

Lanka Glass House – Store Management System

Final Project Report



Sri Lanka Institute of Information Technology

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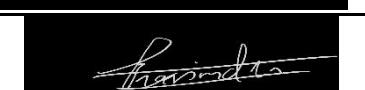
DECLARATION

We declare that this project report or part of it was not a copy of a document done by any organization, university, any other institute, or a previous student project group at SLIIT and was not copied from the Internet or other sources.

Project Details:

Project Title	LANKA GLASS HOUSE - Store Management System
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ABSTRACT

The Lanka Glass Store Management System is a comprehensive web-based solution designed to optimize and streamline the operations of glass product businesses. This system offers key functionalities to enhance efficiency across multiple departments, including employee management, inventory management, order handling, billing and payment processing, customer management, delivery management, and supplier management. By digitizing and automating traditional manual processes, the system ensures smoother operations and better service delivery for both employees and customers.

Built using the MERN stack (MongoDB, ExpressJS, ReactJS, and NodeJS), this application provides a user-friendly interface that enables employees, managers, and customers to interact with the system effortlessly. It supports secure employee registration, profile management, and account customization. Managers benefit from easy access to reports, efficient inventory control, and seamless delivery tracking. Additionally, customers can place orders, manage profiles, and track deliveries, ensuring an improved shopping experience.

Key features include the ability to handle maintenance requests, assign tasks to technicians, track delivery status in real-time, and manage supplier relationships effectively. By utilizing GitHub for version control, the system ensures smooth collaboration among developers and continuous updates to meet evolving business needs.

In summary, the Lanka Glass Store Management System is a modern solution that addresses the challenges of manual business management, providing glass store owners with a highly efficient and automated platform for handling daily operations.

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LIST OF ACRONYMS AND ABBREVIATIONS

Table 1 - Acronyms And Abbreviations

Abbreviation	Description
MERN	MongoDB, Express, React Js, Node Js
ER	Entity Relationship Diagram
DBMS	Database management System
UI	User Interface
SD	Sequence Diagram
SDLC	Software Development Life Cycle

SYSTEM DIAGRAM

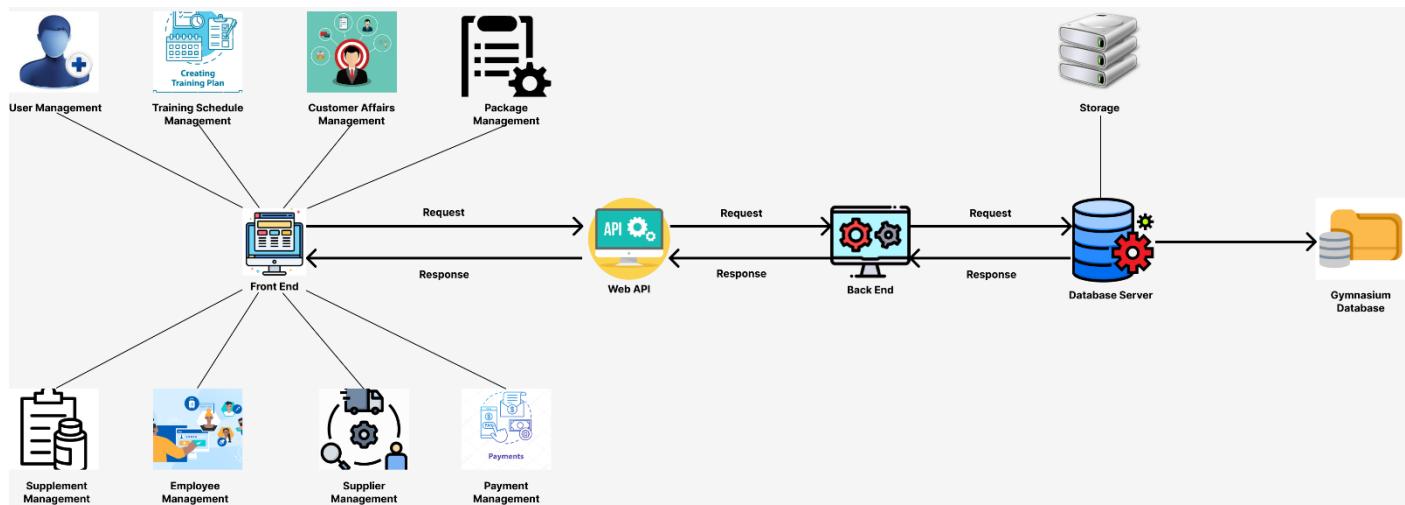


Figure 1.1 - System Diagram

CHAPTER1 - INTRODUCTION

BACKGROUND

Company Background

Lanka Glass House located in Kandy, Sri Lanka, is a renowned provider of high-quality glass products and custom solutions. Serving residential, commercial, and industrial clients, they specialize in delivering exceptional service and craftsmanship. It consists of a team of skilled professionals who are dedicated to meeting the unique needs of each project, ensuring superior quality and customer satisfaction. Through their extensive product range and bespoke solutions, they have built a local reputation as a trusted leader in the glass industry.

What is an E-Commerce platform?

An e-commerce system, often known simply as an online marketplace, is a digital platform designed for commercial transactions conducted over the internet. The term "e-commerce" originates from electronic commerce, highlighting the electronic nature of buying and selling products and services in the virtual realm. These platforms serve as dynamic hubs connecting businesses and consumers, offering a wide array of products and services. Educational institutions, enterprises, and individuals alike leverage e-commerce systems for seamless online transactions and interactions. In the contemporary digital landscape, "e-commerce" has become synonymous with online shopping, capturing the essence of the widespread use of these platforms for purchasing goods and services. These systems cater to diverse needs, ranging from electronics and clothing to various household items, providing users with a convenient and accessible avenue for transactions that transcends physical boundaries.

Our website

Our website for Lanka Glass House is a comprehensive solution designed to streamline business operations and enhance efficiency across all facets of the company. This application integrates eight essential functions:

- Customer Management: Efficiently track and manage customer information and interactions, ensuring personalized service and improved customer satisfaction.
- Employee Management: Simplify employee record-keeping, scheduling, and performance evaluations, facilitating smooth HR operations and boosting productivity.

- Inventory Management: Maintain real-time tracking of glass products and supplies, optimizing stock levels and minimizing shortages.

Problem and motivation

Problems

In developing a comprehensive web application for Lanka Glass House, we have identified several key issues that need to be addressed to enhance the business's operational efficiency and customer satisfaction:

1. Inefficient Customer Management:

-The current system lacks a centralized way to track and manage customer information, leading to potential lapses in service and missed opportunities for personalized engagement.

2. Employee Management Challenges:

-Manual record-keeping and scheduling for employees are time-consuming and prone to errors, resulting in inefficiencies and difficulties in tracking performance.

3. Inventory Management Issues:

-Without real-time tracking of glass products and supplies, the shop faces challenges in maintaining optimal stock levels, leading to either overstocking or stockouts.

4. Financial Management Complications:

-Managing financial transactions, generating reports, and monitoring budgets manually can be cumbersome and prone to inaccuracies, impacting the financial health of the business.

5. Order Processing Inefficiencies:

- The absence of an integrated order management system leads to delays and inaccuracies in order processing, affecting customer satisfaction and operational efficiency.

6. Delivery Coordination Problems:

- Coordinating delivery schedules and logistics manually can result in delays, miscommunications, and reduced customer satisfaction.

7. Maintenance and Replacement Oversights:

- Keeping track of maintenance and replacement tasks for glass products and equipment is challenging without a systematic approach, leading to potential quality issues and customer dissatisfaction.

8. Supplier Management Difficulties:

- Managing supplier information and purchase orders manually can lead to inefficiencies and disruptions in the supply chain, affecting the availability of quality materials.

By addressing these identified problems through our integrated web application, we aim to enhance operational efficiency, improve customer and employee satisfaction, and support the growth and success of [Your Glass Shop's Name].

Motivation

In today's competitive business environment, technology is crucial for enhancing efficiency, improving customer satisfaction, and driving growth. The motivation behind developing a comprehensive web application for Lanka Glass House is rooted in the need to optimize its operations and provide a seamless experience for both customers and employees.

By automating critical functions such as customer management, inventory control, and order processing, the system aims to minimize manual errors and save time, enabling staff to focus on delivering exceptional service. Moreover, the platform's integrated financial management tools offer accurate tracking of transactions and budgets, giving the business greater control over its financial health.

This project also seeks to empower employees by providing them with efficient management tools that streamline their workflows and boost productivity. Additionally, maintaining strong supplier relationships and ensuring inventory accuracy will help Lanka Glass House maintain its high product standards while fostering long-term business sustainability.

Ultimately, the web application will position Lanka Glass House as a leader in the industry, supporting its growth and long-term success.

Literature review

Customer Management

Examining customer management across these websites, most of the websites prioritize basic customer information and interaction. For instance, Royal Glass House maintains customer records but lacks advanced CRM functionalities such as detailed interaction histories and personalized service. In contrast, our website offers a robust CRM system that tracks customer interactions, preferences, and provides personalized experiences.

Employee Management

None of the competitor websites offer dedicated employee management functions. For example, Kandy Glass House and Central Picture Palace (Pvt) Ltd. rely on manual HR processes, which can be inefficient and prone to errors. Our website, however, integrates an advanced employee management system, including attendance tracking, performance evaluations, and role-based access control, ensuring efficient management and employee satisfaction.

Inventory Management

Inventory management is a critical function that is partially addressed by competitors. For instance, Royal Glass House and Kings Glass Emporium have basic inventory tracking systems but lack real-time updates and automated reordering. Our web application provides comprehensive inventory management with real-time tracking, automated reordering, and detailed reporting, reducing the risk of stockouts and overstock situations.

Financial Management

Financial management features are also limited in competitor websites. While Kings Glass Emporium and Kandy Glass House manage basic financial records, they do not provide real-time financial insights or detailed reporting. Our solution offers a full suite of financial management tools, including real-time tracking, budget management, and detailed financial reporting, enabling better financial decision-making and planning.

Order Management

Order management functions are commonly found on competitor websites, as they are essential for customer service. Royal Glass House and Central Picture Palace (Pvt) Ltd. have basic order tracking systems, but they lack automation and real-time updates. Our system streamlines the order lifecycle,

from creation to fulfillment, with real-time status updates, reducing errors and improving customer satisfaction.

Delivery Management

Delivery management is another area where competitors fall short. Royal Glass House relies on manual scheduling and tracking, which can lead to delays. Our website offers advanced delivery management with real-time tracking, automated scheduling, and customer notifications, ensuring timely and accurate deliveries.

Maintenance Tracking

Maintenance tracking is not addressed by any competitor websites. Our web application includes a structured maintenance tracking system, scheduling and reporting maintenance tasks to ensure optimal performance and prevent costly repairs.

Supplier Management

Supplier management is minimally addressed by competitors. Kings Glass Emporium maintains basic supplier records but lacks comprehensive tracking and performance analysis. Our system provides detailed supplier management, tracking purchase orders, and generating performance reports, enhancing procurement efficiency and supplier relationships. Our literature review highlights the limitations of existing solutions from Royal Glass House, Kandy Glass House, Central Picture Palace (Pvt) Ltd., and Kings Glass Emporium. These competitors lack comprehensive integration, automation, and advanced functionalities that our web application offers. By addressing these gaps, our solution ensures streamlined operations, improved efficiency, and enhanced customer satisfaction, making it a superior choice for [Your Glass Shop's Name]. This review confirms the necessity of developing a tailored system that comprehensively addresses the specific challenges faced by the client.

Table 2 - literature review

Functions	Lanka Glass House	Royal Glass house	Kandy Glass House	City Glass House	Abewikrama Glass House
User account management	✓	✓	✓	✓	✓
Employee management	✓	✓	✗	✓	✓
Customer affairs management	✓	✓	✓	✓	✓
Supplier management	✓	✗	✗	✗	✗
Package management	✓	✓	✓	✓	✗
Supplements managements	✓	✗	✗	✓	✗
Payment management	✓	✓	✓	✓	✓
Training Schedule	✓	✗	✗	✗	✗

Aim and objectives

Aim

Enhance Operational Excellence: Achieve optimal performance across customer service, inventory management, and order fulfillment through automation, streamlined workflows, and enhanced tracking systems.

Objectives

The objectives of the web application for Lanka Glass House focus on enhancing operational efficiency and improving service quality. Each objective targets key areas as follows

1. Develop a Customer Management System:
Implement a centralized system to efficiently track customer information and interactions.
2. Create an Employee Management Portal:
Establish a module for managing employee records and scheduling.
3. Implement Inventory Tracking:
Introduce real-time inventory tracking capabilities to optimize stock levels.
4. Build a Financial Management Dashboard:
Develop a dashboard for tracking financial transactions and generating reports.
5. Design an Order Management System:
Streamline order processing by creating a system that tracks orders from creation to fulfillment.
6. Establish Delivery Management Features:
Integrate delivery management skills, including assigning drivers.
7. Set Up Maintenance Tracking:
Create a module for scheduling and assigning technicians.
8. Implement Supplier Management Tools:
Develop a supplier management system to track supplier information and purchase

The structure of the report

SECTION 1:

The first section of the report describes the difficulties of the manual system and as a solution how the system should support, and the deliverables expected by the users of the system.

SECTION 2:

Section two of the report includes Requirement Analysis, Design, Implementation and Testing. Use case diagrams and Activity diagrams to depict the Requirements Analysis. ER diagram, Class diagram, and Interfaces depict the overall design of the system. The implementation describes module structures and test cases used in the system.

SECTION 3:

Section three includes references used as support to complete the project report successfully.

CHAPTER 2 - REQUIREMENTS

Stakeholder Analysis for Lanka Glass Store Management System

In developing the Lanka Glass Store Management System, it's essential to identify and understand the various stakeholders involved. These individuals or groups have different interests and levels of influence over the project, and meeting their expectations is key to its success.

1. Internal Stakeholders

Business Owners/Store Managers:

Business owners and managers are focused on enhancing operational efficiency and maximizing profits. They have significant influence over the project since they define key business requirements and make critical decisions. They expect the system to streamline processes like order management, inventory tracking, and financial reporting, aiming for better overall business performance.

Employees/Store Staff:

Employees are interested in how the system can simplify their daily tasks, such as handling customer orders and managing stock. While their influence is moderate, their feedback on the system's usability is vital post-launch. They expect an easy-to-use interface that helps them work more efficiently.

IT Team (Developers and Support):

The IT team is responsible for the technical development and ongoing support of the system. They have high influence as they ensure the system is built to meet both functional and non-functional requirements. They expect clear requirements and timely feedback to deliver a reliable and secure system.

2. External Stakeholders

Customers:

Customers are primarily concerned with having a seamless and easy experience when interacting with the store online. Their influence is high, as their satisfaction will determine the success of the system. They expect a fast, user-friendly platform for placing orders and tracking deliveries.

Suppliers:

Suppliers are interested in how the system handles orders and payments. Their influence is moderate, since their efficiency affects the store's operations. They expect transparent processes and an easy way to manage orders and payments.

Technicians/Maintenance Workers:

Technicians need clear communication about maintenance tasks. While their influence is low, they play a critical role in maintaining product quality. They expect the system to efficiently manage and assign tasks to ensure smooth operations.

Regulatory Authorities:

Regulatory authorities are focused on ensuring compliance with industry standards and legal requirements, especially regarding data security and financial reporting. Their influence is moderate, as failure to comply can have serious consequences. They expect the system to meet all necessary legal requirements.

Requirements analysis

Requirements analysis for Lanka glass house.

Customer Management:

- Track and manage customer information and interactions.
- Provide personalized service and engagement features for customers.

HR Management:

- Manage employee details, salary, and evaluations.
- Provide role-based access control to different parts of the system.

Inventory Management System:

- Real-time tracking of stock levels for glass products and supplies.
- Automate reordering to avoid stockouts or overstock situations.

Order Management System:

- Handle the full lifecycle of an order, from creation to delivery.
- Provide real-time updates for order tracking.

Financial Management Dashboard:

- Manage and monitor financial transactions.
- Generate reports and monitor budgets.

Delivery Management System:

- Assign delivery tasks and track the status in real-time.
- Integrate customer notifications for order status and delivery timelines.

Maintenance Tracking:

- Track and manage maintenance and repair tasks for equipment and glass products.
- Assign technicians

Supplier Management:

- Manage supplier details, purchase orders, and performance tracking.
- Handle supplier communications.

Requirements Modeling

1. Sales and Financial Management

- **Functional Requirements:**
 - Track sales transactions with details like product, quantity, price, and total amount.
 - Generate and manage invoices, ensuring they are stored and retrievable.
 - Monitor revenue, including tracking daily, monthly, and annual sales.
 - Process payments, with the ability to record and update payment statuses.
 - Generate financial reports, including profit and loss statements, sales summaries, and other financial metrics.
 - Analyze sales performance using graphical representations (e.g., charts, trends).
- **User Roles:**
 - Admin: Full access to manage transactions, generate reports, and update records.
 - Sales Staff: Access to record sales, view customer orders, and process payments.
- **Features:**
 - Sales dashboard with summaries and recent transactions.
 - Invoice management system with status updates.
 - Payment tracking linked with sales records.
 - Reporting tools with filters for custom date ranges.
 - Analytics for trends and performance insights.

2. Product and Stock Management

- **Functional Requirements:**

- Add, update, and delete product listings, including product descriptions, prices, and images.
 - Track stock levels, with real-time updates and alerts for low stock.
 - Process restocking orders and request inventory updates.
 - Generate inventory reports and perform stock audits.
- **User Roles:**
 - Admin: Full access to manage product listings, update stock, and generate reports.
 - Inventory Manager: Access to update stock levels, handle restocking, and generate inventory reports.
 - **Features:**
 - Product catalog with searchable product listings.
 - Stock management dashboard with inventory levels.
 - Low-stock alerts and restock request forms.
 - Inventory reporting with export options for data.

3. Customer Management

- **Functional Requirements:**
 - Allow customers to register, edit, and delete their profiles.
 - Maintain a customer database with contact information and order history.
 - Handle customer support interactions, including FAQs and contact forms.
- **User Roles:**
 - Admin: Manage customer records, view/edit profiles, and handle inquiries.
 - Customer Support: Access to assist with customer inquiries and profile updates.
- **Features:**
 - Customer registration and profile management forms.
 - Order history and tracking for customers.
 - Support and feedback forms for customer interactions.

4. Maintenance and Repair

- **Functional Requirements:**
 - Schedule and manage maintenance tasks, including routine checkups and repairs.

- Track repair requests with statuses and assigned technicians.
- Assign tasks to technicians and update repair statuses.
- Generate maintenance and repair reports, including completed and pending tasks.
- **User Roles:**
 - Admin: Full access to manage tasks, assign technicians, and generate reports.
 - Technician: Access to view assigned tasks, update statuses, and report task completion.
- **Features:**
 - Maintenance scheduling calendar with task assignment.
 - Repair request tracking with status updates.
 - Technician dashboard for task management.
 - Reporting and status updates for maintenance history.

5. Delivery Management

- **Functional Requirements:**
 - Manage online delivery orders with real-time status tracking.
 - Assign orders to drivers and notify customers about delivery details.
 - Update delivery status from order placement to delivery completion.
 - Generate delivery reports with summaries of order statuses.
- **User Roles:**
 - Admin: Manage all delivery orders, assign drivers, and generate reports.
 - Driver: Access to view assigned deliveries and update status on the go.
- **Features:**
 - Delivery order management system with assignment tracking.
 - Driver dashboard with delivery details.
 - Notification system for customer updates.
 - Delivery reporting with export capabilities.

6. Order Management

- **Functional Requirements:**
 - Process and track customer orders, including order status and history.

- Manage order statuses from placement through fulfillment.
- Handle cancellations, returns, and refunds.
- Generate order reports with customer order details and statuses.
- **User Roles:**
 - Admin: Full access to manage orders, process returns and generate reports.
 - Sales Staff: Access to process and update order statuses, handle returns.
- **Features:**
 - Order tracking system with real-time status updates.
 - Cancellations and return management tools.
 - Customer order tracking and history views.
 - Reporting tools for order summaries.

7. Employee Management

- **Functional Requirements:**
 - Maintain employee records with personal, job, and payroll details.
 - Manage payroll, including salary, attendance, and payment processing.
 - Assign tasks to employees and monitor their completion.
 - Track employee performance and handle inquiries.
- **User Roles:**
 - Admin: Full access to manage employee records, tasks, and payroll.
 - HR Staff: Access to update employee details, manage payroll, and track attendance.
- **Features:**
 - Employee database with role-based access.
 - Task assignment and tracking system.
 - Payroll management tools with attendance tracking.
 - Performance monitoring dashboard.

8. Supplier Management

- **Functional Requirements:**
 - Maintain supplier information, including contacts, contracts, and product catalogs.
 - Track orders and deliveries from suppliers.

- Handle communications with suppliers, including order requests and updates.
- Update contracts and monitor supplier performance.
- **User Roles:**
 - Admin: Manage supplier records, track orders, and handle contracts.
 - Procurement Staff: Access to track orders, update contracts, and communicate with suppliers.
- **Features:**
 - Supplier management database with contact and order tracking.
 - Order request and tracking tools.
 - Supplier communication system for updates.
 - Performance monitoring with contract management features.

CHAPTER 3 - DESIGNING AND DEVELOPMENT

Union Diagram of Actors

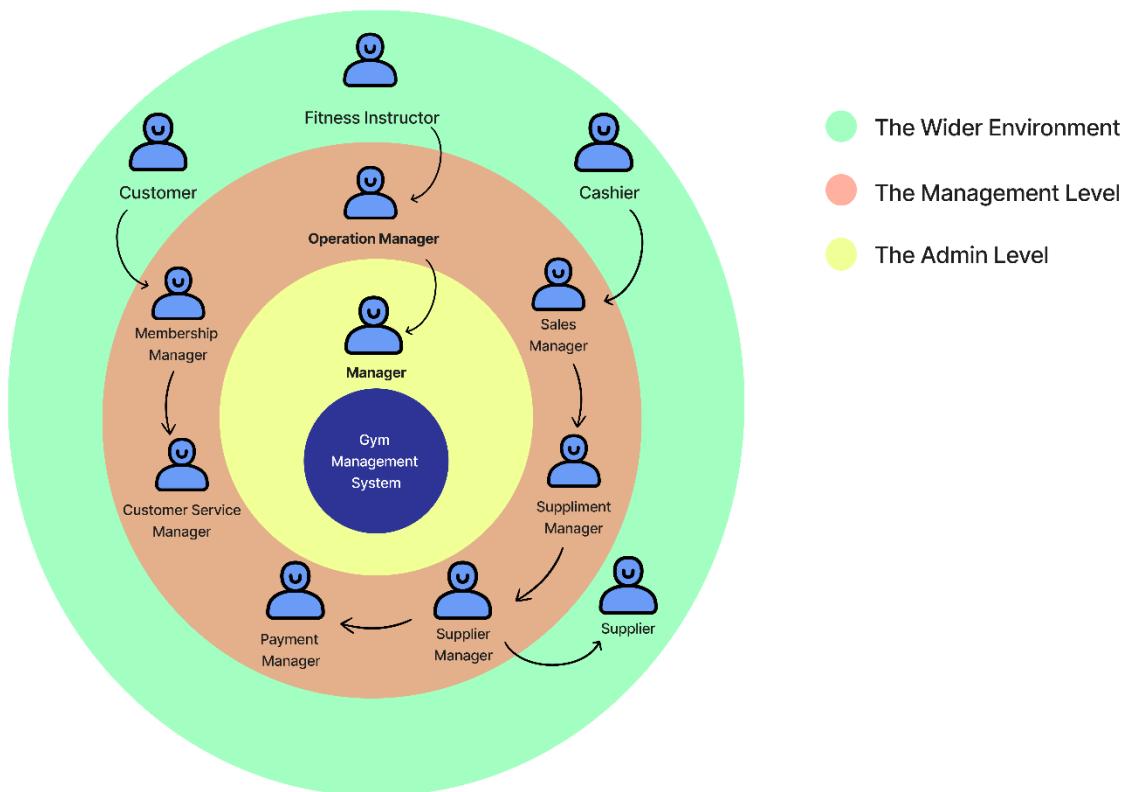


Figure 2.1 - Union Diagram

DIAGRAMS OF COMPONENTS

Financial Management – IT21377280

Use Case Scenario of Training Schedule Management

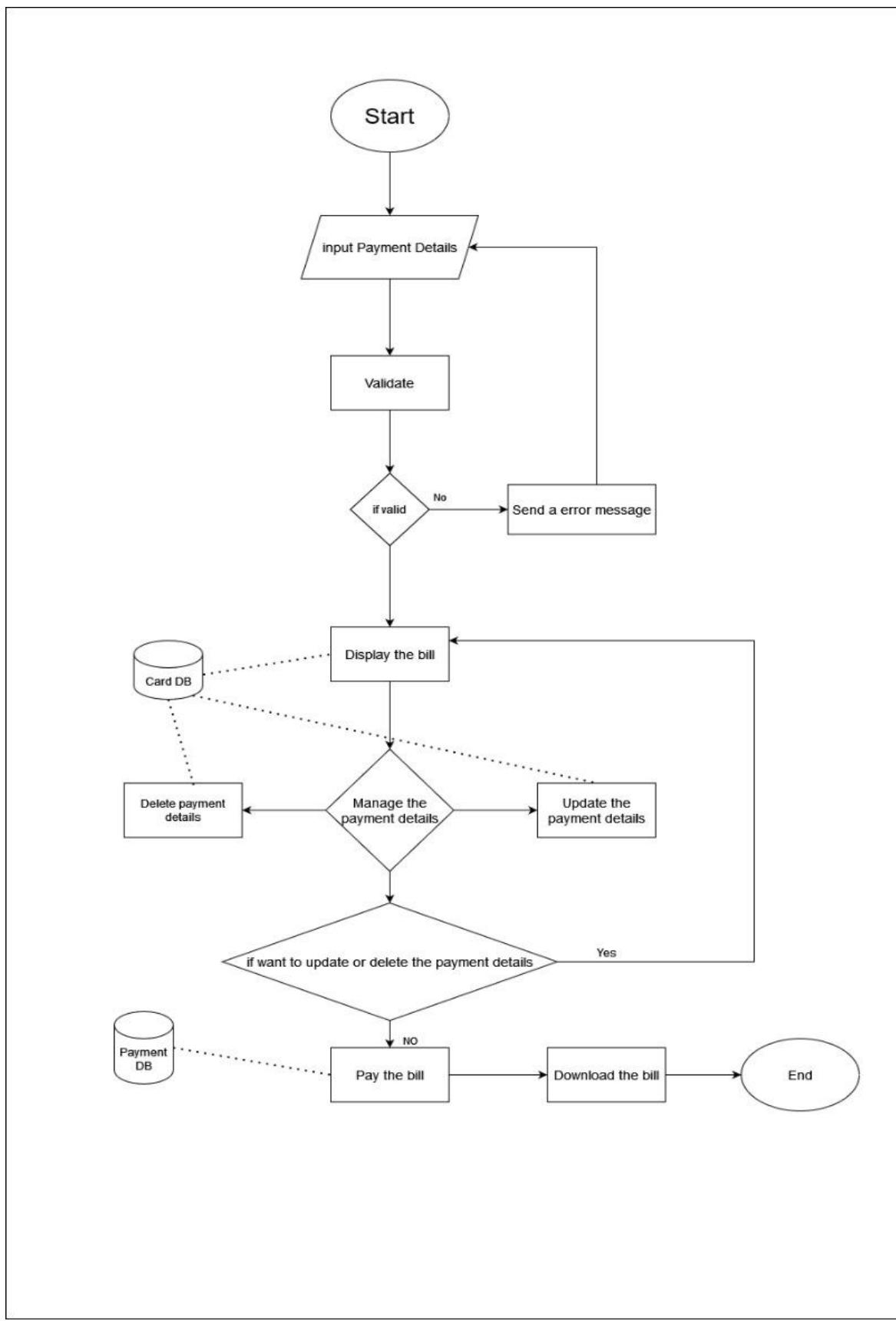
Name	Manage Payment with Bill Downloading, Editing, and Deletion	
Summary	The payment function allows customers to input payment details, download bills after completing the payment, and edit or delete payment information. Admins can view payment transactions and download transaction reports.	
Priority	01	
Pre-conditions	<ol style="list-style-type: none">1. The customer must have items in the cart ready for checkout.2. The customer must provide valid payment details (e.g., card information, billing address).3. The admin must have access to the payment management panel	
Post-conditions	<ol style="list-style-type: none">1. The system processes the payment and generates a bill for the customer to download.2. The customer can modify or delete their payment details.3. The admin can view all payment transactions and download reports	
Primary Actors(s)	Customer, Admin	
Trigger	The customer initiates the payment process after confirming the items in the cart or the admin views transactions and generates a report.	
Main Scenario	Step	Action
	1	The customer proceeds to the payment page after reviewing their cart.
	2	The system displays available payment options and prompts the customer to enter their payment details (e.g., card number, billing address).
	3	The customer inputs valid payment details and clicks "Submit".
	4	The system processes the payment and generates a bill. The customer can download the bill in PDF format.
	5	The customer is given the option to edit or delete payment details if needed.

	6	The customer selects to edit the payment details, modifies them, and resubmits. The system validates the new details and updates the payment record.
	7	The customer selects to delete payment details, and the system confirms the deletion.
	8	The admin logs into the system and accesses the payment transactions panel.
	9	The admin views a list of all transactions and can download reports in CSV or PDF format for further analysis.
Extensions	Step	Action
	3a	If the payment details are invalid (e.g., expired card), the system notifies the customer and prompts them to re-enter valid information.
	6a	If the customer attempts to delete payment details while the transaction is processing, the system notifies the customer that the details cannot be deleted until the transaction is complete.
	9a	If the admin attempts to download a report for a specific date range with no transactions, the system displays a message indicating that no data is available.

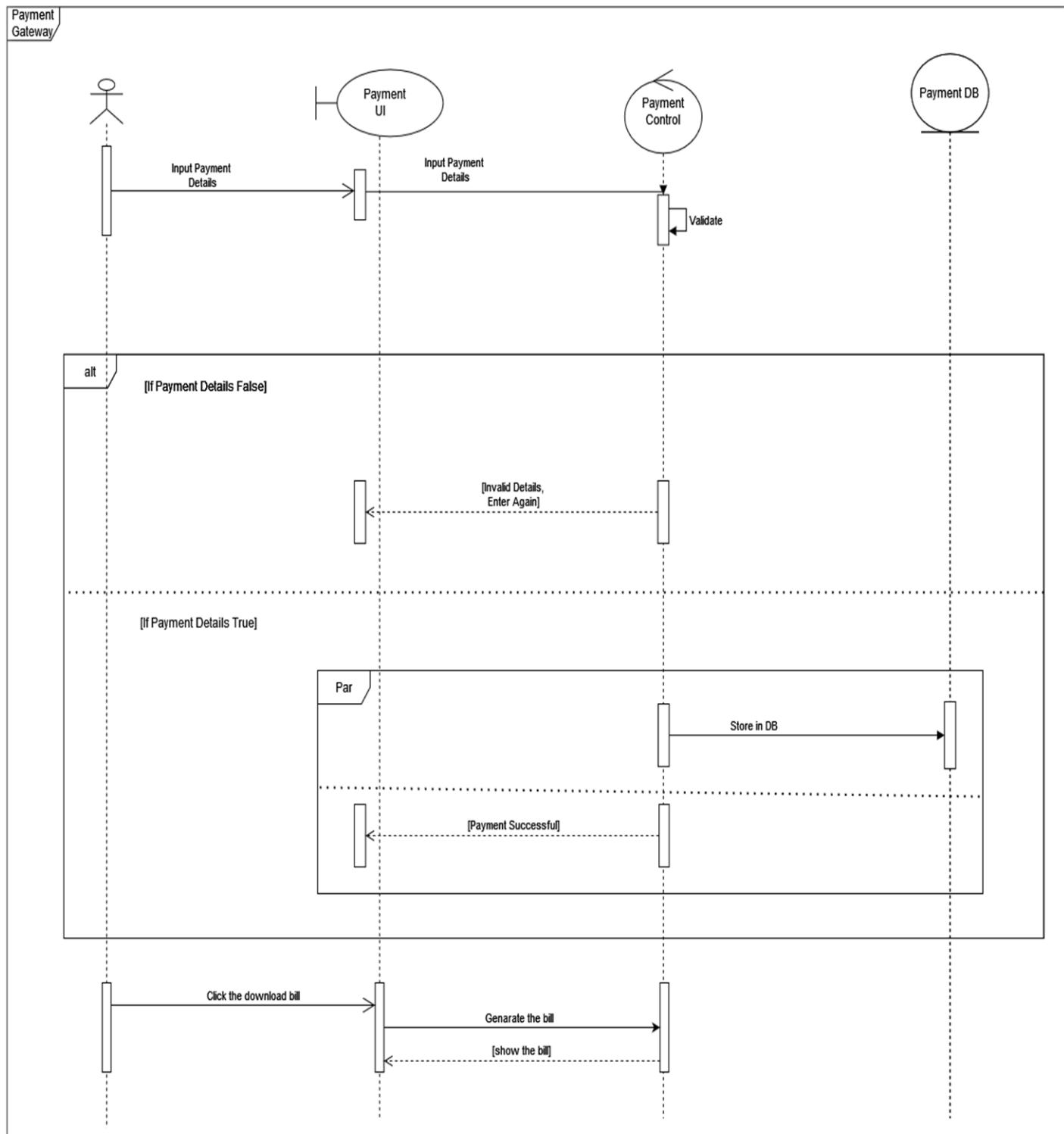
Use case diagram of Financial Management



Flow Chart of Financial Management



Sequence diagram of Financial Management.



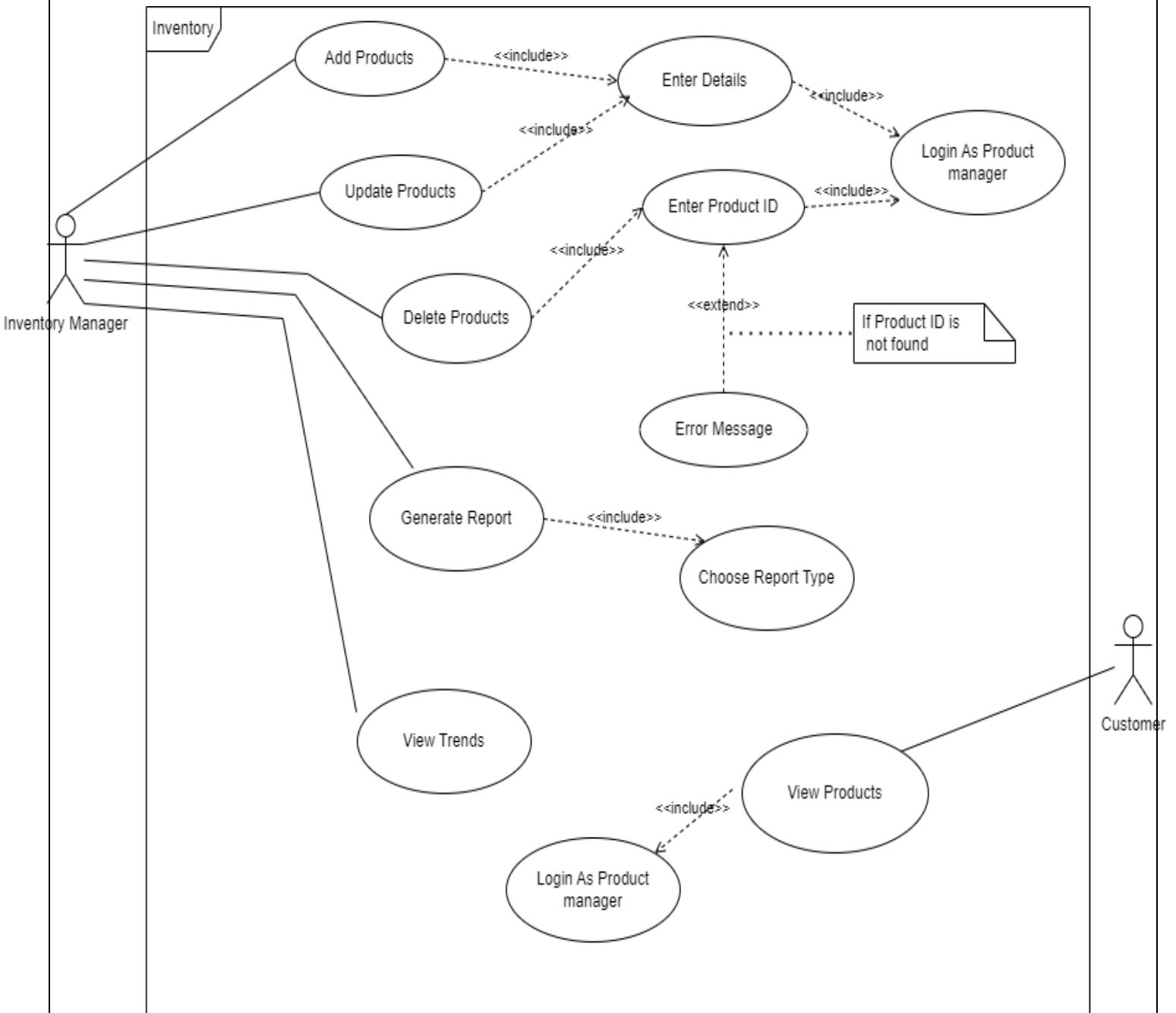
Inventory Management – IT22239198

Use Case Scenario of Inventory Management

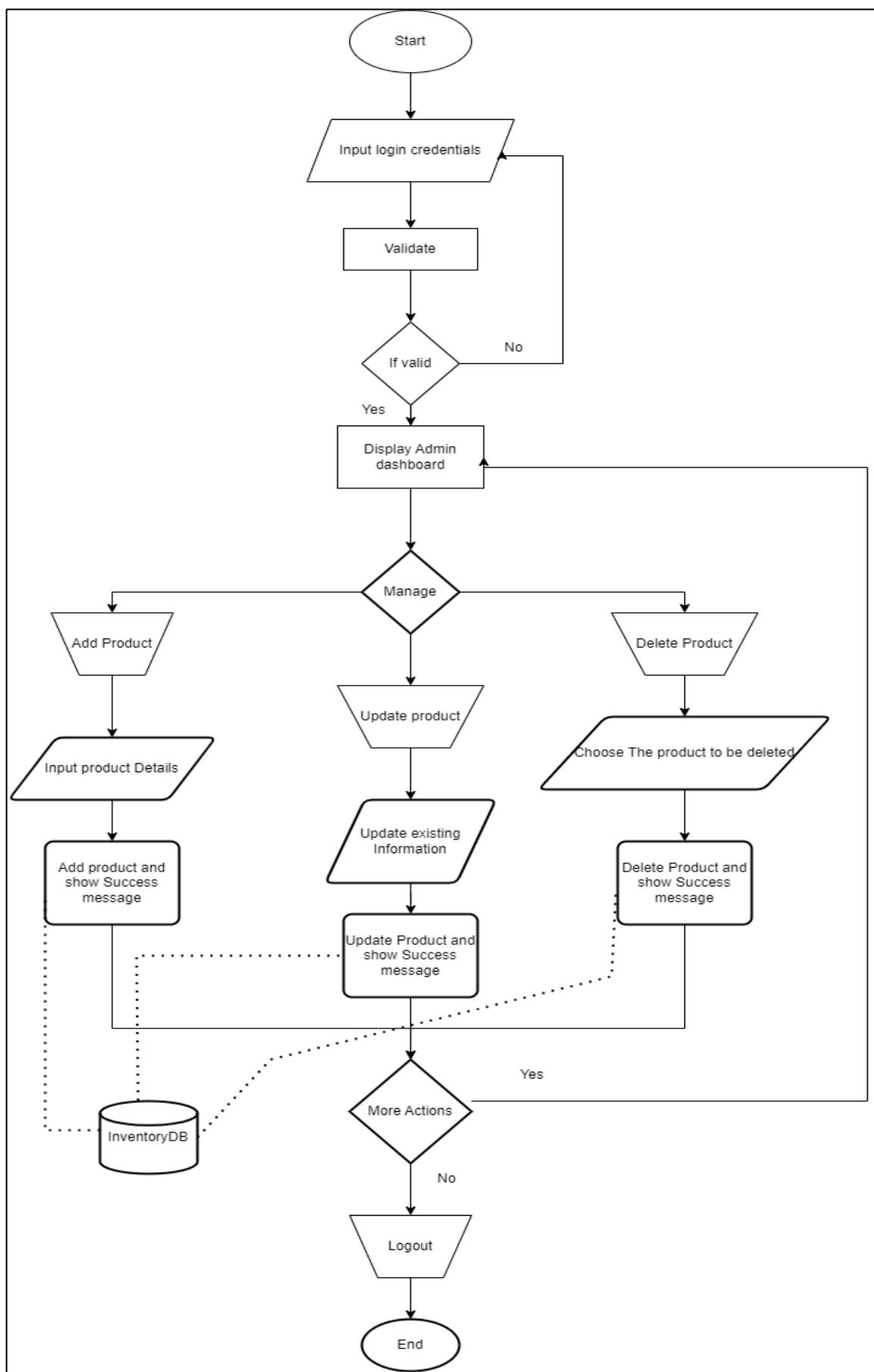
Name	Manage Inventory	
Summary	Ability to manage products, track stock levels and update the inventory in real time.	
Priority	01	
Pre-conditions	4. The Inventory Manager must be logged into the system. 5. Forms are available to add products 6. Update, Delete functions are available	
Post-conditions	4. Products are Added successfully 5. Products are Updated or Deleted	
Primary Actors(s)	Inventory Manger, Customer	
Trigger	To manage product inventory	
Main Scenario	Step	Action
	1	The Inventory Manager logs in to the system to manage the inventory
	2	To add products navigate to Add product section
	3	Enter Products details such as name, price, description and quantity
	4	Submit the form to add the product to the system
	5	The customer can view the new products in the dashboard
	6	To edit products Inventory manager will navigate to inventory section and choose the product to be updated by clicking the update button
	7	Change the necessary details in the update form
	8	Submit the update form to save the changes
	9	To Delete products, Inventory manager will navigate to inventory section and choose the product to be deleted by clicking the delete button
	10	Then confirm when the confirm dialog box appears

	14	Inventory manager can request for reports by clicking Generate Report Button
	15	Inventory manager can request for Inventory Trends by clicking View trends Button
Extensions	Step	Action
	4a	If there are any errors due to validations display the error message
8a		If there are any errors due to validations display the error message

Use case diagram of Inventory Management.



Flow Chart of User Management.



Sequence diagram of Inventory Management.

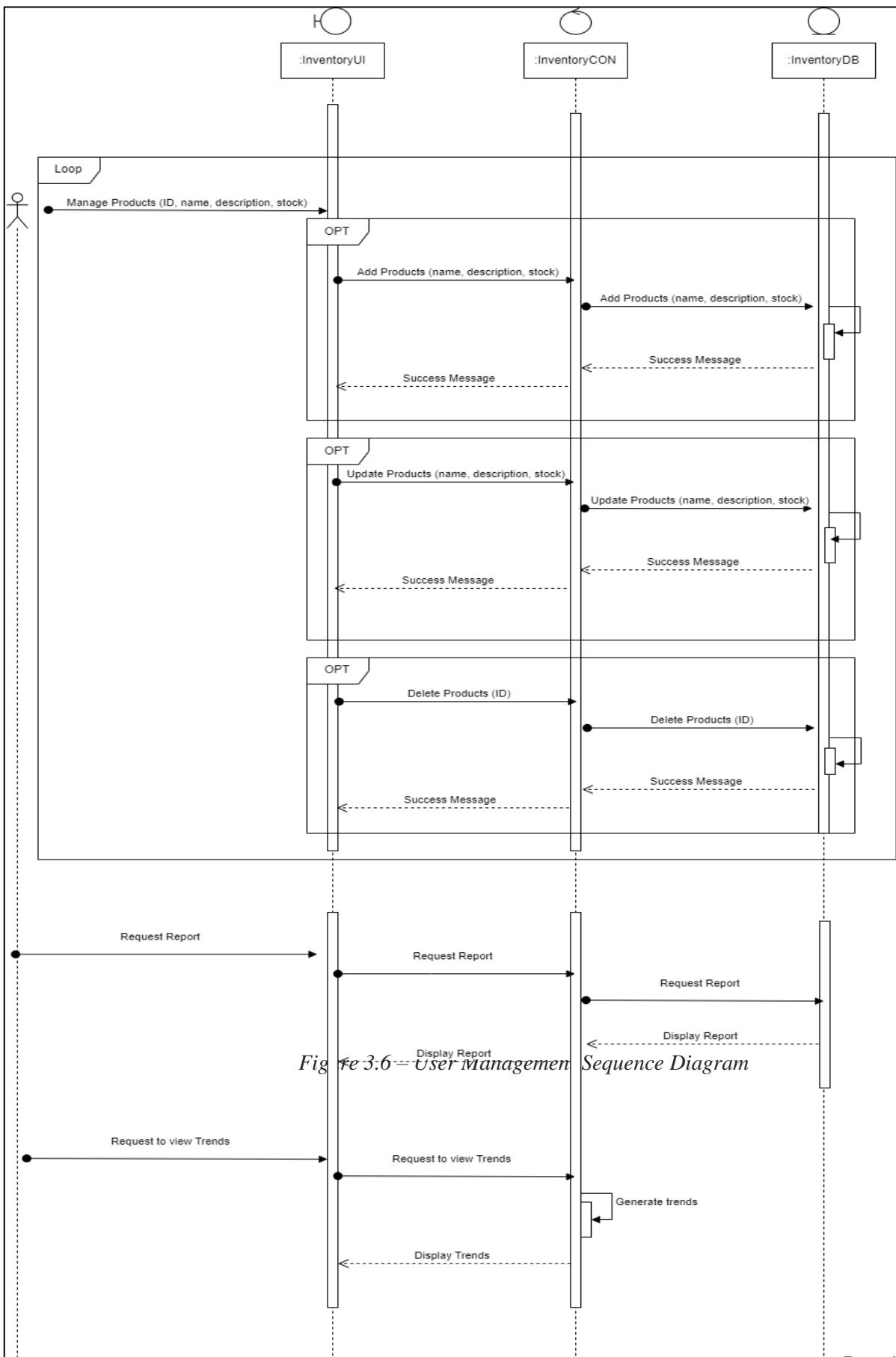


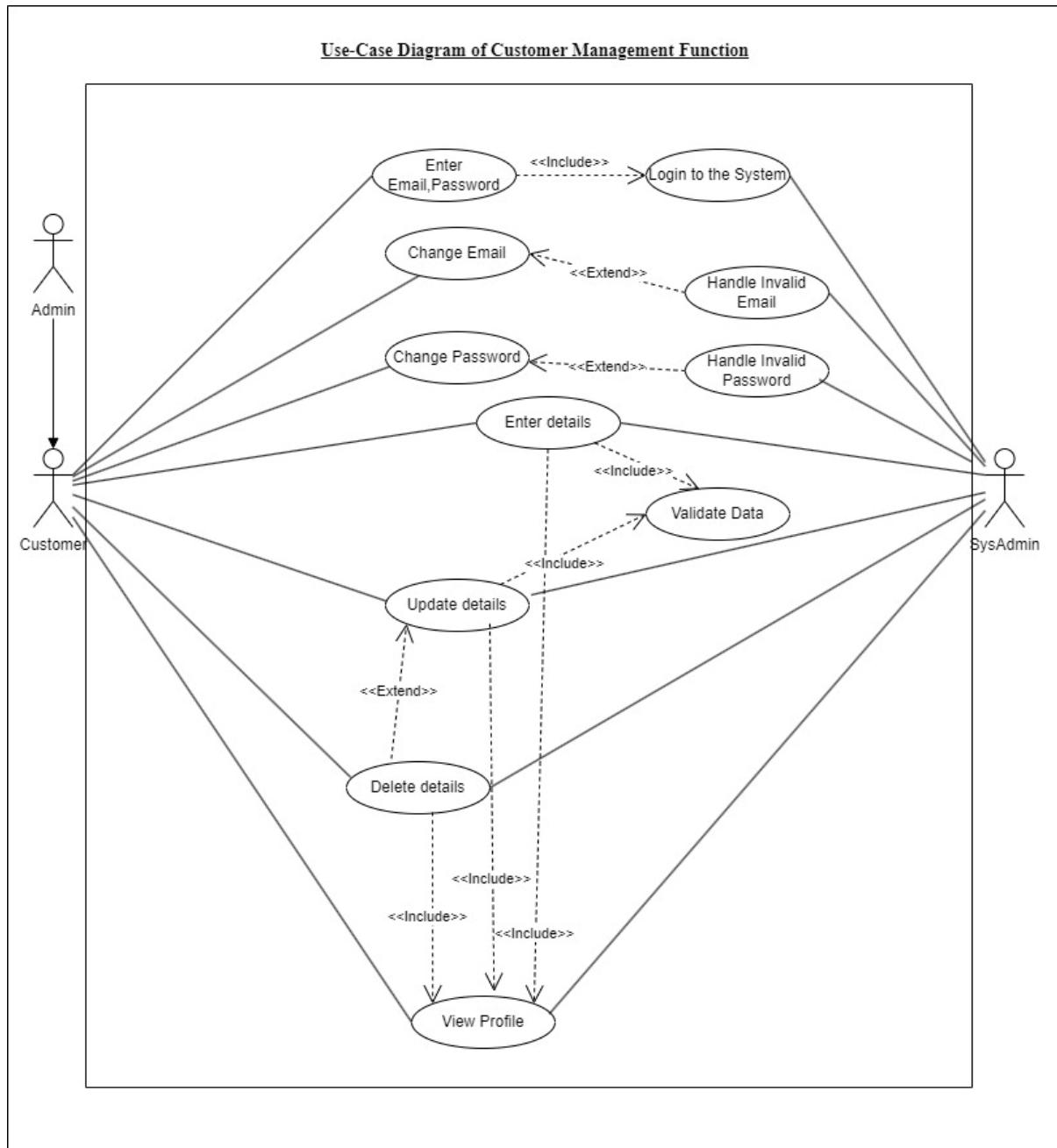
Figure 3.6 - Sequence Diagram of Inventory Management

Customer Profile Management – IT22201614

Use Case Scenario of Customer Profile Management

Name	Manage Customer Profiles	
Summary	The customer management function allows customers to create, update, view, and delete their profiles. Admins can access and manage customer data for support and updates.	
Priority	01	
Pre-conditions	<ul style="list-style-type: none">The customer must be registered with the systemThe customer must be logged into update or delete into their profile	
Post-conditions	<ul style="list-style-type: none">Customer update or delete as per action	
Primary Actors(s)	Customer	
Trigger	The customer initiates the process by viewing or updating their profile. The admin initiates the process by managing customer profiles for support or updates.	
Main Scenario	Step	Action
	1	The customer logs into the system.
	2	The customer navigates to the profile section.
	3	The system displays the customer's current profile details.
	4	The customer edits their profile details (e.g., name, contact information).
	5	The system validates the information entered and saves the changes.
	6	The customer can delete their profile if desired.
	7	The system updates the profile and saves the changes.
Extensions	Step	Action
	5a	If the customer enters invalid data (e.g., incorrect email format), the system prompts correction before saving.
	6a	If the customer cancels profile deletion, the system retains the profile details without any changes.

Use case diagram of Customer Affairs Management.



Flow Chart of Customer Profile Management.

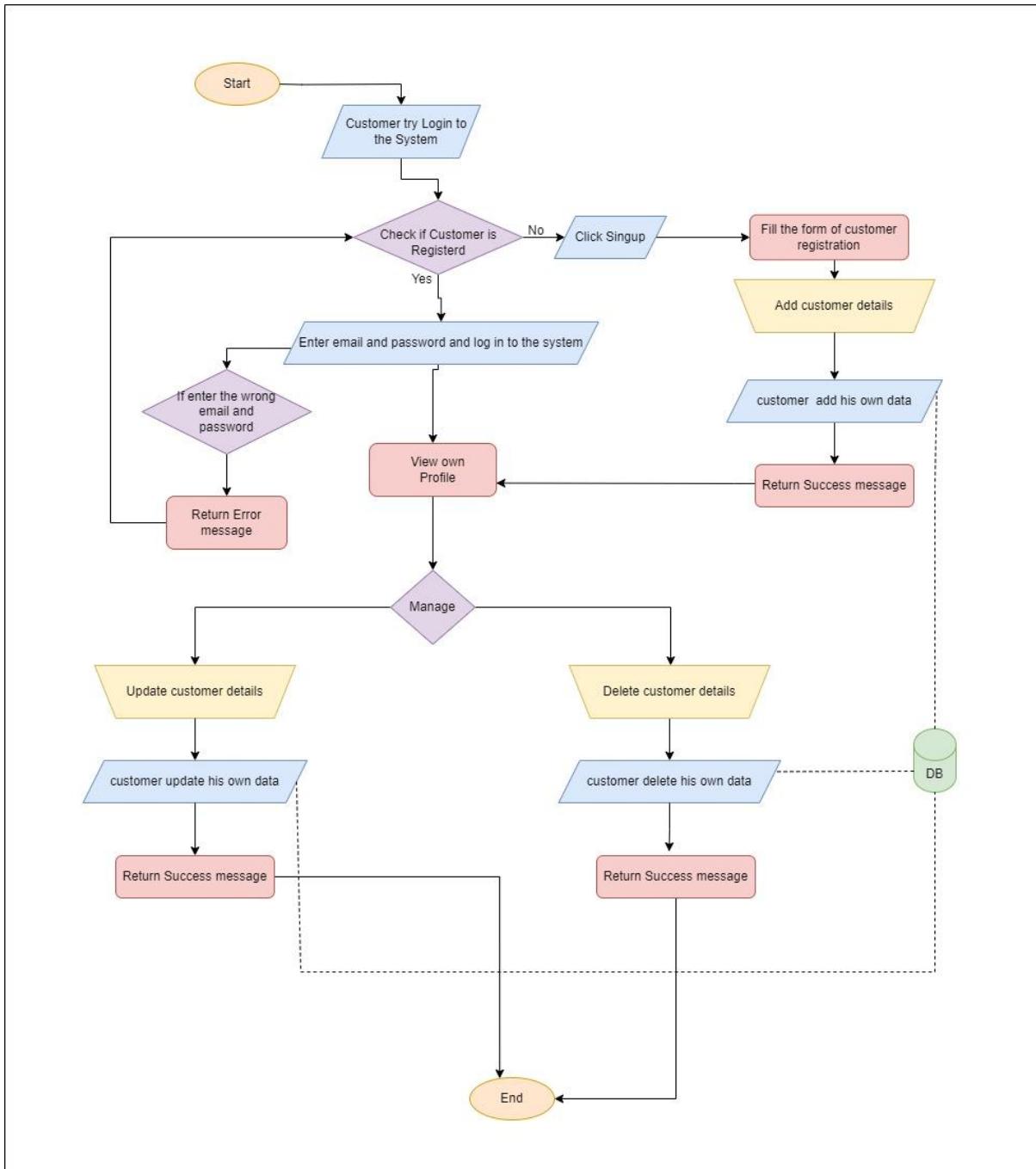
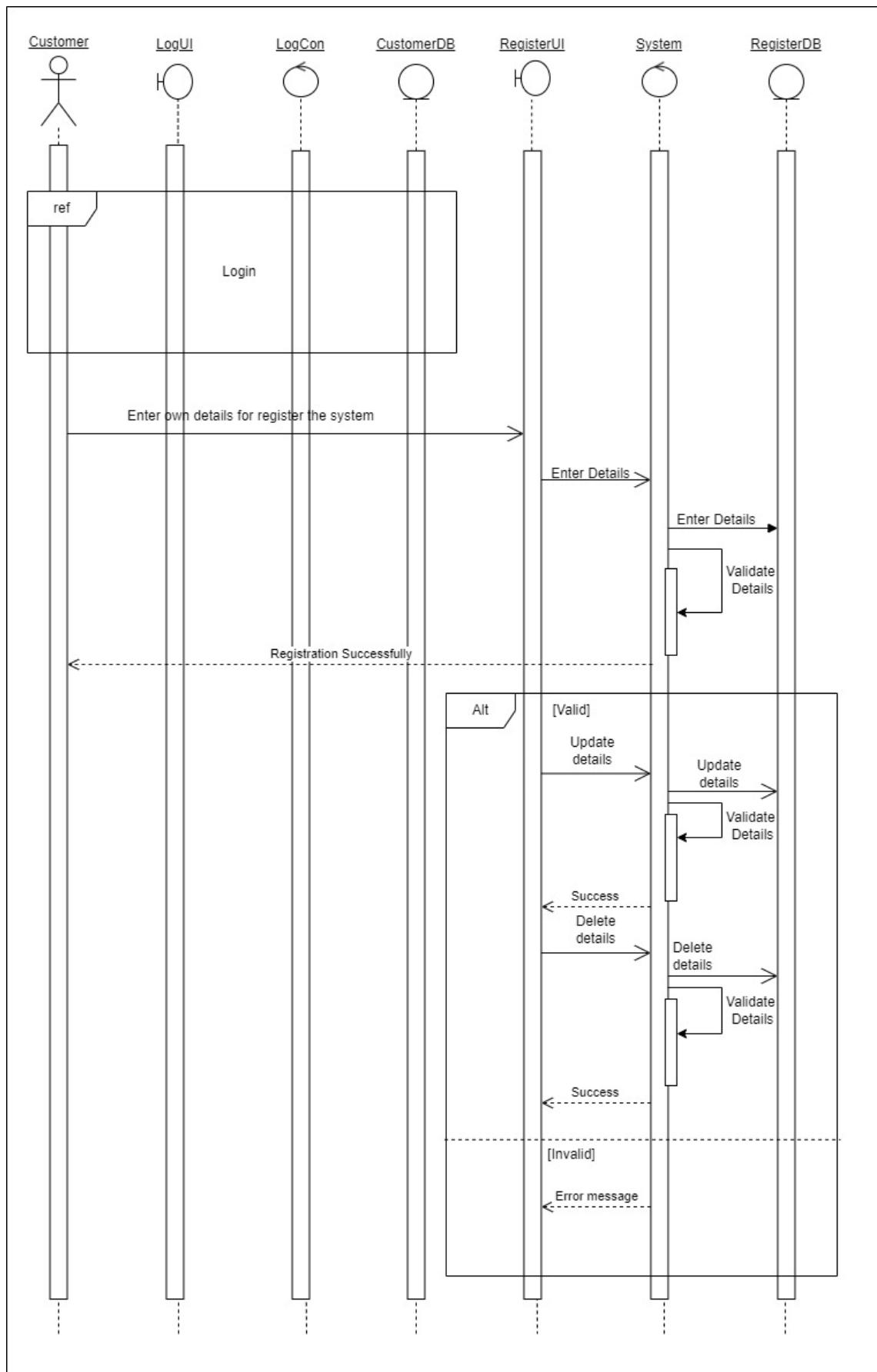


Figure 3.8 – Customer Affairs Management Activity Diagram

Sequence diagram of Customer Profile Management.



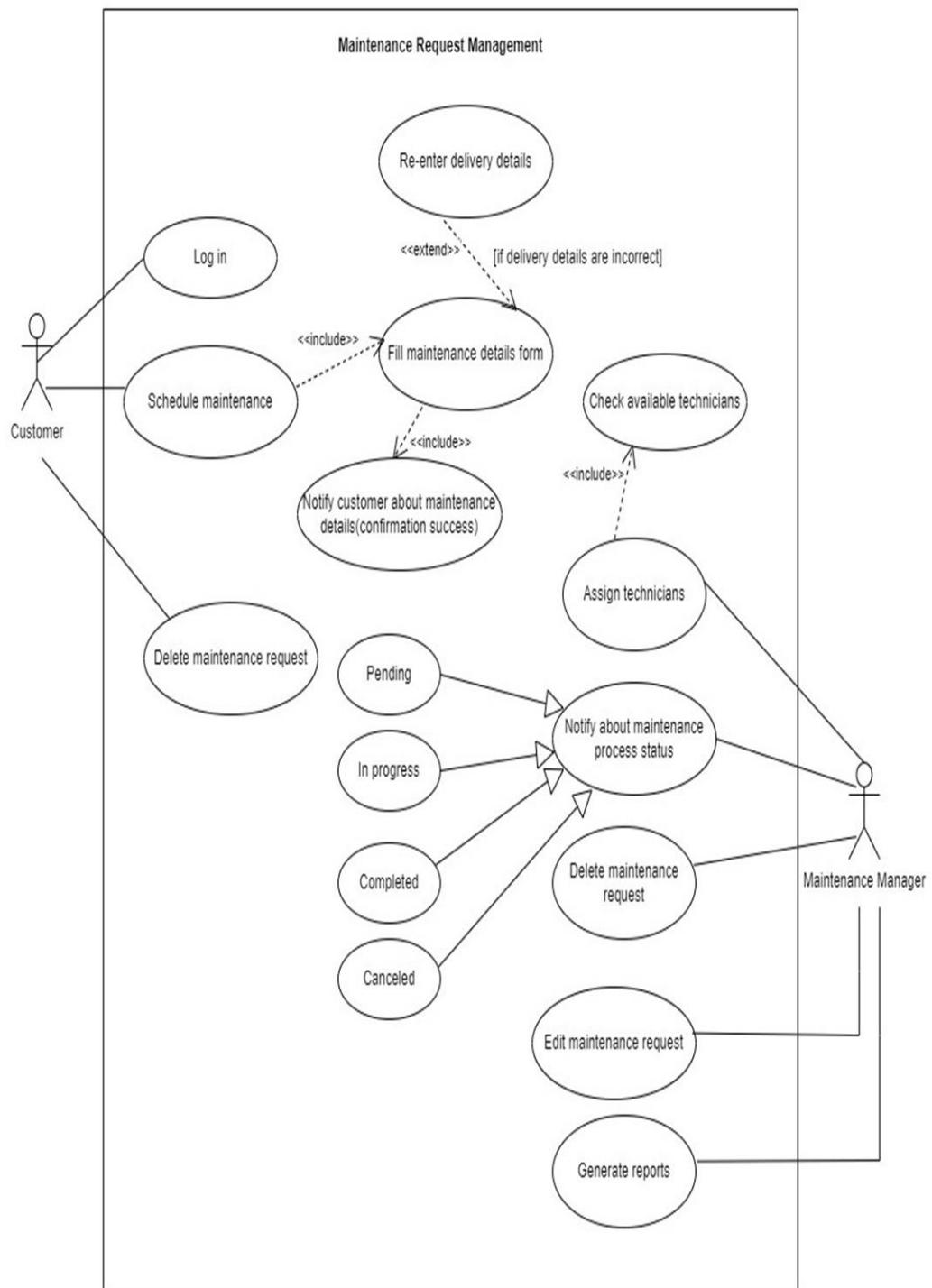
Maintenance Request Management – IT22198136

Use Case Scenario of Maintenance Request Management

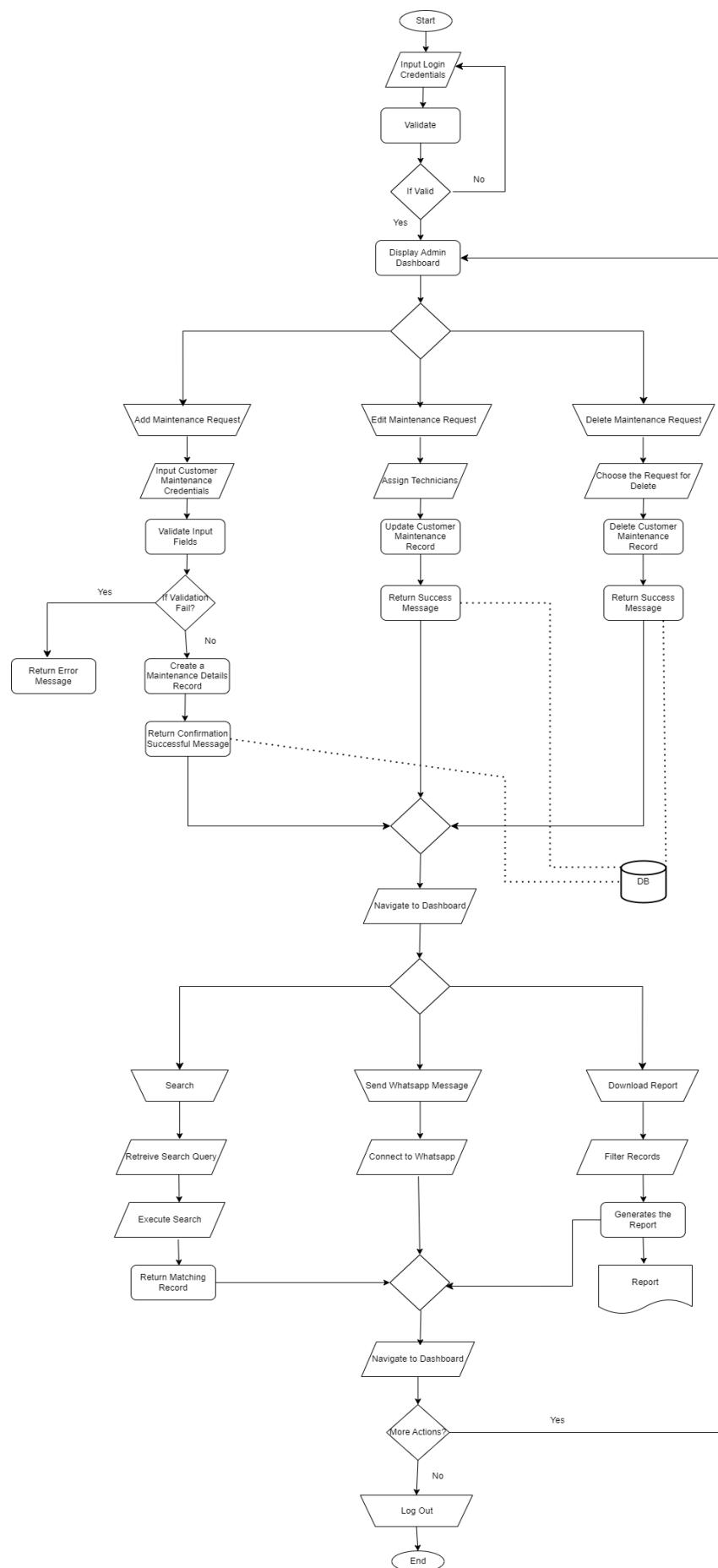
Name	Maintenance Request Management	
Summary	Unregistered users register and log in to the system to submit maintenance requests. Registered users can add or delete their requests. Admin logs in to view, edit, delete requests, assign technicians, and communicate updates to the customer. Admin can also generate reports.	
Priority	04	
Pre-conditions	7. Customer and admin roles are set up within the system. 8. The system allows maintenance requests to be tracked, assigned, and updated.	
Post-conditions	6. Customer sees a confirmation message when requests are successful. 7. Admin can assign technicians, notify customers, and generate maintenance reports.	
Primary Actors(s)	Customer, Admin	
Trigger	Customer registers and logs in to make a maintenance request, or the admin logs in to view and manage customer requests.	
Main Scenario	Step	Action
	1	Customer visits the website and navigates to the registration page.
	2	Customer fills out the registration form, submits it, and logs in after receiving confirmation.
	3	Logged-in customer goes to the maintenance request section and adds a new maintenance request.
	4	The system processes the request, displays a success confirmation message, and provides a request ID.
	5	Customer can view their request, and if needed, delete it from their account.
	6	Admin logs in to the system, navigates to the maintenance requests page, and views all customer requests.
	7	Admin selects a request to edit details or to delete the request if necessary.
	8	Admin checks technician availability and assigns an appropriate technician to handle the request.

	9	Admin updates the request status and notifies the customer by sending an email and/or a WhatsApp message with task updates.
	10	Admin generates a report detailing the maintenance request status, assigned technicians, and task completion times for analysis or record-keeping.
Extensions	Step	Branching Action
	1a	If registration fails due to a duplicate email, the system prompts the customer to use a different email address.
	4a	If the request submission fails, the system notifies the customer and prompts them to try again.
	5a	If the customer attempts to delete a request that is already in progress, the system restricts deletion and informs the customer.
	6a	If no customer requests are available, the system notifies the admin and prompts for a refresh or to check back later.
	8a	If no technicians are available, the admin can schedule the request for a future date and notify the customer.
	9a	If the email or WhatsApp message fails to send, the system retries sending the message or logs an error for admin review.
	10a	If report generation fails, the admin retries with updated filters or selects a different date range for the report.

Use case diagram of Maintenance Request Management.

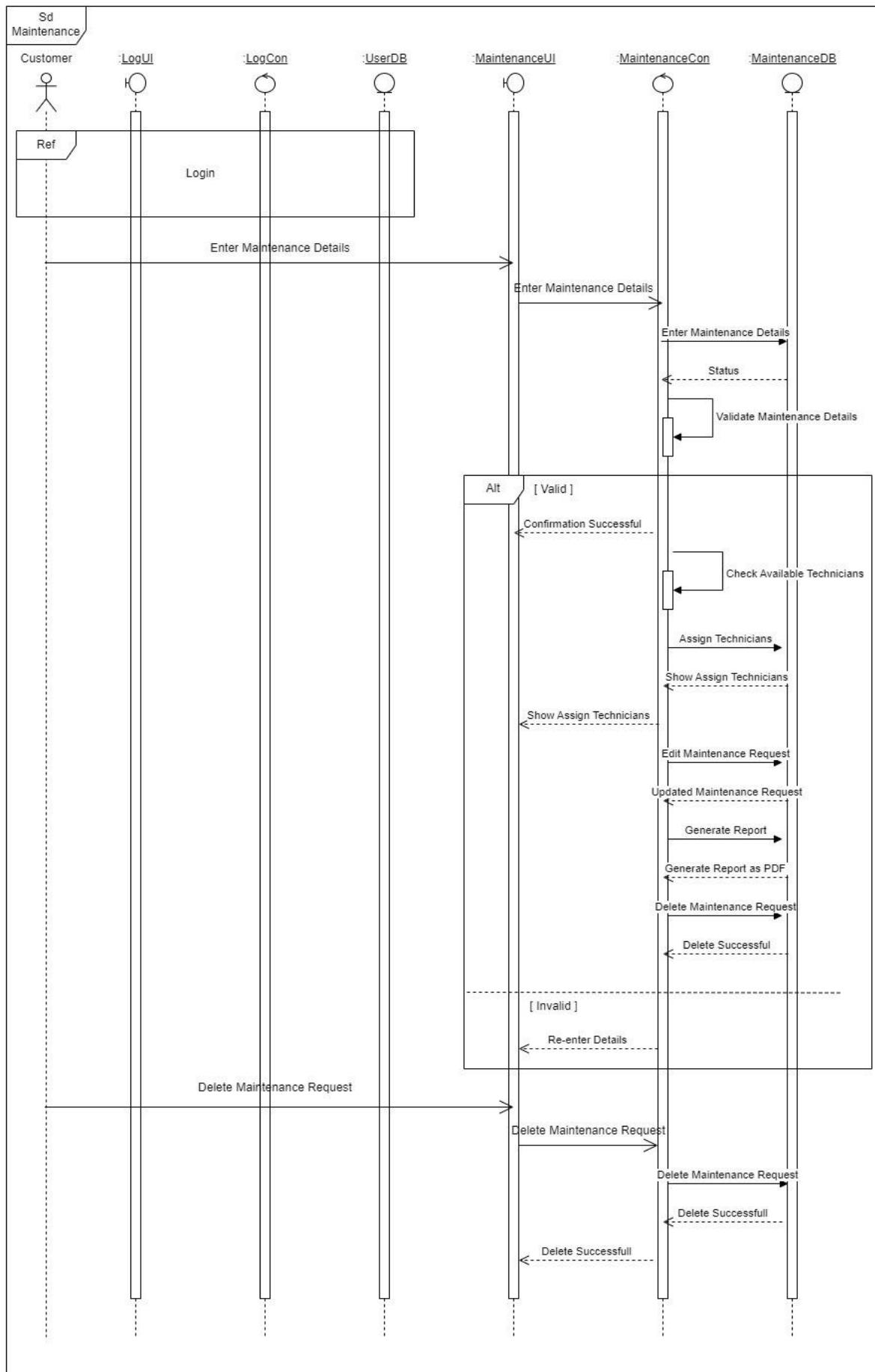


Flow Chart of Maintenance Request Management.



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Sequence diagram of Maintenance Request Management.



Delivery Management - IT22299970

Use Case Scenario of Delivery Management

Name	Delivery Management	
Summary	Unregistered users can register. Registered customers can place orders, fill out delivery details, and receive confirmations or correction prompts. Delivery manager can assign drivers, update delivery status, edit or delete requests, notify customers of status updates, and generate delivery reports.	
Priority	05	
Pre-conditions	1. User must be registered to place orders. 2. Delivery manager must have access to assign drivers and manage delivery requests.	
Post-conditions	1. Registered users can place orders and track delivery status. 2. Delivery manager assigns drivers, manages delivery details, and generates delivery reports.	
Primary Actors(s)	Customer, Admin	
Trigger	Customer places a delivery request, or Delivery Manager manages delivery requests.	
Main Scenario	Step	Action
	1	Unregistered user visits the system and registers by filling out the required details.
	2	Registered customer logs in and navigates to the order placement page.
	3	Customer proceeds to the delivery request page and selects "Add Delivery Request."
	4	Customer fills out the delivery details form and submits it.
	5	System verifies delivery details. If correct, a confirmation success message is shown.
	6	Delivery Manager logs in and navigates to the delivery requests section.
	7	Delivery Manager views new delivery requests and assigns available drivers to each order.
8	Delivery Manager can edit or delete any delivery request as needed.	

	9	Delivery Manager updates the customer on the delivery process status.
	10	Delivery Manager generates delivery reports.
Extensions	Step	Branching Action
	1a	If registration fails due to incomplete details or invalid input, the system prompts the user to provide required details.
	4a	If the delivery details are incorrect, the system notifies the customer to re-enter the details.
	7a	If drivers are not available, the system notifies the manager, who informs the customer about the unavailability.
	8a	If the manager tries to edit or delete a request and the request is locked, the system restricts access and notifies the manager.

Use case diagram of Delivery Management

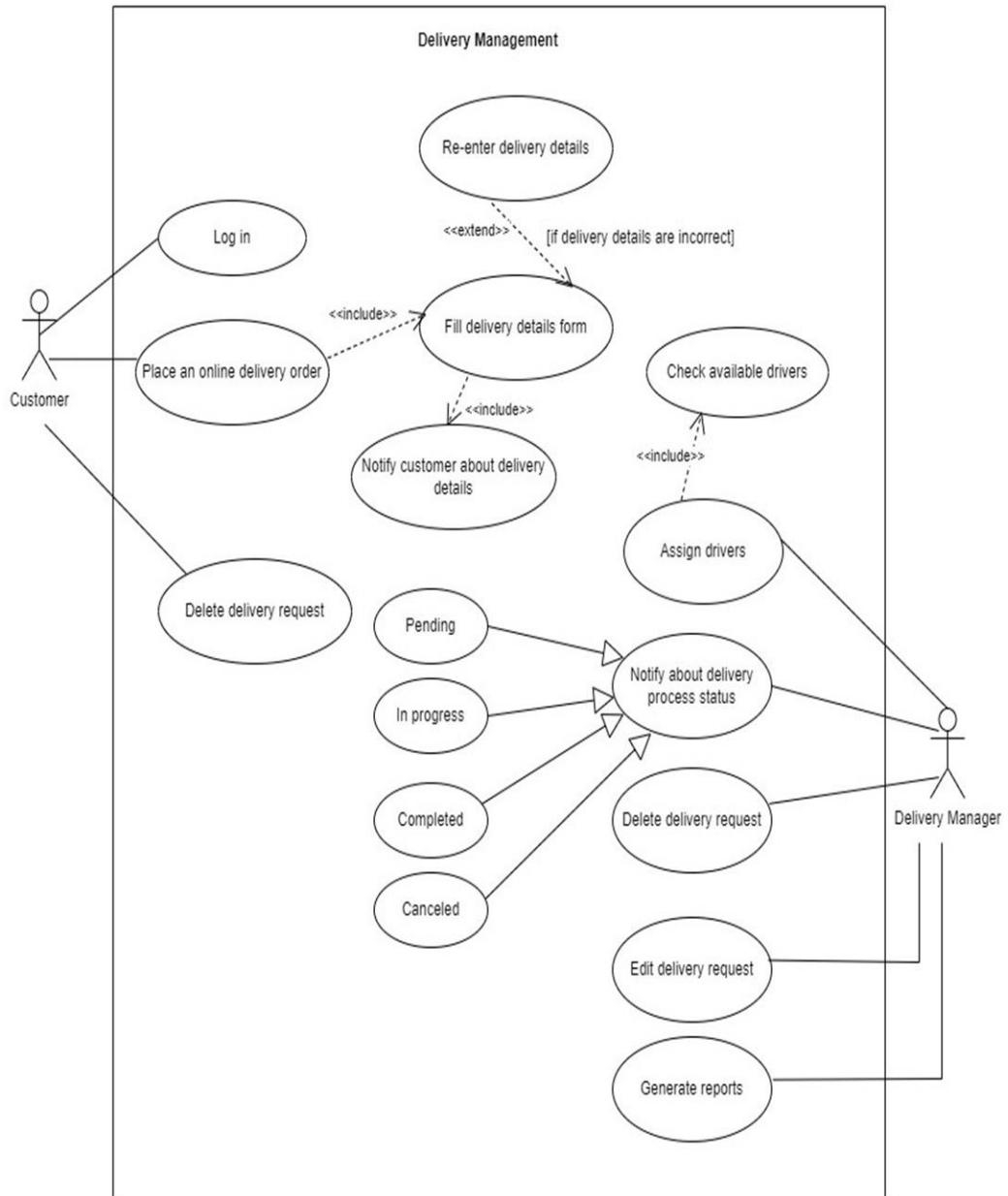
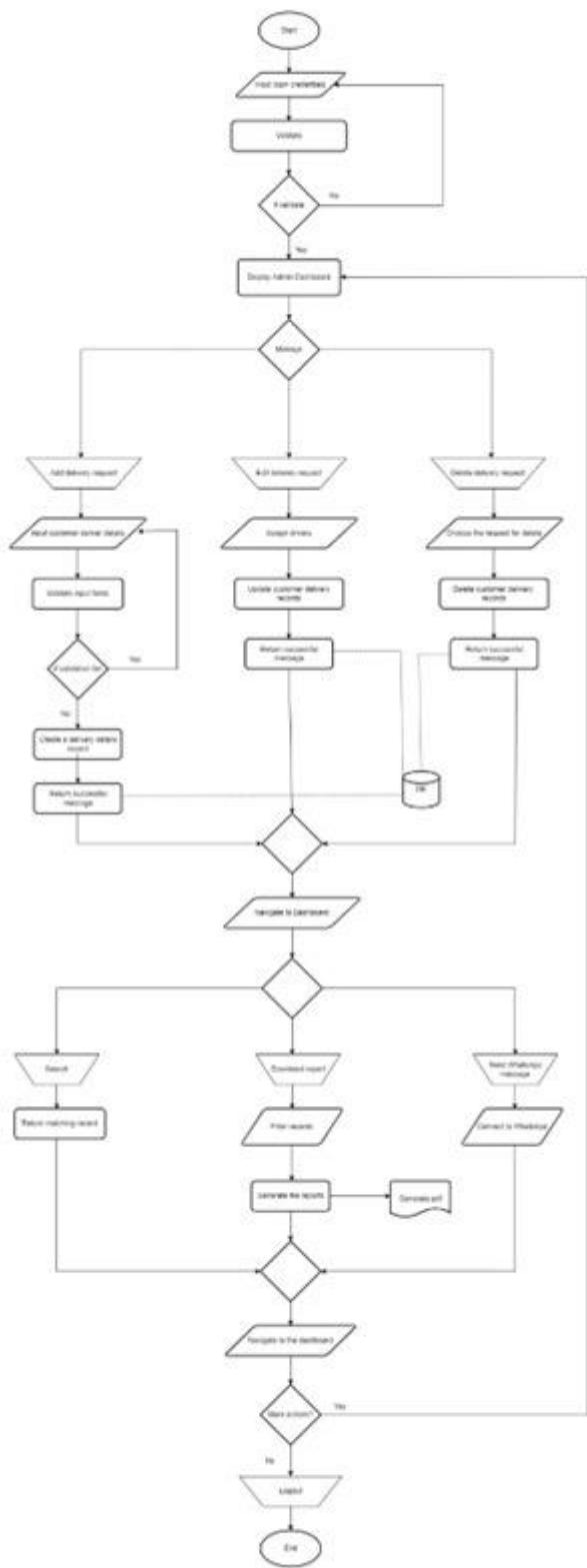
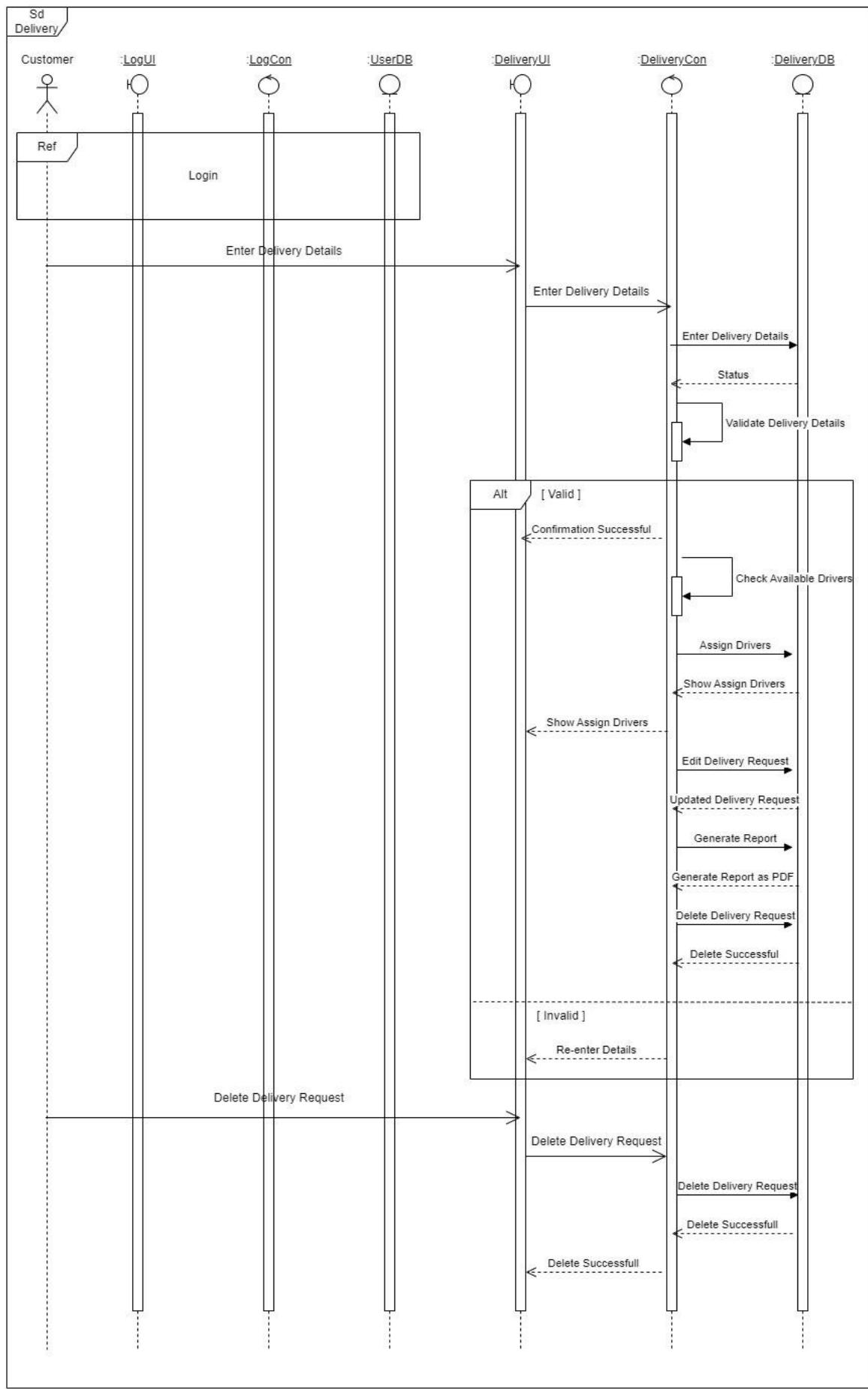


Figure 3.16 – Employee Management Activity Diagram

Flow Chart of Delivery Management



Sequence diagram of Delivery Management



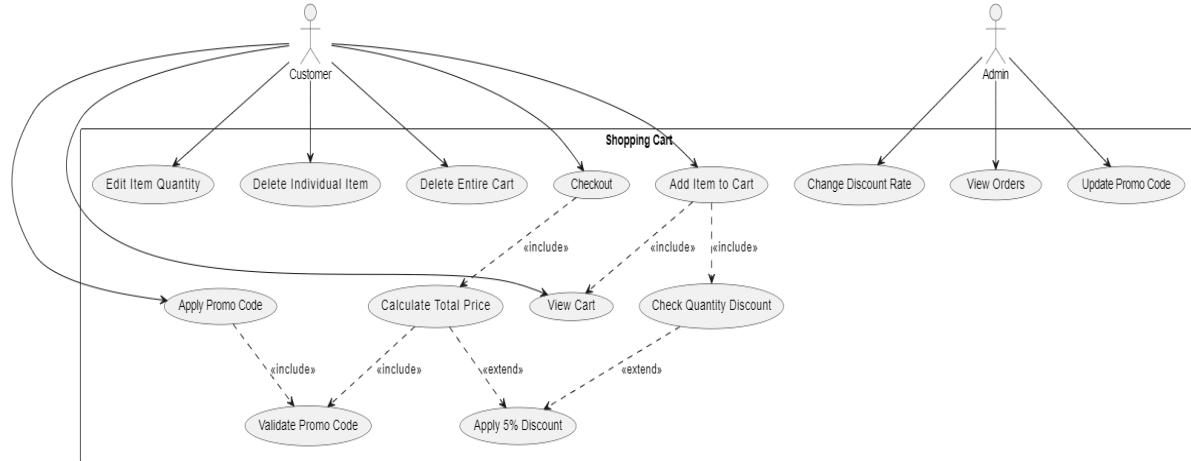
Cart Management – IT22295392

Use Case Scenario of Cart Management.

Name	Manage Shopping Cart with Promo Codes and Discounts	
Summary	The shopping cart lets customers add, edit, delete items, apply promo codes, get a 5% discount for 5+ items, and checkout. Admins can update promo codes and discount rates.	
Priority	02	
Pre-conditions	9. The customer must be logged into the system. 10. Products (glass and mirrors) are available for purchase. 11. Admin must have set valid promo codes and discount rates.	
Post-conditions	8. The cart is updated with the selected items, including any changes (edit, delete, or clear). 9. The system calculates and displays the total price with applicable discounts. 10. The system applies the correct discount for more than five items and validates the promo code.	
Primary Actors(s)	Customer, Admin	
Trigger	The customer initiates the process by adding an item to the cart, editing quantities, or applying a promo code, or when an admin modifies discount rates or promo codes.	
Main Scenario	Step	Action
	1	The customer browses products and adds multiple glass or mirror items to the cart.
	2	The system updates the cart and displays the current item count and price.
	3	The system checks if more than 5 items are in the cart.
	4	If true, a 5% discount is applied automatically to the total price.
	5	The customer can view the contents of the cart, including item details, quantities, total price, and discounts applied.
	6	The customer selects an item from the cart and modifies its quantity.
	7 The system updates the cart with the new quantity and recalculates the total price.	

	8	The customer selects an item from the cart to remove.
	9	The system removes the item from the cart and updates the total price.
	10	The customer chooses to delete all items from the cart.
	11	The system clears the cart and displays a message indicating that the cart is empty.
	12	The customer enters a promo code into the provided input field.
	13	The system validates the promo code. If valid, the system applies the promo code discount and updates the total price.
	14	The customer proceeds to checkout. The system calculates the final price with all applicable discounts (promo code and quantity-based discounts) and allows the customer to confirm and complete the purchase.
	15	The admin logs in and accesses the promo code and discount management panel.
	16	The admin updates the promo code and/or discount rate in the system. The system saves the new settings, which are now applied to future cart calculations.
Extensions	Step	Action
	3a	If the promo code entered by the customer is invalid, the system notifies the customer and prompts them to enter a valid code.
	6a	If the cart contains less than 5 items, the system does not apply the 5% quantity-based discount, and the total price remains unchanged, except for any valid promo code discount.
	7a	If the customer edits item quantities, reducing the total to fewer than 5 items, the system removes the 5% discount and recalculates the total price.
	8a	If the promo code has expired or been removed by the admin, the system invalidates the code and notifies the customer that the promo code is no longer valid, recalculating the total price.
	11a	If the admin changes the discount rate, the system applies the new rate to future purchases where the customer meets the quantity threshold.
	13a	If the customer deletes all items from the cart, the system resets the cart, removes all items, and sets the total price to zero while displaying an empty cart message.

Use case diagram of Cart Management.



Flow Chart of Cart Management.

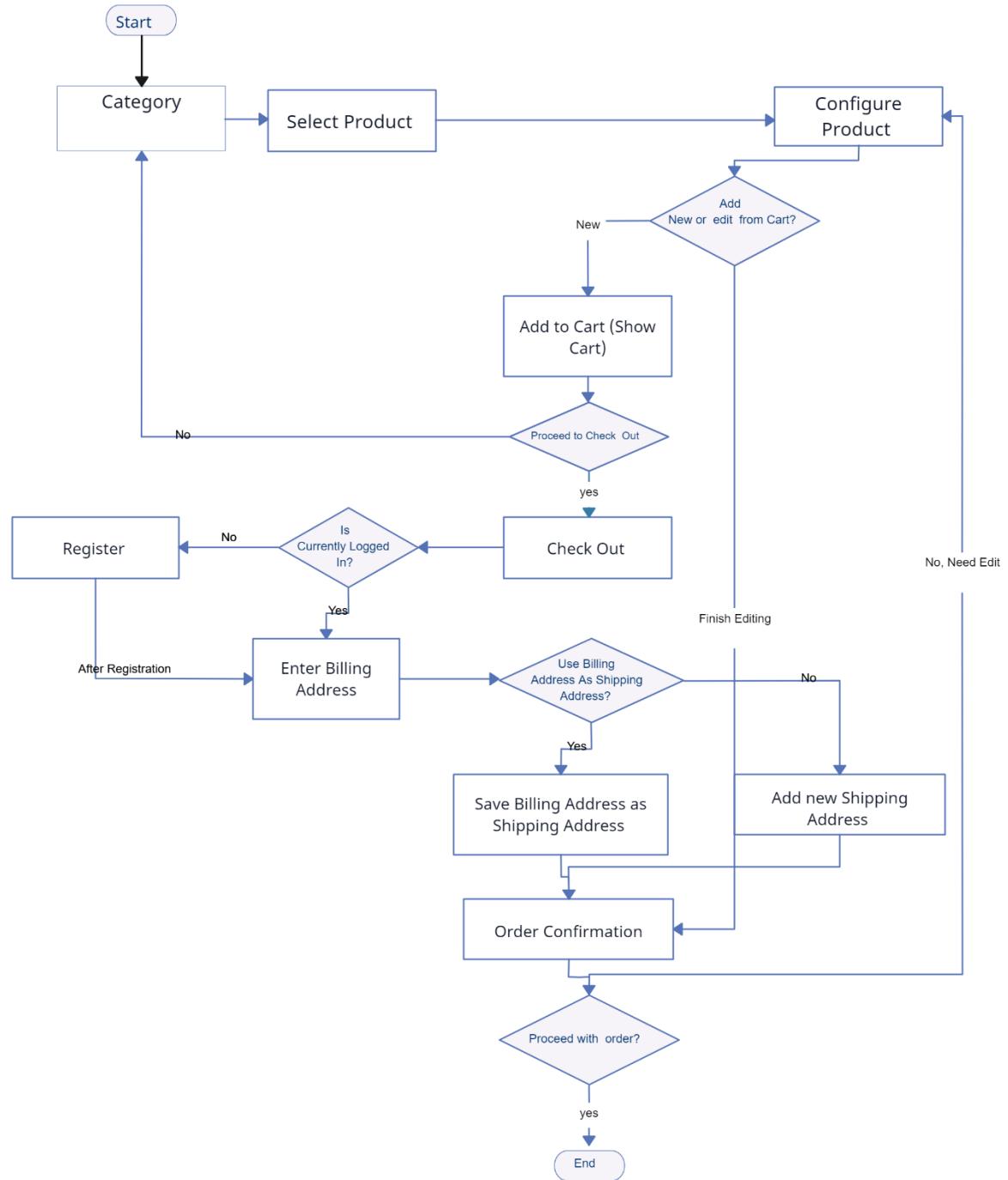
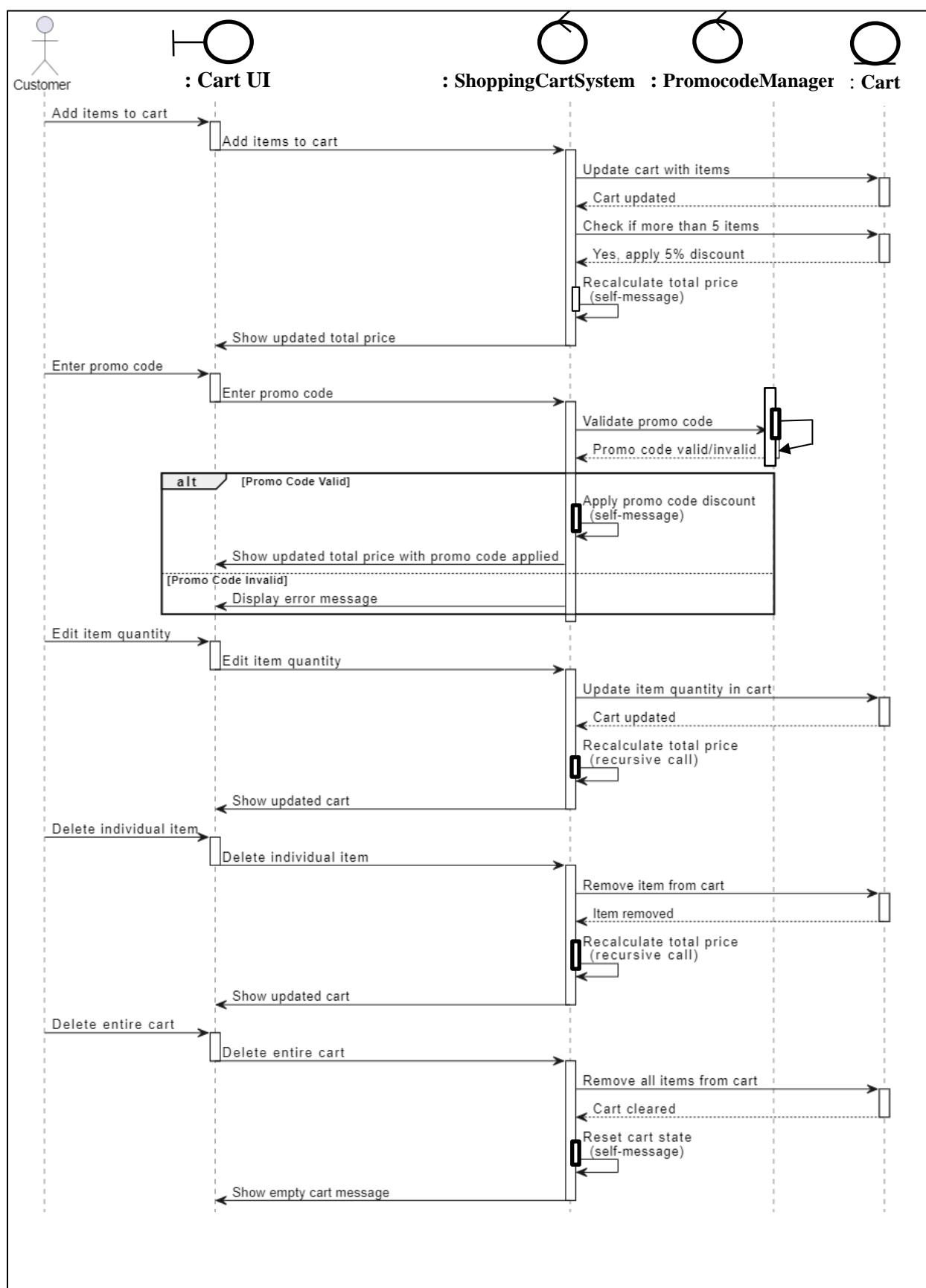


Figure 3.20 – Payment Management Activity Diagram

Sequence diagram of Cart Management.



Employee Management – IT22125002

Use Case Scenario of Employee Management.

Name	Manage Employee Records and Payroll	
Summary	This use case involves managing employee profiles, assigning tasks, monitoring performance, and processing payroll. It allows admins to add, update, or delete employee details and handle employee inquiries efficiently.	
Priority	7	
Pre-conditions	12. Admin must be logged into the system. 13. Employees should have valid IDs and profiles in the system. 14. Payroll information such as salaries and tax rates should be defined.	
Post-conditions	11. Employee records are maintained with up-to-date details. 12. Payroll is processed accurately and on time. 13. Tasks are assigned to employees, and their performance is monitored. 14. Employee inquiries and updates are handled smoothly.	
Primary Actor(s)	Admin , Employee	
Trigger	Admin initiates the process by adding or updating employee information, assigning tasks, or processing payroll.	
Main Scenario	Step	Action
	1	Admin logs into the employee management panel.
	2	Admin selects the "Add Employee" option to enter new employee details (e.g., Name, ID, Job Title, Basic Salary).
	3	The system validates the input and stores the new employee's record.
	4	Admin assigns tasks or updates tasks for specific employees.
	5	The system notifies the employees about the assigned tasks through the employee portal.
	6	Admin selects an employee to monitor performance (e.g., task progress, attendance).
	7	The system updates performance metrics and displays reports to the admin.

	8	At the end of the payroll cycle, the admin reviews and processes employee salaries.
	9	The system calculates the payroll, including taxes and deductions, and generates pay slips.
	10	Employees can log in to view their profile, task status, and payroll details.
	11	If needed, employees submit inquiries through the system, which the admin reviews and responds to.
Extensions	Step	Action
	4a	If an employee's role changes, the admin updates their profile and salary accordingly.
	7a	If task performance is unsatisfactory, the admin assigns additional training.
	9a	If errors are found in payroll, the admin adjusts the salary and reprocesses payroll.
	11a	If an inquiry is urgent, the admin escalates it to the relevant department for faster resolution.

Use case diagram of Employee Management.

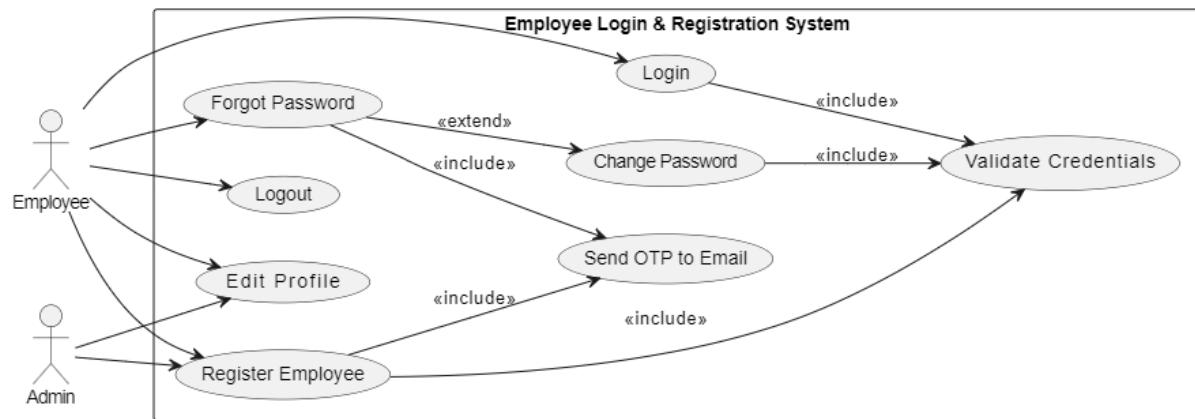
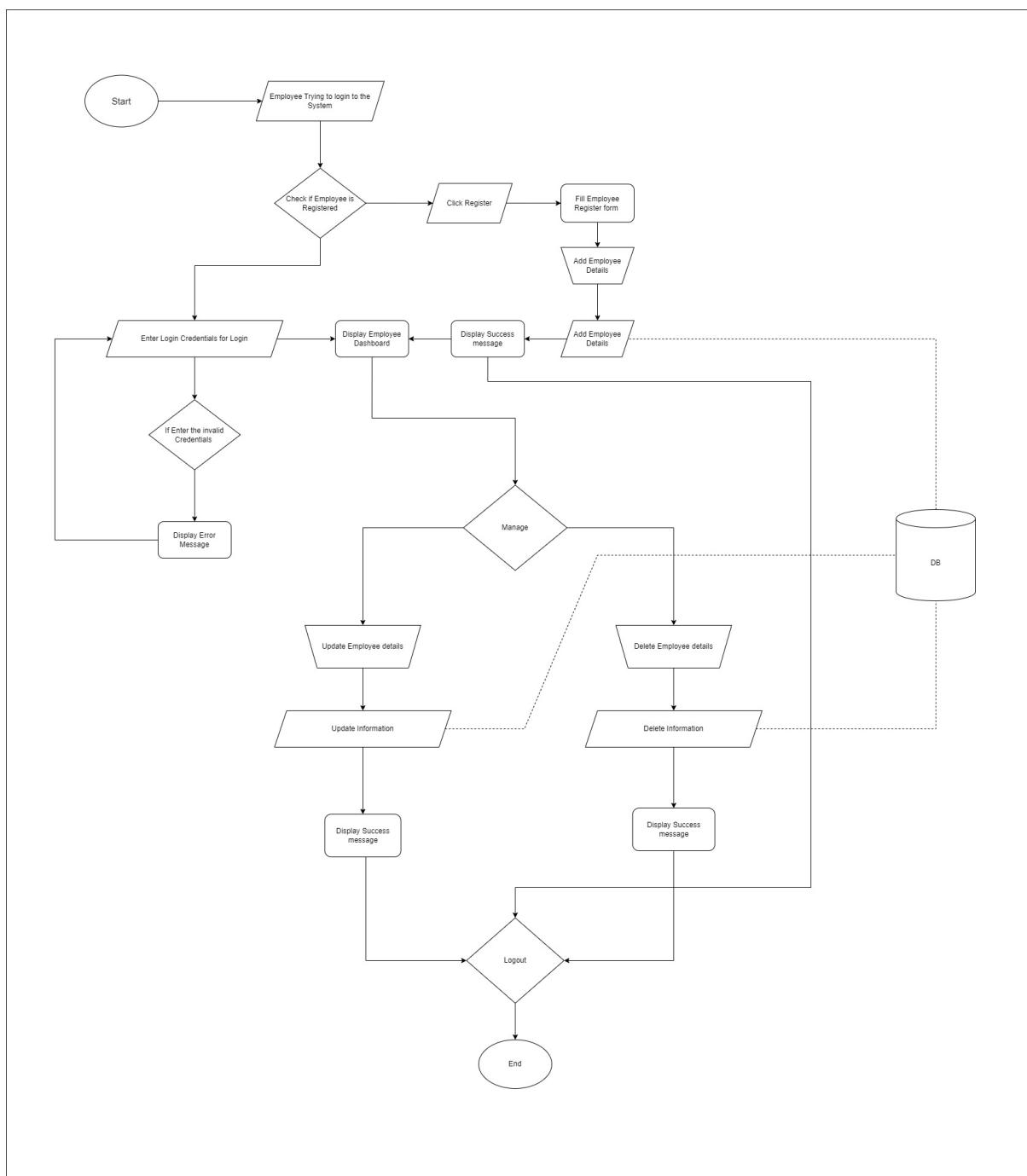
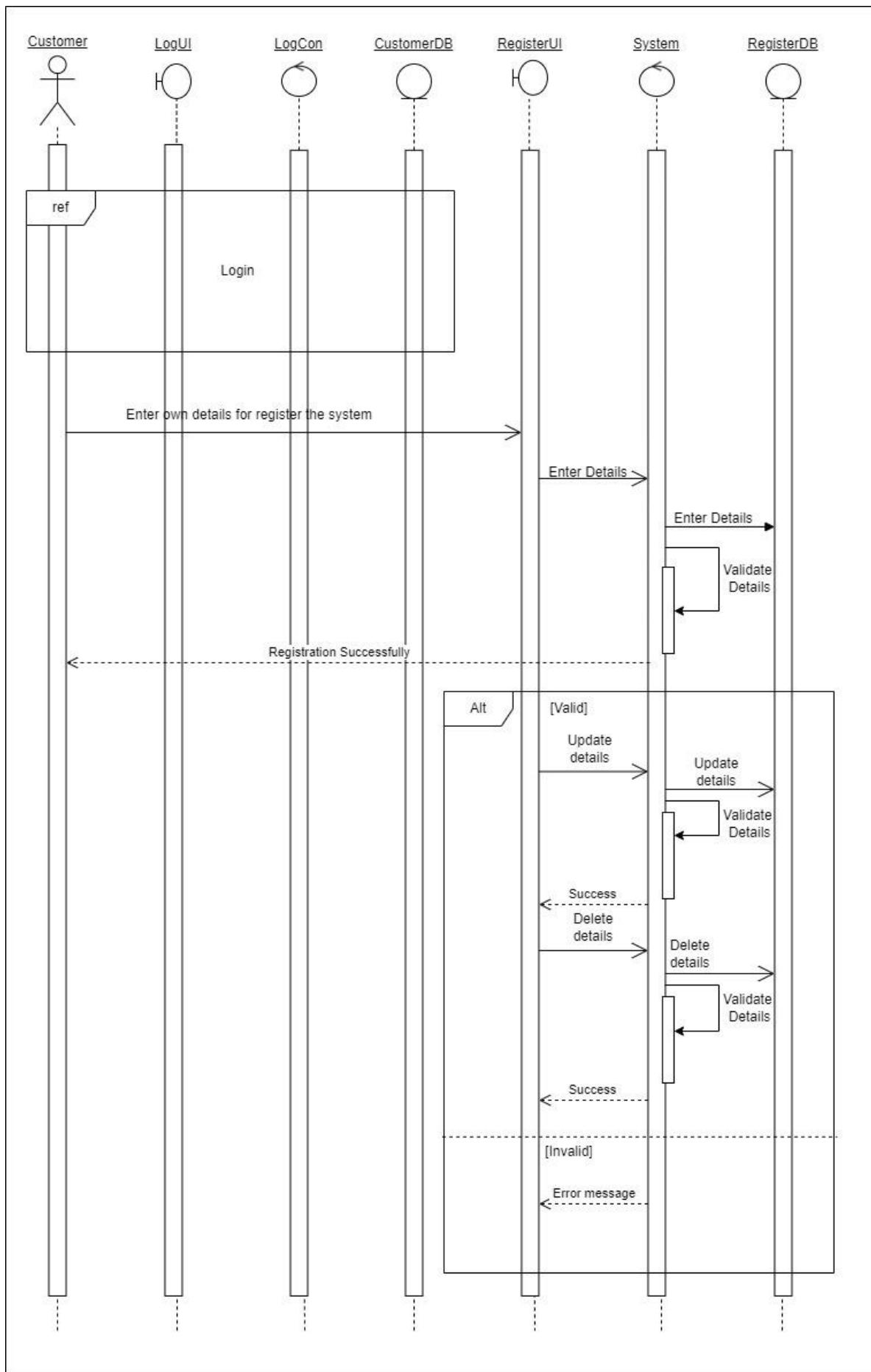


Figure 3.24 – Supplements Management Usecase Diagram

Flow Chart of Employee Management.





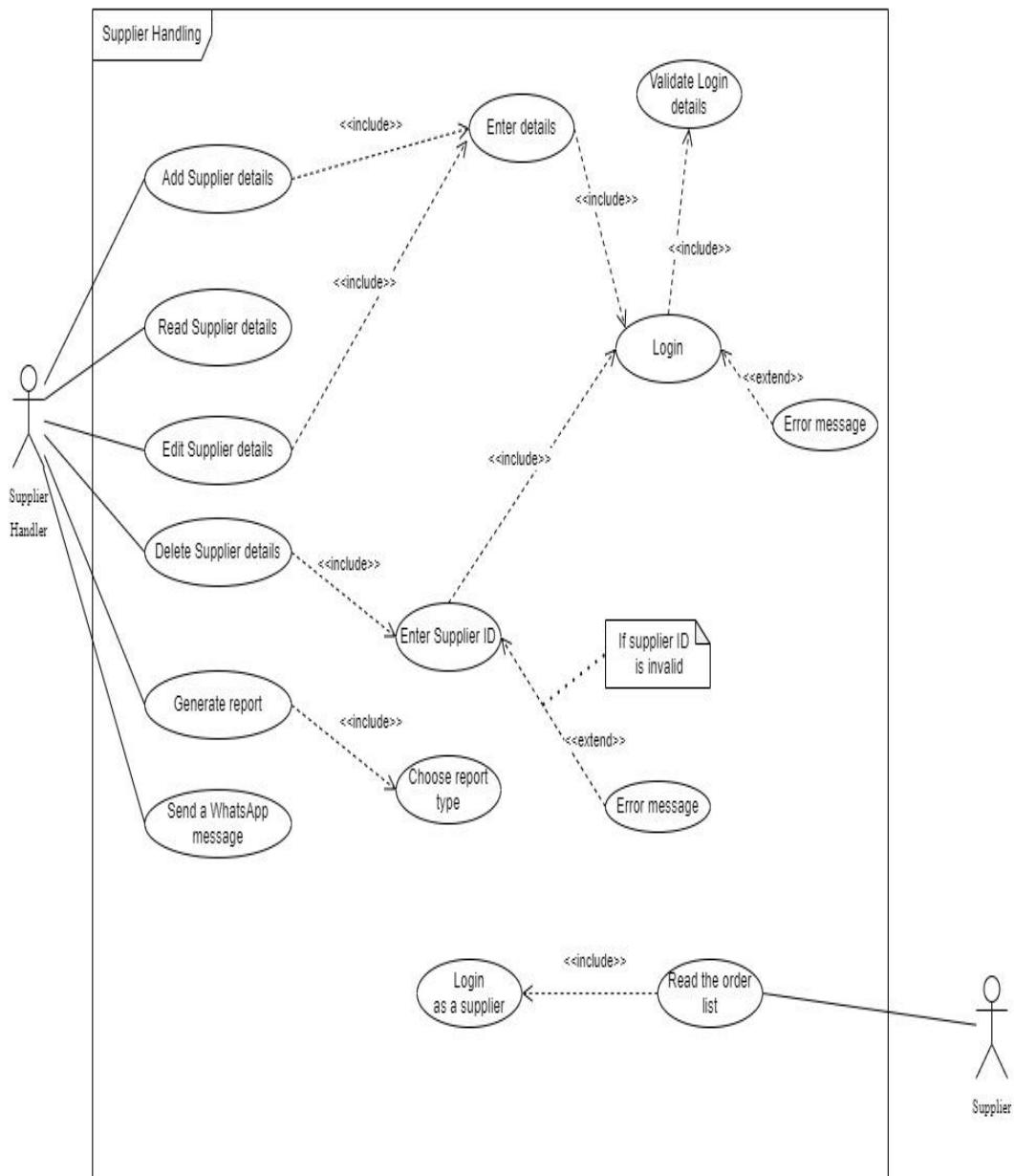
Supplier Management - IT21181160

Use Case Scenario of Supplier Management.

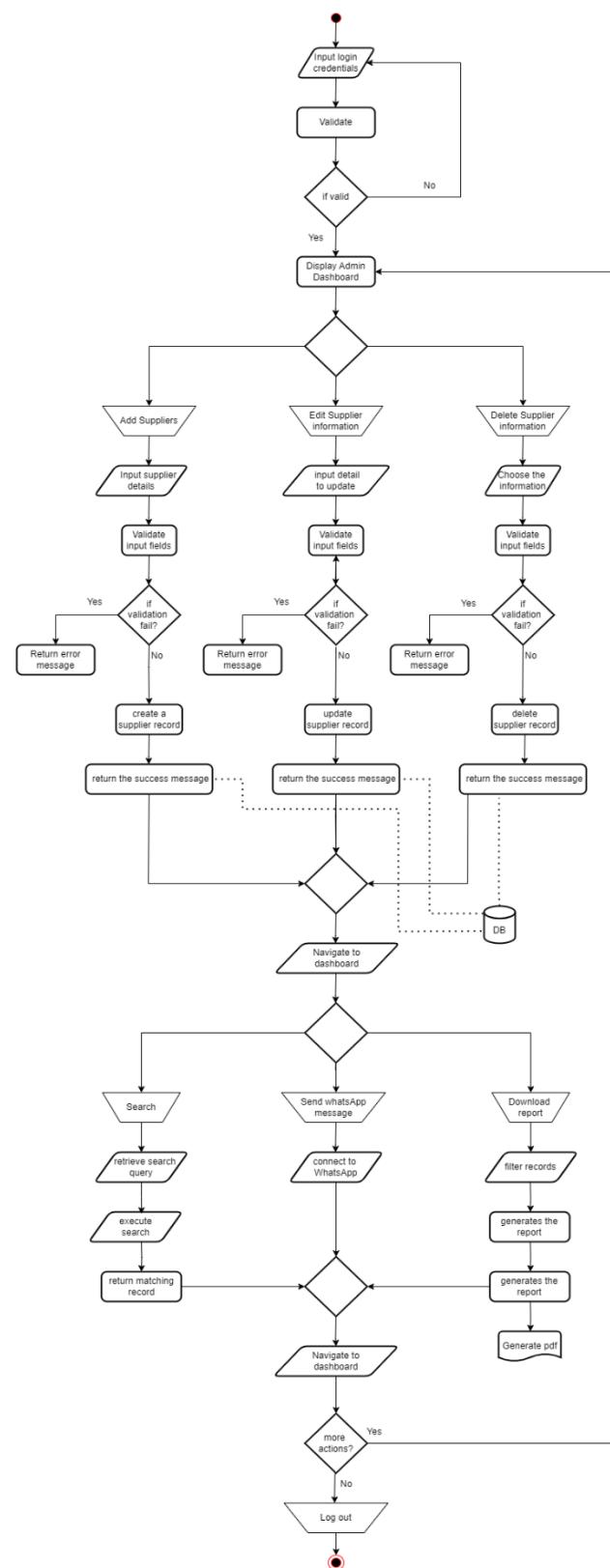
Name	Manage Suppliers	
Summary	Supplier Manager Handle Suppliers	
Priority	08	
Pre-conditions	The Supplier Manager must login to the system	
Post-conditions	Supplier Handler can place orders as he want	
Primary Actors(s)	Supplier Handler	
Secondary Actors(s)	Supplier	
Trigger	Supplier Manager initiates the management process by accessing the "Manage Suppliers" functionality in the system.	
	Step	Action
Main Scenario	1	Supplier Handler login to the system by using his username and the password.
	2	Supplier Handler navigates to the “Supplier” section.
	3	Supplier Handler click on “add Suppliers” button.
	4	Supplier Handler can choose a supplier and a brand.
	5	Enter details for form and click on “SUBMIT” button.
	6	Site will Navigates to “Supplier Details” page.
	7	Supplier Handler can see previous and all the orders.
	8	Supplier Handler selects an order and clicks on “Edit” button and edits it and then click “SUBMIT”.
	9	Supplier Handler selects an order and clicks on “delete” option.
	10	Supplier Handler can click on “download the report” and downloads the order report.
	11	Supplier Handler can click on “send a WhatsApp message” and contact through WhatsApp.
	12	Supplier Handler can logout after the action is done.
	13	Navigate to the home page.
	14	Supplier can login to the system by entering his username and password

	15	Supplier navigates to the ‘orders’ page and reads the list of orders received.
	Step	Action
Extensions	1.a	System checks whether the username and password entered are valid or invalid.
	1.b	If invalid, the system will show an error message and ask to re-enter login credentials
	5.a	If all the details are not entered the system displays ‘Please fill out all fields’
	5.b	If details are invalid system displays ‘Incorrect details’ and asks the user to refill the form
	8.a	If updated information are invalid system displays ‘Incorrect details’ and asks the user to refill the form
	13.a	Ask supplier handler to logout before leaving the page

Use case diagram of Supplier Management.

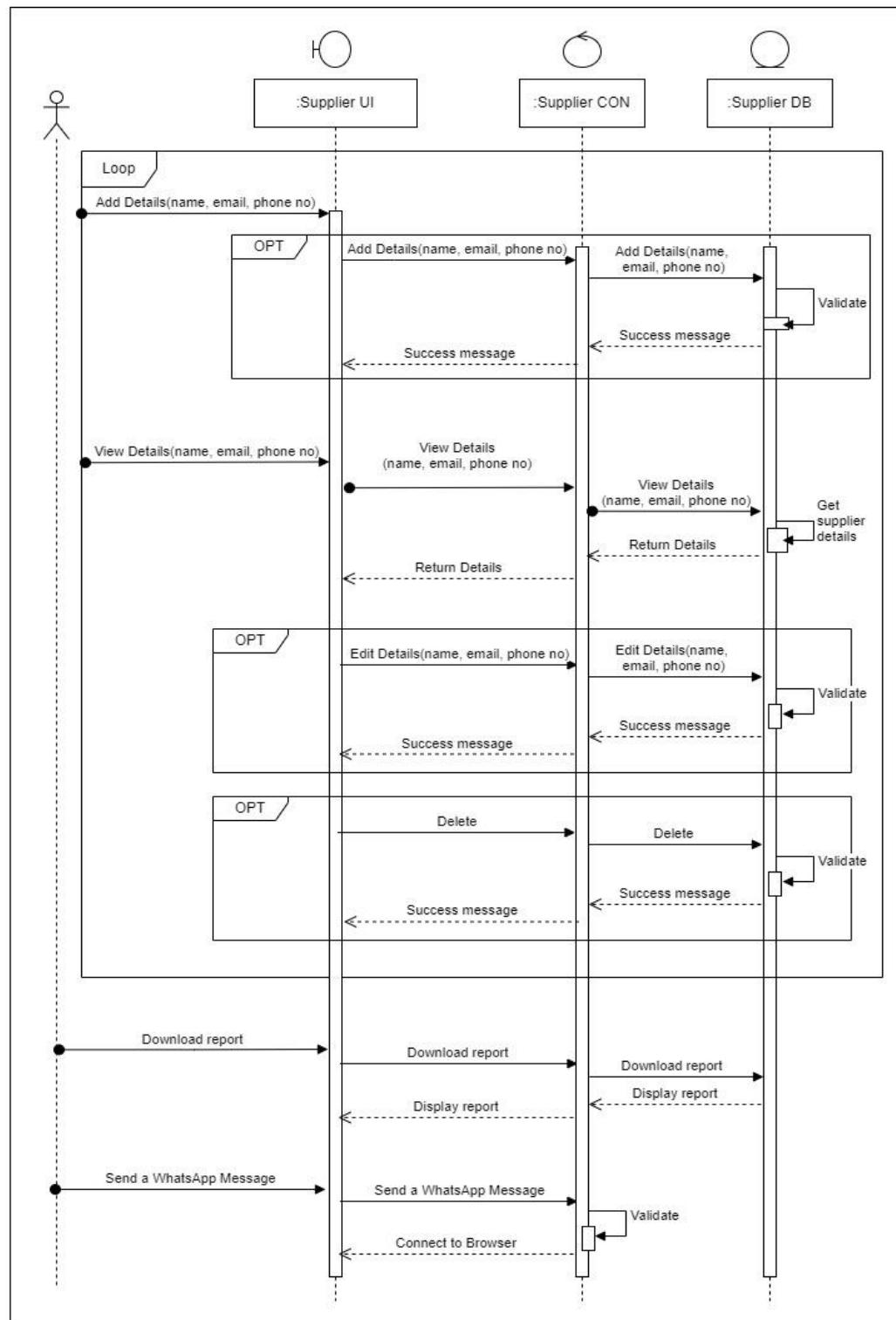


Flow Chart of Supplier Management.



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Sequence diagram of Supplier Management.



NON-FUNCTIONAL REQUIREMENTS

Functionality:

The system must meet the functional requirements of the users, which may include specific features or capabilities that the system must have in order to meet the needs of the user.

Performance:

The system must be able to perform its intended functions in a timely and efficient manner, with fast response times and minimal downtime.

Scalability:

The system must be able to scale to handle increasing amounts of data, users, or transactions without sacrificing performance or stability.

Reliability:

The system must be reliable and able to operate continuously without failure or unexpected downtime.

Compatibility:

The system must be compatible with other systems or software that the user may use, with the ability to exchange data or integrate with other systems, as necessary.

Usability:

The system must be easy to use and navigate, with an intuitive interface that is accessible to users with varying levels of technical expertise.

Cost:

The system must be cost-effective, with a reasonable cost that is commensurate with the value that it provides to the user.

PERFORMANCE REQUIREMENTS

In performance requirements, we take into consideration the request time and the response time between the client side to the server side and other only client-side functions that operate in the browser.

- Components should load within a second
- Database objects should retrieve the results within 2 seconds
- User authentications should be done in less than 2 seconds

High-level Architecture Diagram

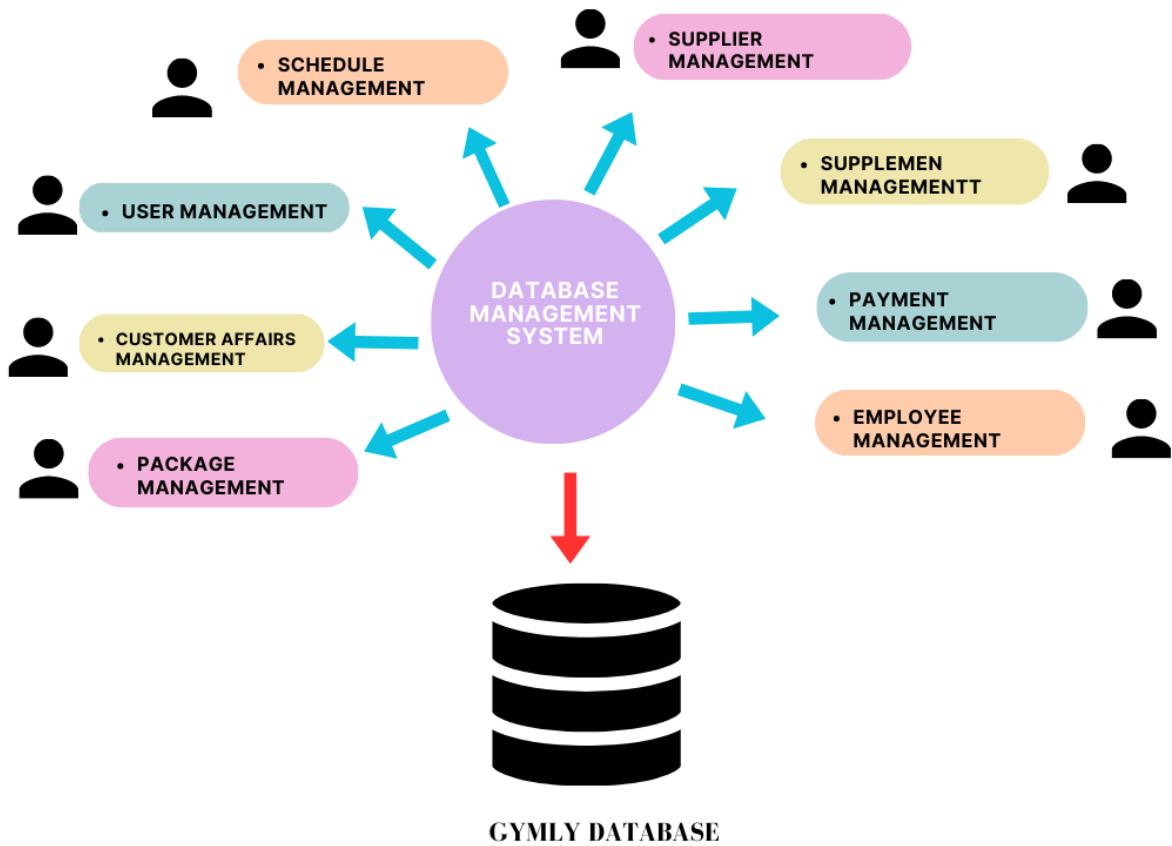


Figure 4 - High-level Architecture Diagram

Class Diagram

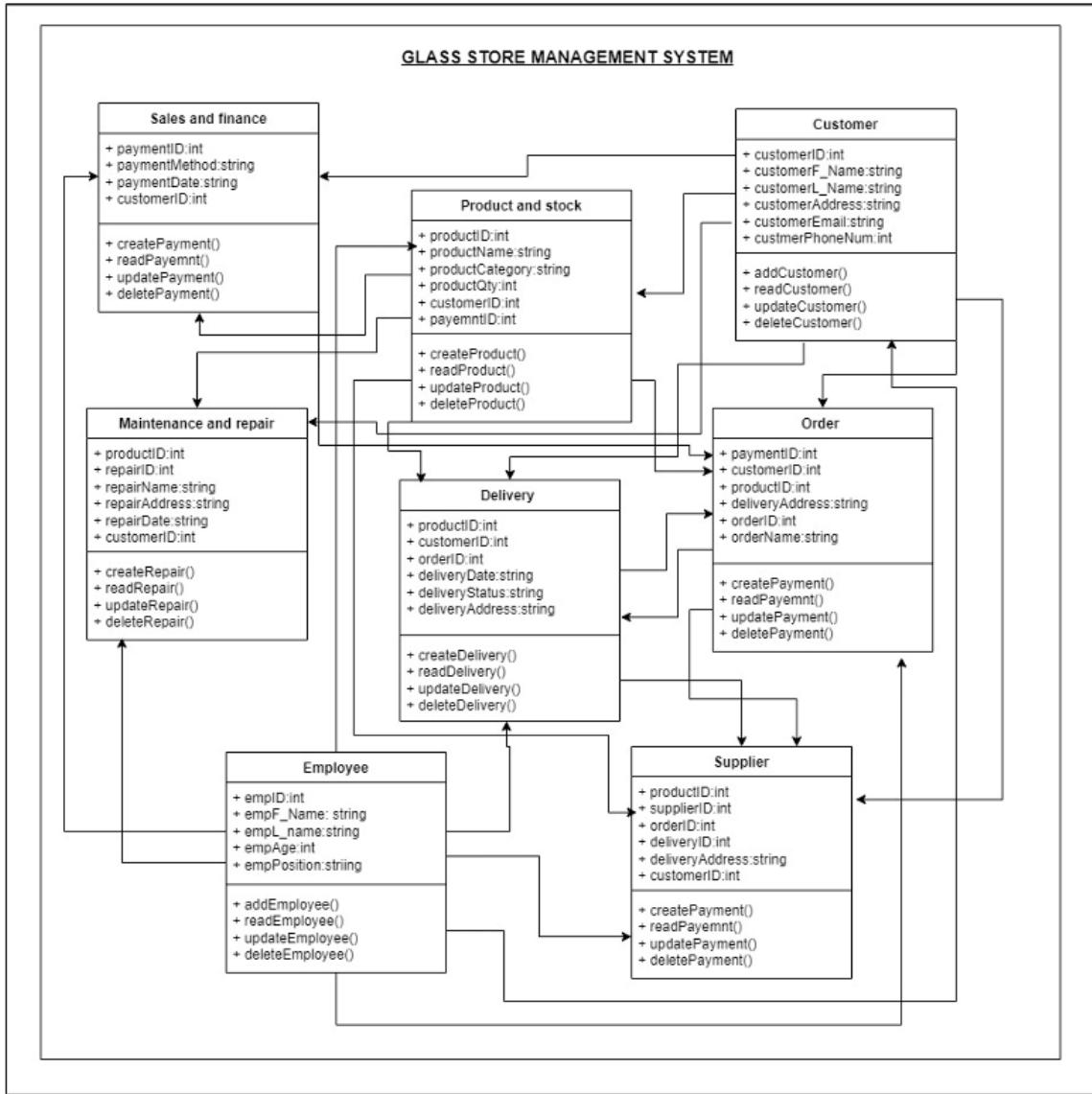


Figure 5 - Class Diagram

ER Diagram

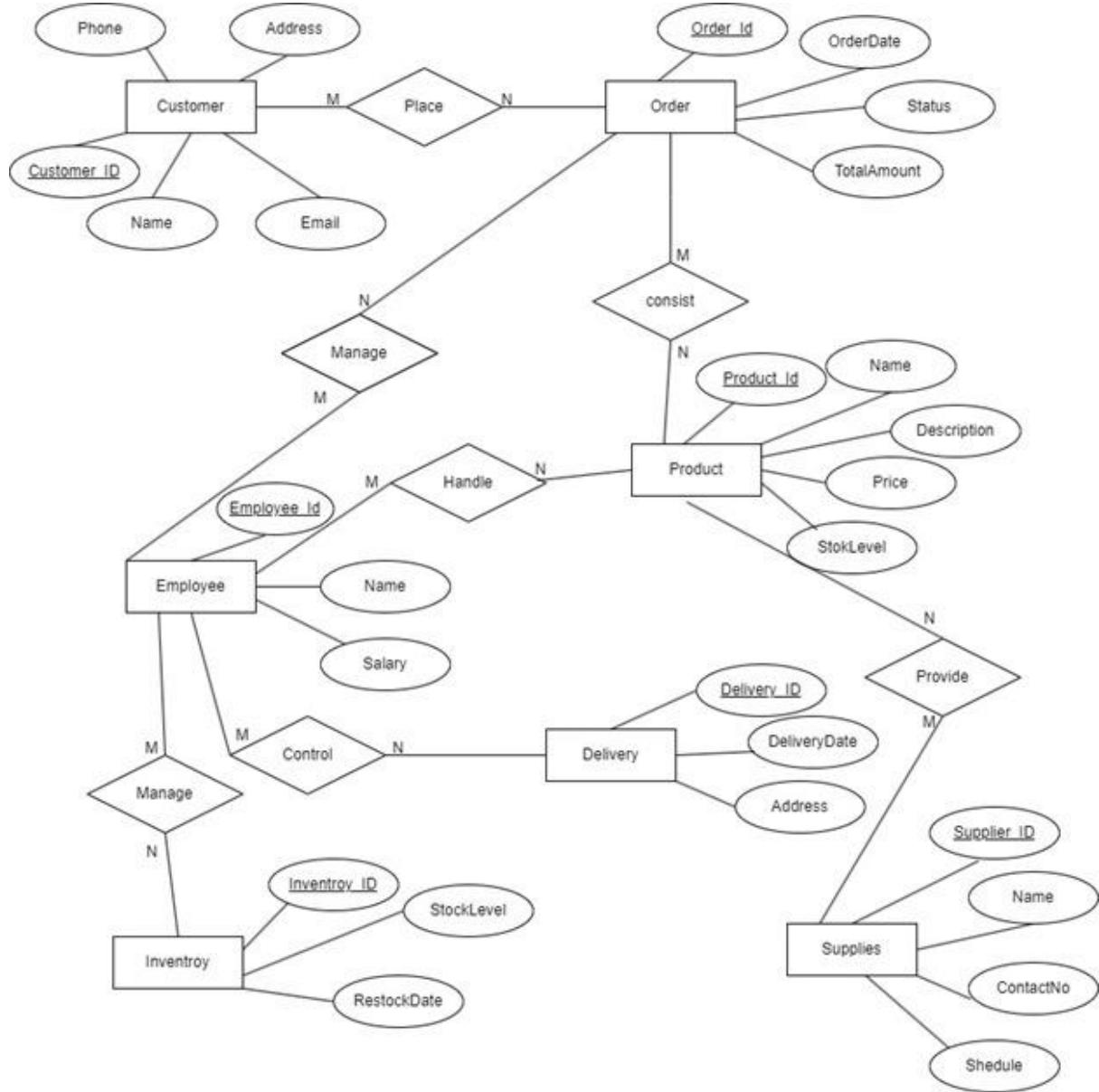


Figure 6 - EER Diagram

DATABASES

Database Aspects

Database Technology: We are using MongoDB, a NoSQL database, which is well-suited for handling diverse data types, offering flexibility and scalability as the store grows.

Data Structure: Key collections include:

- Products: To manage inventory, descriptions, pricing, and availability.
- Customers: To store customer profiles, order history, and preferences.
- Orders: To track cart items, payments, and order statuses.
- Maintenance Requests: For tracking customer maintenance needs and fulfillment timelines.
- Employees (HR data): To manage employee information, payroll, and schedules.
- Delivery Requests: For Tracking Delivery requests and managing drivers and timelines.
- Payment: To securely store card and payment details.
- Supplier information: To Manage and track supplier information and their Ratings.

Data Relationships: Though MongoDB is schema-less, relationships between data collections (e.g., orders linked to customers or employees) are efficiently managed using document references or embedded data.

Scalability and Performance: MongoDB's horizontal scaling and distributed architecture allow the platform to handle increasing data loads and maintain high performance.

Data Security: MongoDB's encryption features and role-based access control (RBAC) help secure sensitive data like customer payment details and employee records.

Development Aspects

Front-End: Developed using React, the front-end is dynamic and responsive, offering a fluid and interactive user interface. Components are designed to be reusable and modular, improving development efficiency.

Back-End: Node.js and Express form the backbone of the server-side logic, handling API requests, authentication, and core business functions like cart management, payment processing, and delivery scheduling.

API Layer: RESTful APIs bridge the front end and back end, allowing data exchange between the client and server for real-time product updates, order processing, and maintenance tracking.

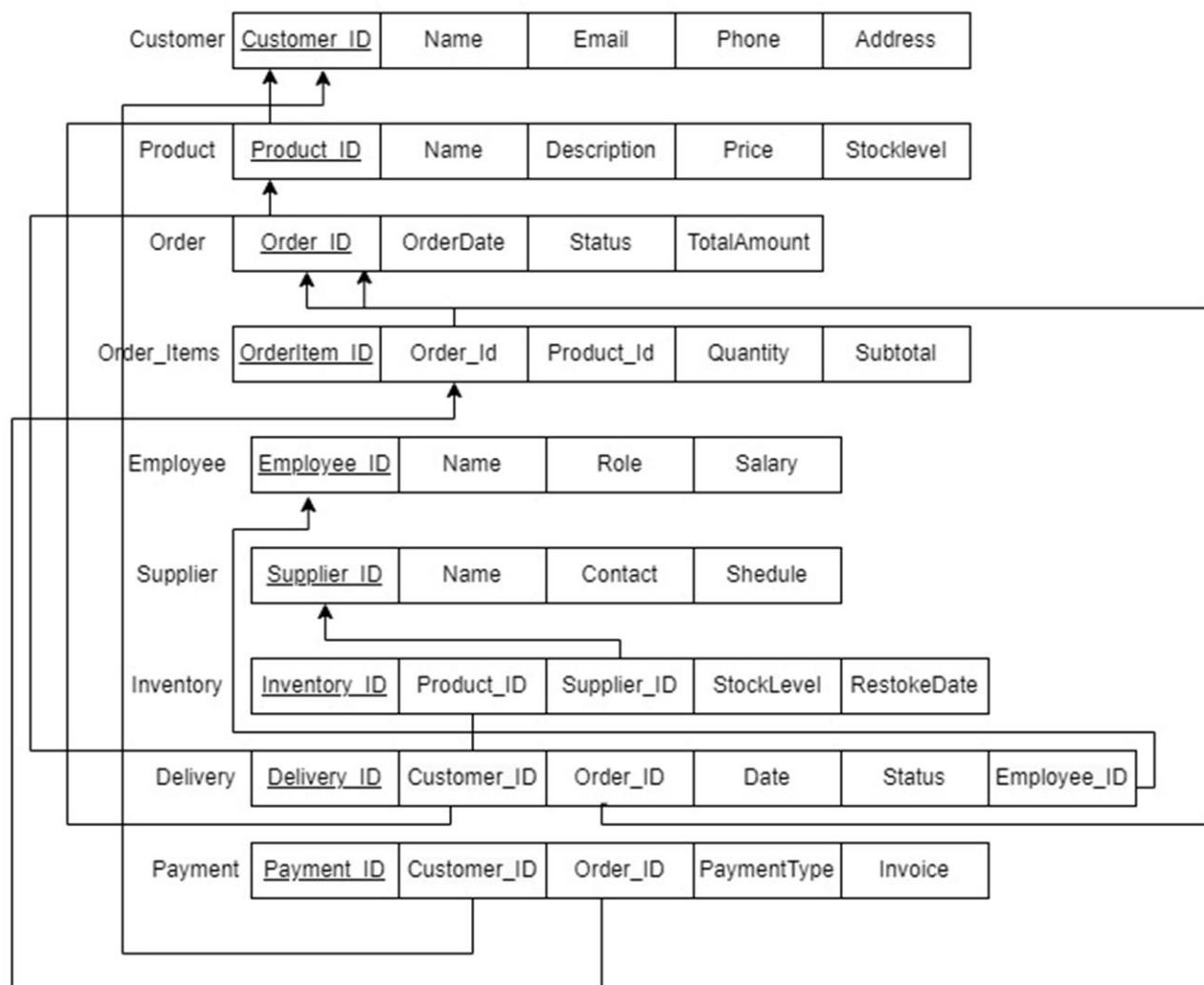
Authentication and Authorization: Implemented via tools like JWT (JSON Web Tokens) for secure login and access control, ensuring that different user roles (e.g., admin, employee, customer) only access authorized areas of the platform.

Payment Integration: Integrated with a secure payment gateway (e.g., Stripe, PayPal) to handle customer transactions, ensuring security and PCI compliance.

Version Control: Development is managed using Git, allowing for collaboration, version tracking, and efficient code management.

Testing: Regular unit testing and integration testing are employed to ensure both the front end and back end function properly under different scenarios, reducing bugs and enhancing stability.

Database schema



PROCESSES

1. Employee Management Process: Manage store staff including salespersons, delivery personnel, and administrators. Handle employee onboarding, scheduling, performance tracking, and assign access levels based on job roles. Track working hours and provide tools for managing shifts and holidays.
2. Inventory Management Process: Track and manage glass product inventory, including stock levels, product details, and item categories. Automatically update inventory when new stock is received or when products are sold. Implement restocking alerts and allow administrators to manage product listings with pricing updates.
3. Order Management Process: Manage customer orders from placement to completion. Include functionalities for creating, editing, and tracking orders. Allow customers to place orders, view order statuses, and modify or cancel orders. Keep a detailed order history and integrate with delivery processes for seamless order fulfillment.
4. Payment Management Process: Handle customer payments, including payment gateway integration for online payments and in-store transactions. Process payments for orders, issue invoices and receipts, track payment history, and handle refunds. Support multiple payment methods like credit/debit cards, cash, and mobile payments.
5. Customer Management Process: Maintain a customer database to store personal information, contact details, and purchase history. Provide functionalities for registering new customers, managing customer profiles, and offering personalized services. Enable customer loyalty programs and provide access to exclusive offers or promotions.
6. Maintenance Handling Process: Implement a system for scheduling and managing store maintenance activities, including equipment repairs and regular maintenance tasks. Allow staff to log issues, assign maintenance personnel, and track the status of maintenance tasks. Ensure preventive maintenance schedules are set for store equipment.
7. Delivery Management Process: Manage deliveries for customer orders. Allow customers to schedule deliveries and track their progress. Integrate the delivery system with inventory and order management to ensure accurate delivery times. Provide options for handling delivery logistics and updates and notify customers of delivery status via SMS or email.
8. Supplier Handling Process: Manage relationships with suppliers by storing supplier contact details, tracking order histories, and managing contracts. Automate reordering processes when inventory runs low, track supplier deliveries, and handle payment processing for suppliers. Enable communication channels for order adjustments or cancellations.

WORKFLOWS

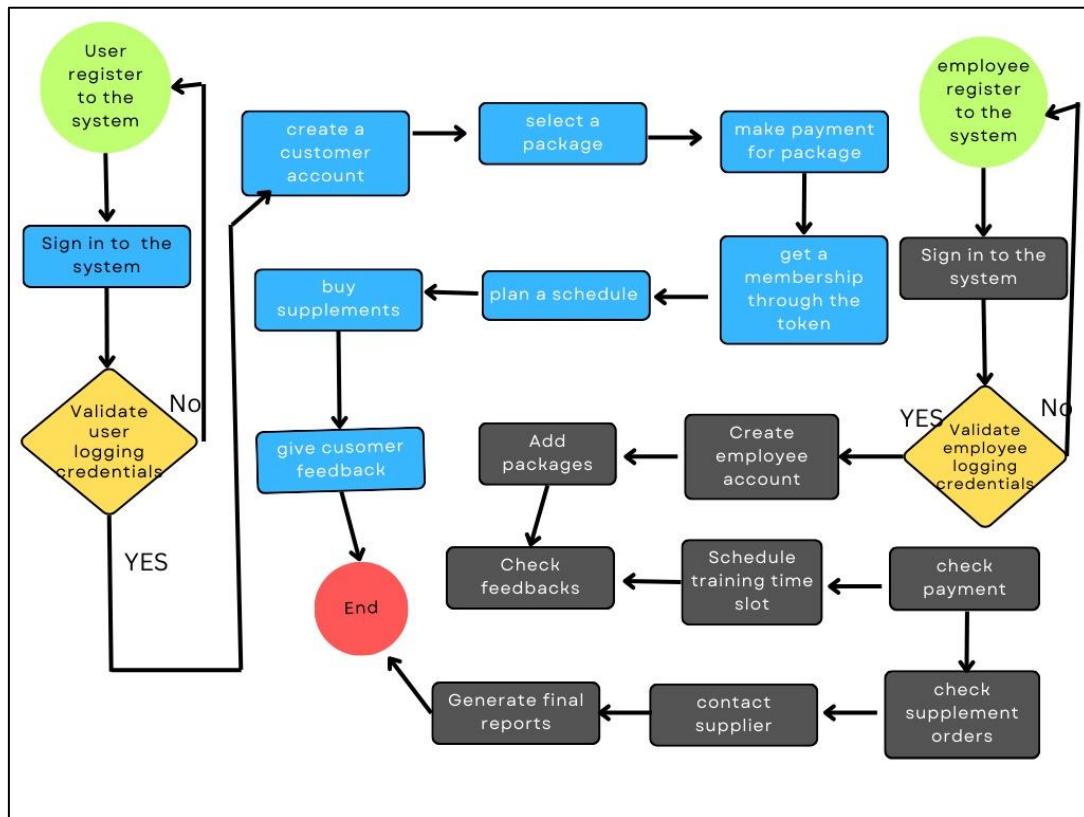


Figure 8 - Workflows

1. User Registration & Sign-In:

- The customer begins by registering on the system, providing details such as name, email, contact number, and creating a unique username and password.
- Once registered, the user signs into the system using their credentials, and the system validates the login to ensure the information is correct.

2. Customer Account Creation:

- After signing in, the customer has the option to create a customer profile, adding additional details like delivery preferences, address, and contact information.
- With the account set up, the customer can start browsing glass and mirror products on the website.

3. Product Browsing & Selection:

- The user explores available glass and mirror products, filtering by categories such as size, type (e.g., frosted, tinted, or clear), and finish.
- Once satisfied, the user adds selected products to their cart and reviews the choices before proceeding to checkout.

4. Payment Processing:

- The customer reviews the items in their cart, enters delivery details, and applies any available promo codes.
- The system provides various payment methods (e.g., credit card, bank transfer), and once the payment is successfully completed, the order is confirmed.

5. Order Confirmation & Delivery:

- Upon successful payment, the user receives an order confirmation along with an estimated delivery date.
- The system generates an order number, and the customer can track their order status, receiving updates on dispatch and delivery progress.
- The order is assigned to a driver, and the customer is notified with delivery details.

6. Feedback Submission:

- After receiving the products, the system prompts the customer to provide feedback on their experience, including product quality, delivery service, and overall satisfaction.

7. Employee Registration & Sign-In:

- Similar to customers, employees can register and create their accounts by providing details such as name, contact info, and role.
- Once signed in, employees are validated by the system and can access their respective dashboards based on their roles and privileges.

8. Product & Stock Management:

- Employees with the appropriate access can add or update product listings, including descriptions, pricing, and stock levels.
- They can also monitor stock levels, handling restocking when inventory runs low by contacting suppliers.

9. Order & Delivery Management:

- Employees process customer orders, verify payment status, and ensure that items are prepared for delivery.
- They assign orders to delivery personnel and update the delivery status as it progresses.

10. Supplier Communication:

- When stock runs low, employees can contact suppliers to replenish inventory, ensuring product availability for customers.

11. Maintenance & Repair Scheduling:

- In cases where products need repairs or maintenance, customers or employees can schedule repair requests.
- The system tracks these requests, assigns tasks to the appropriate technician, and updates repair statuses for the customer.

12. Report Generation:

- The system automatically generates reports on various aspects of the business, including sales performance, stock levels, customer feedback, and order history.
- These reports provide valuable insights for business analysis, helping to make informed decisions on product offerings, service improvements, and financial performance.

13. Ongoing User-Employee Interaction:

- The workflow continues as customers browse, place orders, and provide feedback, while employees manage stock, process orders, and monitor customer satisfaction.
- The system ensures smooth interactions and updates for both customers and employees throughout the process.

14. System Closure & Session Management:

- When the workflow reaches its end, either after order completion or at a scheduled time, the system gracefully performs necessary operations to close sessions, ensuring data integrity and efficient service.

DEVELOPMENT ASPECTS



Figure 9 - Development Aspects

Chapter 4. – Testing

Test cases and significant results.

User Login and Registration Test Cases			
Test Case	Test Description	Test Data	Test Strategy
1	Register as an unregistered employee	Name: John Doe, Email: john.doe@example.com, Password: P@ssw0rd123	Precondition: Employee not registered Postcondition: Account is created, and employee can log in
2	Log into the system as a registered employee	Email: john.doe@example.com, Password: P@ssw0rd123	Precondition: Employee is registered Postcondition: Employee is logged in and redirected to the dashboard.
3	Employee Manager logs into the system	Manager Email: manager@example.com, Password: Manager123	Precondition: Manager account exists Postcondition: Manager is logged in and redirected to employee management.
4	Customize and update employee profile	New Name: Jonathan Doe, Phone: 9876543210	Precondition: Employee is logged in Postcondition: Employee details are updated successfully in the system.
5	View employee profile	Employee: John Doe	Precondition: Employee is logged in Postcondition: Employee profile is displayed with up-to-date information.
6	Delete employee account	Employee ID: 12345	Precondition: Employee is logged in Postcondition: Employee account is deleted, and no longer able to log in.

7	Change employee password	Old Password: P@ssw0rd123, New Password: NewP@ss1234	Precondition: Employee is logged in Postcondition: Password is changed successfully, and employee can log in again.
8	Display employee dashboard	Logged-in Employee	Precondition: Employee is logged in Postcondition: Dashboard with employee services is displayed
9	List all registered employees for employee manager	Logged-in Manager	Precondition: Manager logged in Postcondition: All employees listed in the system are displayed.
10	Search for an employee using filters	Filter: Department, Role, Name	Precondition: Employees exist in the system, Postcondition: Employee list is filtered according to the search input
11	Delete employee by manager	Employee ID: 12345	Precondition: Manager logged in, Postcondition: Employee account is removed from the system by the manager.
12	Generate employee report for analysis by manager	Report Date Range: 01/09/2024 - 30/09/2024	Precondition: Employees exist, Postcondition: Report is generated and contains relevant information for the date range.

Card Details Test Cases			
Test Case	Test Description	Test Data	Test Strategy
1	Test valid credit card details for payment processing	Card Number: 4111 1111 1111 1111, Expiration Date: 12/25, CVV: 123	Precondition: Customer is on the checkout page, Postcondition: Payment is processed successfully.
2	Test invalid credit card number for payment processing	Card Number: 1234 5678 9012 3456, Expiration Date: 12/25, CVV: 123	Precondition: Customer is on the checkout page, Postcondition: Payment fails with an appropriate error message.
3	Test expired credit card for payment processing	Card Number: 4111 1111 1111 1111, Expiration Date: 01/20, CVV: 123	Precondition: Customer is on the checkout page, Postcondition: Payment fails with an error indicating card expiration.
4	Test invalid CVV for payment processing	Card Number: 4111 1111 1111 1111, Expiration Date: 12/25, CVV: 999	Precondition: Customer is on the checkout page, Postcondition: Payment fails with an error indicating invalid CVV.
5	Test successful payment processing with different card types	Card Number: 6011 1111 1111 1117 (Discover), Expiration Date: 12/25, CVV: 123	Precondition: Customer is on the checkout page, Postcondition: Payment is processed successfully for Discover card.
6	Test payment processing with a debit card	Card Number: 5123 4567 8910 1234, Expiration Date: 12/25, CVV: 123	Precondition: Customer is on the checkout page, Postcondition: Payment is processed successfully for debit card.
7	Test handling of payment processing when card details are missing	Card Number: , Expiration Date: , CVV:	Precondition: Customer is on the checkout page, Postcondition: Payment fails with an error indicating missing details.

Place order			
Test Case	Test Description	Test Data	Test Strategy
1.	Test placing an order as a customer	Customer account Product ID: 1234 Payment method: Credit card	Verify that a customer can successfully add items to the cart, checkout, and place an order.
2.	Test viewing all orders as an admin	Admin account Orders database with 100 entries	Ensure that the admin can view all customer orders, and the orders are displayed with the correct statuses.
3.	Test receiving order status updates as a customer	Customer account Order ID: ORD567 Order status: "Shipped"	Verify that customers receive notifications for status updates (e.g., "Order Shipped", "Delivered")
4.	Test managing order cancellations and returns by admin	Admin account - Order ID: ORD678 - Request type: "Return"	Confirm that the admin can cancel an order or process a return based on customer requests.
5.	Test generating reports on orders for admin	Admin account - Date range: 01/01/2024 to 31/01/2024	Verify that the admin can generate order reports based on date range and order status and export them.

Maintenance			
Test Case	Test Description	Test Data	Test Strategy
1.	Test scheduling a maintenance task as a Technician Manager	Manager account - Task: Replace filters - Priority: High	Verify that the Technician Manager can successfully schedule maintenance tasks with priority and deadlines.
2.	Test submitting a repair request as a customer	Customer account - Request: AC not working - Priority: Urgent	Ensure that customers can submit repair requests with relevant details, and they are correctly stored.
3.	Test assigning a repair task to a technician	- Manager account - Technician: John Doe - Task ID: T123	Verify that the Technician Manager can assign repair tasks to available technicians.
4.	Test updating the status of a repair task as a technician	Technician account - Task ID: T123 - Status: "In Progress"	Confirm that technicians can update the status of assigned tasks.

			tasks (e.g., In Progress, Completed).
5.	Test generating reports on maintenance activities as a manager	Manager account - Date range: 01/01/2024 to 01/31/2024	Ensure that the Technician Manager can generate maintenance activity reports, filter by date, and export them.

Delivery			
Test Case	Test Description	Test Data	Test Strategy
1.	Test placing an online delivery order as a customer	- Customer account - Product: Laptop - Address: 123 Main St	Ensure that customers can successfully place an order for delivery and provide the correct delivery address.
2.	Test receiving delivery notifications as a customer	Customer account - Order ID: O1234 - Notification: SMS, Email	Verify that customers receive notifications about their delivery, including details such as estimated time of arrival.
3.	Test tracking the status of a delivery as a customer	- Customer account - Order ID: O1234 - Current Status: Out for Delivery	Ensure that customers can track their delivery status, showing real-time updates about order progress
4.	Test assigning a delivery order to a driver as a delivery manager	- Manager account - Order ID: O1234 - Driver ID: D5678	Verify that delivery managers can assign orders to available drivers and assign delivery routes efficiently.
5.	Test notifying customers about delivery details as a manager	- Manager account - Order ID: O1234 - Notification method: Email, SMS	Ensure that customers receive accurate and timely delivery notifications after the driver has been assigned.
6.	Test updating the delivery status as a delivery manager	- Manager account - Order ID: O1234 - New Status: Delivered	Verify that delivery managers can update the status of orders and that customers receive the updated status in real-time
7.	Test generating reports on delivery performance as a manager	Manager account - Date range: 01/01/2024 to 01/31/2024 - Metric: Delivery Time	Ensure that the delivery manager can generate reports based on delivery performance and export them if needed.

Chapter 5 - Evaluation and Conclusion

Evaluate with test results and/or user/expert feedback.

Evaluation Methods

The evaluation of our web application for Lanka Glass House will be conducted through a comprehensive and structured approach to ensure that the system meets all functional and nonfunctional requirements, operates efficiently, and provides value to the users. The evaluation will consist of several key components:

1. Functional Testing

Objective: To verify that each function of the system operates as intended.

Method:

- Unit Testing: Each individual component and function (e.g., customer management, employee management, inventory management) will be tested in isolation to ensure correctness.
- Integration Testing: Combined components will be tested together to verify that they work as expected when integrated.
- System Testing: The entire system will be tested to ensure all components work together seamlessly.
- User Acceptance Testing (UAT): End-users (e.g., shop employees, managers) will test the system to ensure it meets their needs and expectations.

Metrics:

- Number of test cases executed.
- Number of test cases passed/failed.
- Bug/issue tracking and resolution rate.

2. Performance Testing

Objective: To ensure the system performs well under expected load conditions.

Method:

- Load Testing: The system will be subjected to a high load to determine how it performs under stress.
- Stress Testing: The system will be tested beyond its normal operational capacity to identify its breaking point.

- Scalability Testing: The system's ability to scale up or down based on demand will be evaluated.

Metrics:

- Response time under various conditions.
- System throughput (transactions per second).
- Resource utilization (CPU, memory).

Conclude how the objectives are met, and the aim is achieved.

3. Usability Testing

Objective: To ensure the system is user-friendly and meets user expectations.

Method:

- Heuristic Evaluation: Experts will review the system against established usability principles.
- User Surveys and Feedback: End-users will provide feedback on their experience using the system.
- Usability Testing Sessions: Real users will perform tasks while being observed to identify usability issues.

Metrics:

- User satisfaction scores.
- Task completion rates.
- Time taken to complete tasks.

4. Reliability Testing

Objective: To ensure the system is reliable and operates without failure under normal conditions.

Method:

- Failure Rate Analysis: The system's failure rates will be monitored and analyzed.
- Recovery Testing: The system's ability to recover from failures (e.g., power outages, system crashes) will be evaluated.

Metrics:

- Mean time between failures (MTBF).
- Mean time to repair (MTTR).
- System uptime percentage.

5. Beta Testing

Objective: To identify any remaining issues in a real-world environment before full-scale deployment.

Method:

- Controlled Release: The system will be released to a limited number of users in the real world setting.
- Feedback Collection: Continuous feedback from beta users will be collected and analyzed.

Metrics:

- Number of issues reported by beta users.
- User feedback ratings.
- Time taken to resolve reported issues

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