INVENTORY MANAGEMENT SYSTEM

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A Project submitted in partial fulfilment of the requirement for the degree of Bachelor of Science in Software Engineering

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APPROVAL

This project titled on "**INVENTORY MANAGEMENT SYSTEM**", submitted by **Md Ashikur Rahman Khan (ID: 171-35-1836)** 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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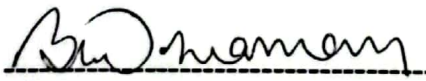

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Tecognize Solutions Limited

DECLARATION

I hereby declare that I have done this project under the supervision of Most Munira Tabassum

Lecturer, Department of Software Engineering, Daffodil International University. I also declare that this project is my original work for the degree of B.Sc. in Software Engineering and that neither the whole work nor any part has been submitted for another degree in this or any other university.

Ashikur

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DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

Documentation of Inventory Management System

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Abstract

This project proposes a new way of managing inventory in small businesses. Typical systems are outdated and inefficient, relying on store managers to manually track inventory levels and send updates to the corporate office on a weekly basis. This means that the corporate office does not have up-to-date information on inventory levels, leading to problems such as stock-outs and overstocks.The new system will be a cloud-based inventory management system. This will allow all stores to access the same real-time inventory data. Store managers will still be able to track inventory levels and create purchase orders, but they will no longer need to send this information to the corporate office. The corporate office will be able to view inventory levels and place orders directly from the cloud-based system.The new system would also make it easier to move items from one store to another. Currently, there is no established process for doing this. The new system will allow store managers to easily request and approve stock transfers between stores.Overall, the new system will be a more efficient and effective way to manage inventory for small businesses. It will provide the corporate office with up-to-date inventory information and facilitate the transfer of items between stores.

Table of Contents

Chapter 1
Introduction

1.1 Project Overview

The Inventory Management System is a comprehensive software solution designed to streamline and automate the process of managing inventory, sales, purchases, returns, and generating reports. It provides an efficient and reliable means for businesses to track and control their inventory levels, monitor sales and purchase transactions, handle returns and refunds, and generate essential reports for decision-making purposes.

Benefits:

Enhanced Inventory Control: The system enables businesses to have better control over their inventory levels, leading to improved efficiency, reduced carrying costs, and minimize stock outs or overstocks.

Streamlined Operations: By automating various inventory management tasks, sales, purchases, and returns processes, the system streamlines operations, reduces manual effort, and increases productivity.

Improved Decision-Making: The availability of accurate and up-to-date reports empowers administrators to make informed decisions regarding inventory planning, sales strategies, and supplier management.

Enhanced Customer Satisfaction: Efficient returns management and accurate inventory tracking contribute to improved customer satisfaction by ensuring timely and accurate order fulfillment, managing returns effectively, and maintaining transparent communication.

Scalability and Adaptability: The system is designed to be scalable, allowing businesses to accommodate growth and adapt to changing requirements over time.

In summary, the Inventory Management System is a powerful tool that provides businesses with the necessary features and functionality to effectively manage their inventory, streamline sales and purchase processes, handle returns, and generate meaningful reports. By utilizing this system, businesses can improve efficiency, reduce costs, enhance customer satisfaction, and make informed decisions based on real-time data.

1.2 Project Purpose

- The purpose of the Inventory Management System is to automate and streamline the process of managing inventory, sales, purchases, returns, and generating reports.
- The system aims to provide businesses with a centralized platform for efficient and accurate inventory control, enabling them to optimize stock levels and reduce carrying costs.
- It aims to simplify sales and purchase management, allowing businesses to track transactions, update information, and generate insights into sales performance and supplier relationships.
- The system facilitates effective returns management, ensuring timely processing of returns, refunds, and replacements, thus enhancing customer satisfaction.
- By generating comprehensive reports, the system helps businesses make data-driven decisions, identify trends, and evaluate overall business performance.
- The project's purpose is to enhance operational efficiency, reduce manual effort, and improve decision-making capabilities for businesses involved in inventory management.
- It aims to provide scalability and adaptability, allowing businesses to accommodate growth and adapt to changing market demands.
- The ultimate purpose of the project is to empower businesses to improve inventory control, streamline operations, and enhance customer satisfaction, leading to increased profitability and business success.

1.3 Proposed System

- The proposed system is an advanced Inventory Management System that offers a comprehensive set of features and functionalities to address the specific needs of businesses involved in inventory management.

- It is a web-based application that can be accessed from anywhere, providing flexibility and convenience to users.

- The system includes a user-friendly interface with intuitive navigation, making it easy for users to perform various tasks efficiently.

- It incorporates robust user authentication and access control mechanisms to ensure secure access to the system and protect sensitive data.

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- It utilizes advanced algorithms and automation to optimize inventory levels, minimize stockouts, and prevent overstocking situations.

- The system offers real-time synchronization with suppliers' systems to enable seamless communication and automated ordering processes.

- It provides detailed analytics and reporting capabilities, allowing users to generate customized reports, perform data analysis, and gain valuable insights into inventory performance.

- It offers comprehensive reports to ensure smooth system implementation and user adoption.

Chapter 2
Software Requirements Specification (SRS)

2.1 Introduction:

- **Purpose:** The purpose of this document is to provide a detailed specification of the requirements for the development of the Inventory Management System.
- **Scope:** The system will encompass inventory management, sales management, purchase management, returns management, and report generation functionalities.
- **Definitions**, **Acronyms**, and **Abbreviations**: Provide a list of technical terms, acronyms, and abbreviations used throughout the document.
- **System Overview:** Describe the system's high-level architecture and components. Identify the key stakeholders and their roles in using the system.

2.2 Functional Requirements:

2.2.1 Registration:

Requirement ID	Requirement Description	Stakeholders
FR - 01	The system shall allow users to create a new account by providing their name, email, and password.	User

FR - 02	The system shall validate the uniqueness of the email address during the registration process.	System
FR - 03	The system shall store the registered user information securely.	System

2.2.2 Login:

Requirement ID	Requirements Description	Stakeholders
FR - 04	The system shall authenticate users based on their registered email and password.	Users, System
FR - 05	The system shall provide error messages for invalid login attempts (e.g., incorrect email or password).	System
FR - 06	The system shall enforce security measures, such as password hashing, to protect user credentials.	System

2.2.3 Dashboard:

Requirement ID	Requirements Description	Stakeholders

FR - 07	The system shall provide a user-friendly dashboard that displays an overview of relevant information and quick access to system features.	Users
FR - 08	The dashboard shall show real-time updates on key metrics, such as total sales, inventory status, or pending orders.	Users, system
FR - 09	The system shall allow users to customize the dashboard layout and configure the displayed information.	User

2.2.4 Product Management:

Requirement ID	Requirements Descriptions	Stakeholders
FR - 10	The system shall allow users to add new products by providing details such as name, description, price, and quantity.	Users
FR - 11	The system shall validate the input data for product creation, ensuring required fields are filled and appropriate data types are used.	System

FR - 12	The system shall enforce unique product names to avoid duplicates in the inventory.	System

2.2.5 Supplier Management:

Requirement ID	Requirement Description	Stakeholders
FR - 13	The system shall allow users to add new supplier information, including name, contact details, and address.	User
FR - 14	The system shall provide validation for supplier contact details to ensure the correct format (e.g., email or phone number).	System
FR - 15	The system shall allow users to update existing supplier information, such as contact details or address.	User

2.2.6 Sale Management:

Requirements ID	Requirements Description	Stakeholders
FR - 16	The system shall enable users to create sales transactions by selecting the customer, products, quantities, and other relevant details.	Users
FR - 17	The system shall calculate the total cost of a sales transaction based on the selected products and quantities.	System
FR - 18	The system shall allow users to view and search for sales transactions, including details such as date, customer, and total cost.	Users

2.2.7 Purchase Manage:

Requirement ID	Requirement Description	Stakeholders
FR - 19	The system shall allow users to create purchase transactions by selecting the supplier, products, quantities, and other relevant details.	Users
FR - 20	The system shall calculate the total cost of a purchase transaction based on the selected products and quantities.	System

FR - 21	The system shall allow users to view and search for purchase transactions, including details such as date, supplier, and total cost.	Users

2.2.8 Expense Management:

Requirement ID	Requirements Description	Stakeholders
FR - 22	The system shall provide the capability to record end categories Various expenses, utilities, rent, his salary.	Users
FR - 23	The system shall allow users to add new expense records by providing details such as description, amount, and date	Users
FR - 24	The system shall allow users to view and search for expense records, including details such as description, amount, and date.	Users

2.2.9 Return Management:

Recruitments ID	Requirement Description	Stakeholders
FR - 25	The system shall enable users to process product returns, including updating inventory quantities and refunding the customer.	Users
FR - 26	The system shall allow users to view and search for return transactions, including details such as date, customer, and refunded amount.	Users
FR - 27	The system shall generate return reports for analysis and tracking purposes.	Users , System

2.2.10 Report Generate:

Requirement ID	Requirement Description	Stakeholders
FR - 28	The system shall provide predefined report templates to generate reports on sales, purchases, expenses, and inventory status.	Users
FR - 29	The system shall allow users to customize report parameters, such as date range or specific data filters, before generating reports.	Users

FR - 30	The system shall generate reports in a printable format, such as PDF or Excel, and provide options for saving or exporting the reports.	Users , System

2.3 Non Functional requirements:

2.3.1 Performance:

- The system should handle a large volume of inventory, sales, and purchase data efficiently.
- It should provide quick response times for user interactions and generate reports within reasonable time frames.

2.3.2 Security:

- The system should employ robust security measures, including data encryption, secure user authentication, and access control.
- It should protect sensitive data, such as customer information and financial records, from unauthorized access.

2.3.3 Usability:

- The system should have an intuitive and user-friendly interface, minimizing the learning curve for users.
- It should provide clear instructions and error messages to guide users during operations.

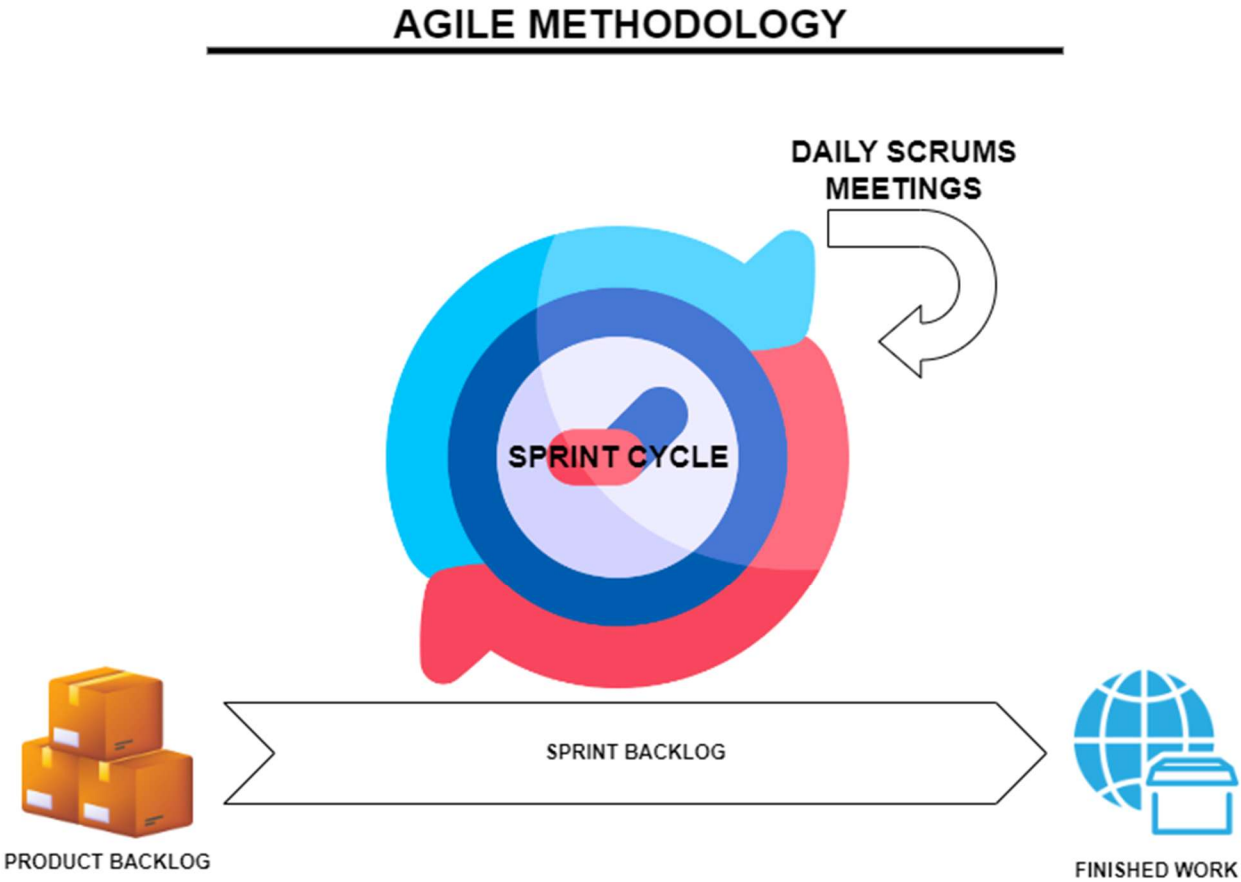
- The system should be compatible with multiple devices and screen sizes, ensuring responsiveness and usability

Chapter 3

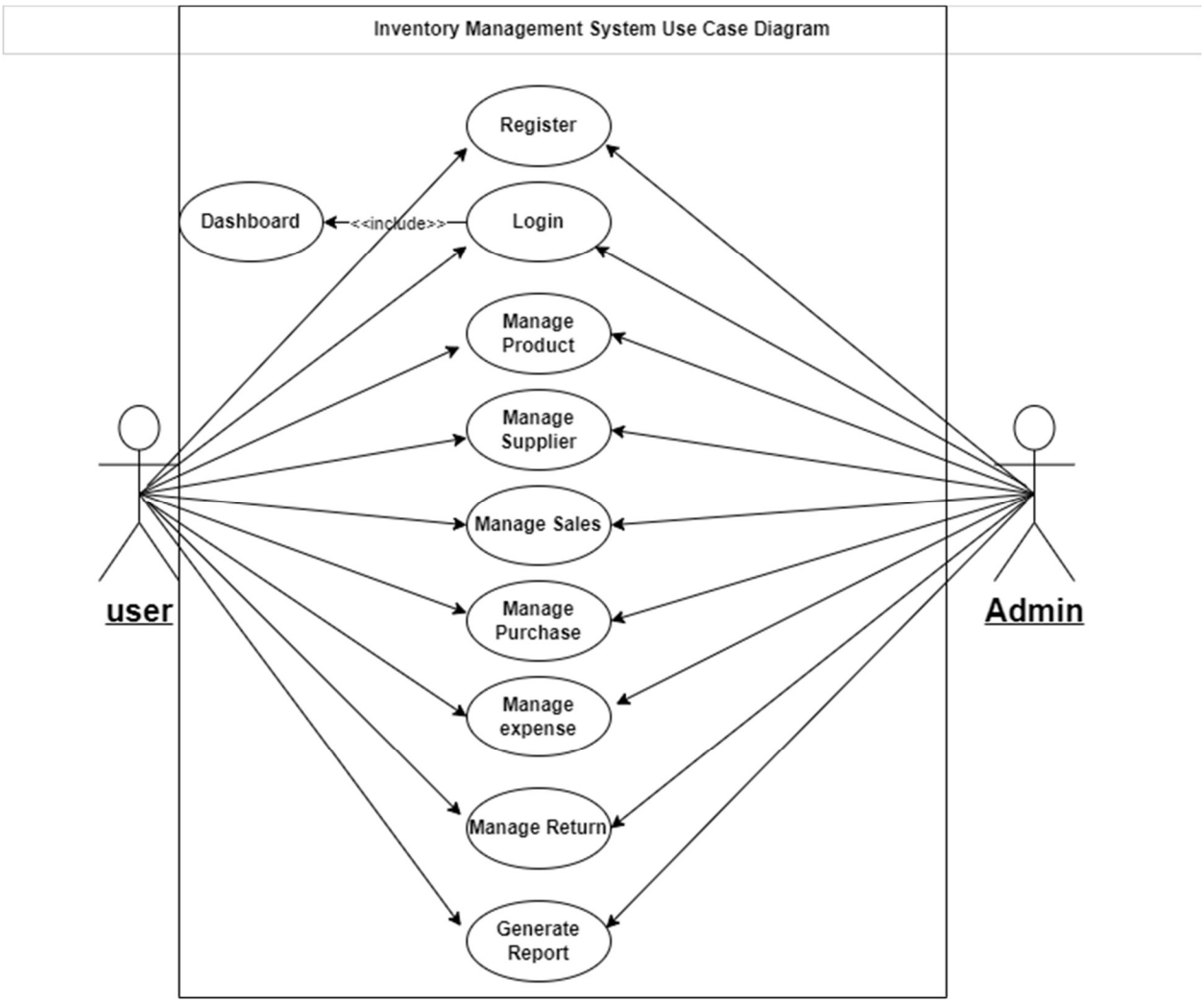
Software Requirement Analysis and Specification

3.1 Development Model:

Development Model In the case of a MERN stack project, which involves developing a web application using technologies such as MongoDB, Express.js, React, and Node.js, the Agile method is being used here. These methodologies emphasize regular communication, short development cycles (sprints), and frequent feedback from stakeholders. The Agile model enables the project team to deliver working software incrementally, allowing for early feedback and continuous integration
of new features. It also facilitates the ability to adapt to changing requirements and priorities as the project progresses



3.2 Use Case Diagram



3.3 Use Case Descriptions

3.3.1 Login

Use Case Name	Login
Goal	Allow a user to log into a system
Preconditions	User must be registered with their email and correct password
Primary Actor	User
Secondary Actor	-
Trigger	N/A

3.3.2 Sales

Use Case Name	Manage Sales
Goal	Allow the user to manage sales transactions and records
Preconditions	User must logged into the system
Primary Actor	User
Secondary Actor	-
Trigger	N/A

3.3.3 Purchase

Use Case Name	Manage Sales
Goal	Allow the user to manage sales transactions and records
Preconditions	User must be logged into the system
Primary Actor	User
Secondary Actor	-
Trigger	N/A

3.3.4 Returns

Use Case Name	Manage Return
Goal	Allow the user to manage product returns and related records
Preconditions	User must be logged into the system
Primary Actor	User
Secondary Actor	-
Trigger	N/A

3.3.5 Supply Manage

Use Case ID	UC-05
Use Case Name	Manage Supplier
Goal	Allow the user to manage supplier information
Preconditions	User must be logged into the system

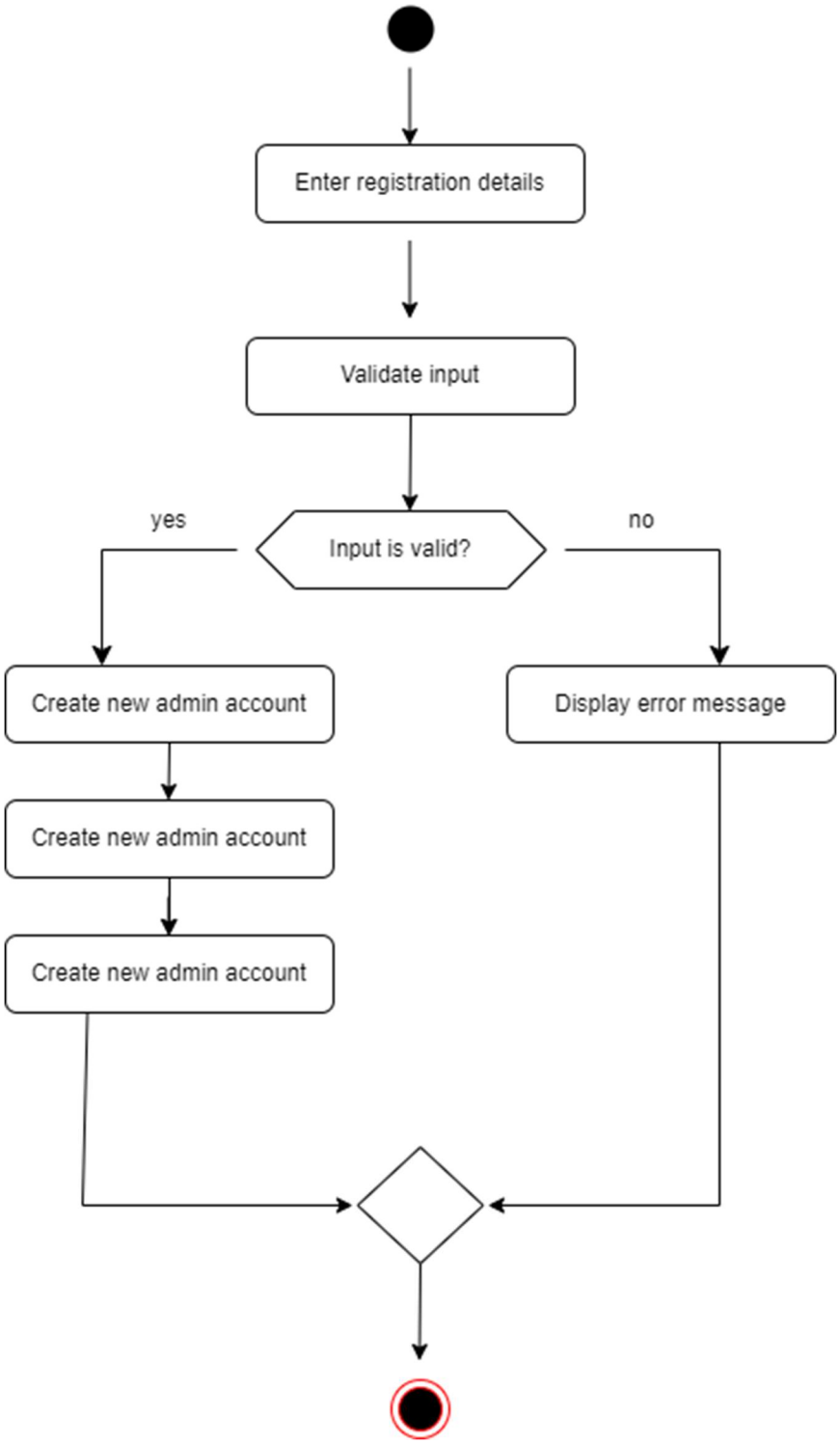
Primary Actor	User
Secondary Actor	-
Trigger	N/A

3.3.6 Report Generator

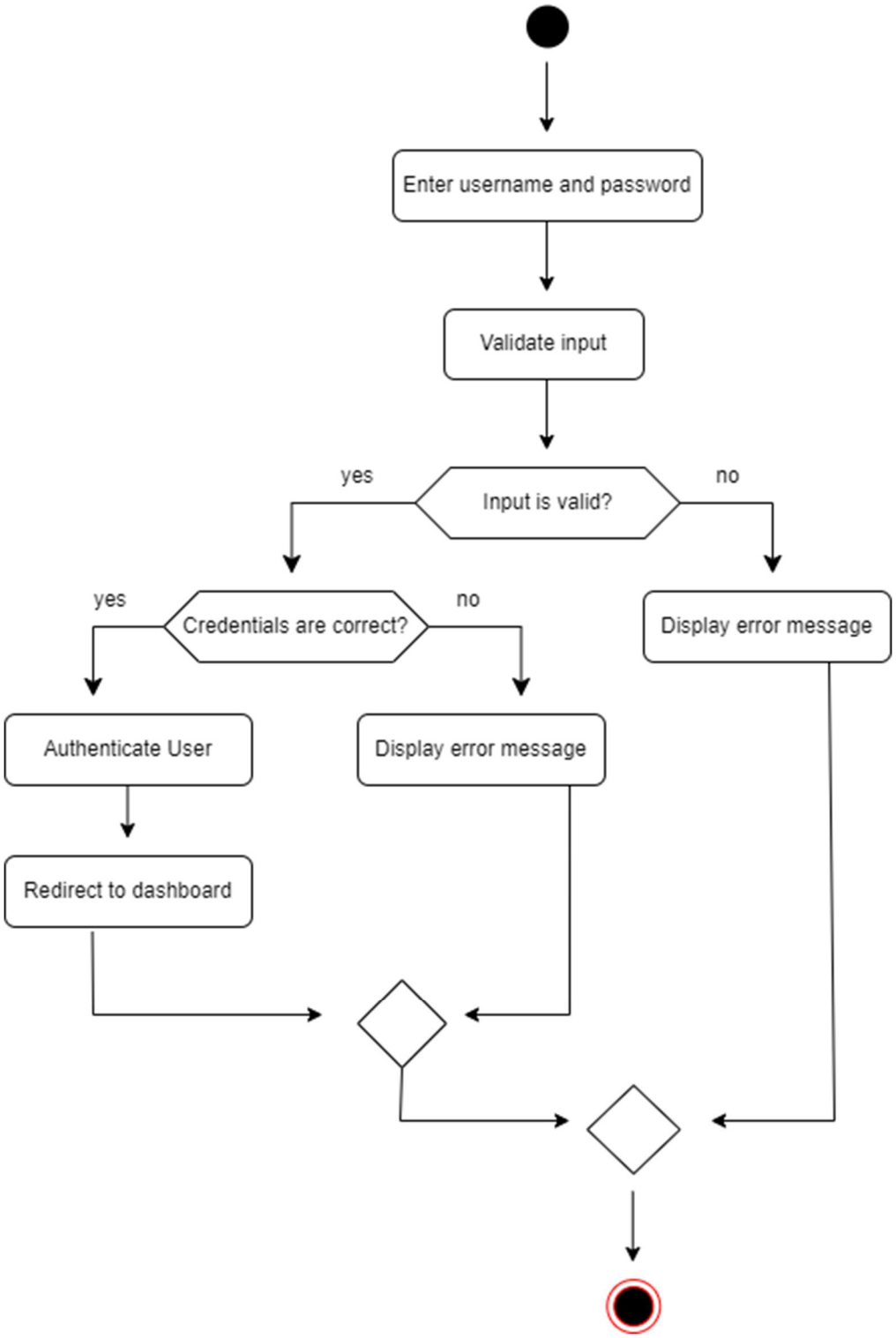
Use Case ID	UC-10
Use Case Name	Generate Report
Goal	Allow the user to generate system reports
Preconditions	User must be logged into the system
Primary Actor	User

3.4 Activity Diagram

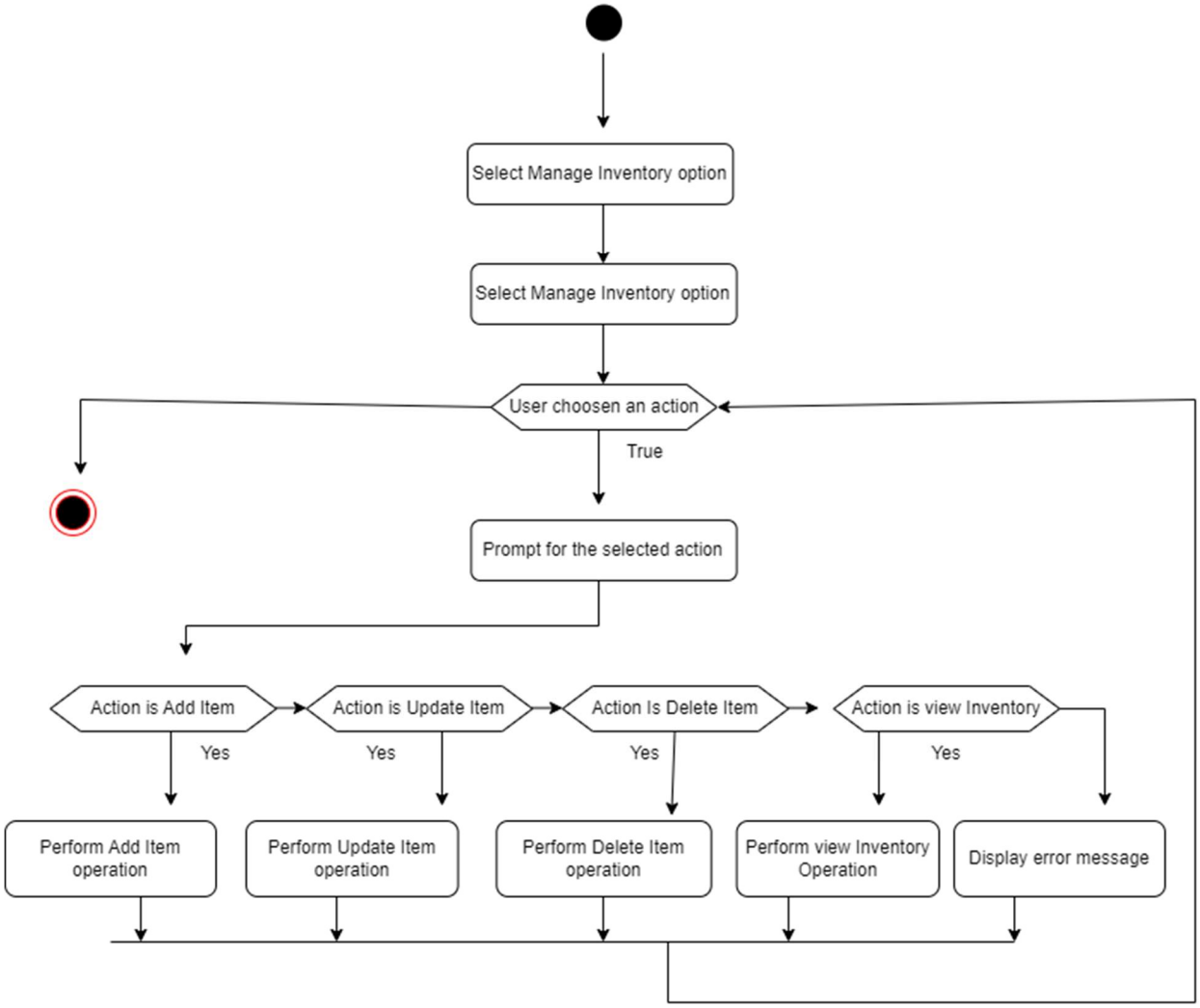
3.4.1 Register



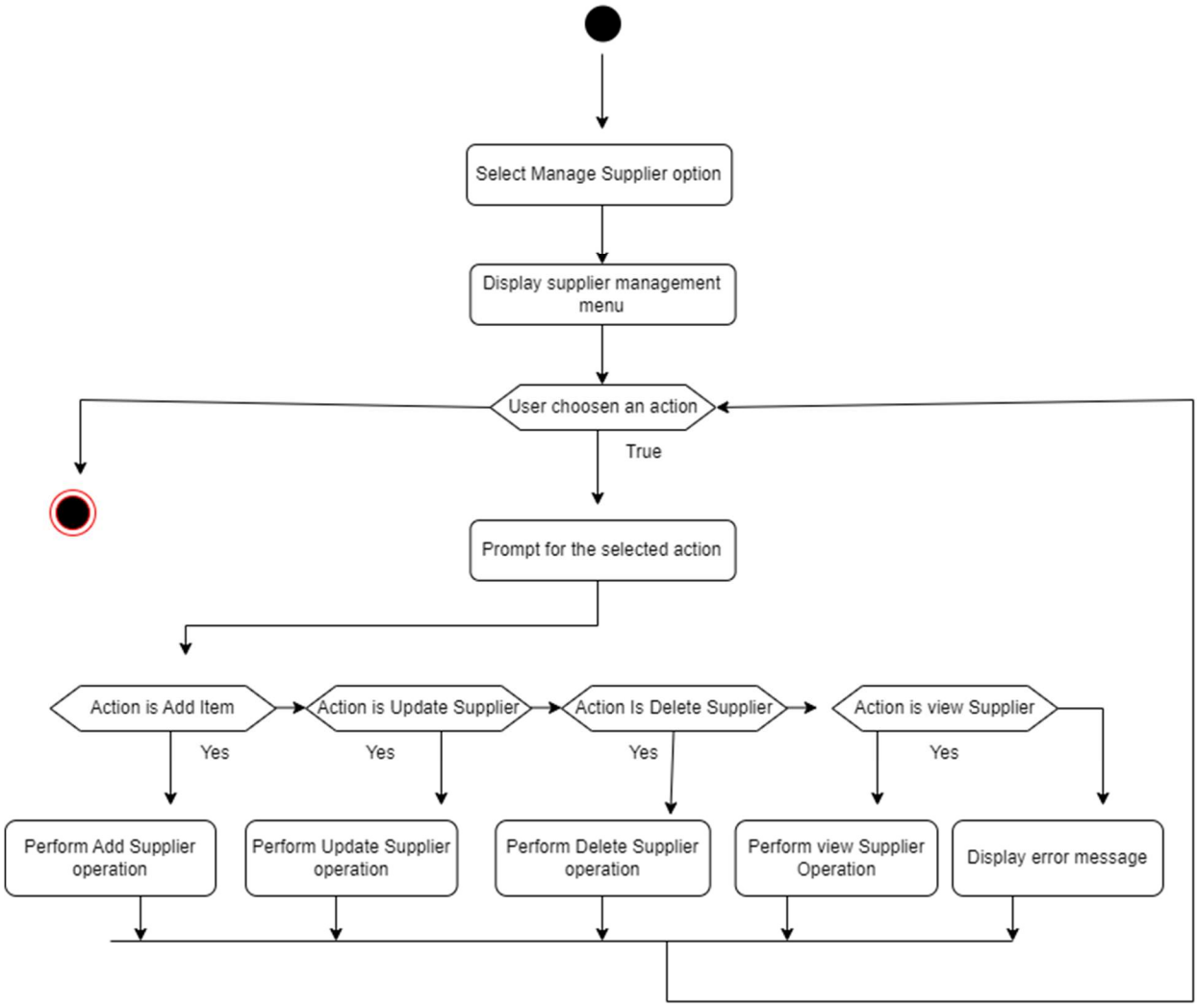
3.4.2 Login



3.4.3 Manage Inventory



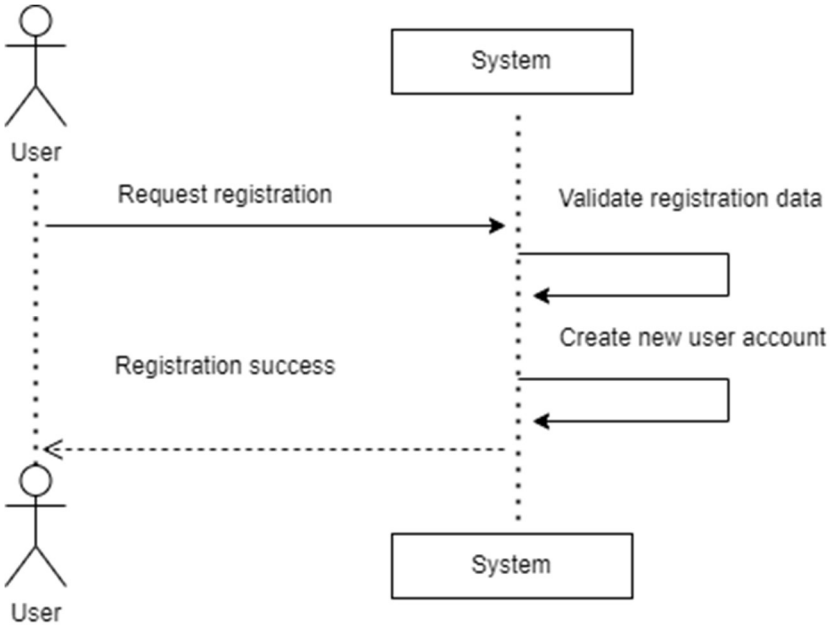
3.4.4 Manage Supplier



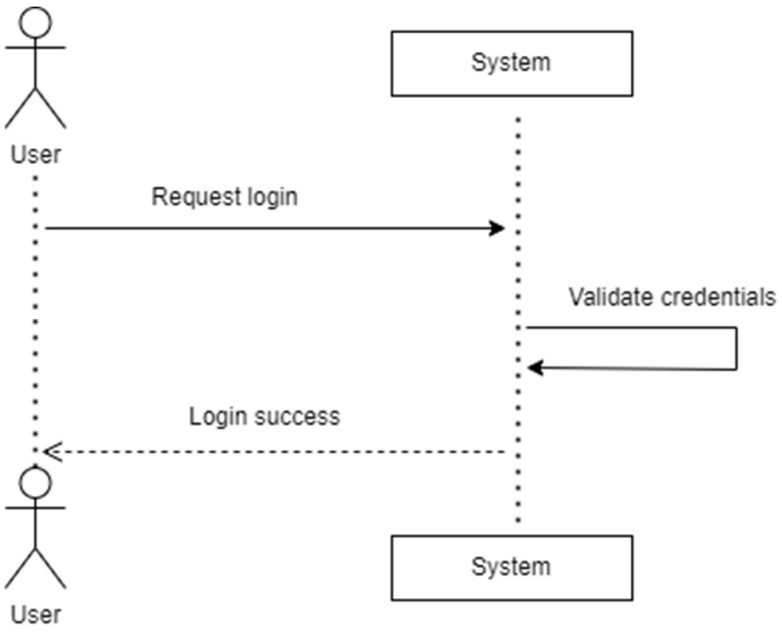
3.4.5 Generate Report

3.5 Sequence Diagram

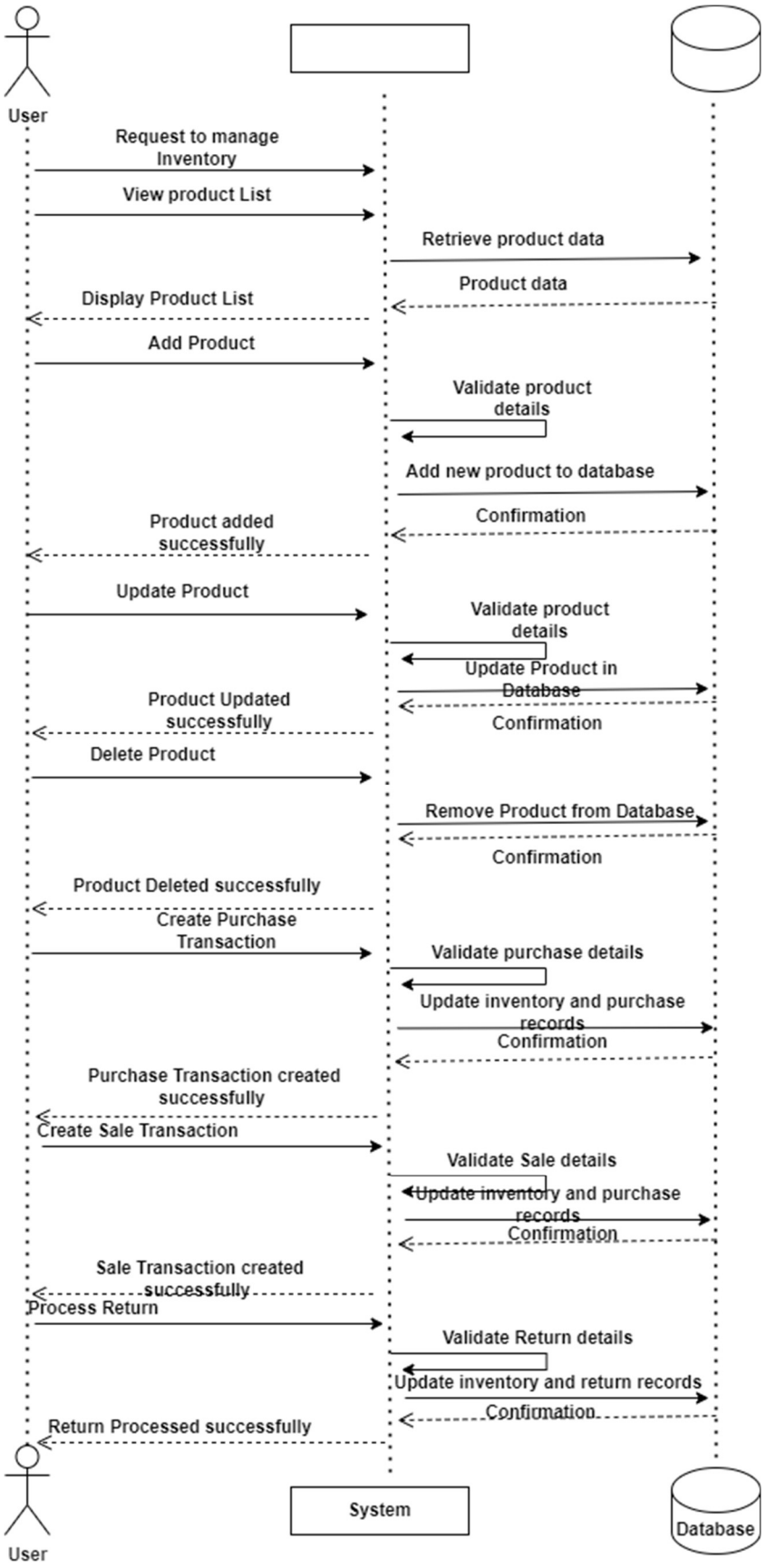
3.5.1 Register



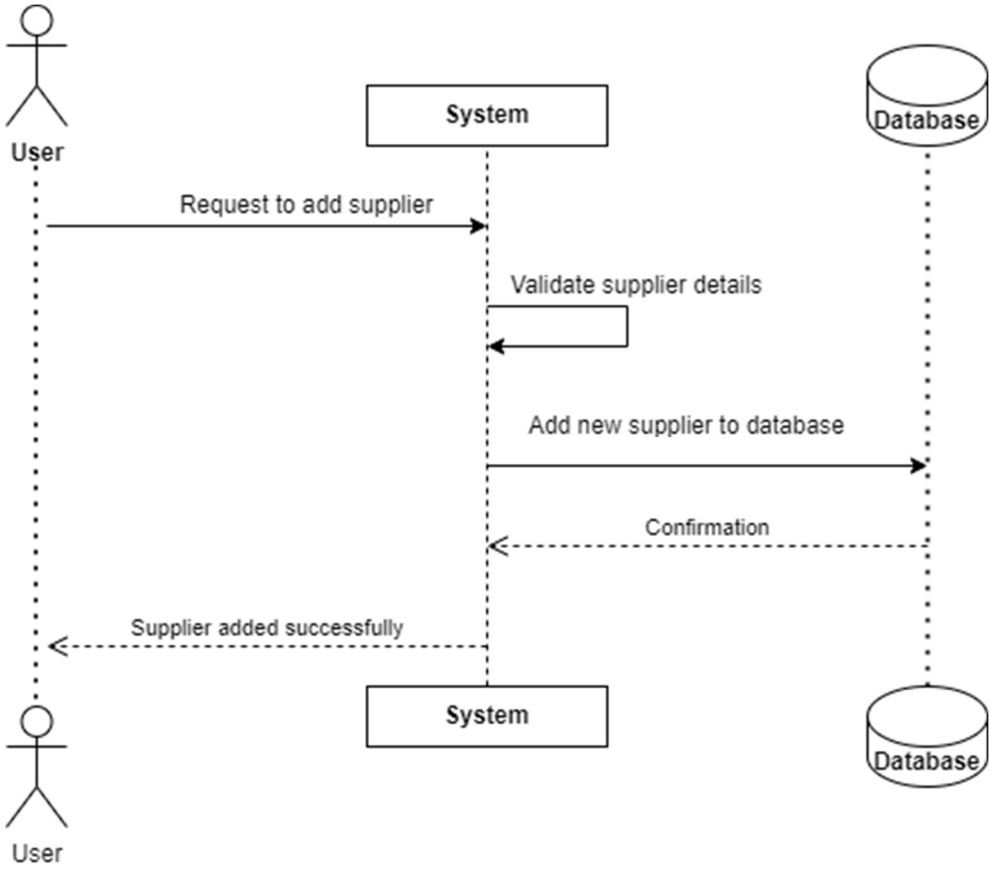
3.5.2 Login



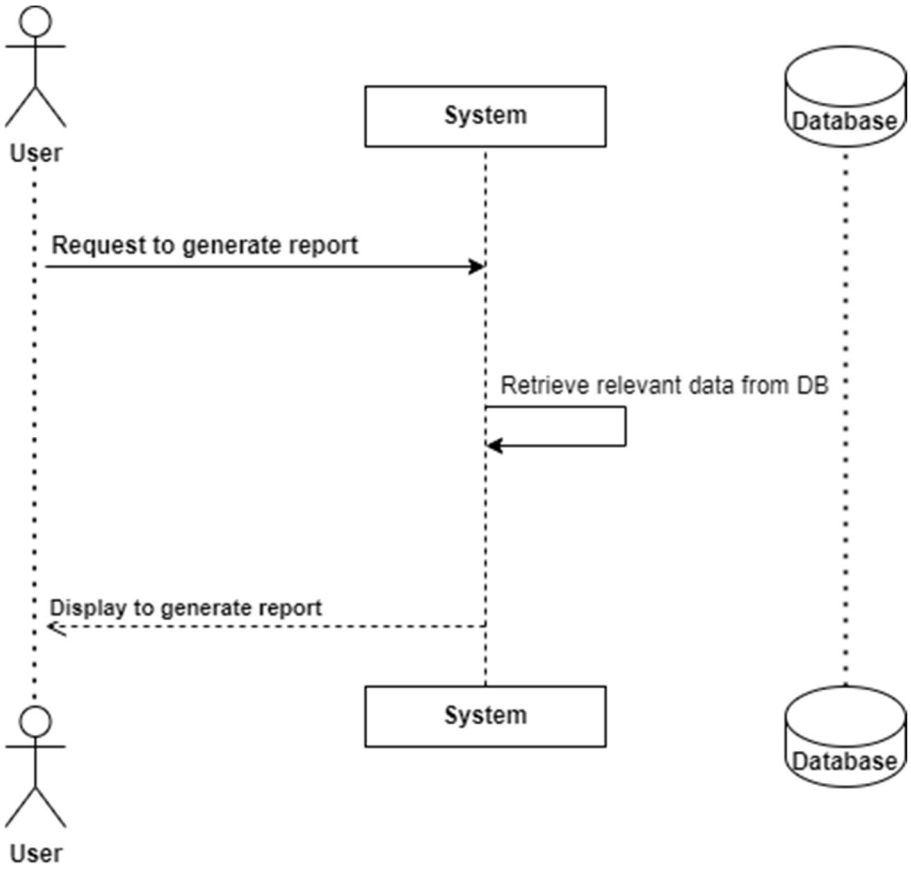
3.5.3 Manage Inventory



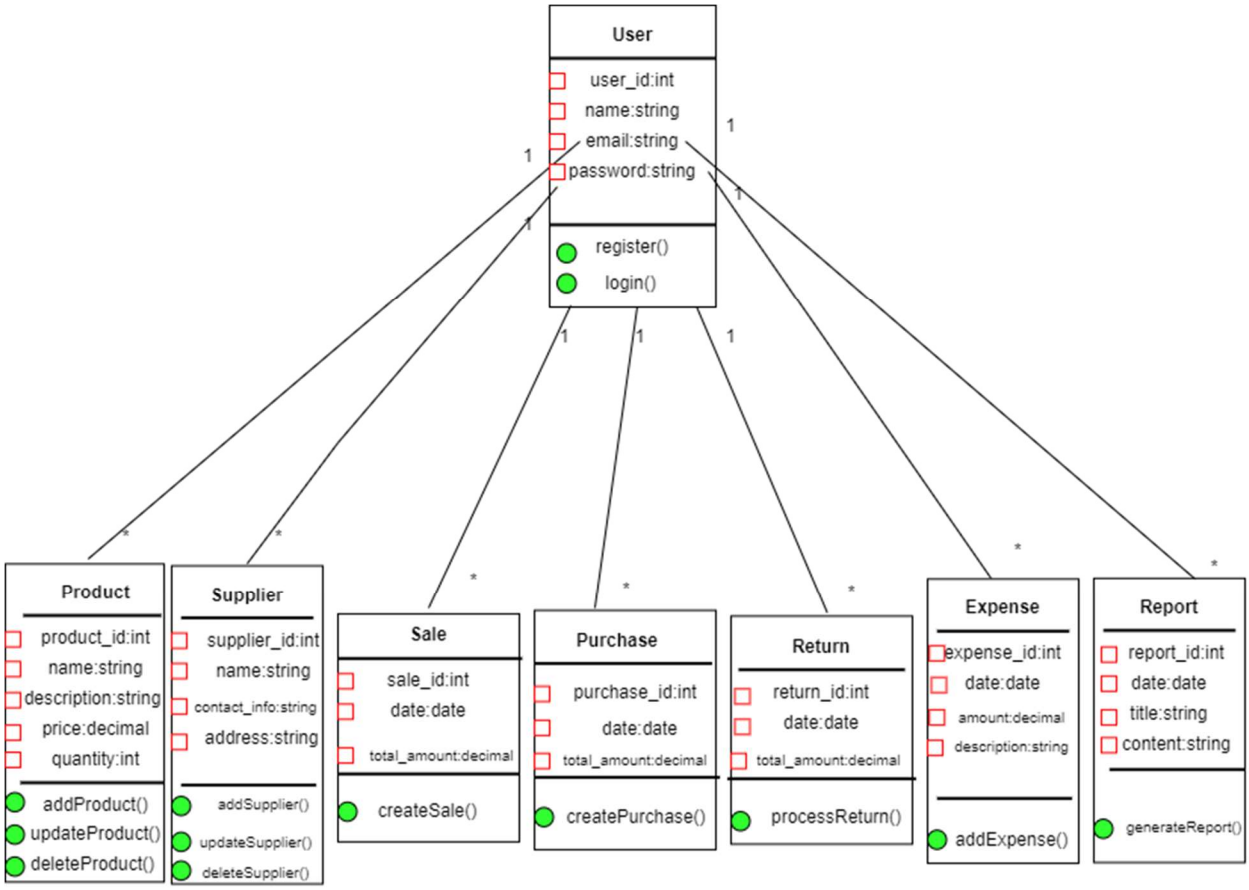
3.5.4 Manage Supplier



3.5.5 Generate Report



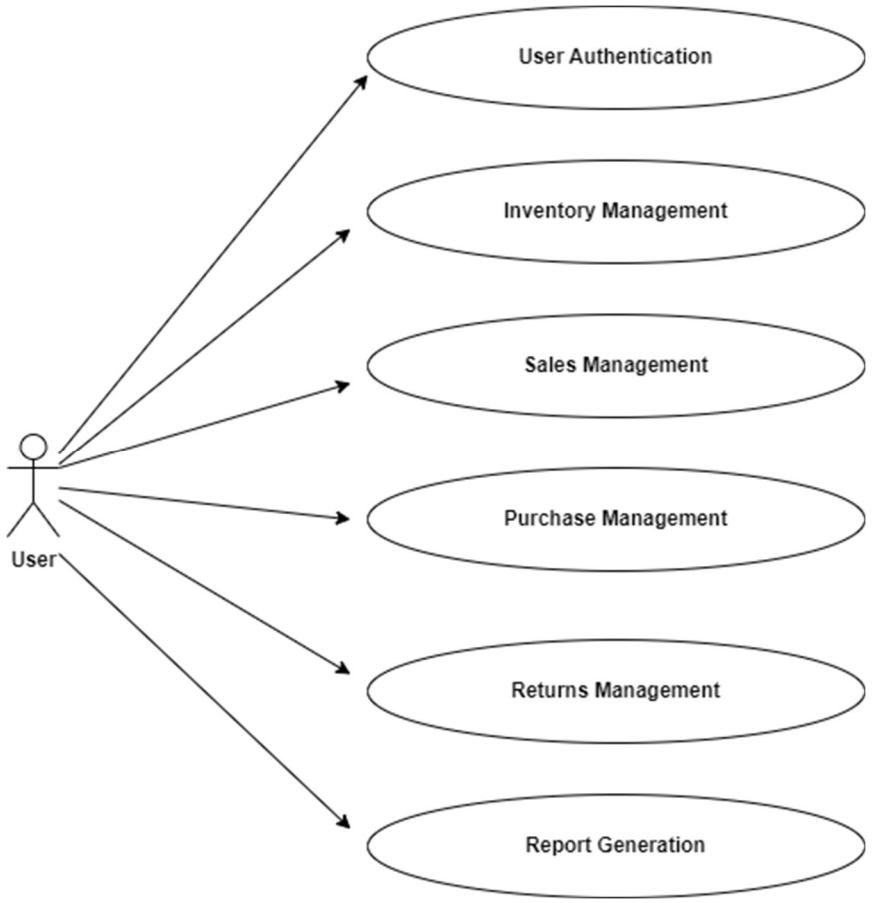
3.7 Class Diagram



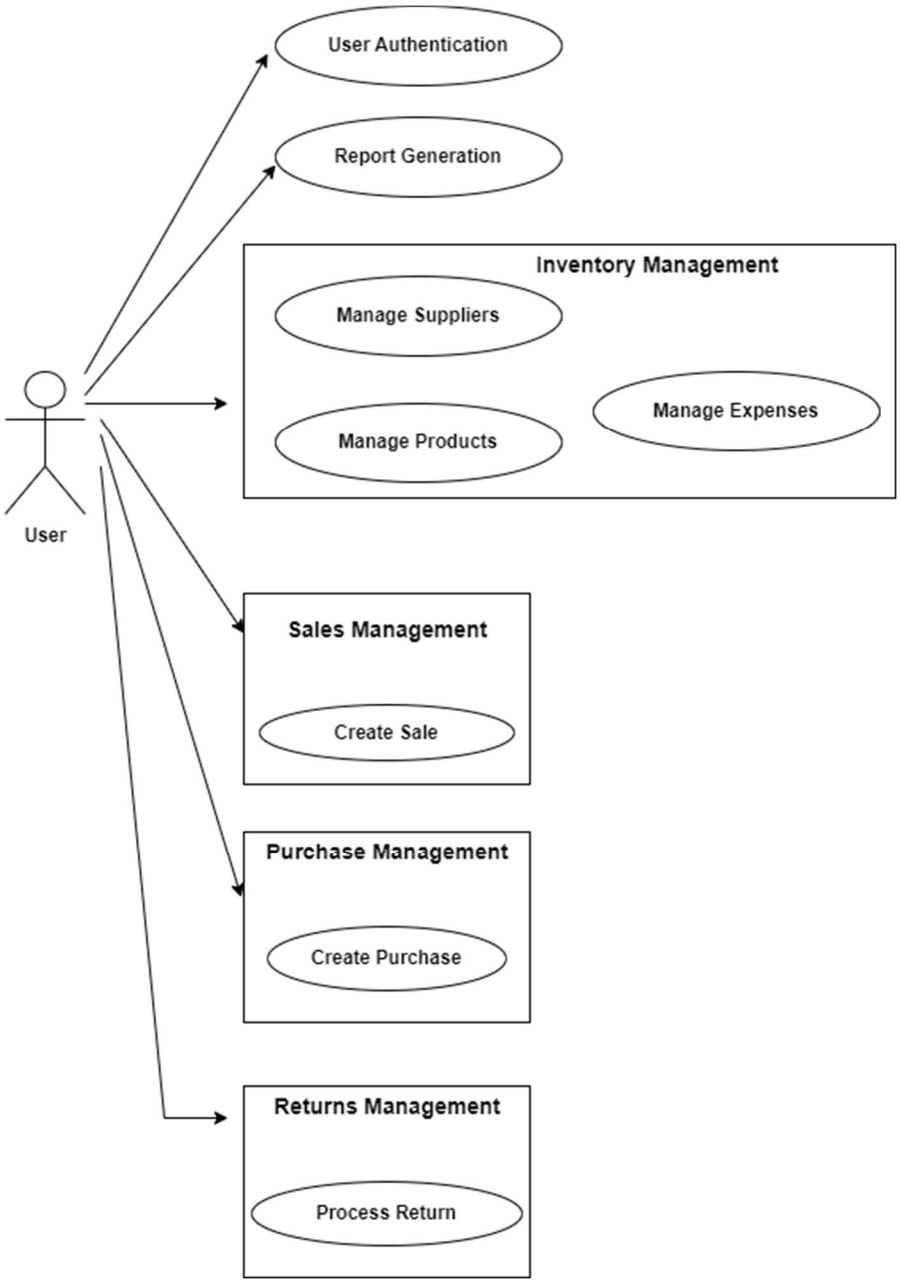
3.8 Data Flow Diagram

3.8.1 DFD Level 0

Inventory Management System - Level 0 DFD

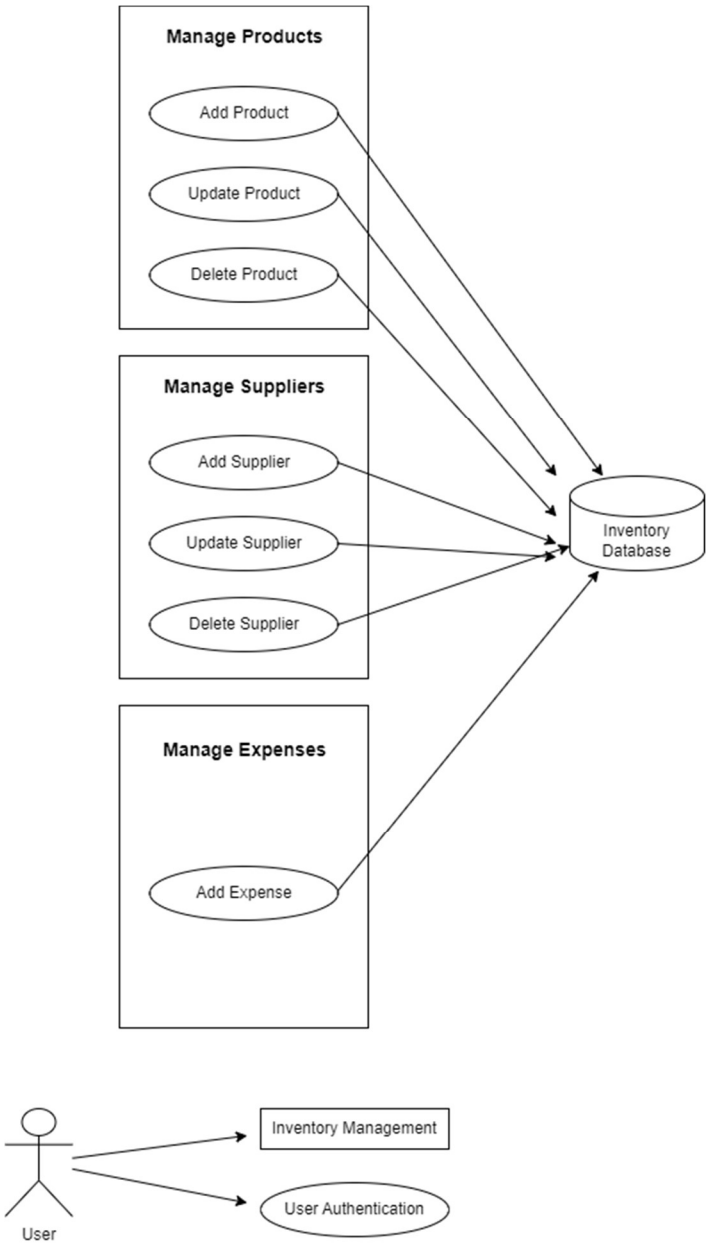


3.8.2 DFD Level 1

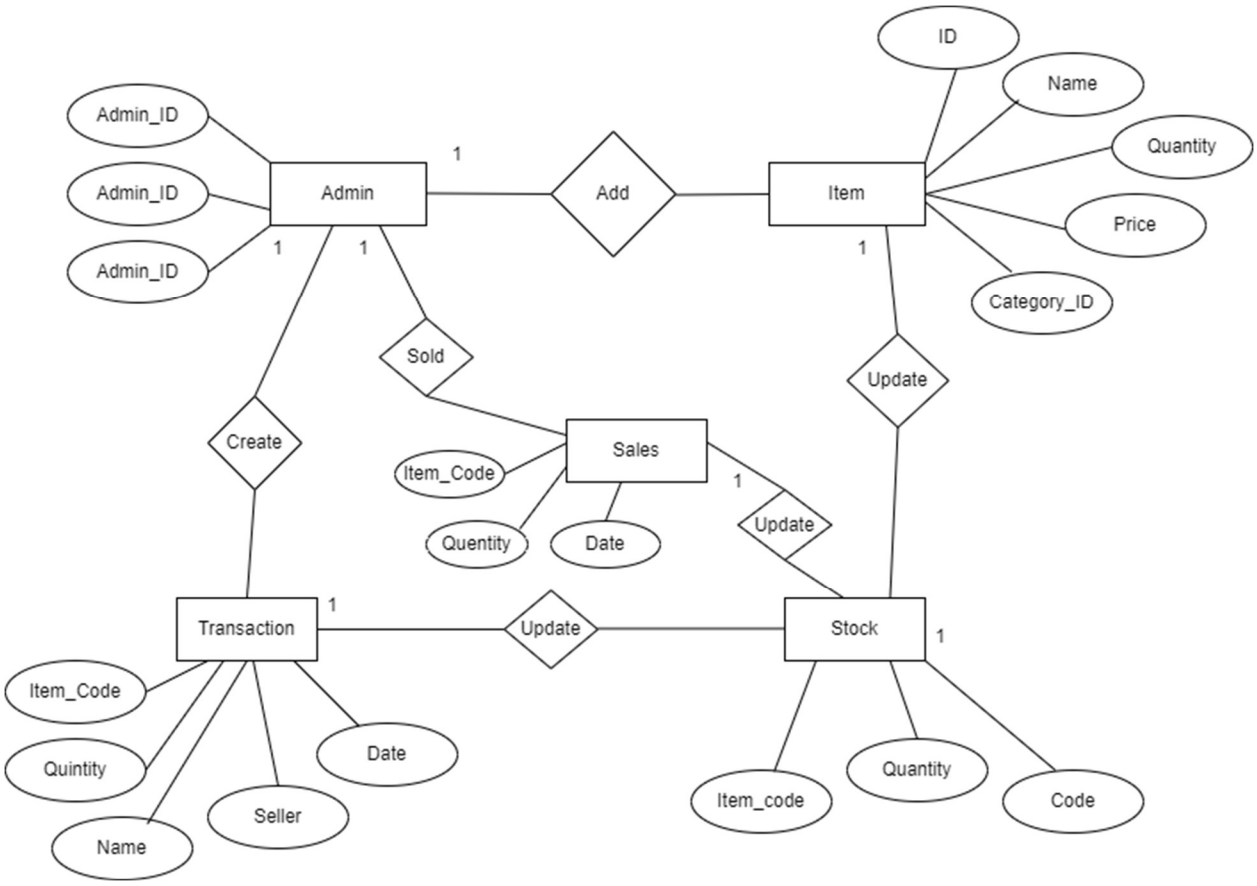


3.8.3 DFD Level 2

Inventory Management System- Level 2 DFD



3.8.4 ERD Diagram:



Chapter 4

Development Tools and Technologies

4.1 Integrated Development Environment (IDE)

An integrated development environment (IDE) is a software application that provides comprehensive facilities to computer programmers for software development. An IDE normally consists of at least a source code editor, build automation tools, and a debugger. I used VS Code for developing my Web Application.

4.2 Programming Language

This is basically a MERN stack project. This project is developed in JavaScript. The backend is developed with Node JS.

4.3 UI Design

This project's user interface is designed with React JS and Redux JS for design.

4.4 Database

A database is an organized collection of data, generally stored and accessed electronically from a system. The database management system is the software that interacts with end-users, and applications. We have used the MongoDB cluster as a cloud database in this project.

4.5 Deploy and hosting

For Deploy and Hosting, we used GitHub and Vercel.

Chapter 5

Test Cases

5.1 Test Cases for User Authentication:

Test Case ID	Test Scenario	Expected Result
TCA-001	Valid username and password provided	User successfully authenticated
TCA-002	Invalid username and password provided	User authentication fails
TCA-003	Empty username and password fields	User authentication fails
TCA-004	Password with incorrect case sensitivity	User authentication fails
TCA-005	User account locked due to multiple failed attempts	User authentication fails and account locked

5.2 Test Cases for Inventory Management:

Test Case ID	Test Scenario	Expected Result
TCI-001	Adding a new item to the inventory	Item successfully added
TCI-002	Updating an existing item in the inventory	Item information successfully updated
TCI-003	Deleting an item from the inventory	Item successfully deleted

TCI-004	Viewing the inventory	
TCI-005	Adding an item with invalid or missing data	Item addition fails

5.3 Test Cases for Sales Management:

Test Case ID	Test Scenario	Expected Result
TCS-001	Recording a new sale	Sale successfully recorded
TCS-002	Updating an existing sale information	Sale information successfully updated
TCS-003	Viewing the sales records	Sales records displayed successfully
TCS-004	Attempting to record a sale with invalid data	Sale records fails

5.4 Test Cases for Purchase Management:

Test Case ID	Test Scenario	Expected Results
TCP-001	Adding a new purchase	Purchase successfully added
TCP-002	Updating an existing purchase information	Purchase information successfully updated
TCP-003	Viewing the purchase records	Purchase records displayed successfully

TCP-004	Attempting to add a purchase with invalid data	Purchase addition fails

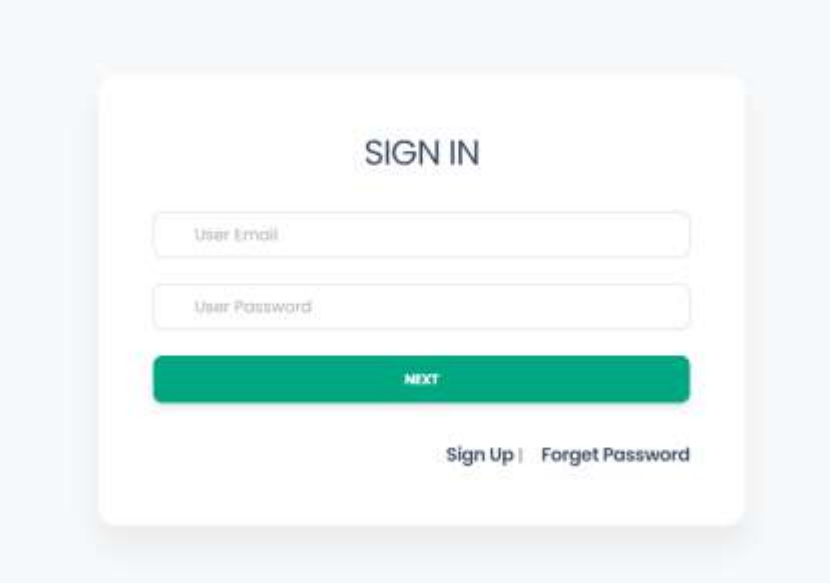
5.5 Test Cases for Returns Management:

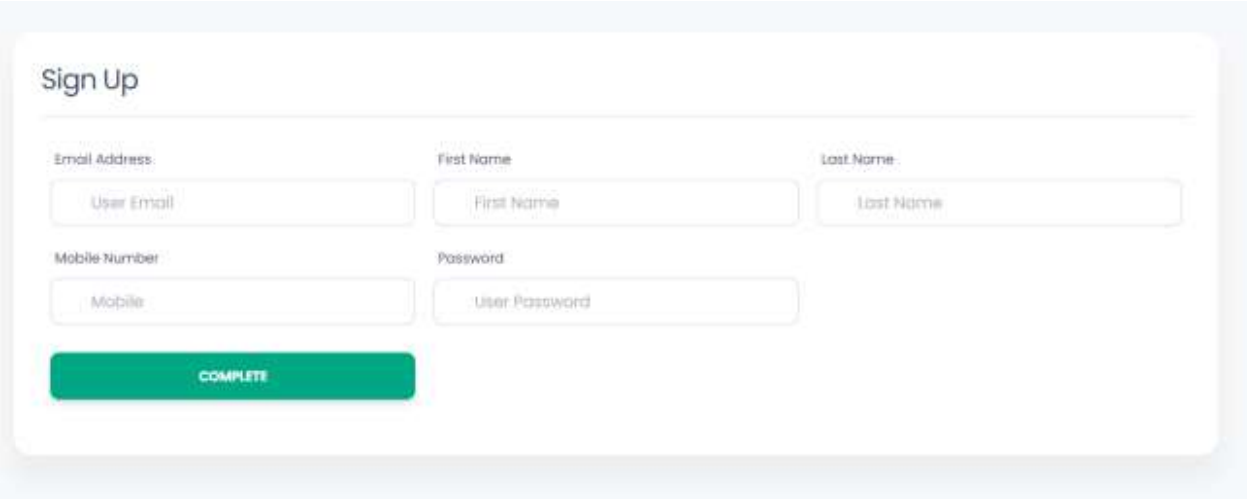
Test Case ID	Test Scenario	Expected Result
TCR-001	Processing a return	Return successfully processed
TCR-002	Viewing the return records	Return record displayed successfully
TCR-003	Attempting to process a return with invalid data	Return processing fails

Chapter 6

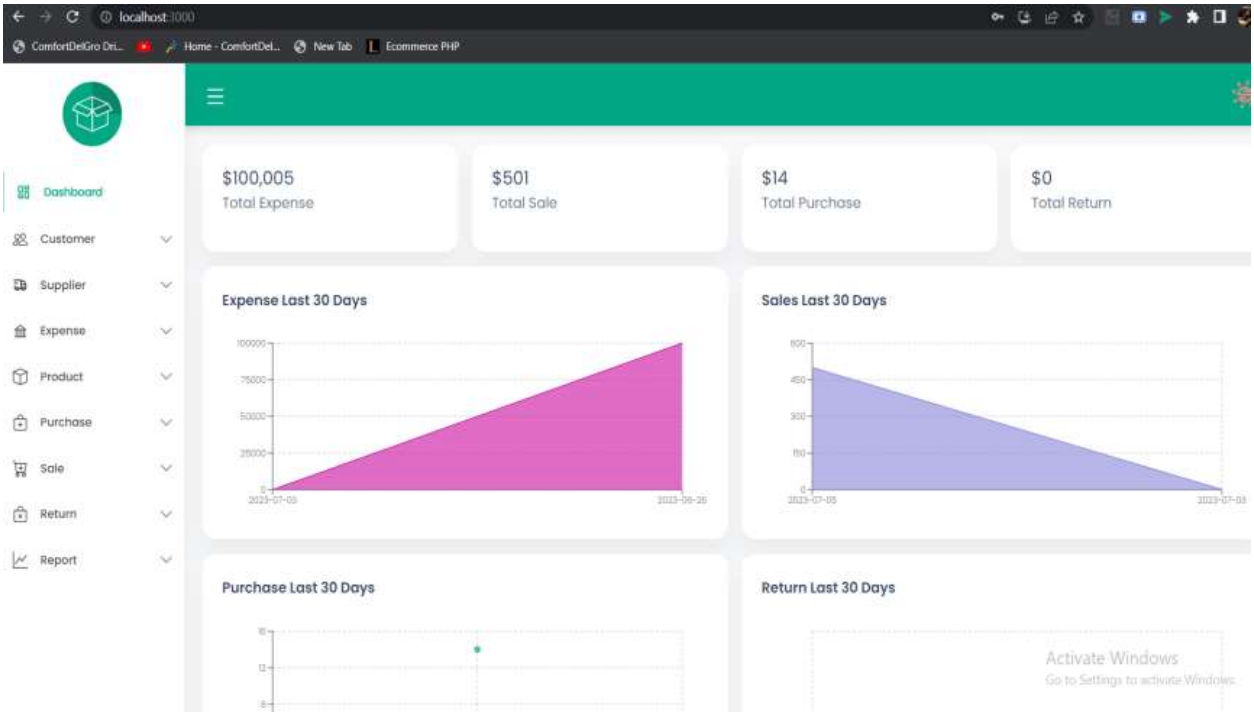
User Guideline

6.1 Login/Registration/Forgot Password



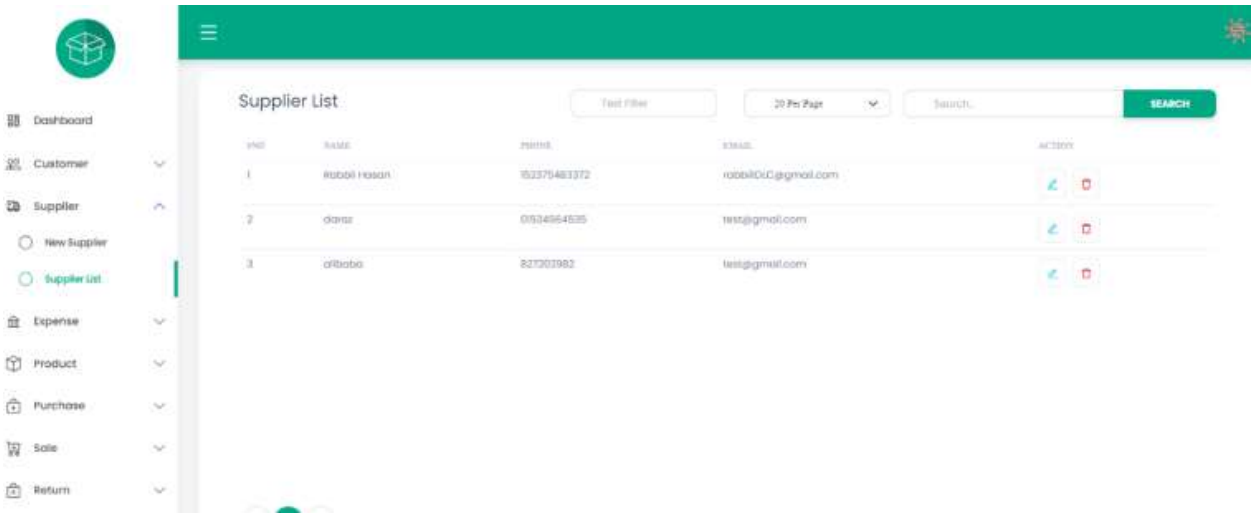


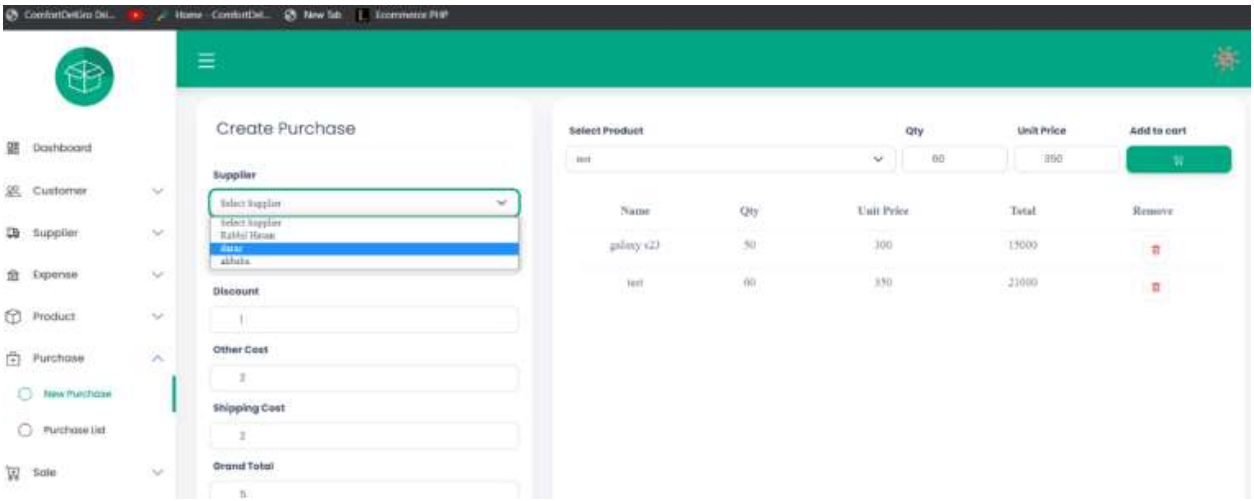
6.2 Dashboard

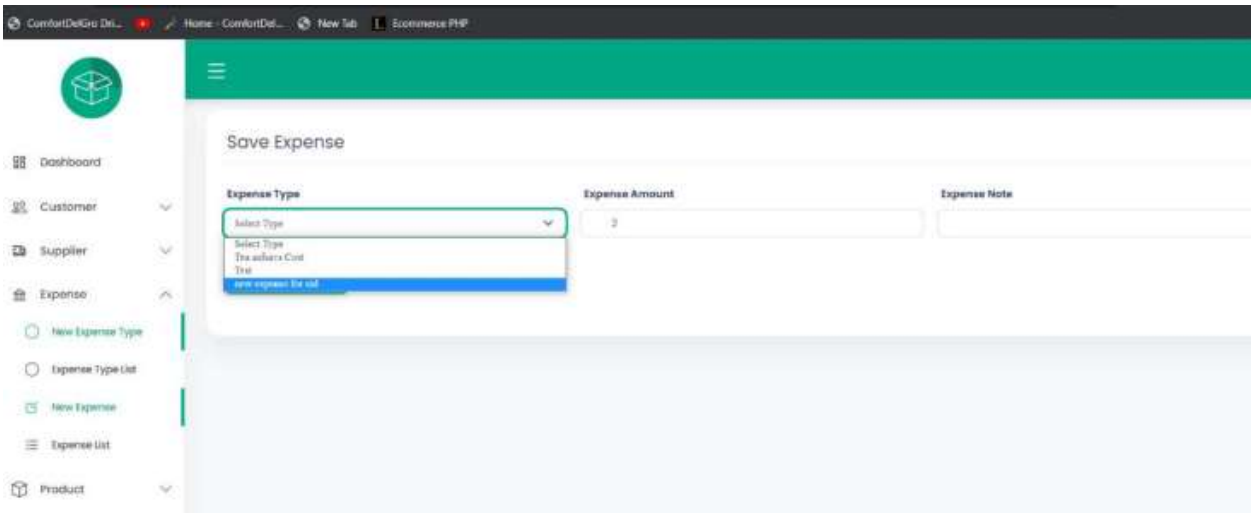


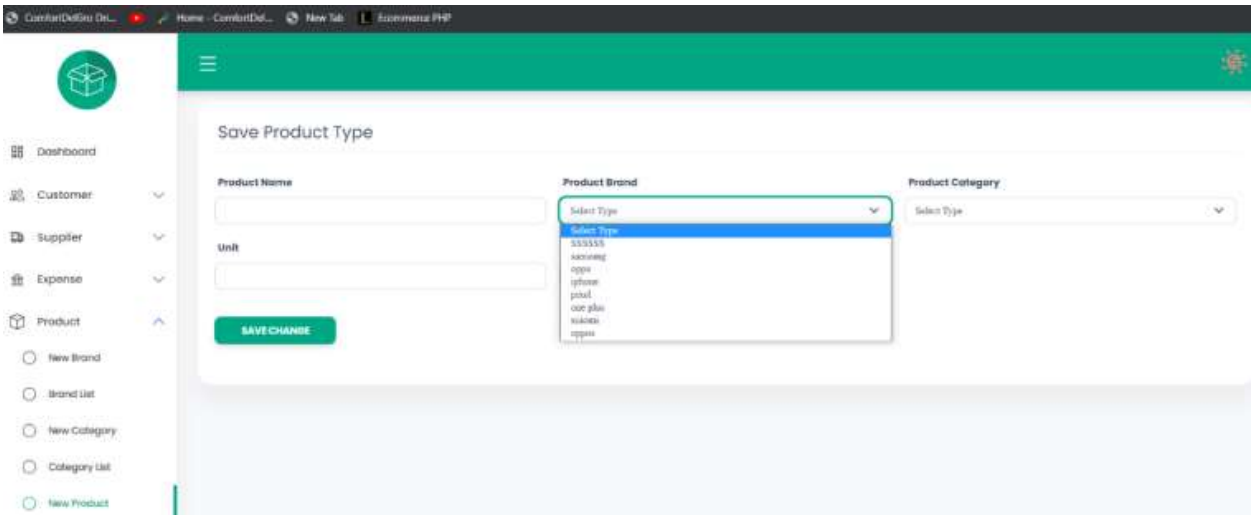
Dashboard with Summary

6.3 Other Functionalities



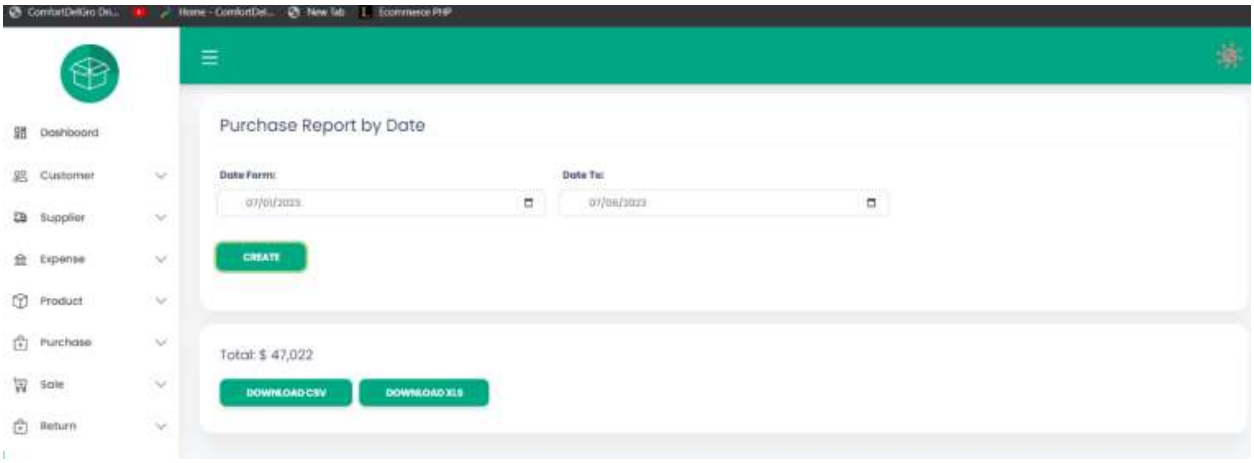


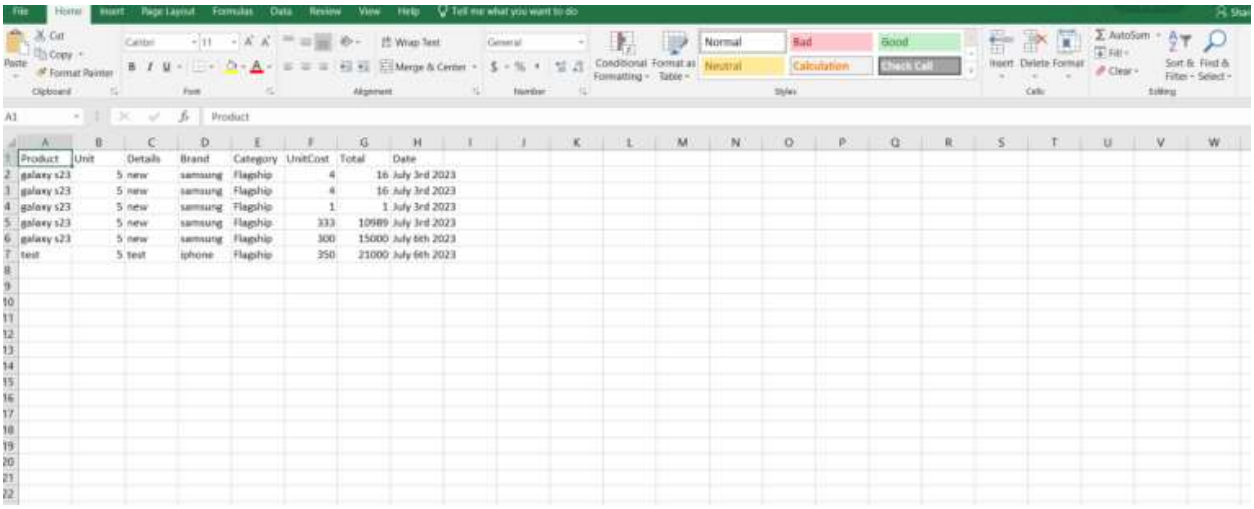




Others Functionalities

6.4 Generate Report into excel or CSV file





Product	Unit	Details	Brand	Category	UnitCost	Total	Date
galaxy s23		5 new	samsung	Flagship	4	16	July 3rd 2023
galaxy s23		5 new	samsung	Flagship	4	16	July 3rd 2023
galaxy s23		5 new	samsung	Flagship	1	1	July 3rd 2023
galaxy s23		5 new	samsung	Flagship	333	10989	July 3rd 2023
galaxy s23		5 new	samsung	Flagship	300	15000	July 6th 2023
test		5 test	iphone	Flagship	350	21000	July 6th 2023

Chapter 7

Conclusion

The System offers numerous benefits to businesses in efficiently managing their inventory, sales, purchases, returns, and generating reports. However, it is essential to consider both the advantages and potential challenges associated with the system.

7.1 Pros:

Efficient Inventory Control: The system enables businesses to track and manage their inventory levels accurately, leading to improved efficiency, reduced carrying costs, and minimize stock outs or overstocks.

Streamlined Operations: By automating inventory management tasks, sales, purchases, and returns processes, the system streamlines operations, reduces manual effort, and increases productivity.

Enhanced Decision Making: The availability of accurate and up-to-date reports empowers administrators to make informed decisions regarding inventory planning, sales strategies, and supplier management.

Improved Customer Satisfaction: The system facilitates timely order fulfillment, effective returns management, and transparent communication, resulting in enhanced customer satisfaction.

Scalability and Adaptability: The system is designed to be scalable, accommodating business growth, and adaptable to changing requirements.

7.2 Cons:

Initial Implementation Effort: The initial setup and implementation of the system may require time and resources, including data migration, integration with existing systems, and user training.

Technical Dependencies: The system's performance and functionality may rely on external factors, such as reliable internet connectivity, hardware infrastructure, and compatibility with specific devices or operating systems.

Security and Privacy Concerns: Ensuring the security of sensitive data, such as customer information and financial records, requires robust security measures and ongoing vigilance against potential threats.

User Adoption and Training: Proper training and user adoption initiatives may be necessary to ensure that all users, including administrators and staff, are comfortable and proficient in utilizing the system's features and functionalities.

Maintenance and Upgrades: Regular maintenance and updates may be required to address system bugs, add new features, and ensure compatibility with evolving technologies..

7.3 Future Scopes:

Inventory Management System provides a robust solution for businesses to streamline their inventory management processes, there are several potential future scopes to consider for further enhancements and expansions:

- Integration with E-commerce Platforms: Integrate the system with popular e-commerce platforms to automate inventory updates, order processing, and fulfillment. This would enable seamless synchronization between the online store and the inventory system, providing real-time inventory visibility and order management.

- Advanced Analytics and Forecasting: Enhance the reporting and analytics capabilities of the system by incorporating advanced data analysis techniques. This would enable businesses to gain deeper insights into inventory trends, sales patterns, and customer behavior. Additionally, implementing forecasting algorithms can help businesses predict demand and optimize inventory levels.

- Mobile Application: Develop a mobile application for the Inventory Management System, allowing administrators and staff to manage inventory, track sales, and perform other essential tasks from their mobile devices. This would provide convenience and flexibility, particularly for users who require on-the-go access to the system.

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- Supplier Relationship Management: Expand the supplier management functionality to include features such as performance tracking, automated order placement, and communication tools. This would strengthen supplier relationships, optimize procurement processes, and ensure reliable and timely supply of goods.

- Integration with Accounting Software: Integrate the inventory system with popular accounting software to automate financial processes such as invoicing, expense tracking, and financial reporting. This integration would streamline financial management and provide a holistic view of the business's financial health.

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- Warehouse Automation and IoT Integration: Explore the integration of Internet of Things (IoT) devices and technologies to automate inventory tracking, optimize warehouse operations, and enable real-time monitoring of stock levels. This could involve utilizing RFID tags, sensors, and smart devices to enhance inventory accuracy and streamline logistics.

- Machine Learning and AI Integration: Leverage machine learning and artificial intelligence techniques to develop predictive models for inventory demand, dynamic pricing, and automated replenishment. These advanced technologies can optimize inventory decisions, reduce costs, and improve customer satisfaction.

- Enhanced Security and Compliance: Continuously enhance the system's security measures to protect sensitive data, mitigate cyber threats, and ensure compliance with relevant regulations such as GDPR or data privacy laws. This includes implementing encryption, secure authentication protocols, and regular security audits.

These future scopes would further enhance the functionality, efficiency, and adaptability of the Inventory Management System, enabling businesses to stay competitive, improve decision- making, and optimize their inventory management processes.

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