Sri Lanka Institute of Information Technology

Faculty of Computing

Year 2 – Semester 1 (2025)

SE2030 - Software Engineering

Project Title: Web-based Inventory Control System

Design Document

Group ID: 2025-Y2-S1-MLB-B10G2-06

Registration Number	**Name**
IT24102699	Mummullage B.U.T
IT24102758	Priyamalka W D N
IT24102784	Panagodage N.M.H
IT24102773	Siriwardane K.D.D.D
IT24102795	Alahakoon A. M. J. P
IT24102798	Sooriyabandara U.R.G.W.K

5/10/2025

1. Agile Sprint Summaries

Sprints Completed So Far

Sprint 01: Foundation and User Management

Goal of the first sprint of our project is to establish the core project structure, database, and implement a secure user authentication system.

Sprint ID	User Story	Priority
SP1-01	As a user, I want to log in securely to the system so that I can access my designated functions.	High
SP1-02	As a System Administrator, I want to manage user accounts so that I can control access to the system.	High
SP1-03	As a user, I want a consistent and navigable application layout so that I can easily find my way around the system.	High
SP1-04	As a user, I want to be able to reset my password so that I can regain access if I forget it.	Medium

Key Deliverables:

- Project setup with Java and connection to the SQL Server database.
- Implementation of the database schema (Users, Items tables).
- User registration and secure login/logout functionality.
- Password reset and recovery feature.
- Creation of the main application layout and navigation.

Activities:

- Backend development for user authentication (hashing passwords, session management).
- Frontend UI design for login, registration, and main dashboard pages.
- Unit testing for user management functions.
- Initial setup of version control (Git).

Sprint 02: Core Inventory & Warehouse Operations

Goal of the second sprint is to implement the core inventory management (CRUD operations) and the interface for warehouse staff.

Sprint ID	User Story	Priority
SP2-01	As an Inventory Manager, I want to add, view, update, and delete items so that I can maintain an accurate inventory.	High

SP2-02	As a Warehouse Staff member, I want to update stock levels using a mobile device so that I can record changes in real-time.	High
SP2-03	As an Inventory Manager, I want to search and filter for items so that I can find products quickly.	High
SP2-04	As a Warehouse Staff member, I want to scan barcodes to look up items so that I can update stock information accurately.	Medium

Key Deliverables:

- A functional module for adding, viewing, updating, and deleting items in the inventory.
- A search and filter feature to easily find items.
- A mobile-responsive interface for warehouse staff to update stock levels.
- Integration with barcode scanning for item lookup and updates.

Activities:

- Backend API development for item management.
- Frontend development of the inventory table and item detail forms.
- Development of the warehouse-specific UI.
- Testing CRUD operations to ensure data integrity.
- Team review and feedback session.

Sprint 03: Order Processing and Sales Dashboard

Automate the purchase order process and provide the sales team with a real-time inventory dashboard is the goal of our third sprint.

Sprint ID	User Story	Priority
SP3-01	As an Inventory Manager, I want the system to automatically generate purchase orders for low-stock items to ensure timely replenishment.	High
SP3-02	As a Sales Staff member, I want to view a real-time inventory dashboard so that I can check product availability for customers.	High
SP3-03	As an Inventory Manager, I want purchase orders to be sent to suppliers automatically to streamline the ordering process.	High
SP3-04	As a Sales Staff member, I want to receive low-stock alerts on my dashboard so that I am aware of potential stockouts.	Medium

Key Deliverables:

- Automated creation and tracking of purchase orders sent to suppliers.
- Real-time inventory dashboard for the sales team showing stock levels and low-stock alerts.
- Functionality for sales staff to check stock availability and order status.
- Email notifications for purchase order status updates.

Activities:

- Developing the logic for purchase order generation based on reorder levels.
- Integrating an email service for sending notifications.
- Designing the UI for the sales dashboard with real-time data fetching.
- End-to-end testing of the order creation and fulfillment flow.

Sprints to be completed

Sprint 04: Reporting, Analytics, and Finalization

Develop the reporting module for the business owner, conduct final testing, and prepare for deployment is the goal of our final sprint.

Sprint ID	User Story	Priority
SP4-01	As a Business Owner, I want to view reports on sales and stock valuations so that I can make informed business decisions.	High
SP4-02	As a System Administrator, I want automated data backups scheduled so that company data is protected from loss.	High
SP4-03	As a user, I want a fully tested and bug-free system so that I can perform my tasks without interruption.	High
SP4-04	As a Business Owner, I want to export reports to PDF or Excel so that I can share and analyze the data offline.	Medium

Key Deliverables:

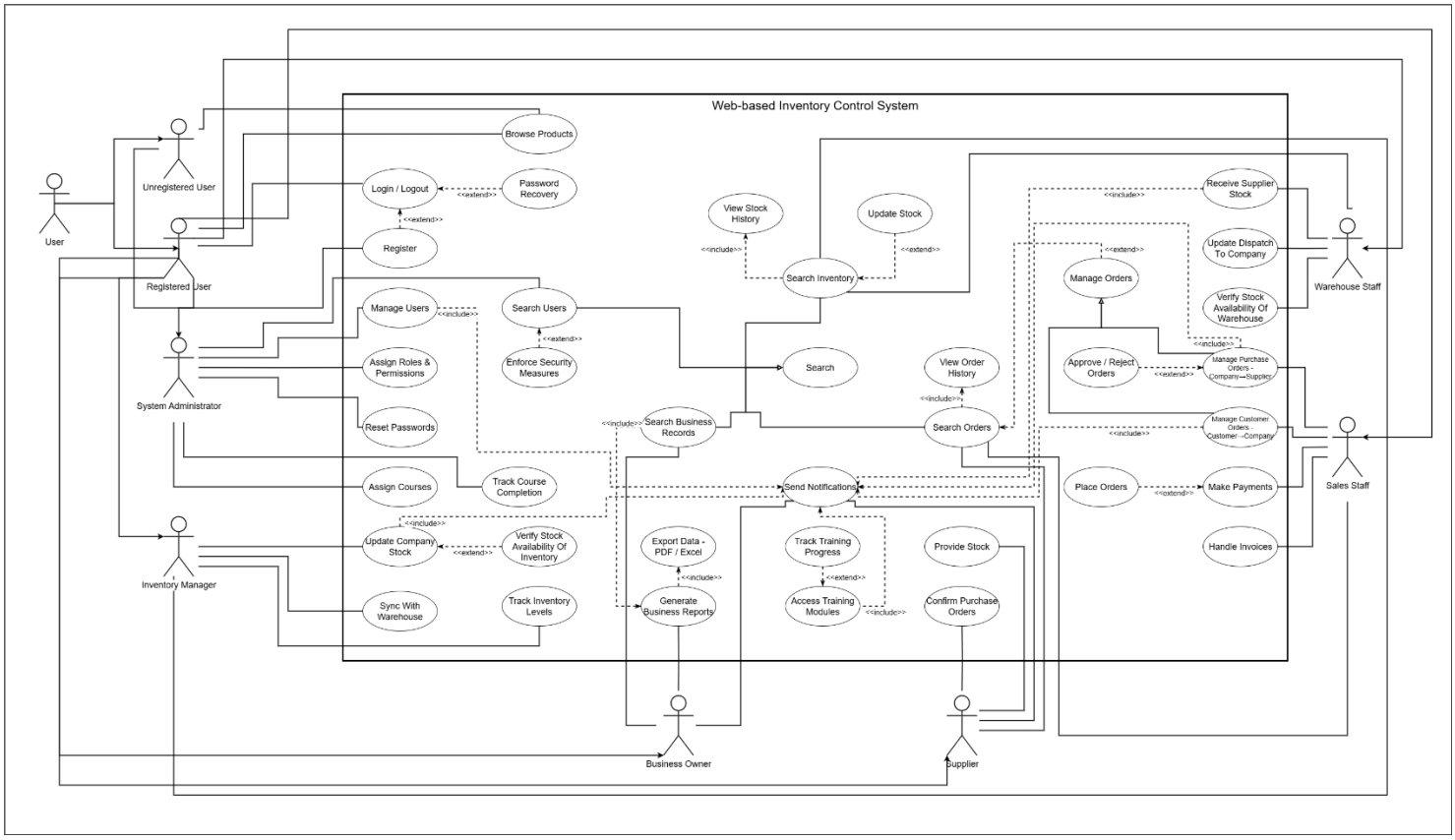
- A reporting dashboard for the business owner to view sales trends, stock valuation, and other key metrics.
- Functionality to export reports to PDF and Excel formats.
- Implementation of automated data backups.
- Comprehensive integration testing and bug fixing.
- User acceptance testing with stakeholders.
- Preparation of final project documentation and training guides.

Activities:

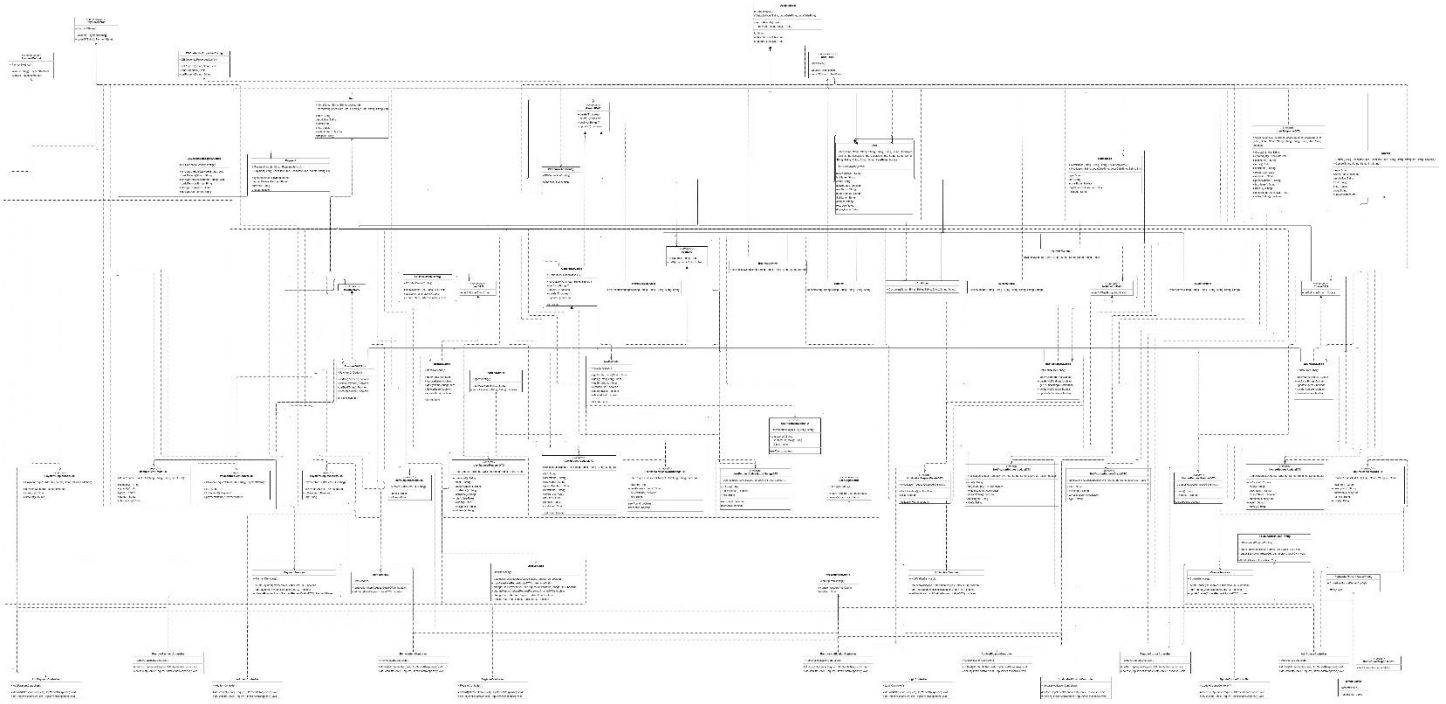
- Developing complex SQL queries and backend logic for report generation.
- Using a charting library to visualize data on the frontend.
- Conducting full-system regression testing.
- Finalizing the UI/UX based on feedback.
- Preparing the system for the final demonstration.

2. Final Use Case Diagram

This diagram illustrates the interactions between different users (actors) and the main functionalities (use cases) of our system.



3. Class Diagram

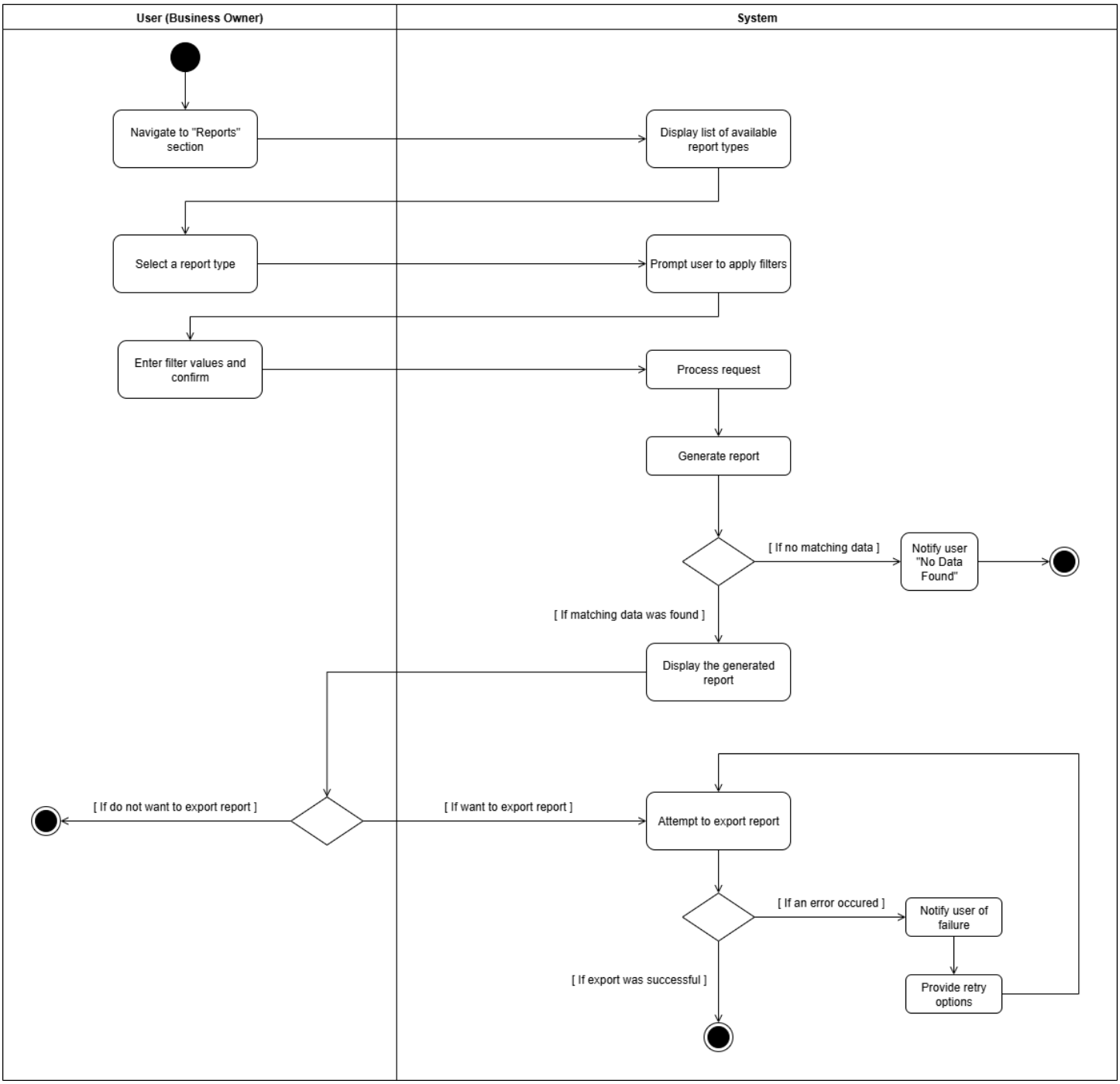


(Please refer to [this link]() if these diagrams are not clear enough)

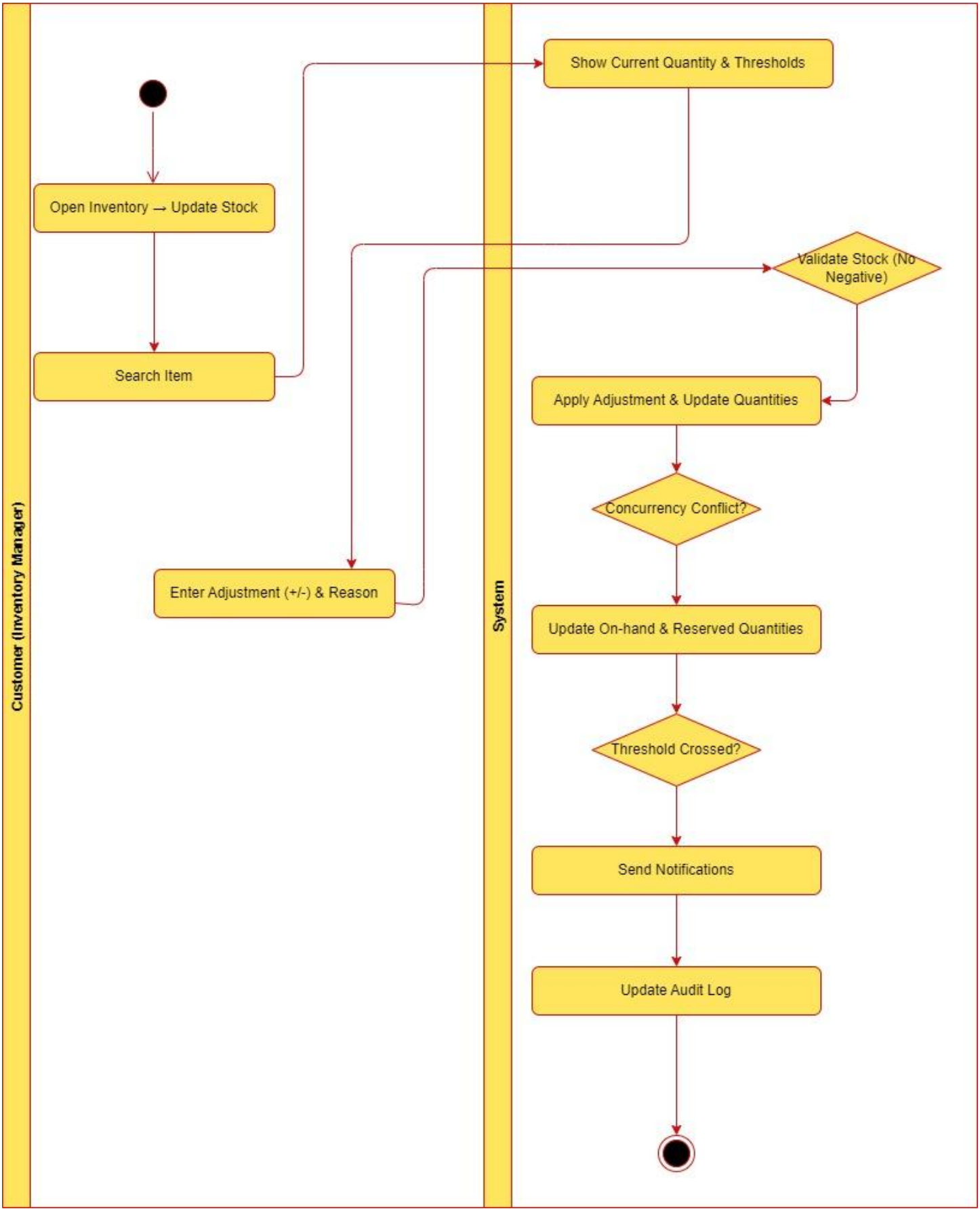
4. Activity Diagrams

Here are the activity diagrams for each of the six major functions.

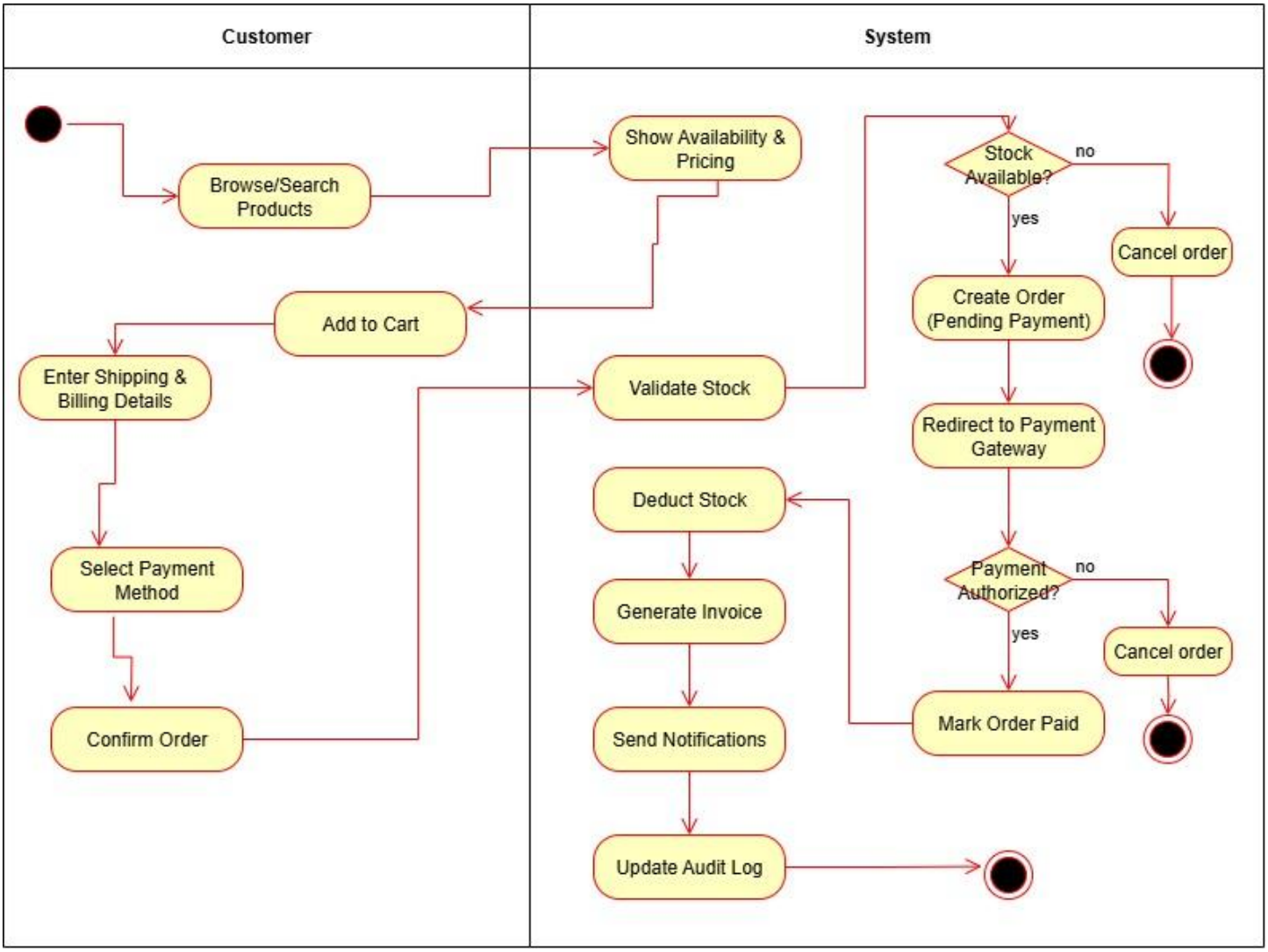
i. Business Report Generation (Mummullage B.U.T - IT24102699)



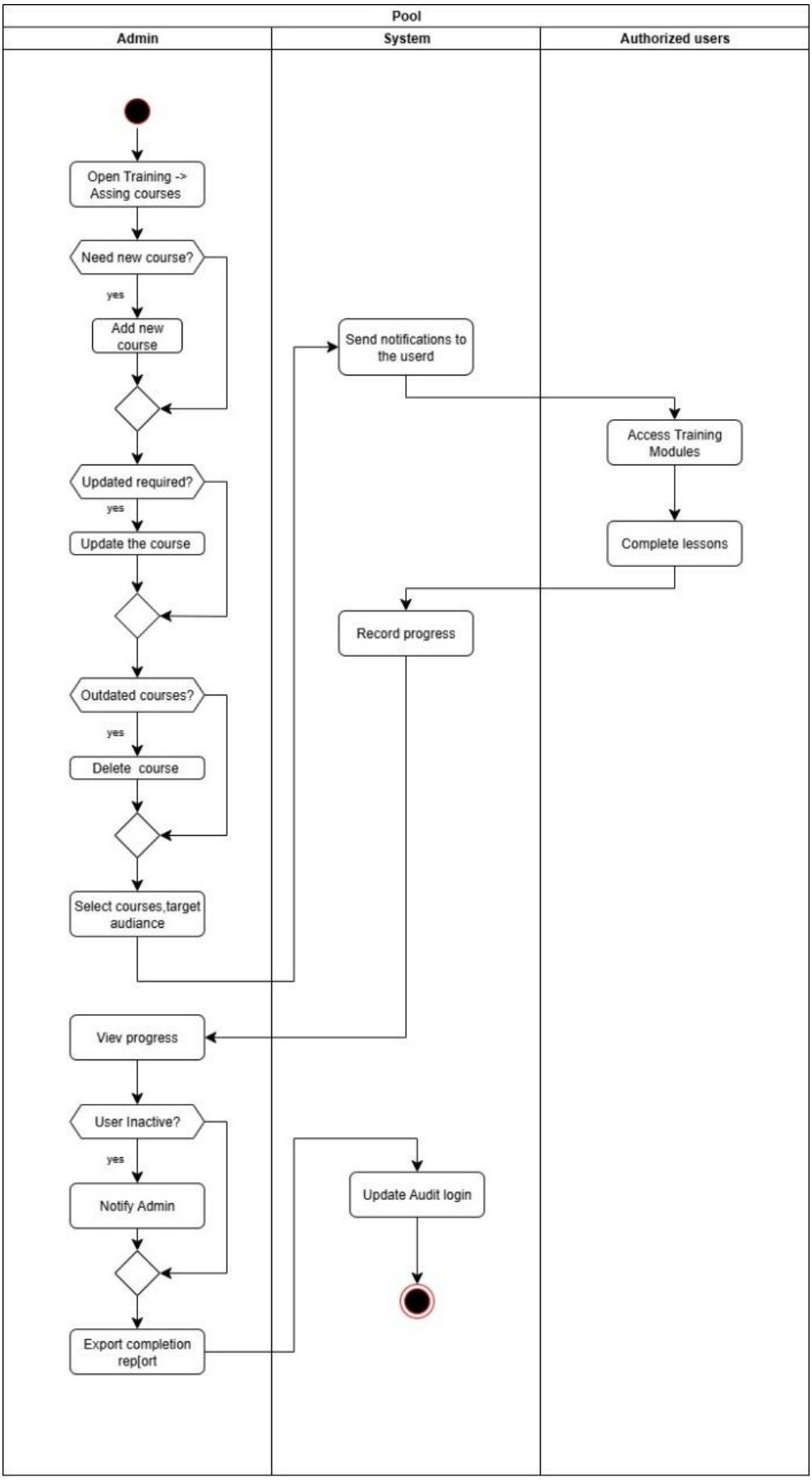
ii. Update Company Stock (Priyamalka W D N - IT24102758)



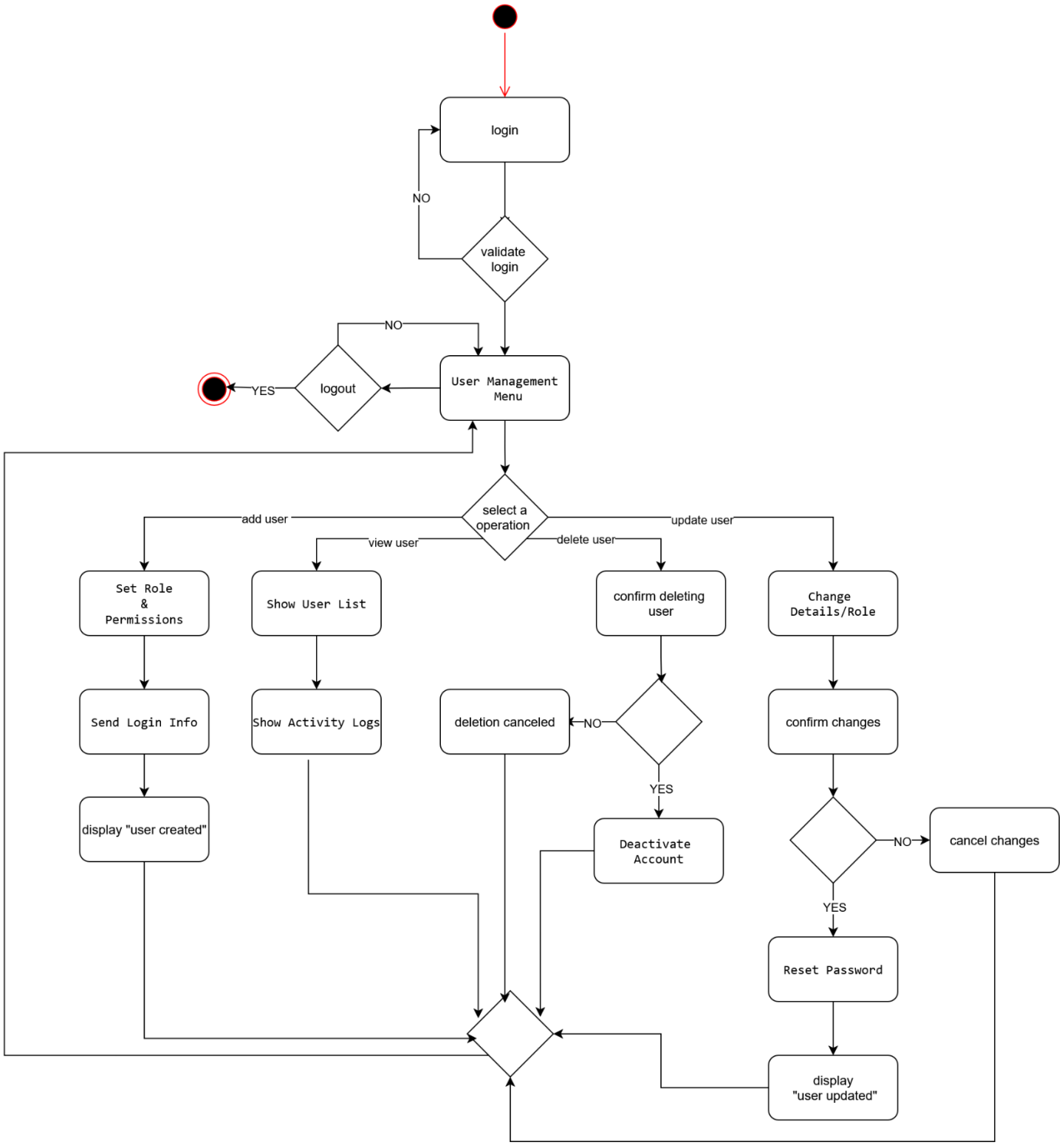
iii. Process Customer Order & Payment (Panagodage N.M.H - IT24102784)



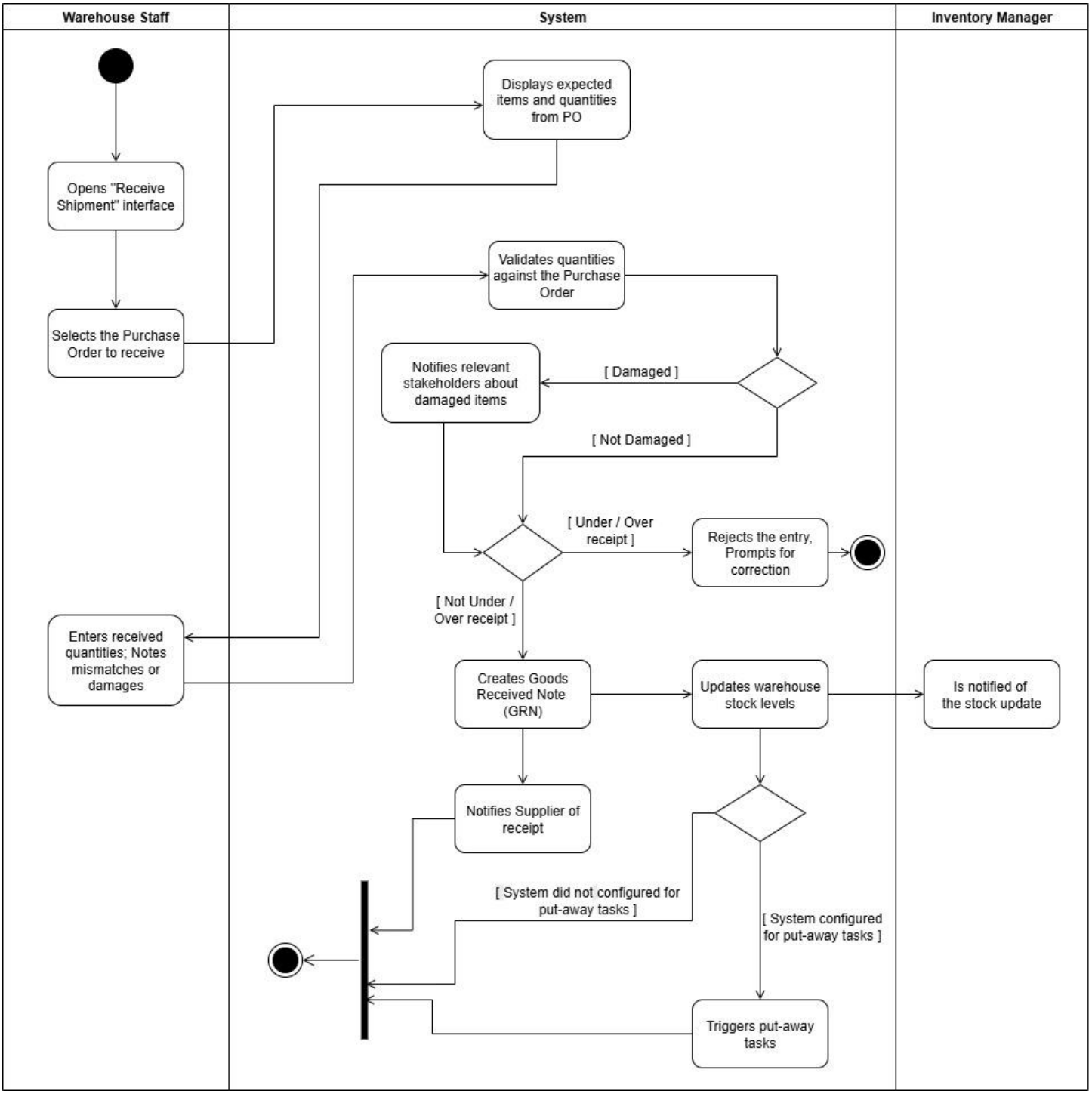
iv. Assign Course & Track Completion (Siriwardane K.D.D.D - IT24102773)



v. Manage Users (Alahakoon A. M. J. P - IT24102795)



vi. Receive Supplier Shipment (Sooriyabandara U.R.G.W.K - IT24102798)



5. Ethical Considerations

Building and using this system responsibly requires us to address key ethical points.

a) **Data Security and Privacy**

Problem: The system handles confidential business and employee data. Unauthorized access could create business risks and violate privacy.

Solution: We will use strong security measures to protect this information. Access will be limited based on job roles, so employees only see the data they need. We will also encrypt data and secure passwords to prevent security breaches.

b) **Data Accuracy**

Problem: Incorrect data in the system, such as wrong stock levels, can lead to poor business decisions, financial loss, and customer dissatisfaction.

Solution: The system will have built-in checks to prevent users from entering invalid data. We will also recommend that the company conduct regular physical inventory counts to ensure the system's data remains accurate.

c) **User Adoption and Training**

Problem: Shifting from a manual system to a new digital platform can be a difficult transition for employees, who may worry about their roles or struggle with technology.

Solution: We will position the system as a tool to help employees work more efficiently, not to replace them. We will provide clear training and have designed the system to be user-friendly, ensuring a smooth and supportive transition for all staff.

d) **System Accessibility**

Problem: The system must be usable by all employees, including those with disabilities.

Solution: We will build the application according to accessibility standards. This includes using clear text, allowing keyboard navigation, and ensuring compatibility with screen readers, making the system inclusive for everyone.

e) **Over-reliance on Automation and Job Displacement**

Problem: Employees, particularly in roles involving manual data entry or stock counting, may fear that the new automated system will make their jobs redundant. This can lead to anxiety, low morale, and resistance to adopting the new technology.

Solution: We will emphasize that the system is a tool designed to augment employee skills,

not replace them. By automating repetitive tasks, employees can focus on more valuable activities like quality control, supplier negotiation, and customer service. We will recommend that the company invest in reskilling programs to help employees transition to these higher-value roles.

f) **Algorithmic Bias in Automated Ordering**

Problem: The system's automated purchase order feature might unintentionally develop a bias. For example, it could consistently favor a single supplier based on historical data, even if new, more competitive suppliers become available. This could stifle competition and lead to dependencies that are not in the company's best interest.

Solution: The system will include a dashboard for the Inventory Manager to review automated ordering patterns. We will implement settings that allow for periodic re-evaluation of suppliers and provide an easy way for managers to manually override automated suggestions, ensuring a fair and competitive supplier ecosystem.

g) **Data Ownership and Transparency with Suppliers**

Problem: The system shares valuable data with suppliers, such as order frequency and volume. It is crucial to define who owns this data and how it can be used. Without clear agreements, a supplier could potentially use this information to their advantage in negotiations or share it with competitors.

Solution: We will advise Southern Goods Distributors to establish clear data-sharing agreements with their suppliers. These agreements should specify that the data belongs to Southern Goods, outline the permitted uses of the data, and include confidentiality clauses to prevent misuse.

h) **System Downtime and Business Continuity**

Problem: The company will become heavily dependent on this system for its core operations. An unexpected system failure or extended downtime could halt business, leading to significant financial loss, order delays, and damage to the company's reputation with its customers.

Solution: In addition to regular automated backups, we will design the system with reliability in mind. We will also provide a comprehensive business continuity plan that outlines clear, step-by-step procedures for reverting to essential manual operations in the event of a critical system failure, ensuring the business can continue to function during an outage.