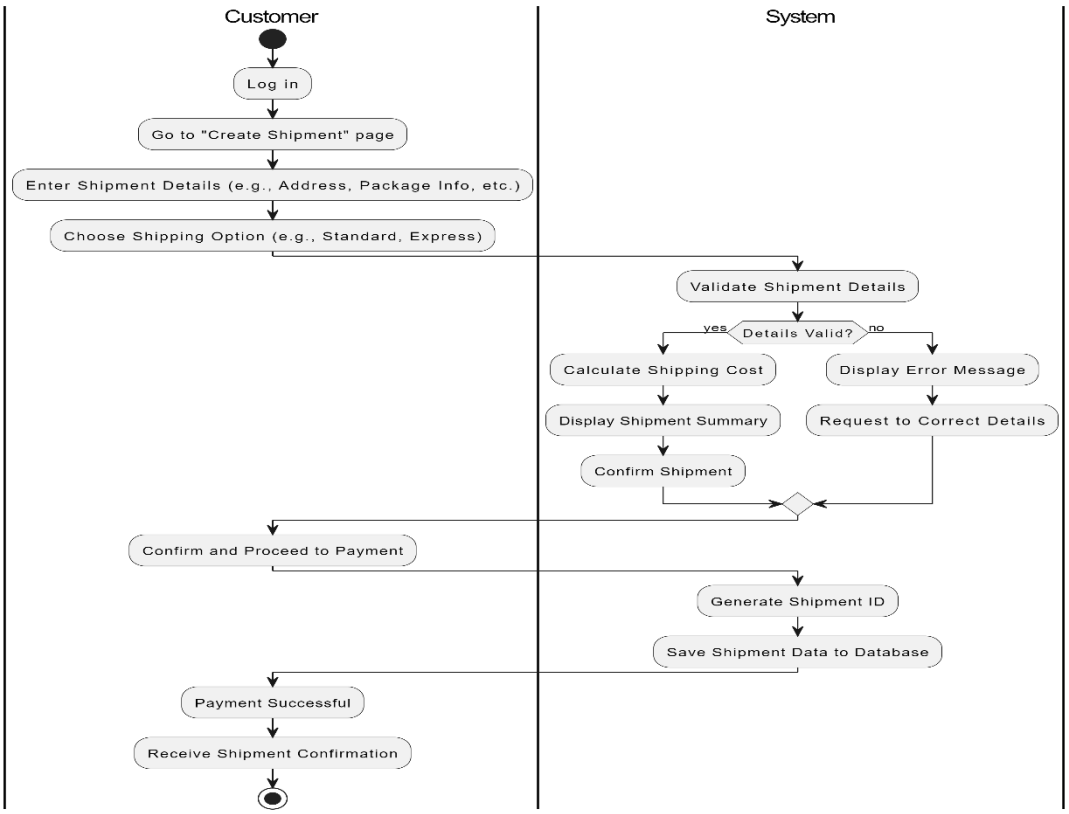

Figure 4: Login

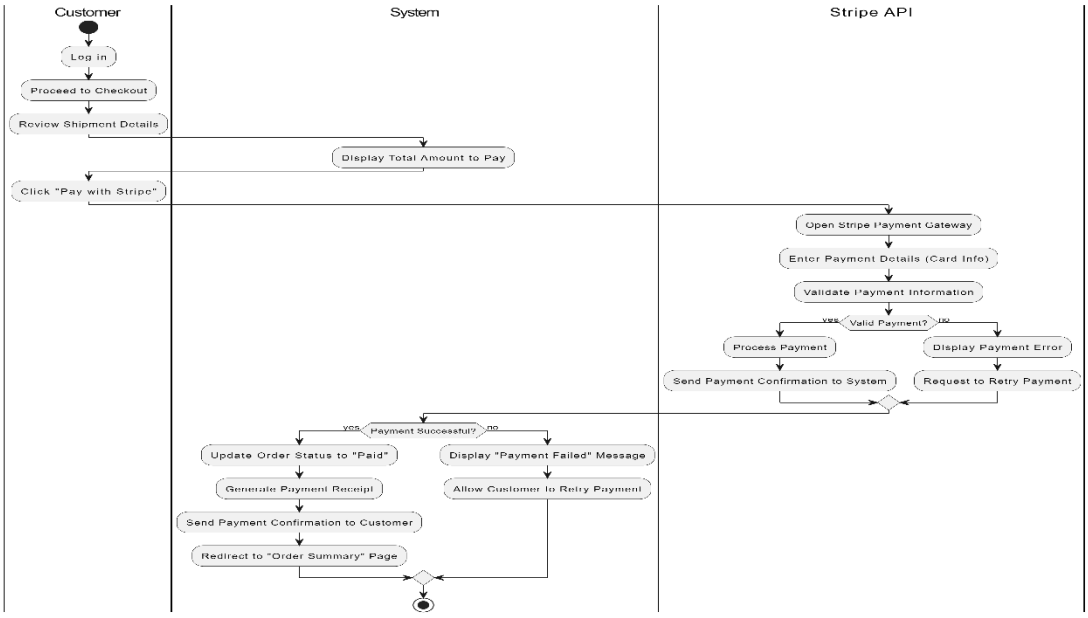

Figure 5: Make payment

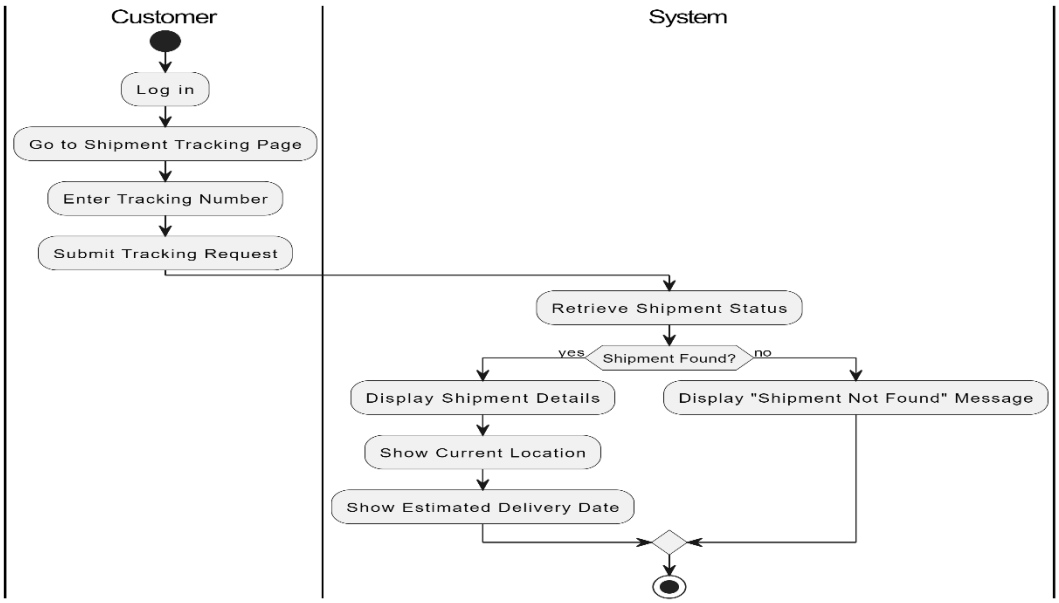

Figure 6: Track shipment

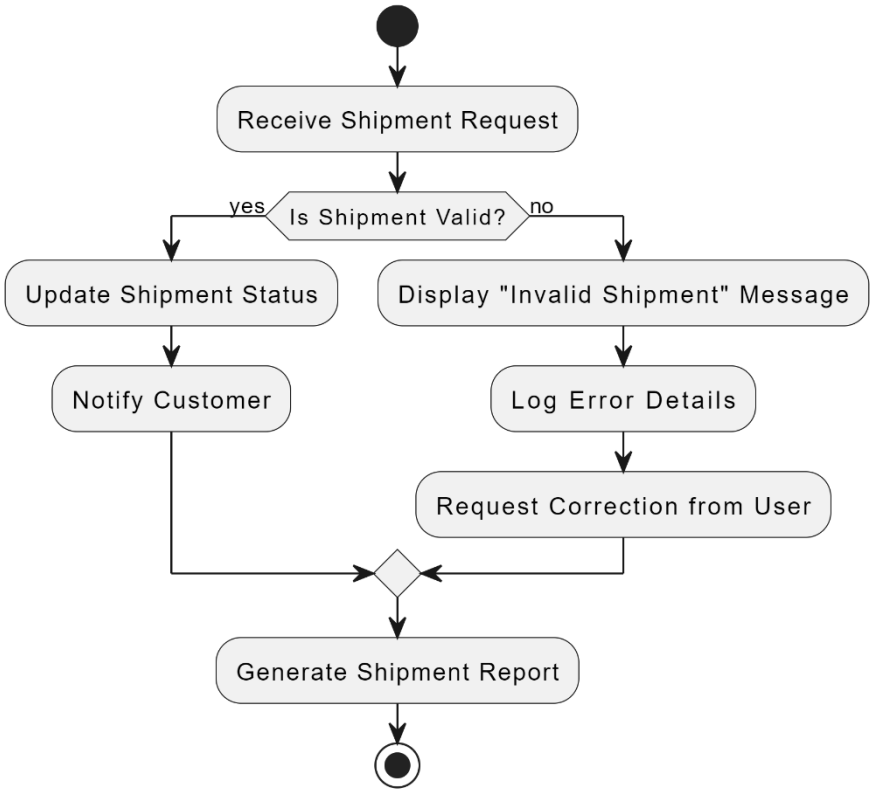

Figure 7: Manage shipment

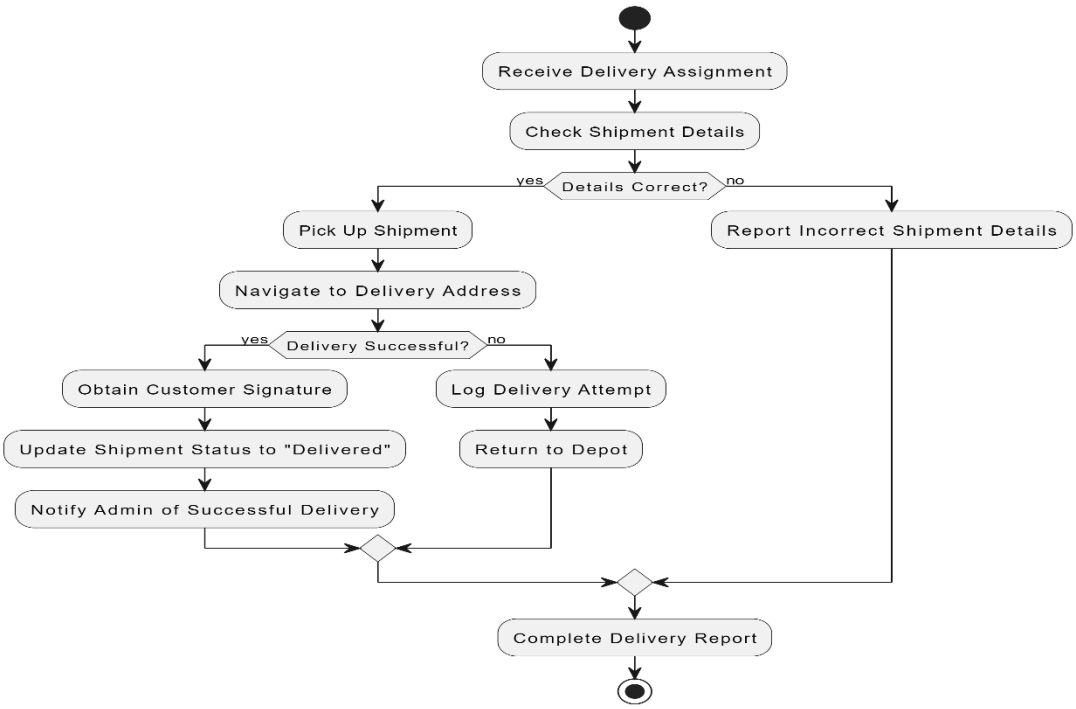

Figure 8: Delivery shipment

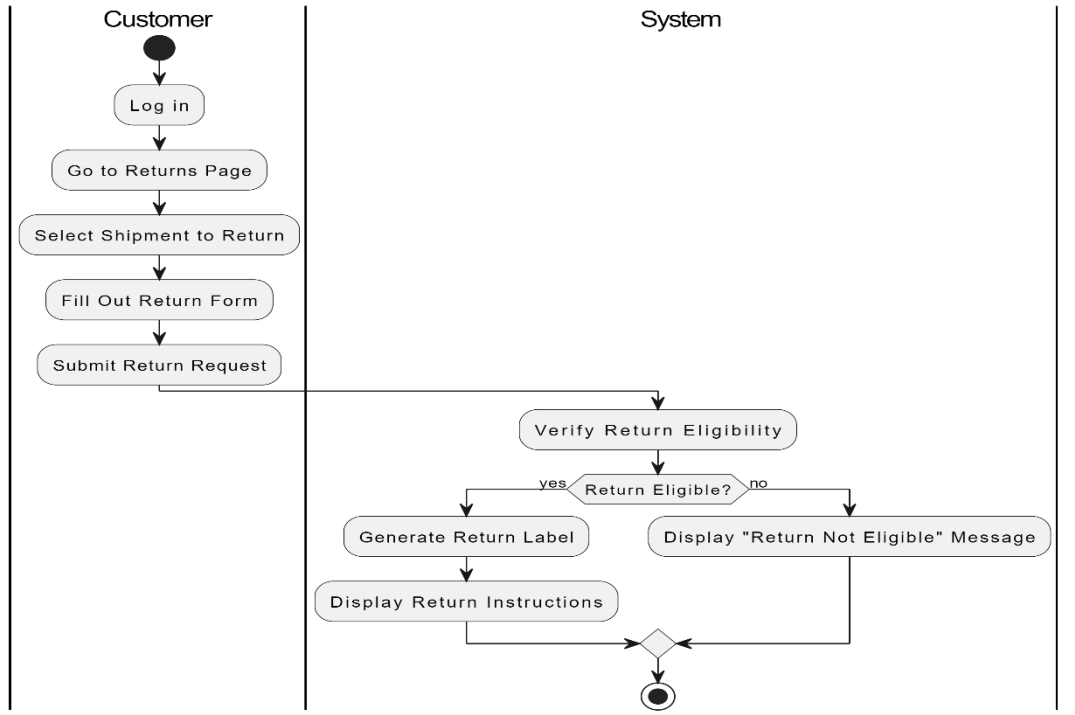

Figure 9: Return

2.4.4 Sequence Diagram

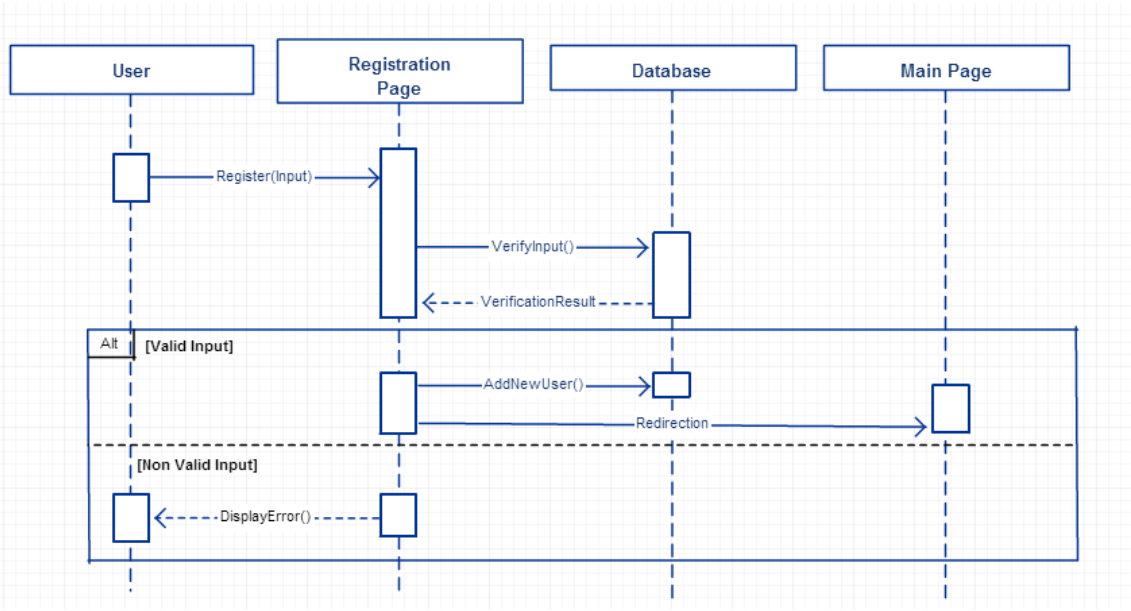

Figure 10: Registration

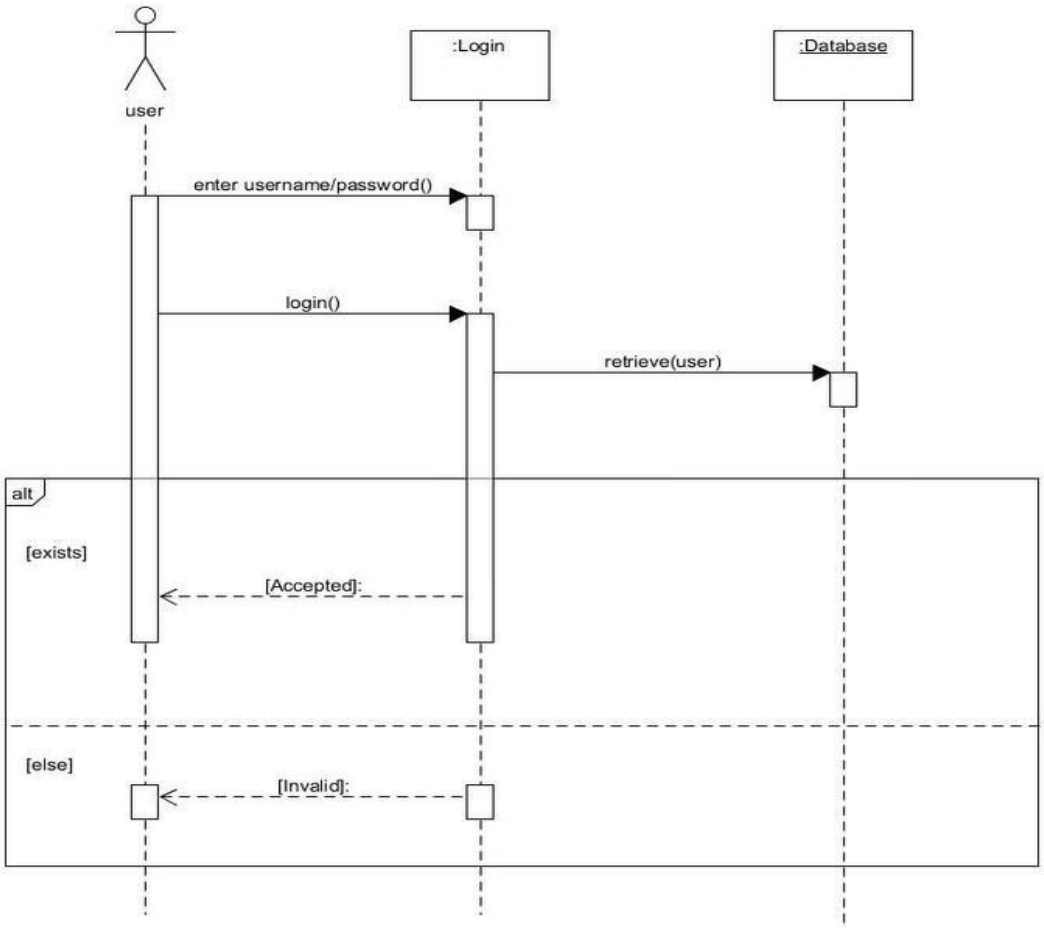

Figure 11: Login

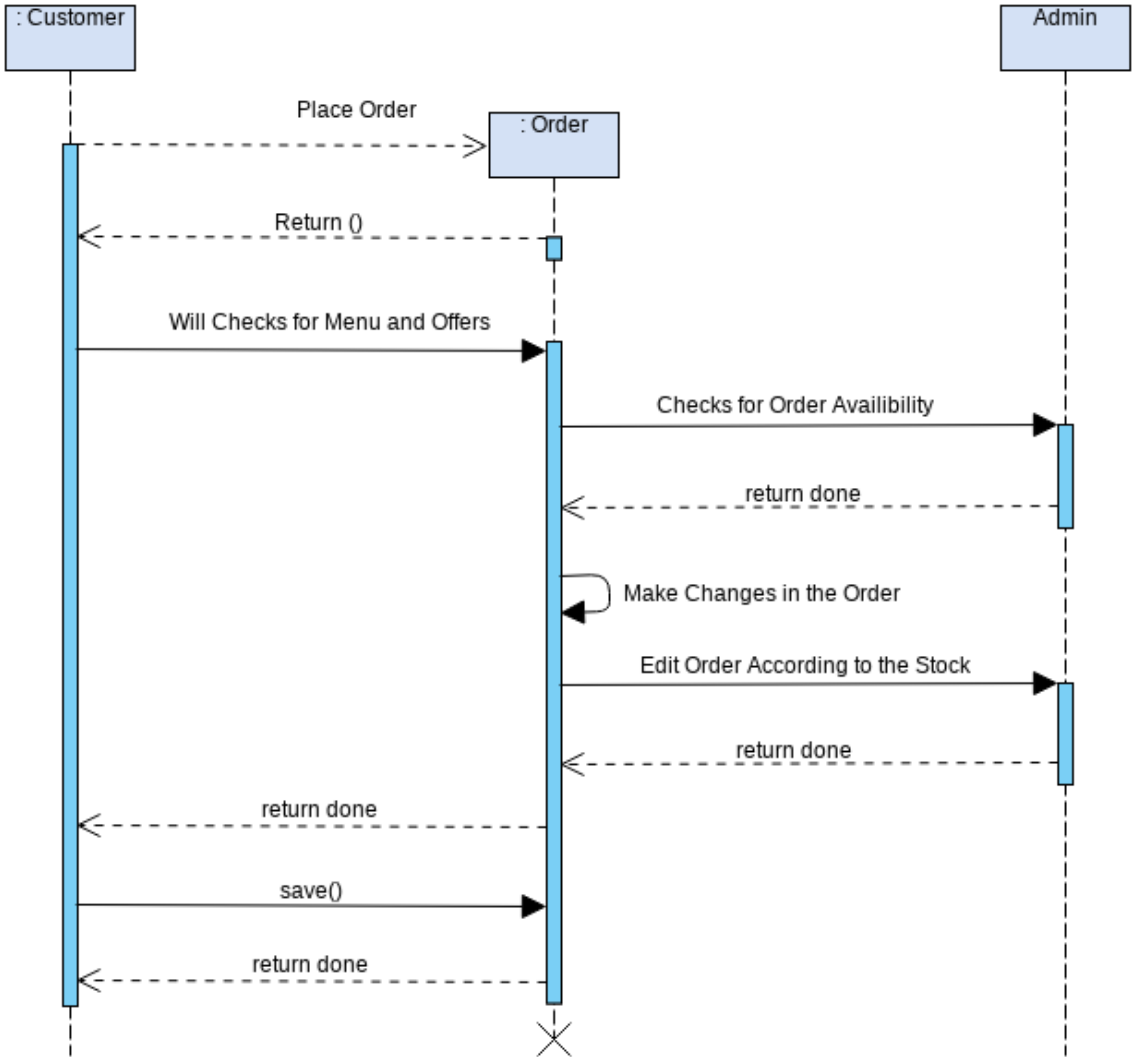

Figure 12: Create Order

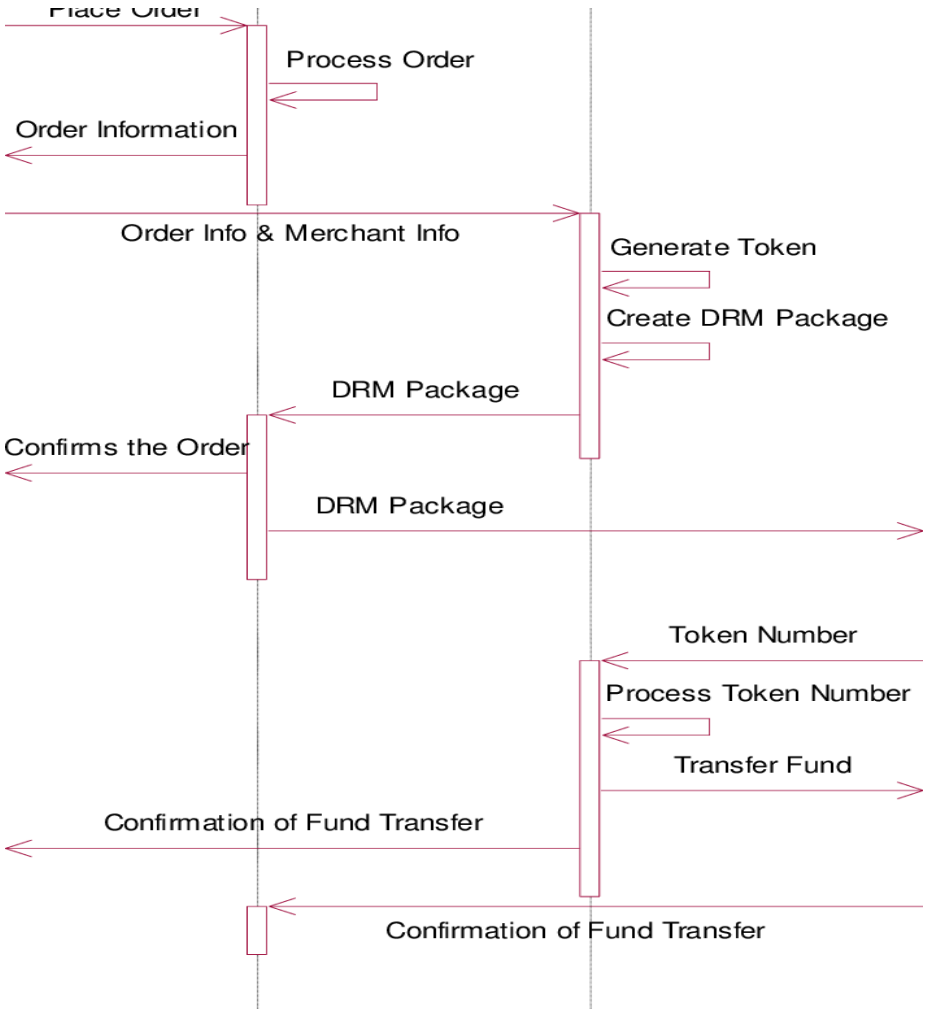

Figure 13: Make Payment

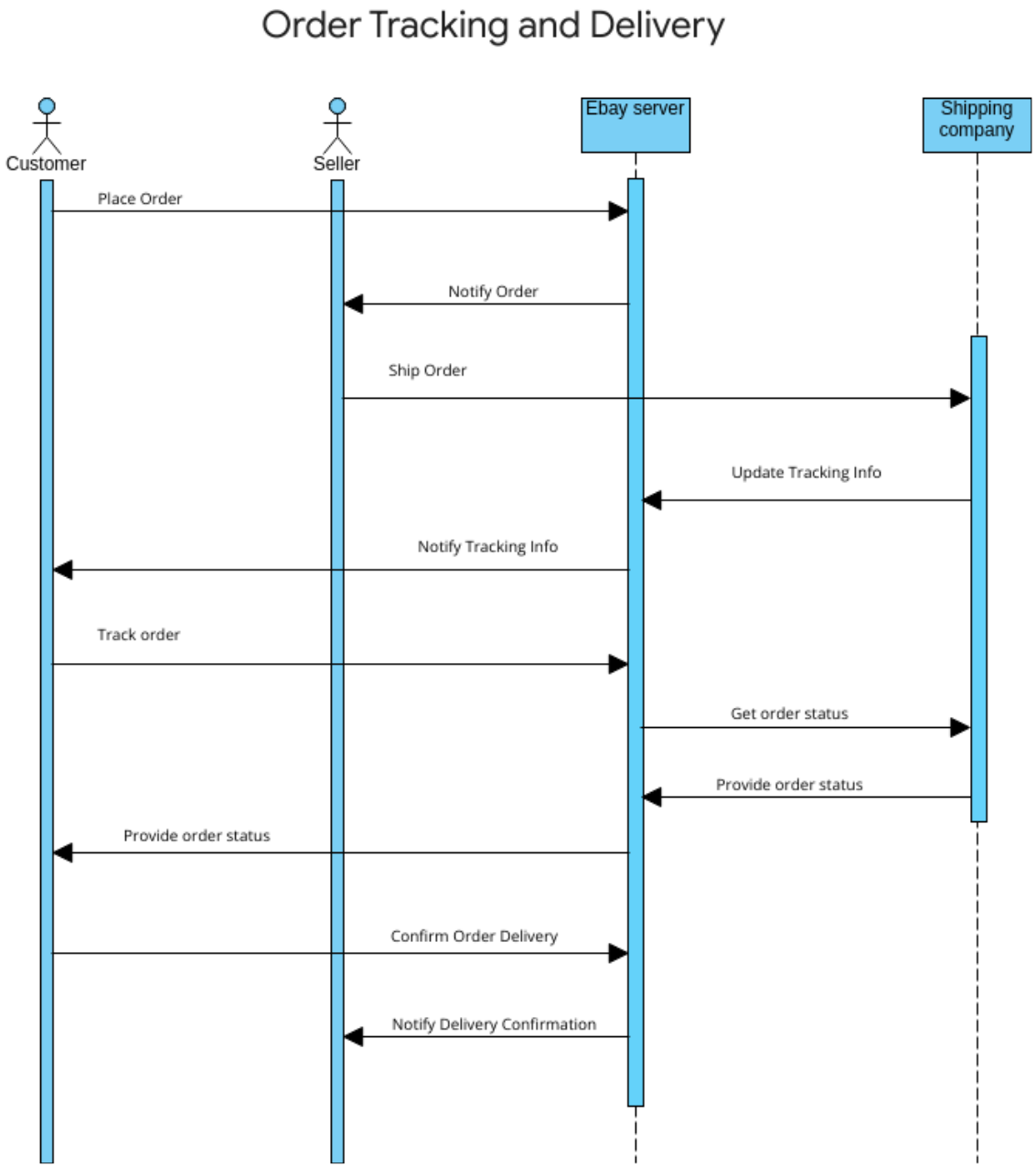

Figure 14: Track Order & Delivery

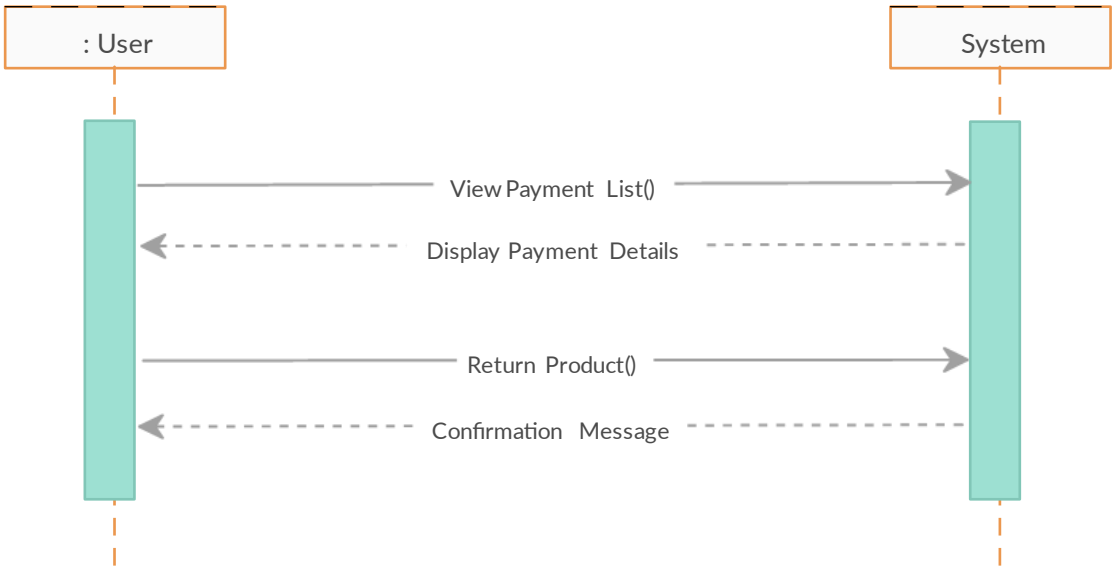

Figure 15: Return

2.4.5 Class Diagram

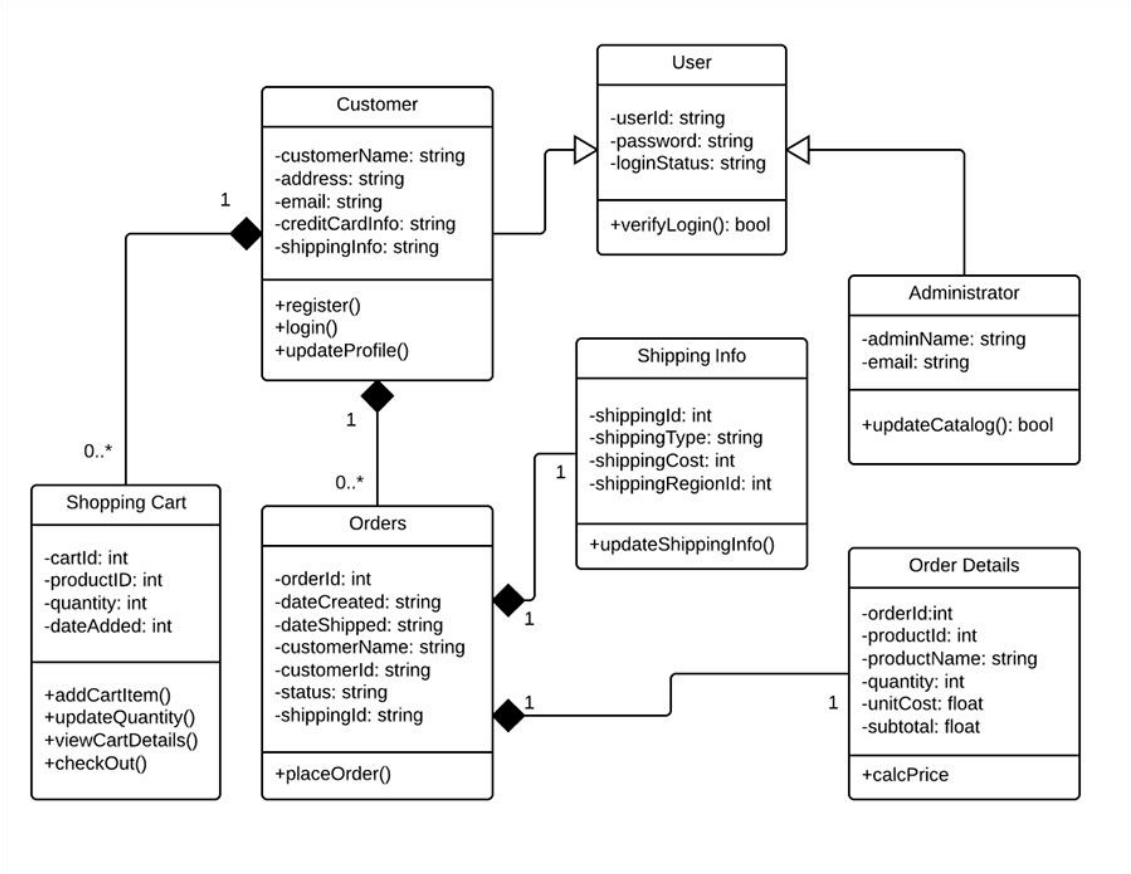

Figure 16: Class_Diagram

2.4.6 ER Diagram

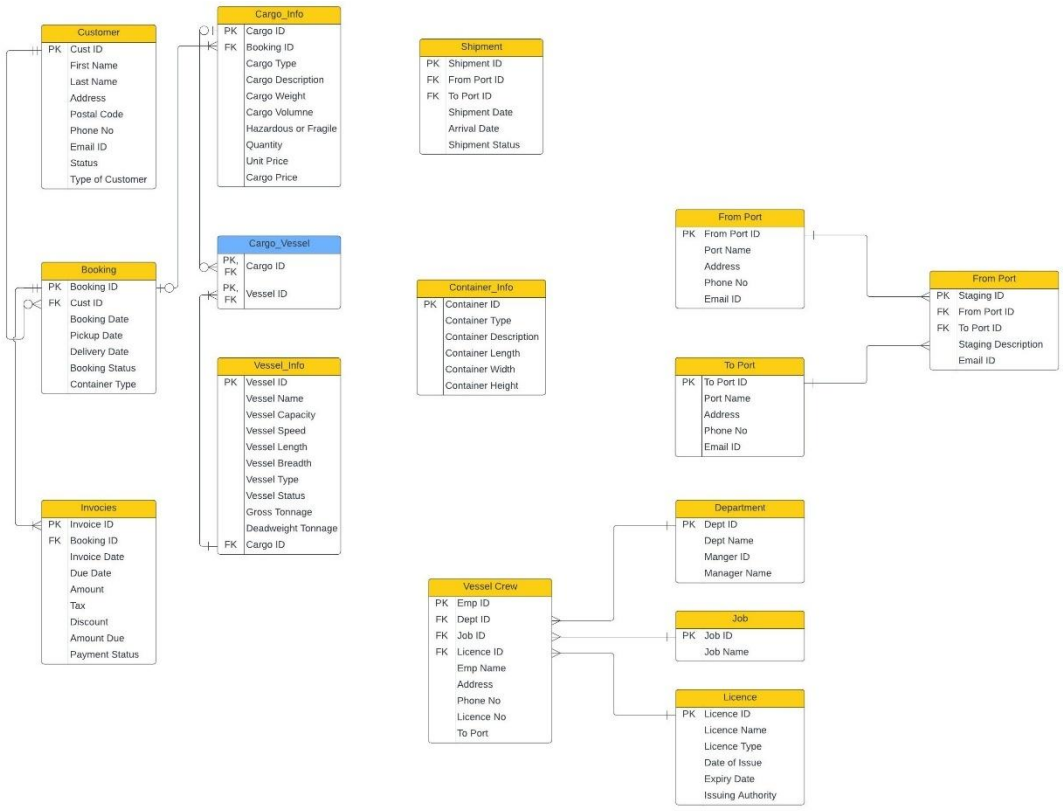

Figure 17: ER_Diagram

2.5 Coding: Appendix simple coding

```
// pages/index.js

export default function Home() {
  return (
    <div>
      <h1>Welcome to the Next.js Tutorial</h1>
    </div>
  );
}
```

2.6 Summary

The Shipment Management System is designed to streamline shipping processes, reduce costs, and improve delivery times. With integrated carrier APIs, real-time tracking, and AI-based route optimization, the system provides a comprehensive solution for small and medium-sized businesses, with scalability for future growth.

Chapter 3 Software Testing

3.1 Introduction

The Shipment Management System is a software solution designed to streamline the shipping process, from order creation to delivery. It helps businesses efficiently manage shipments by automating tasks like generating shipping labels, tracking orders, and integrating with carriers such as FedEx. Customers may simply track their orders thanks to the system's real-time shipment progress information.. With features like multi-carrier support, route optimization, and inventory management, the SMS improves operational efficiency and customer satisfaction. It is scalable, user-friendly, and ensures accurate and timely deliveries, making it an essential tool for businesses in logistics.

3.2 Features for Testing

3.2.1 To Be Tested Feature

1) User Registration
2) User Login
3) Admin Login
4) Admin Dashboard
5) Create Shipment
6) Track Shipment
7) User Logout
8) Admin Logout

3.3 Strategies for Testing

3.3.1 Test Methodology

1. The Shipment Management System's testing methodology guarantees that the system operates accurately, interfaces with other services, and operates effectively.

   Test Levels:

   - **Unit Testing**: Verify individual components like Order, Shipment, and Carrier classes.
   - **Integration Testing**: Test interactions between modules and external services.

- **System Testing**: Validate end-to-end functionality, including order processing and tracking.
- **Acceptance Testing**: Ensure the system meets business requirements.

2. **Test Types**:
   - **Functional Testing**: Verify core functionalities like order creation, shipment tracking, and label generation.
3. **Test Strategy**:
   - **Manual Testing**: Validate critical user flows and edge cases.
   - **Automated Testing**: Automate repetitive tasks like shipment tracking and order processing.
4. **Test Data**:
   - Use valid, invalid, and edge-case data to ensure robust testing of all features.

3.3.2 Pass/Fail Criteria

Pass: Orders are created correctly, tracking updates in real-time, accurate shipping labels are generated, and carrier integration works.

Fail: Incorrect order creation, failed status updates, or errors in label generation or carrier integration.

Test Case: 5.3.1		**Name of Test Case: User Registration**				
System: Quick Ship		**Subsystem:** User Authentication				
Designed by: Jahid Hasan		**Design Date:** 14.08.24				
Executed by: Jahid Hasan		**Execution date:** 25.12.24				
Description:	The user register for the Quick Ship system by providing valid registration information.					
Pre-condition:	The user accesses the registration page.					
Step	**Username**	**Email**	**Password**	**Response**	**Pass/ Fail**	**Comment**
1	Jahid02	jahid@gmail.com	123456	Registration successful	pass	User registration is completed with valid information
2		jahid@gmail.com	123456	Username field empty	fail	User must put a username
3	Jahid02		123456	Email field empty	fail	User must put an email id
4	Jahid02	jahid@gmail.com		Password field empty	fail	User must put a password

Test Case: 5.3.2		**Name of Test Case: User Login**			
System: Quick Ship		**Subsystem:** User Authentication			
Designed by: Jahid Hasan		**Design Date:** 14.08.24			
Executed by: Jahid Hasan		**Execution date:** 25.12.24			
Description:	The user login for the Quick Ship system by providing valid login information.				
Pre-condition:	The user accesses the login page.				
Step	**Email**	**Password**	**Response**	**Pass/ Fail**	**Comment**
1	jahid@gmail.com	123456	Login successful	pass	User Login is completed with valid information
2		123456	Email field empty	fail	User must put an email id
3	jahid@gmail.com		Password field empty	fail	User must put a password

Test Case: 5.3.3		**Test Case Name: Admin Login**			
System: Quick Ship		**Subsystem:** Admin Verification			
Designed by: Jahid Hasan		**Design Date:** 14.08.24			
Executed by: Jahid Hasan		**Execution date:** 25.12.24			
Description:	The admin login for the Quick Ship system by providing valid login information.				
Pre-condition:	The admin accesses the login page.				
Step	**Email**	**Password**	**Response**	**Pass/ Fail**	**Comment**
1	jahid.admin@gmail.com	123456	Login successful	pass	Admin Login is completed with valid information
2		123456	Email field empty	fail	Admin must put an email id
3	Jahid.admin@gmail.com		Password field empty	fail	Admin must put a password

Test Case: 5.3.4		**Admin Dashboard is the test case name**
System: Quick Ship		**Subsystem:** Admin Pannel
Designed by: Jahid Hasan		**Design Date:** 14.08.24
Executed by: Jahid Hasan		**Execution date:** 25.12.24
Description:	The admin check for the dashboard.	
Pre-condition:	The system administrator needs to log in.	
Step	**Response**	**Comment**
1. Click Dashboard	Successful	Successfully viewing the admin dashboard

Test Case: 5.3.5		**Test Case Name: Create Shipment**
System: Quick Ship		**Subsystem:** User Account
Designed by: Jahid Hasan		**Design Date:** 14.08.24
Executed by: Jahid Hasan		**Execution date:** 25.12.24
Description:	User create an order.	
Prerequisite:	To access the account, the user must log in.	
Step	**Response**	**Comment**
1. Click Order	Successful	Successfully place an order

Test Case: 5.3.6		**Test Case Name: Track Shipment**
System: Quick Ship		**Subsystem:** User Account
Designed by: Jahid Hasan		**Design Date:** 14.08.24
Executed by: Jahid Hasan		**Execution date:** 25.12.24
Description:	User tracking Shipment.	
Prerequisite:	To access the account, the user must log in.	
Step	**Response**	**Comment**
1. Input Tracking ID	Successful	Successfully track the Order.

Test Case: 5.3.7		Test Case Name: User Logout
System: Quick Ship		**Subsystem:** User Account
Designed by: Jahid Hasan		**Design Date:** 14.08.24
Executed by: Jahid Hasan		**Execution date:** 25.12.24
Description:	User Logout from the System.	
Prerequisite:	The User must login to the account.	
Step	**Response**	**Comment**
1. Click on Logout icon	Successful	Successfully logout from the System

Test Case: 5.3.8		Test Case Name: Admin Logout
System: Quick Ship		**Subsystem:** Admin Account
Designed by: Jahid Hasan		**Design Date:** 14.08.24
Executed by: Jahid Hasan		**Execution date:** 25.12.24
Description:	Admin Logout from the System.	
Prerequisite:	Admin must login to the account.	
Step	**Response**	**Comment**
1. Click on Logout icon	Successful	Successfully logout from the System

3.5 Summary

In this chapter we discuss about software testing, we test different type of user and admin authentication and system performance. The Shipment Management System is a software solution designed to streamline the shipping process, from order creation to delivery. It helps businesses efficiently manage shipments by automating tasks like generating shipping labels, tracking orders, and integrating with carriers.

Chapter 4 Deployment and Maintenance

4.1 Introduction

Deployment involves transferring the Shipment Management System (SMS) to a production environment, ensuring it's fully operational. Maintenance ensures the system remains functional, secure, and up-to-date through monitoring, updates, and addressing issues based on user feedback and business needs.

4.2 Make an effort to adhere to the software release life cycle (SRC)

The **Shipment Management System** follows the **System Development Life Cycle (SDLC)** for deployment and maintenance:

---

1. Planning

- Create a deployment plan, set hardware/software requirements, and get stakeholder approval.

2. Design

- Define deployment architecture (cloud/on-premise) and plan maintenance processes for bug fixes and updates.

3. Development

- Build the system with essential features and automate deployment using scripts.

4. Testing

- Conduct unit, integration, and user acceptance testing (UAT), ensuring stress testing for peak loads.

5. Deployment

- Deploy the system to production, migrate data, and provide go-live support.

6. Maintenance

- Fix bugs, release updates, gather user feedback, and monitor system performance.

By following **SDLC**, the SMS ensures smooth deployment, effective maintenance, and continuous improvement.

Chapter 5 User Manual

5.1 Introduction

The Shipment Management System is a comprehensive software solution designed to streamline and optimize the process of managing shipments from order placement to delivery. This system provides tools for tracking shipments, managing inventory, selecting carriers, optimizing routes, and handling documentation. It helps businesses improve operational efficiency, reduce shipping costs, and enhance customer satisfaction by ensuring timely and accurate deliveries. With real-time tracking, automated processes, and detailed reporting, the SMS plays a crucial role in modern supply chain and logistics management.

5.2 Project Functionalities

Admin Dashboard

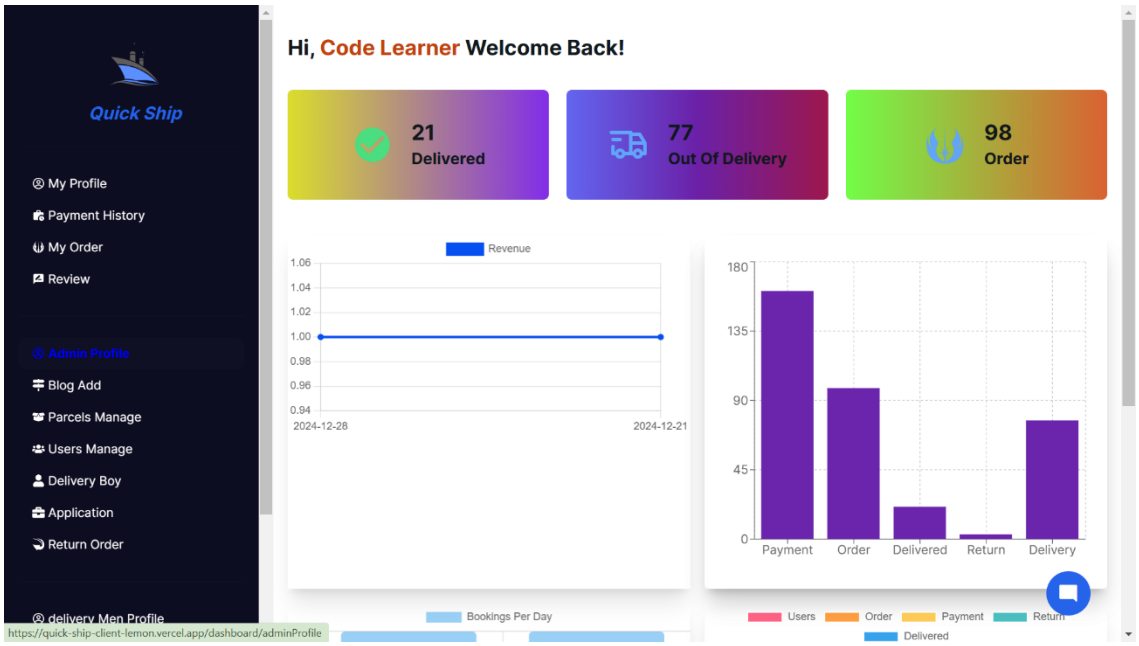

Figure 18: Admin Dashboard

Home Page

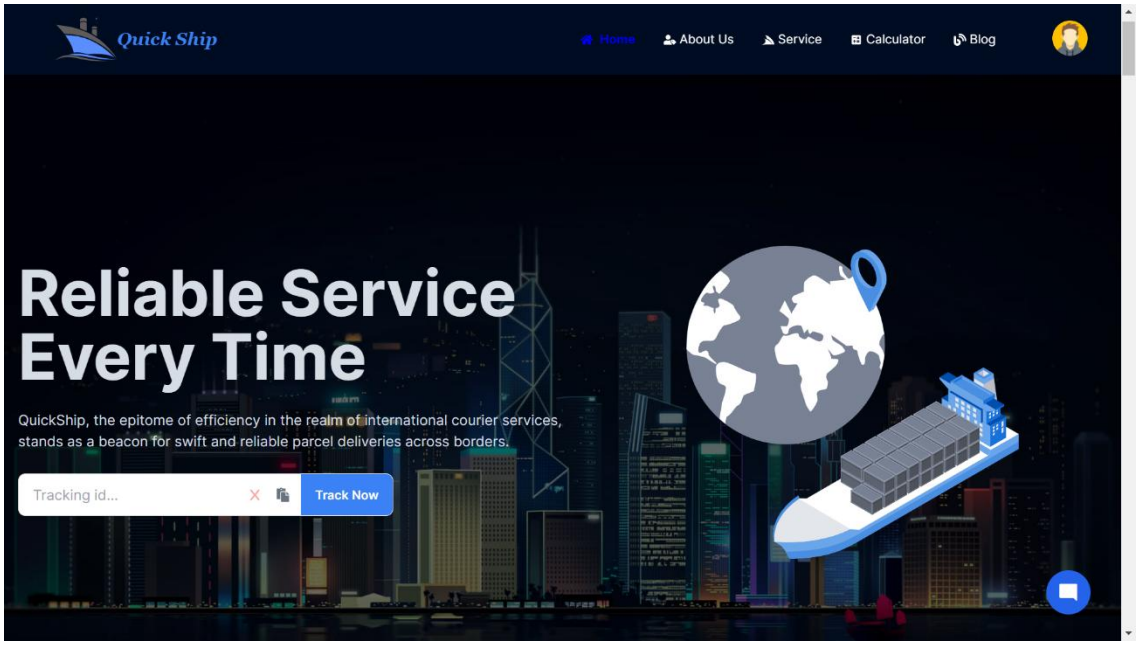

Figure 19: Home page

Login Page

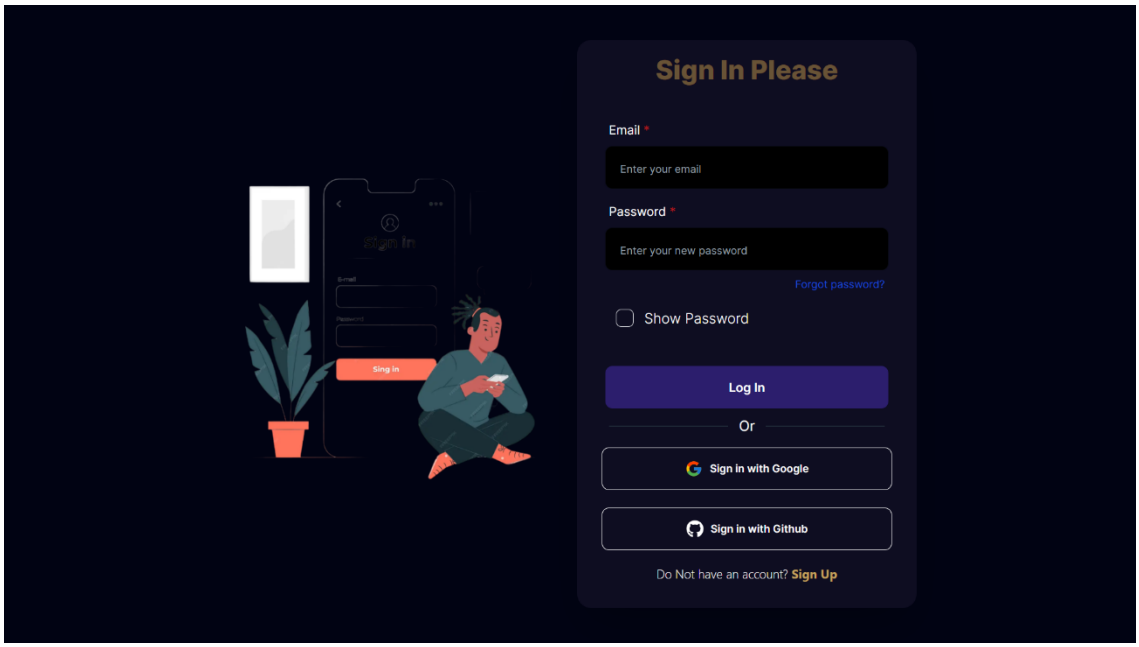

Figure 20: Login page

Booking Page

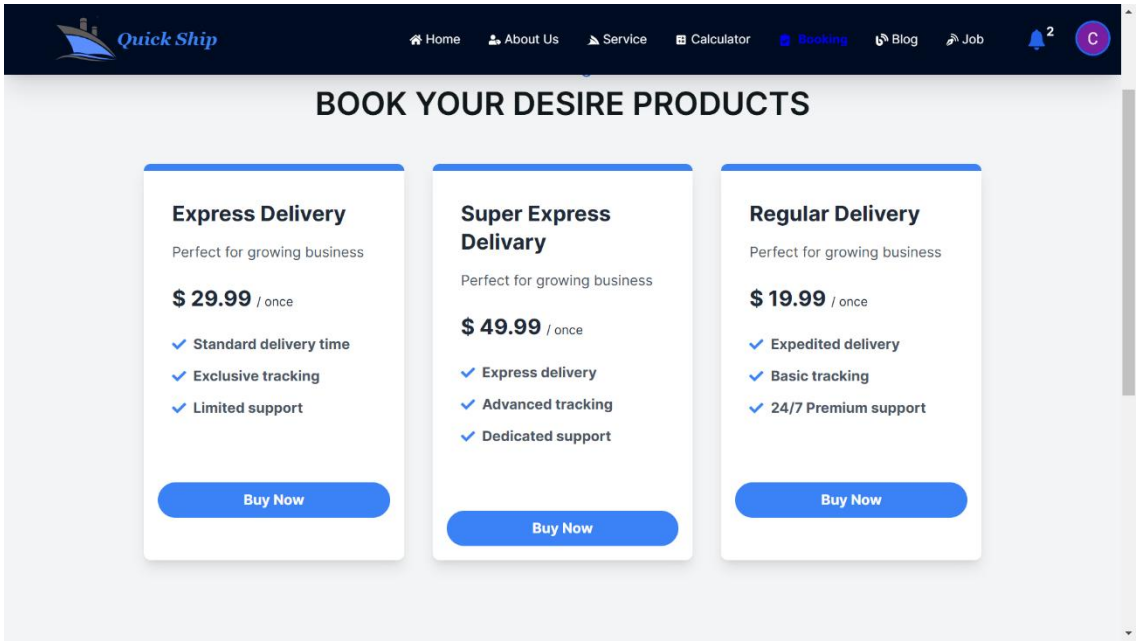

Figure 21: Booking page

Delivery From

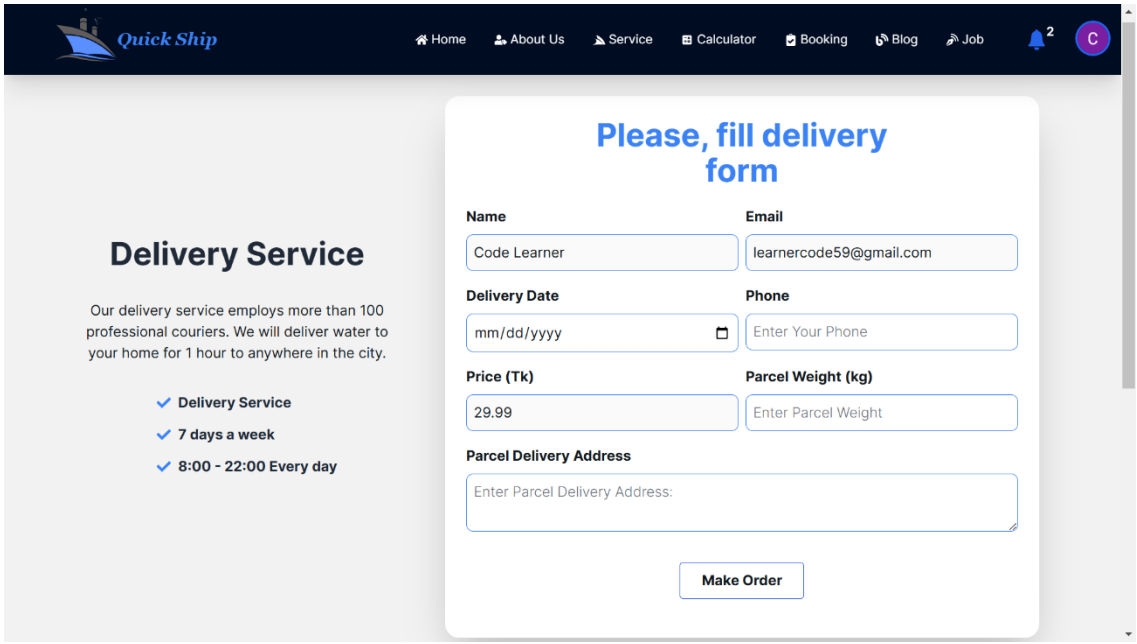

Figure 22: Delivery From

Track shipment

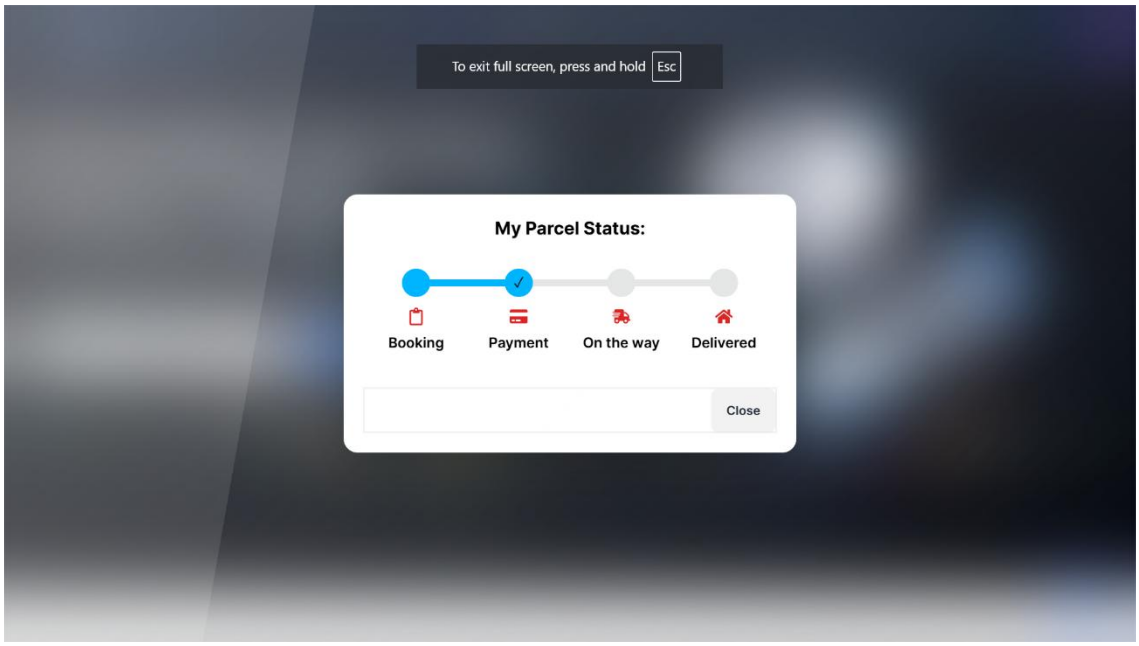

Figure 23: Track shipment

User Dashboard

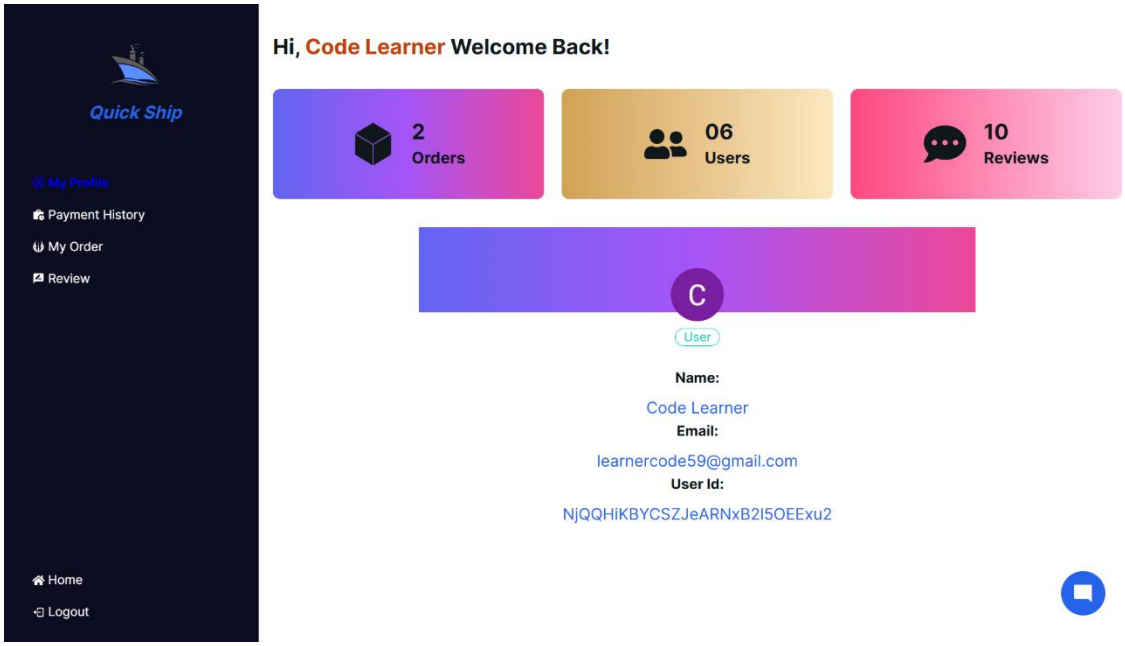

Figure 24: User Dashboard

5.3 Summary

In this chapter we write about our shipment management system functionalities and user interfaces. We add different types of user interface screenshots.

Chapter 6 Project Summary

6.1 Introduction

The Shipment Management System is a software solution designed to efficiently handle the movement of goods throughout the supply chain. It streamlines processes such as order tracking, carrier management, route optimization, and shipment documentation. By automating key tasks and providing real-time visibility into the shipment lifecycle, the SMS enhances operational efficiency, reduces costs, and improves customer satisfaction. This system is essential for businesses looking to manage shipments effectively and ensure timely delivery of products to customers.

6.2 Project Limitation

1. Time Constraints

Tight deadlines may limit testing, integration, and user training.

2. Budget Constraints

Limited funds can reduce resources, features, or long-term maintenance.

3. Technology Constraints

Integration challenges with legacy systems and carrier APIs.

4. Resource Limitations

Shortage of skilled personnel or data for analytics.

6.3 Scope

1. **Order Management**: Capture and process orders, integrate with e-commerce platforms.
2. **Shipping Documentation**: Generate labels, invoices, and customs documents.
3. **Carrier Management**: Integration with multiple carriers for rate comparison and tracking.
4. **Inventory Integration**: Sync inventory levels with order fulfillment.
5. **Shipment Tracking**: Real-time tracking and notifications for businesses and customers.
6. **Returns Management**: Facilitate returns and generate return labels.
7. **User Roles**: Role-based access for admins and users.
8. **Reporting & Analytics**: Shipping performance, costs, and carrier reports.
9. **Customer Notifications**: Automated alerts for order and shipping updates.

6.4 Future Work

1. **AI/ML Features**
    - **Route Optimization**: Use AI to optimize delivery routes.

    - **Demand Forecasting**: Predict shipment demand for better inventory management.
2. **Mobile App**
    - Develop a mobile app for customers and warehouse staff for real-time tracking and notifications.
3. **International Compliance**
    - Enhance the system to handle complex international regulations and multi-currency support.
4. **Customer Service Automation**
    - Integrate AI chatbots for real-time customer support.
5. **Sustainability**
    - Add carbon footprint tracking and eco-friendly shipping options.
6. **Carrier Expansion**
    - Integrate additional regional and niche carriers.
7. **Advanced Analytics**
    - Enhance reports with predictive insights for delays, costs, and carrier performance.
8. **Customizable UI**

- Allow more user interface customization for better efficiency.

6.5 Conclusion

The **Shipment Management System** project successfully streamlined order tracking, shipment management, and carrier integration. Key achievements include:

- **Real-time Tracking**: Improved visibility for businesses and customers.
- **Carrier Integration**: Seamless connections with major carriers for optimal shipping.
- **Inventory Sync**: Ensured accurate stock levels and automated fulfillment.
- **User Role Management**: Enhanced system security with clear access controls.

Key Lessons Learned:

- **Stakeholder Communication**: Regular engagement was crucial for meeting expectations.
- **Feature Prioritization**: Focusing on core features enabled timely delivery.
- **Integration Challenges**: Careful planning was needed for smooth API integrations.

Objectives Met:

The project delivered an efficient system, improving shipment tracking, reducing manual errors, and enhancing logistics performance.

.

REFERENCES

Use a reference manager such as *Mendeley*, *EndNote* or any reference manager software to generate all your list of references here. Once all the references are included then apply *Caption for Reference* style.

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Crooks, N. M., & Alibali, M. W. (2014). Defining and measuring conceptual knowledge in mathematics. Developmental Review, 34(4), 344–377. https://doi.org/10.1016/j.dr.2014.10.001

Gertler, M. S. (2003). Tacit knowledge and the economic geography of context, or the undefinable tacitness of being (there). Journal of Economic Geography, 3(1), 75–99. https://doi.org/10.1093/jeg/3.1.75

APPENDICES

Appendix A: **API Integration and Shipment Tracking**

A.1 Shipment Tracking
Details how the system fetches real-time tracking updates, including package status and estimated delivery.

A.2 Sample Tracking Data
Example response showing tracking status and shipment location.

Appendix B: **Performance Reports**

B.1 Shipment Analytics
Performance report showing shipment statistics, average delivery times, costs, and carrier performance comparisons.

B.2 UI Mockups
Mockup designs for the dashboard and tracking interface, illustrating key features and user flow.

Shipment Management System

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