
*3 – L Variety Store Inventory Management System with Online Ordering for Customers*

Project Documentation Submitted to the Faculty of the

School of Computing and Information Technologies

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In Partial Fulfillment of the Requirements for

Introduction to Systems and Design for CS/IT

SYSADD1

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## Executive Summary

This project aims to enhance operational efficiency and digital presence at 3 L Variety Store and Frozen Goods by implementing an online ordering system. Known for its wide selection of frozen foods and Filipino delicacies, the store currently struggles with manual inventory management and outdated operational methods. The goal is to modernize these processes by introducing a digital solution that automates stock tracking, simplifies invoicing, utilizes AI for predictive analysis, and enhances supplier management.

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# I. Introduction

## 1.1 Project Context

3 L Variety Store is a family-owned business managed by Ms. Lorena Lacorte Erano, located in Ormoc. The store specializes in a diverse range of frozen products, ready-to-eat meals, vegetables, and desserts. Regularly, the store is managed by two staff who handle product sales to customers and check the inventory. The store supplies retail, wholesale, and bulk orders to residents and stores in the area. However, it can only accommodate one to five walk-in customers at a time, resulting in long queues, especially during rush hours.

Currently, only one cashier is available to check out items, further contributing to the long wait times. Additionally, the store struggles with inconsistent product availability due to sudden changes in supply, leaving customers unaware of potential stock shortages.

To address these pain points, the project aims to integrate an online ordering system with mobile application for customers that will enhance the store's processes and productivity. This will work alongside the existing stock and sales responsive web app to improve inventory management and point of sales (POS). The responsive web app tracks sales and stock levels, eliminating the need for manual monitoring and computation, thereby digitizing these processes.

By leveraging modern technology to optimize inventory management and expand the store's reach, this project seeks to set a benchmark for local food stores. Through these efforts, we aspire to demonstrate how technology can enhance efficiency and customer satisfaction, helping 3 L Variety Store reach its full potential.

## 1.2 Statement of the Problem

The store currently manages all operations, including inventory checks for restocking needs, manually. These are the current challenges they face.

1. Delays in restocking which can vary from 2-4 business days due to discrepancies in stock inventory data not being monitored frequently.
2. Historical sales data over the years are not being used to its full potential because of disorganized data management limiting only within a few weeks to 2 months of insights.
3. Missed opportunities of sales due to the store clerk overlooking product availability during business hours.
4. Wait time during operation hours are done by an average of 6 minutes per customer. The issues rise up especially on busy hours resulting in longer queues and agitated customers.
5. Inquiries through Facebook and messenger are spammed which results in delays of response.

## 1.3 Objectives

In today's digital world, having efficient management systems is essential for smooth operations and accuracy. Currently, our client uses manual methods and various tools, leading to inefficiencies and a higher chance of errors. To improve these processes and boost efficiency, we have set the following key objectives for our project: 

**Specific Objectives:**

1. To mitigate delays in restocking inventory from 3-4 days to only 1-2 and to maintain close oversight of stock level to accurately record stock inventory data.
2. Providing the client with updated reports on a weekly, monthly, and yearly basis saving the need to manually compute and analyze sales data.
3. To ensure consistent product availability and reduce misinformation from 50% to 90% so by the time the store clerk checks their stocks they will know for certain.
4. Reducing customer waiting times by 30%.
5. Ensure that inquiries through Facebook Messenger are concise and accurate based on the current inventory situation. Which will reduce the inquire waiting time from an average of 25 minutes to 5 or less.

These objectives are designed to upgrade the client's current methods, using digital solutions to create a more efficient, reliable, and user-friendly system. By the end of this project, we expect the store to run in a tidier and well-organized way streamlining operations.

### 1.4 Significance of the Project

Understanding why our project matters involves recognizing its significant impact on various groups such as:

- Store Staff - Our project minimizes manual tasks, enabling staff to prioritize customer service and increasing job satisfaction.
- Store manager - Introduces real-time updates and predictive analytics for accurate inventory management, improving efficiency and minimizing stock-related challenges.
- Customers - They enjoy reliable product availability and quicker service, enhancing their shopping experience and overall satisfaction.
- Retailer - The project enhances operational efficiency, cuts costs, and draws more customers, positioning the store competitively in the market

### 1.5 Scope and Limitations

**Scope:**

The project's scope involves creating a mobile e-commerce application tailored to the client's needs for the 3-L store. This app aims to simplify customer transactions, alleviate delays during checkouts especially on busy hours, and transition from manual to digital transaction record-keeping. Additionally, it will enhance inventory management with real time tracking and predictive analytics. The main features include digitizing the current system with implementation of barcodes, generating reports, monitoring inventory levels, providing real-time updates, and using predictive analytics to anticipate inventory needs. These improvements will boost operational efficiency and customer satisfaction.

**Limitations:**

However, the system will take several months, during which manual processes and staff training will still be necessary. Budget limitations may restrict some features, and the store's current technology may need upgrading. Migrating data from manual records to the digital system could be time-consuming and prone to errors. Integrating with third-party services may also present challenges. There may be initial resistance from staff used to traditional methods, and AI predictions might not fully be reliable at first.

By understanding these constraints, the project team can prioritize delivering a functional system now and plan for future improvements.

## II. Review of Related Literature / Systems

### 2. 1 Shopify

It is an online platform where sellers can create a website for their business. They have inventory management, payment processing, and sales data analysis. According to Shopify [1], they also offer many varieties of tools where they can design their website and customize the arrangement of their website.

Our project, the "3-L Variety Store E-commerce System with Mobile Application for Customers," is inspired by Shopify's comprehensive suite of e-commerce tools. Shopify offers advanced inventory management, secure payment processing, and detailed sales analytics within a customizable platform that adapts to business branding and operational needs.

Aligned with Shopify's capabilities, our aim is to boost operational efficiency through real-time inventory tracking and proactive stock management in our mobile application. This integration seeks to reduce discrepancies, ensure timely restocking, and enhance customer satisfaction by preventing stock shortages.

Moreover, we will utilize Shopify's secure payment processing to ensure a reliable transaction experience. The application will prioritize intuitive design principles to improve usability, reflecting Shopify's commitment to user-friendly interfaces.

Additionally, integrating Shopify's sales analytics will empower store managers with insights into customer behavior and operational performance. These insights will guide informed decisions, optimize inventory management practices, and facilitate business growth.

In summary, by incorporating Shopify's robust features into our application, we strive to enhance operational efficiency, elevate customer satisfaction, and position the 3-L Variety Store competitively in the digital marketplace. This approach ensures a seamless shopping experience while leveraging Shopify's proven tools for success and expansion.

### Zoho Inventory

It is a cloud-based inventory management system where businesses can manage their inventory products, and it has many features, such as an order management system and multi-channel selling. reporting and analytics, warehouse management, and more. According to Zoho [2], they allow businesses to track their inventory in real time, which helps them maintain their stock level and prevents stockouts and overstocking.

Our focus on developing the 3 – L Variety Store E-commerce System with Mobile Application for Customers is to incorporate Zoho Inventory’s strengths. By integrating real-time inventory tracking and advanced order management, we aim to streamline operations, enhance customer satisfaction, and drive business growth through informed decision-making and efficient inventory control. This integration will optimize stock levels and improve the overall shopping experience for our customers.

**Food Panda**

It is a food-based delivery service where customers can get their food delivered to their respective restaurants registered within the app, they offer convenience for both the customer and the restaurant owner. While the project itself has no plans to implement a delivery option we took Food panda as reference for its food catalogue selection.

Inspired by Food Panda’s achievements, our "3-L Variety Store E-commerce System with Mobile Application for Customers" emphasizes a broad product selection and user-friendly interface. While our app does not offer delivery services like Food Panda, we prioritize simplified shopping through effective product management and intuitive design. By implementing these principles, we enhance navigation and streamline checkout processes, ensuring our app excels in the competitive digital market.

**Square**

Square provides a wide range of business tools, such as an e-commerce platform, point-of-sale system, and inventory management software, allowing businesses to efficiently handle inventory across both online and physical sales channels.

In developing the "3-L Variety Store E-commerce System with Mobile Application for Customers," we take inspiration from Square's comprehensive business tools: an advanced e-commerce platform, a versatile point-of-sale (POS) system, and efficient inventory management software. These tools seamlessly integrate online and physical sales operations to enhance efficiency and improve customer satisfaction.

Our goal is to create a user-friendly interface like Square's, ensuring ease of use for store managers and staff. Implementing real-time inventory tracking aims to minimize discrepancies and ensure timely restocking, thereby enhancing product availability and customer satisfaction.

Integration with popular communication platforms like Facebook and Messenger will streamline customer inquiries about product availability, improving response times and service quality. Multi-channel sales management capabilities will consolidate sales activities, optimizing inventory management and customer service.

Regular reporting features will offer insights into sales trends and inventory performance, empowering store managers with data-driven decision-making capabilities.

Through these integrated features, the 3-L Variety Store E-commerce System with Mobile Application for Customers aims to streamline operations, maintain product availability, reduce customer wait times, and enhance overall service quality. This strategy ensures competitiveness in the digital marketplace while delivering an exceptional shopping experience.

**Amazon**

Is an E-Commerce platform, online store, and web service company established on July 5, 1994, Amazon sells a variety of things, including clothing, auto and industrial supplies, cosmetics, health and beauty aids, electronics, food, games, jewelry, children's and infant products, music, sports equipment, toys, and tools. According to Amazon [5], it provides online-related support services

such cloud web hosting, using Amazon Web Services as well as home delivery and shipping, Amazon is also available on all device platforms such as mobile and desktops.

Amazon's success is built on its extensive product selection, efficient logistics, and robust AWS infrastructure. These strengths ensure prompt deliveries, diverse product availability, and secure cloud solutions, establishing high benchmarks in customer service and technological advancement.

In developing the 3-L Variety Store E-commerce System with Mobile Application for Customers, we aim to mirror Amazon's efficiency and customer-centric approach. By optimizing order processing, refining user interfaces, and utilizing analytics, our goal is to deliver a seamless shopping experience. This strategy aims to effectively meet customer demands while enhancing operational efficiency and competitive edge in the digital market.

## Uniqlo

Uniqlo is another example of an E commerce application. Catered on fashion and apparels. The system features similar features to modern day shopping apps like Zalora, Nike, H&M etc. The products feature a unique user-friendly interface together with a selection of different sizes for customers from kids to adult sizing. According to Uniqlo [6], they also has a barcode scanner feature used to check inventory that is available for purchase It also has the same customer purchase option as Nike and Zalora where customers can choose to have their item delivered or pickup to nearby Uniqlo branches nationwide.

Our project, the "3-L Variety Store E-commerce System with Mobile Application for Customers," is inspired by Uniqlo's intuitive interface and advanced barcode scanning technology, aimed at improving efficiency and customer satisfaction. By integrating these features, we seek to streamline inventory management and offer flexible delivery options, mirroring Uniqlo's commitment to seamless online shopping experiences.

## Sephora

The Sephora E commerce mobile and web application offers seamless loyalty program integration, customized product suggestions, the option to keep a shopping list, check store inventory, and scan products for search and review. Additionally, it gives consumers early and exclusive access to a variety of products. User feedback includes that Sephora has pleasing and engaging user interface that attracts a lot of customers. (Sephora, 2023) [7]

These elements are pivotal in enhancing customer engagement and satisfaction. In our "3-L Variety Store E-commerce System with Mobile Application for Customers," we seek to adopt similar capabilities. Our focus will be on developing a comprehensive loyalty program that incentivizes repeat purchases and fosters customer loyalty. Additionally, we will implement advanced algorithms to deliver personalized product suggestions tailored to individual customer preferences and shopping behaviors. These initiatives are aimed at not only improving customer experience but also driving sales and establishing a competitive edge in the digital marketplace.

### Importance of Inventory management system

Inventory Management Systems are generally described as integrated systems designed to integrate, standardize and automate decision processes related to the management and control of inventories. Many businesses tend to fail in their inventory management due to inefficiencies

in manual processes. That's why many businesses these days create systems to improve tracking. According to Vires (2014) [8], Inventory Management Systems give information to decision-makers inside organizations at the strategic, tactical, and operational levels to support inventory choices. Several studies have stressed the presence of numerous stakeholders in inventory decision-making processes. These stakeholders frequently include procurement managers, warehouse operators, sales teams, and finance officials, all of whom offer unique views and needs to the system. The engagement of a varied set of stakeholders guarantees that the system can meet a wide range of demands and issues, resulting in more comprehensive and effective inventory management. However, this variety can lead to disputes because each stakeholder may have different interests and objectives. Effective inventory management systems must include methods for balancing these interests along with encouraging collaboration among all parties involved. An inventory management system is critical for businesses to maintain ideal inventory levels, cut expenses, and improve operational efficiency by automating tracking and delivering real-time data for informed decision-making. It also increases customer happiness by assuring product availability and speedier order fulfillment, as well as promoting regulatory compliance and scalability.

**Sustainability in inventory management system**

According to Civelek (2016) [9], Integrating environmentally friendly practices into inventory management promotes environmental responsibility while retaining economic viability. This research looks at the definitions of sustainability and sustainable inventory management. Sustainable supply chain management is described as the planning, coordination, and control of a company's supply chain that generates value for its consumers at a low cost while safeguarding the environment. Paper-based inventory management wastes a lot of paper, is inefficient, and is bad for the environment. Transitioning to digital inventory systems saves paper waste while enhancing accuracy and efficiency. Sustainable inventory management also includes using environmentally friendly products, optimizing transportation to cut carbon emissions, and establishing recycling and waste reduction initiatives. Furthermore, using renewable energy sources in warehouse operations, as well as energy-efficient equipment and automation, may dramatically reduce operational expenses and carbon footprint. Prioritizing sustainability may improve brand reputation, customer happiness, and employee satisfaction, resulting in competitive advantages and fulfilling regulatory guidelines.

**Predictive Analytics in Inventory Management System**

With the growth of technology comes with great tools and innovations, this also applies towards different management systems and its gradually improving. According to Lee et al. (2022) [10], Predictive analytics is an established methodology to extract and predict valuable inputs to generate impactful insights. This research looks towards on how there are different models of predictive analytics and decision tree that made significant influential impact on making informed decisions for what they were to design to do and strict on its limitations and knowing its target of predicted data for it to make better decisions.

**Applications of Artificial Intelligence in Inventory Management: A Systematic Review of the Literature**

The article [11] emphasizes the critical role of inventory management in modern supply chains, driven by increasing global competition and customer expectations for timely delivery, high quality, and competitive pricing. Inventory management involves planning, organizing, and controlling inventory to balance supply and demand effectively while minimizing costs. Key aspects include inventory visibility, forecasting, valuation, and demand forecasting accuracy, which are vital for optimizing inventory levels and operational efficiency.

Technological advancements, particularly in artificial intelligence (AI) such as machine learning (ML) and deep learning (DL), are transforming inventory management. These technologies enable quicker analysis of large datasets, improving demand forecasting accuracy and operational flexibility while reducing costs. Integrating AI with inventory management enhances decision-making and responsiveness to customer needs, providing contextual insights and faster service.

The study aims to review recent literature and categorize AI applications in inventory management from 2012 to 2022. It provides a systematic overview of current research, identifies commonly used AI methods, and suggests future research directions. Key contributions include developing a classification framework based on previous studies, offering a systematic literature review methodology, and outlining potential areas for further exploration in AI-driven inventory management.

This comprehensive review underscores the evolving landscape of inventory management through AI technologies, highlighting their transformative potential in optimizing supply chains and meeting customer demands efficiently.

**A Deep Learning-Based Inventory Management and Demand Prediction Optimization Method for Anomaly Detection**

The study investigates how advanced technologies such as AI, big data, and data mining are reshaping supply chain management [12]. These innovations optimize efficiency across the supply chain lifecycle, from technical support to product delivery, by leveraging extensive data analysis.

Customer involvement has expanded supply chain lifecycles, necessitating meticulous management from manufacturing through retail. Inventory management (IM) is crucial for minimizing costs by accurately predicting and balancing inventory levels to meet demand effectively.

Traditional demand prediction methods often struggle with rapid market changes. Innovations like Deep Inventory Management (DIM) integrate AI, particularly LSTM in deep learning, to improve demand forecasting accuracy and optimize inventory decisions. DIM adapts to dynamic customer demands, enhancing operational efficiency and reducing costs.

Experiments demonstrate DIM's capability to predict demand trends with over 80% accuracy and achieve significant cost savings. These findings underscore DIM's potential to revolutionize inventory management by leveraging AI for adaptive decision-making and improved supply chain performance.

### 2.2 Synthesis

In developing an e-commerce mobile app for 3-L Variety Store, our research highlights the drawbacks of manual inventory management, such as delays in restocking and inventory inaccuracies. These issues can lead to longer customer wait times and inconsistent product availability, affecting overall service quality.

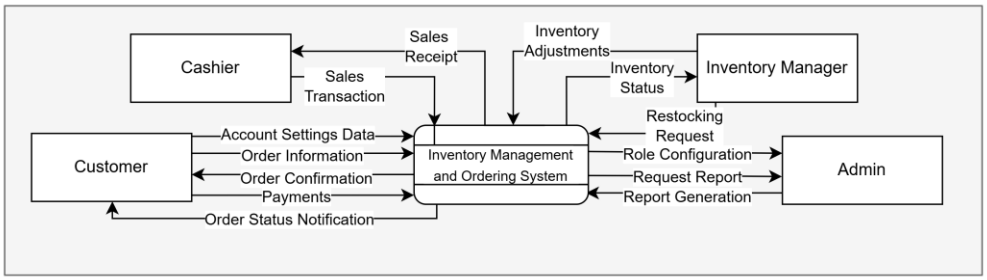
By integrating automated inventory systems into the mobile app, 3-L Variety Store aims to streamline operations, monitor stock levels in real-time, and provide prompt updates to customers. This technological upgrade is intended to improve efficiency and offer a seamless shopping experience, meeting modern consumer expectations for convenience and reliability in online shopping.

Adopting digital solutions not only enhances internal processes but also positions 3-L Variety Store competitively in the digital market, fostering customer loyalty and supporting sustainable business growth.

## III. Data Flow Diagram

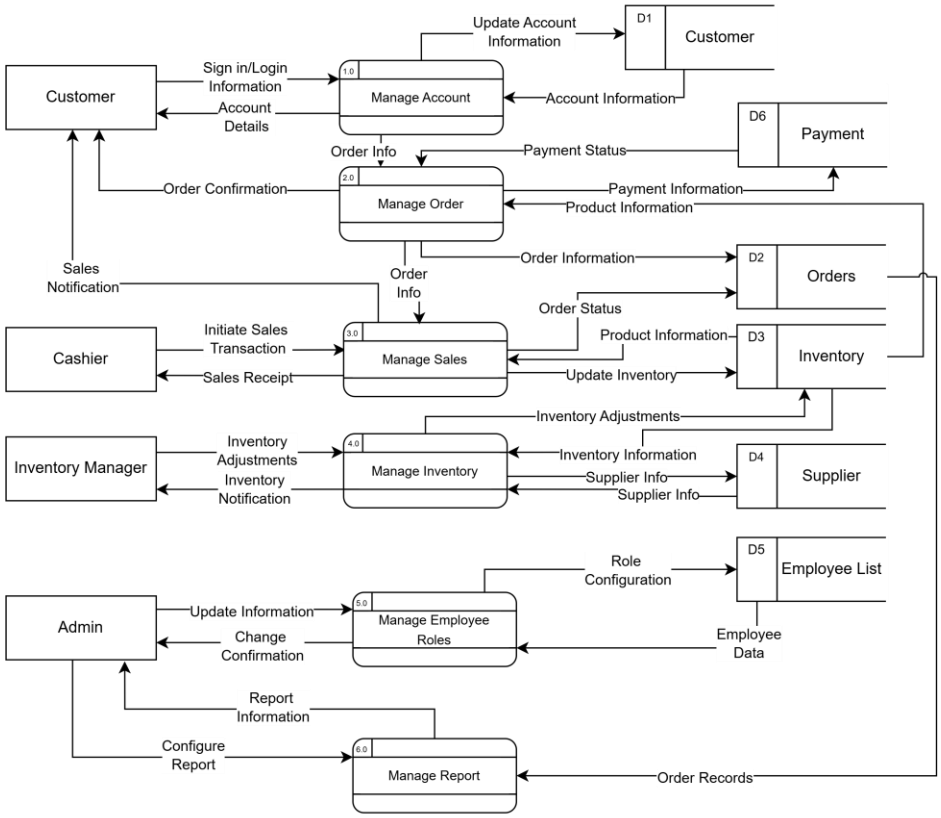
Level 0

**Level 0**



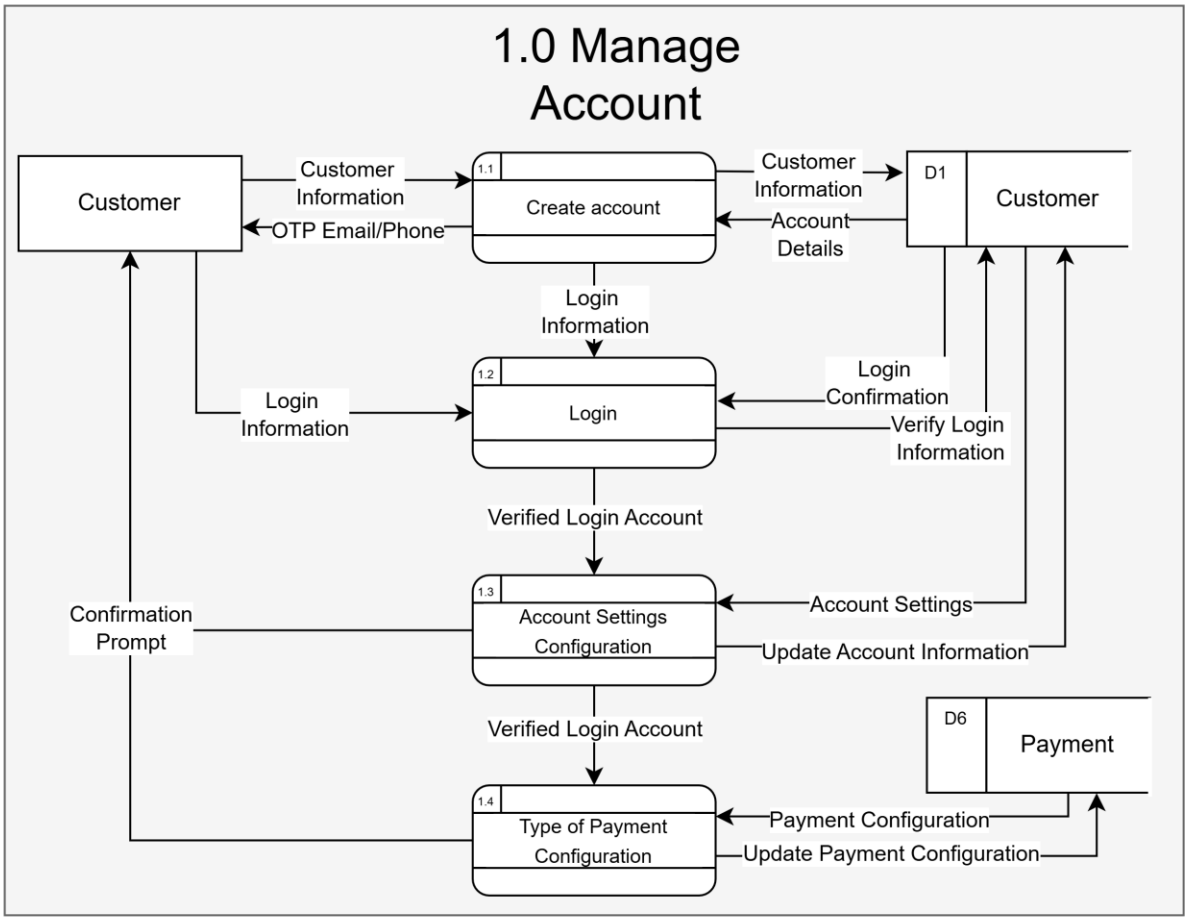

Level 1

**Level 1**

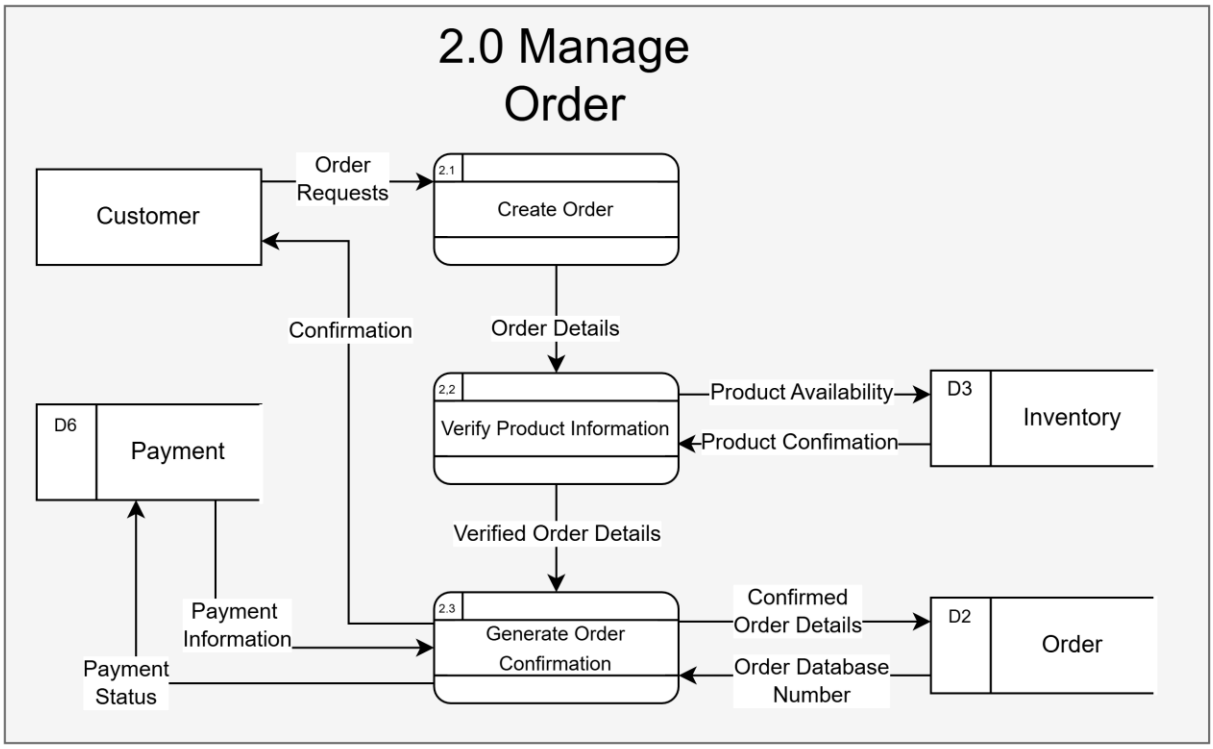



**Level 2**

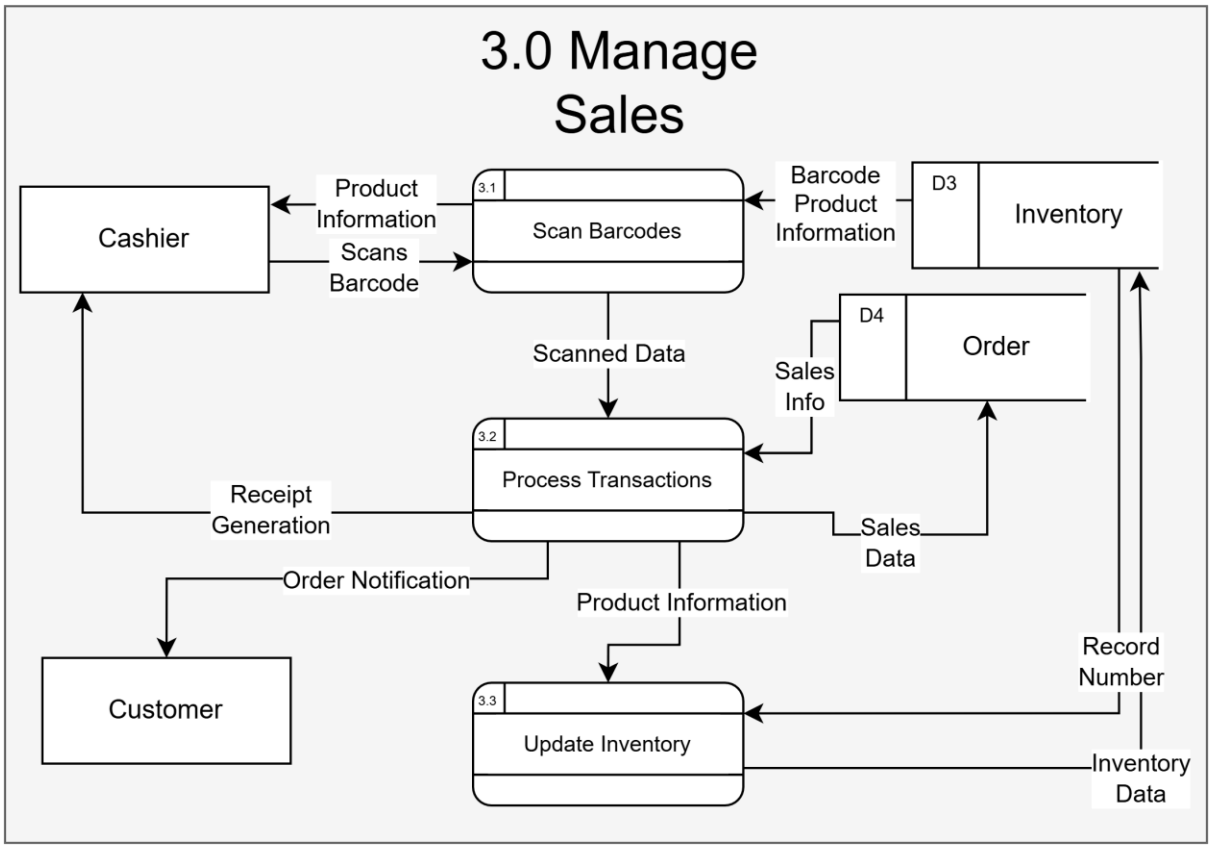
**Manage Account**



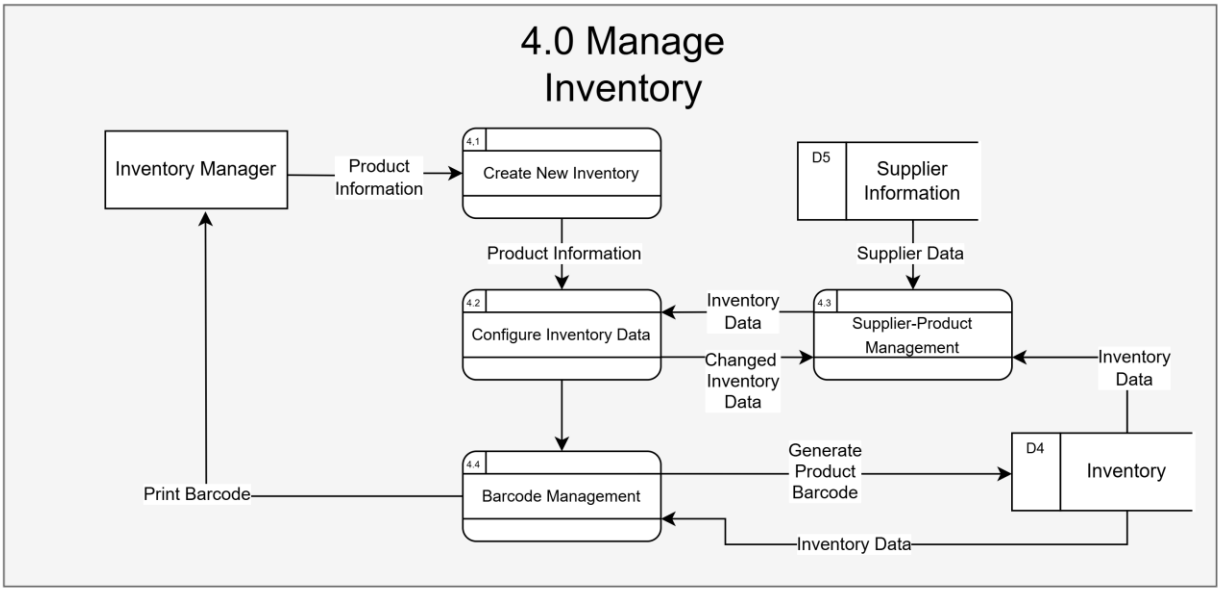
**Manage Order**



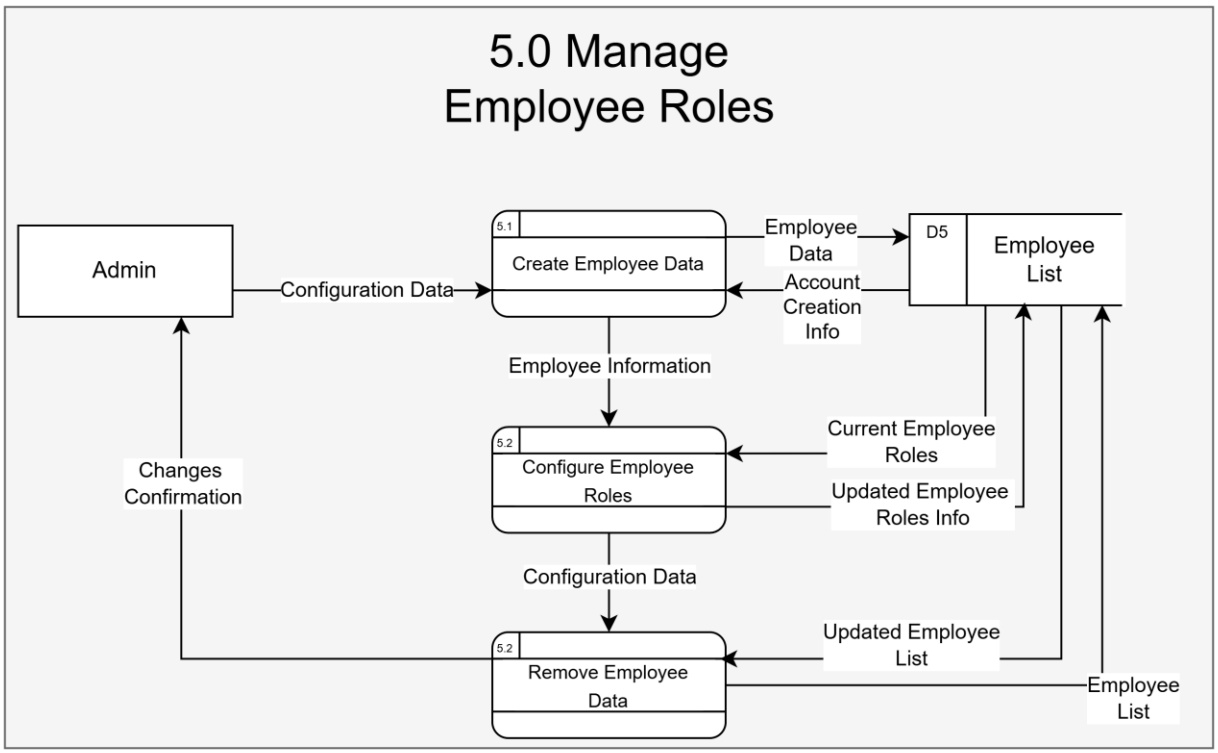
**Manage Sales**



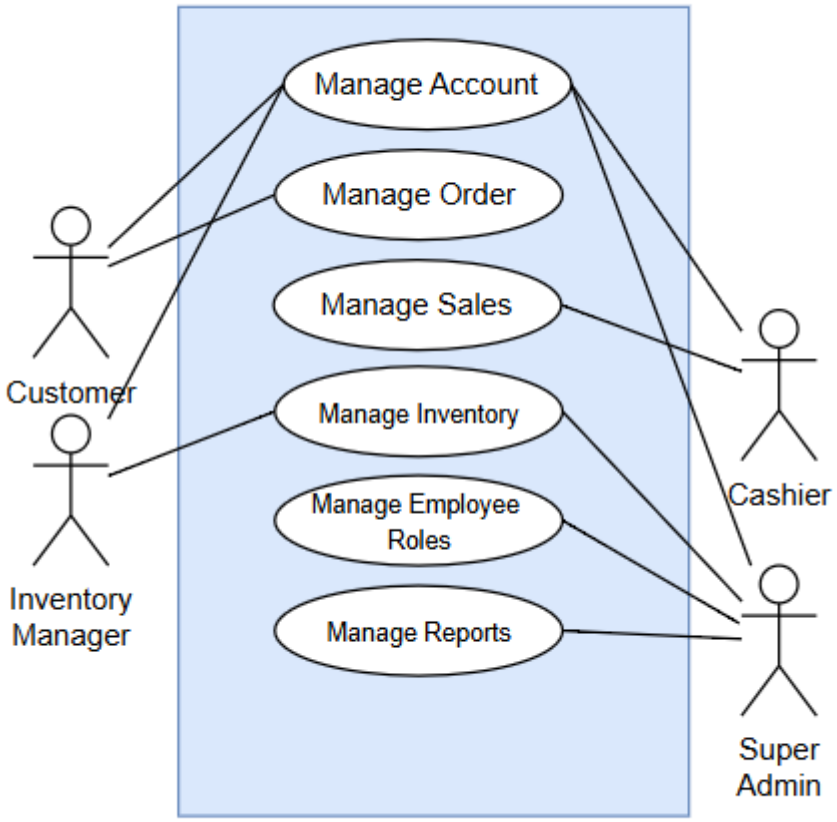

**Manage Inventory**



**Manage Employee Roles**



## IV. Use Case Diagram




## V. Fully Dressed Use case

**Manage Account**

| | |
|---|---|
| Use Case ID: | UC-001 |
| Use Case Name: | Manage Account |
| Created By: | Ichiro Emmanuel Pongos |
| Date Created: | September 19, 2024 |
| Description: | This use case describes the process of account management for customers such as logging in, signing up and managing account information like phone numbers/email and account deletion. |
| Primary Actor: | Customer |

| | |
|---|---|
| Pre-Conditions: | • Able to access the webpage with a pc or phone<br>• Have the above requirements for setting up an account |
| Post-Conditions: | • Customer have successfully created an account<br>• Returns a verification prompt depending what account verification process they pick |
| Main Flow: | **Account Registration**<br>1. Customer initiates the account registration process by providing required information (e.g., name, email, role).<br><br>2. The system validates the provided information.<br><br>3. The system creates a new account and sends a confirmation email. Customer receives confirmation and can now log in.<br><br>**Login**<br>4. Customer provides their credentials (username and password).<br><br>5. The system authenticates the credentials.<br><br>6. If authentication is successful, the system grants access based on the user's role.<br><br>7. Customer is redirected to the appropriate dashboard. Update Account Details<br><br>8. Customer accesses the account management section.<br>9. The user updates their account details (e.g., email, phone number, and payment information).<br><br>10. The system validates and saves the changes.<br><br>11. The Customer receives confirmation that the updates were successful. Reset Password<br><br>12. Customer requests a password reset through the login screen.<br><br>13. The system sends a password reset link to the registered email address.<br>14. Customer follows the link and sets a new password. |

| | |
|---|---|
| | 15. The system confirms the password has been reset and allows login with the new password. |
| Alternative Flow: | **Existing Account:** If the customer already has an account, they proceed to the login process instead of registration.<br><br>**Account Lockout:** After multiple failed login attempts, the system temporarily locks the account and notifies the user to contact support or wait before retrying. |

**Manage Order**

| | |
|---|---|
| Use Case ID: | UC-002 |
| Use Case Name: | Manage Order |
| Created By: | Timothy Louise R. Perez |
| Date Created: | August 31, 2024 |
| Description: | This use case describes the process of managing orders, including creating, updating, and canceling orders. |
| Primary Actor: | Customer |
| Pre-Conditions: | • The customer must be registered and logged into the system.<br>• The inventory system must be up to date with available products. |
| Post-Conditions: | • The order is placed, and the system updates the inventory.<br>• The customer receives confirmation of their order<br>• The cashier is notified of the order for payment processing. |
| Main Flow: | 1. **Customer selects products:** The customer browses the product catalog and selects items to order.<br>2. **Customer reviews the order:** The system displays the selected items in the cart with total costs.<br>3. **Customer provides order details:** The customer enters necessary information for pickup and selects a payment method.<br>4. **System verifies order details:** The system checks the availability of the items and the validity of the payment method.<br>5. **Order is placed:** The system confirms the order and updates the inventory.<br>6. **System notifies the cashier:** The cashier is notified to prepare the invoice and process the payment.<br>7. **System sends confirmation:** The customer receives a confirmation email or SMS with order details and tracking information. |

| | |
|---|---|
| Alternative Flow: | **2a. Customer modifies the order:** The customer can modify the items in the cart before proceeding with the order.<br><br>**4a. Item unavailable:** If an item is out of stock, the system alerts the customer to modify the order. |

**Manage Sales**

| | |
|---|---|
| Use Case ID: | UC-003 |
| Use Case Name: | Manage Sales |
| Created By: | Ichiro Emmanuel Pongos |
| Date Created: | August 31, 2024 |
| Description: | This use case describes the process of managing sales, including creating, recording, and finalizing sales<br><br>transactions. The process ensures that sales are recorded accurately, inventory is updated, and the customer receives appropriate documentation. |
| Primary Actor: | Cashier |
| Pre-Conditions: | • The sales representative must be logged into the sales management system.<br>• The inventory system must be up to date with current stock levels.<br>• Pricing and discount information must be correctly configured in the system.<br>• Customer details should be available or can be captured during the transaction. |
| Post-Conditions: | • The sales are recorded successfully in the system.<br>• Inventory levels are updated based on the items sold.<br>• The customer receives a receipt or invoice.<br>• Sales records and reports are updated to reflect the transaction.<br>• Payment is processed and recorded. |
| Main Flow: | 1. **Initiate Sale Transaction:** The sales representative selects the "New Sale" option in the system.<br>2. **Add Products/Services:** The sales representative adds products or services to the sales order. The system displays the available stock levels for each<br>3. **Apply Discounts:** The sales representative applies any applicable discounts to the order. The system calculates and displays the updated total amount.<br>4. **Review and Confirm Order:** The sales representative reviews the order details with the customer and confirms the transaction. |

| | |
|---|---|
| | 5. **Process Payment:** The sales representative processes the payment using the customer's chosen method. The system confirms the payment.<br>6. **Generate Invoice/Receipt:** The system generates an invoice or receipt, which is provided to the customer.<br>7. **Update Inventory and Records:** The system updates the inventory levels and sales records based on the completed transaction.<br>8. **Complete Transaction:** The sales representative confirms the completion of the sale, and the system logs the transaction details. |
| Alternative Flow: | **3a. Invalid Discount:** If a discount code is invalid, the system displays an error, prompting the sales representative to re-enter a valid code or proceed without the discount.<br><br>**5a. Payment Failure:** If payment fails due to lack pf customer funds, the system notifies the sales representative, who can retry the payment or select an alternative payment method.<br><br>**6a. Invoice Generation Failure:** If the system fails to generate an invoice, it logs the error, and the sales representative can manually create one or retry the process. |

**Manage Inventory**

| | |
|---|---|
| Use Case ID: | UC-004 |
| Use Case Name: | Manage Inventory |
| Created By: | Anamika Nepomuceno |
| Date Created: | September 1, 2024 |
| Description: | This use case describes the process of managing the |
| | inventory, including adding new products, updating stock levels, and removing discontinued items. The process ensures that inventory records are accurate, up-to-date, and reflect the current stock available. |
| Primary Actor: | Customer |
| Pre-Conditions: | • The inventory management system must be operational and accessible to the Inventory Manager.<br>• The product information must be available and verified before adding it to the system. |

| | |
|---|---|
| | • The Inventory Manager must have the appropriate permission to modify inventory records. |
| Post-Conditions: | • The inventory database is updated with the latest stock levels.<br>• New products are added to the inventory with accurate details.<br>• Discontinued or sold-out items are removed or marked as inactive.<br>• The system generates reports reflecting the updated inventory. |
| Main Flow: | 1. **Access Inventory Management**: The Inventory Manager logs into the inventory management system.<br>2. **Add New Products**: The Inventory Manager selects the option to add new products and enters relevant details such as product name, description, SKU, price, and initial stock levels.<br>3. **Update Stock Levels:** The Inventory Manager updates stock levels based on received shipments or sales. The system recalculates total stock and updates the database.<br>4. **Remove/Deactivate Products:** The Inventory Manager removes discontinued products or marks them as inactive in the system. The system updates the inventory records accordingly.<br>5. Review and Save Changes: The Inventory Manager reviews all changes made to the inventory and saves them. The system then updates the inventory database and generates a confirmation. |
| Alternative Flow: | **2a. Duplicate Product Entry:** If the system detects that the product being added already exists, it alerts the Inventory Manager to either update the existing entry or cancel the addition.<br>**3a. Negative Stock Level:** If an attempt is made to reduce stock levels below zero, the system prompts the Inventory Manager to adjust the entry or confirm if the item should be backordered.<br>**4a. Product in Active Orders:** If the product to be removed is still part of active customer orders, the system prevents removal and notifies the Inventory Manager.<br>**5a. Data Entry Error:** If incorrect data is entered (e.g., incorrect SKU or price), the system highlights the error and prompts the Inventory Manager to correct it before saving. |

**Manage Admin Information**

| | |
|---|---|
| Use Case ID: | UC-005 |

| | |
|---|---|
| Use Case Name: | Manage Employee Roles |
| Created By: | Anamika Nepomuceno |
| Date Created: | September 1, 2024 |
| Description: | This use case describes the process of managing employee roles, including updating role configurations and ensuring that employees have the correct roles assigned in the system. The process ensures that employee role information is accurate, up-to-date, and aligned with organizational requirements. |
| Primary Actor: | Admin |
| Pre-Conditions: | • The admin must be logged into the system with the necessary permissions to manage employee roles.<br>• Employee information must be available in the system.<br>• Role configuration options must be predefined in the system. |
| Post-Conditions: | • Employee roles are updated and saved in the system.<br>• The role configuration reflects the latest organizational structure.<br>• Change confirmations are generated and saved in the system logs.<br>• Employee records are updated with the latest role information. |
| Main Flow: | • Access Role Management: The admin logs into the system and navigates to the "Manage Employee Roles" section.<br>• Select Employee Data: The admin selects an employee record from the Employee Records database.<br>• Update Employee Role: The admin assigns or updates the employee's role by selecting a predefined role from the Role Configuration options.<br>• Save Role Configuration: The admin saves the updated role information. The system updates the Employee Records database with the new role data.<br>• Confirm Changes: The admin reviews and confirms the updates, and the system generates a change confirmation. The update role information is now available in the system. |
| Alternative Flow: | **2a. Employee Record Not Found:** If the selected employee record is missing or incorrect, the system alerts the admin to choose a different record or verify the entry. |

| | |
|---|---|
| | **3a. Invalid Role Selection:** If the Admin selects a role that is incompatible with the employee's position or level, the system prompts for a valid role selection.<br><br>**4a. Role Update Conflict:** If the role update conflicts with other system settings (e.g., duplicate roles or unauthorized changes), the system denies the update and logs the conflict.<br><br>**5a. Data Entry Error:** If incorrect information is entered (e.g., invalid data format), the system highlights the error and prompts the admin to correct it before proceeding. |

**Manage Report**

| | |
|---|---|
| Use Case ID: | UC-006 |
| Use Case Name: | Manage Reports |
| Created By: | Rainier Edward Lopez |
| Date Created: | September 1, 2024 |
| Description: | This use case describes the process of managing reports within a system, including generating, viewing, updating, and deleting reports. The process ensures that users have access to accurate and up-to-date information for decision- making and that sensitive data within reports is properly secured. |
| Primary Actor: | Super Admin |
| Pre-Conditions: | • The System Administrator must be logged into the system with the necessary permissions to manage reports.<br>• The system must have access to the data sources required to generate reports.<br>• The report templates and formats must be predefined and available in the system. |
| Post-Conditions: | • Reports are generated and made available for viewing or downloading.<br>• Existing reports are updated with the latest data.<br>• Outdated or unnecessary reports are archived or deleted from the system.<br>• The system logs all report management activities for auditing purposes. |
| Main Flow: | • **Access Report Management:** The System Administrator logs into the system and navigates to the Report Management section.<br>• **Generate New Report:** The System Administrator selects the option to create a new report, chooses the report type, and specifies the data parameters (e.g., date range, data sources). |

| | |
|---|---|
| | • **View Existing Reports:** The System Administrator selects and views existing reports from the report library. The system displays the selected report with the latest data.<br>• **Update Report Parameters:** The System Administrator selects a report to update, modifies the parameters (e.g., adding new data fields or changing the date range), and regenerates the report with updated data.<br>• **Delete or Archive Report:** The System Administrator selects a report to delete or archive, confirms the action, and the system removes or archives the report accordingly.<br>• **Review and Confirm Changes:** The System Administrator reviews all actions taken (generate, update, delete) and confirms the updates. The system saves the changes and updates the report library.<br>• **Generate Audit Log:** The system generates an audit log entry detailing the actions taken on reports, including the user who made the changes and the time of the modifications |
| Alternative Flow: | 2a. **Data Source Unavailable:** If a required data source is unavailable during report generation, the system alerts the System Administrator, who may choose to retry or cancel the operation. 3a.<br>4a. **Invalid Report Parameters:** If the System Administrator enters invalid parameters (e.g., incorrect date range or incompatible data fields), the system prompts correction before proceeding. |

## VI. Test Cases for Fully Dressed Use Cases

| | |
|---|---|
| Test Case ID: | TC-001 (Manage Account) |
| Created by: | Anamika Nepomuceno |
| Priority: | High |
| Description: | Test the process of managing account settings, including login, updating account information, and configuration changes |
| Prerequisites: | 1. Customer has an existing account in the system.<br>2. Customer is logged into the system using valid credentials.<br>3. The system is properly connected to the database storing account information.<br>4. All required fields for updating information (e.g., email, phone) are functional. |

| | |
|---|---|
| Test Data Requirement: | • Customer ID: 54321<br>• Email: customer@example.com<br>• Password: abc123<br>Name: John doe |

| STEP # | STEP DETAILS | EXPECTED RESULTS |
|---|---|---|
| 1 | Customer navigates to the login page. | Login page is displayed. |
| 2 | Customer enters valid login information and clicks "Login." | Customer is successfully logged into the account. |
| 3 | Customer navigates to the "Account Settings" or "Configuration" page. | The Account Settings page is displayed. |
| 4 | Customer modifies account information (e.g., email, phone number) and clicks "Save." | Account information is successfully updated in the system. |
| 5 | System displays a confirmation prompt indicating the account information has been updated. | Confirmation message is shown. |
| 6 | Customer logs out of the account. | Customer is successfully logged out, and no sensitive information is accessible. |

| | |
|---|---|
| Test Case ID: | TC-002 (Manage Order) |
| Created by: | Timothy Perez |
| Priority: | High |
| Description: | Order creation, product verification, and finalizing the customer order. |
| Prerequisites: | 1. The cashier is logged into the order management system.<br>2. Inventory records (D1) are up to date with accurate product stock levels.<br>3. The pricing and discount information is correctly configured in the system.<br>4. Customer details are available or can be entered during the transaction.<br>5. Temporary Order File (T1) is accessible for new order creation. |
| Test Data Requirement: | • Cashier ID: CA001<br>• Customer ID: C001<br>• Product A: Product 101, Quantity: 2<br>• Product B: Product 102, Quantity: 1<br>• Discount Code: DISCOUNT10 |

| STEP # | STEP DETAILS | EXPECTED RESULTS |
|---|---|---|
| 1 | Cashier selects "Create Order" and chooses a customer. | Customer details are displayed or inputted. |
| 2 | System verifies product availability from the inventory records (D1). | Products are displayed with correct details (name, price, quantity). |

| | | |
|---|---|---|
| 3 | Cashier adds products A and B to the sales order. | System confirms product availability or notifies of any issues. |
| 4 | Cashier confirms the order with the customer. | Order confirmation message is displayed. |
| 5 | Cashier processes payment. | Payment is processed, and the transaction is completed. |
| 6 | System generates the invoice and updates the inventory records (D1) and orders database (D2). | Invoice generated, inventory adjusted, and order logged in the database. |

| | |
|---|---|
| Test Case ID: | TC-003 (Manage Sales) |
| Created by: | Ichiro Pongos |
| Priority: | High |
| Description: | Verify that a cashier can successfully manage sales transactions, including creating, recording, and finalizing. |
| Prerequisites: | 1. Cashier is logged into the sales management system.<br>2. Inventory system is up to date with current stock levels.<br>3. Pricing and discount information is correctly configured in the system.<br>4. Customer details are available or can be captured during the transaction. |
| Test Data Requirement: | • Cashier ID: CA001<br>• Customer ID: C001<br>• Product A: Product 101, Quantity: 2<br>• Product B: Product 102, Quantity: 1<br>• Discount Code: DISCOUNT10 |

| **STEP #** | **STEP DETAILS** | **EXPECTED RESULTS** |
|---|---|---|
| 1 | Cashier selects the "New Sale" option. | New sale screen is displayed. |
| 2 | Cashier selects an existing customer. | Customer details are displayed. |
| 3 | Cashier adds products A and B to the sales order. | Products are added to the order with available stock levels displayed. |
| 4 | Cashier confirms the order Cashier applies the discount code. with the customer. | Discount is applied, and updated total is displayed. |
| 5 | Cashier reviews the order with the customer and confirms the transaction. | Order confirmation message is displayed. |
| 6 | Cashier processes the payment. | Payment is processed successfully. |
| 7 | System generates an invoice and provides it to the customer. | Invoice is generated and provided to the customer. |
| 8 | System updates inventory levels and sales records. | Inventory levels and sales records are updated. |

| | | |
|---|---|---|
| 9 | Cashier confirms the completion of the sale. | Transactions are logged in the system. |

| | |
|---|---|
| Test Case ID: | TC-004 (Manage Inventory) |
| Created by: | Rainier Lopez |
| Priority: | High |
| Description: | This test case validates the functionality of adding, updating, deleting, and managing items in the inventory system. |
| Prerequisites: | 1. User is logged into the inventory management system with appropriate access rights.<br>2. Inventory management system is operational and accessible.<br>3. Test data for items (e.g., item names, categories, quantities, prices) is prepared and available.<br>4. Backup of the current inventory database is created. |
| Test Data Requirement: | User ID: U001 (Inventory Manager Role)<br>New Item: Item ID 101, Name: "Widget A", Category: "Gadgets", Quantity: 50, Price: $10.00<br>Existing Item: Item ID 102, Name: "Gadget B", Category: "Gadgets", Quantity: 20, Price: $15.00<br>Updated Item Details: Item ID 102, New Quantity: 30, New Price: $14.00 |

| **STEP #** | **STEP DETAILS** | **EXPECTED RESULTS** |
|---|---|---|
| 1 | Navigate to the inventory management module. | User is successfully directed to the inventory management screen. |
| 2 | Add a new item with specific details (e.g., Item ID: 101, Name: "Widget A"). | The new item is added and appears in the inventory list. |
| 3 | Update the details of an existing item (e.g., change quantity and price). | The item's details are updated and reflected correctly in the system. |
| 4 | Delete an item from the inventory (e.g., Item ID: 103). | The item is removed and no longer appears in the inventory list. |
| 5 | Search for items using specific criteria (e.g., Category: "Gadgets"). | The inventory list displays only items that match the search criteria. |
| 6 | Apply low stock threshold to an item and check for alert. | System displays a low stock alert for items below the threshold. |

| | |
|---|---|
| Test Case ID: | TC-005 (Manage Employee Roles) |
| Created by: | Ichiro Pongos |
| Priority: | High |

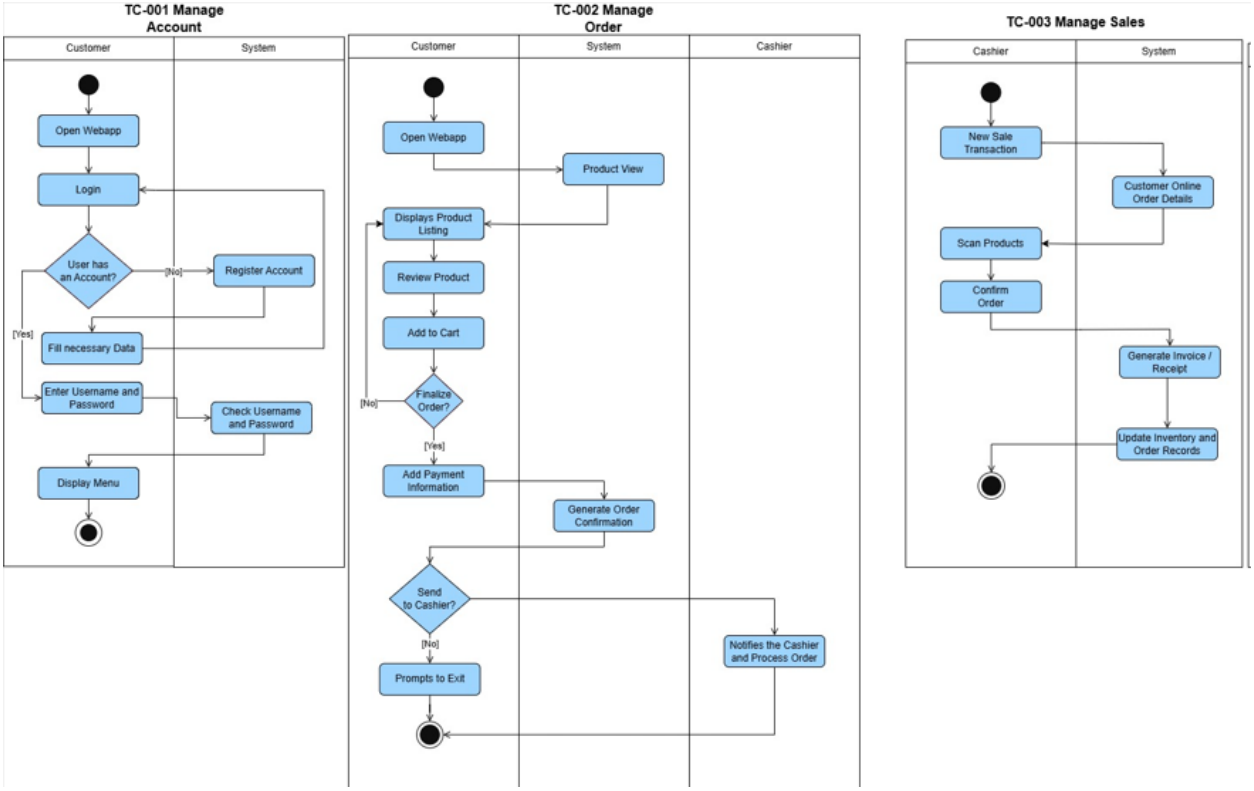
| | |
|---|---|
| Description: | This test case verifies the functionality of adding, updating, deleting, and managing admin and user information within the system. |
| Prerequisites: | 1. Admin user account is created and has the necessary rights.<br>2. Admin portal access is functional and user has permissions.<br>3. The system's database is connected and accessible.<br>4. Admin records already exist in the system for update/delete. |
| Test Data Requirement: | • Admin ID: A001<br>• New Admin/User Details: Name: John Doe, Email: john@domain.com<br>• Invalid Data: Missing email, invalid name format<br>• Existing Admin ID for update: A002 |

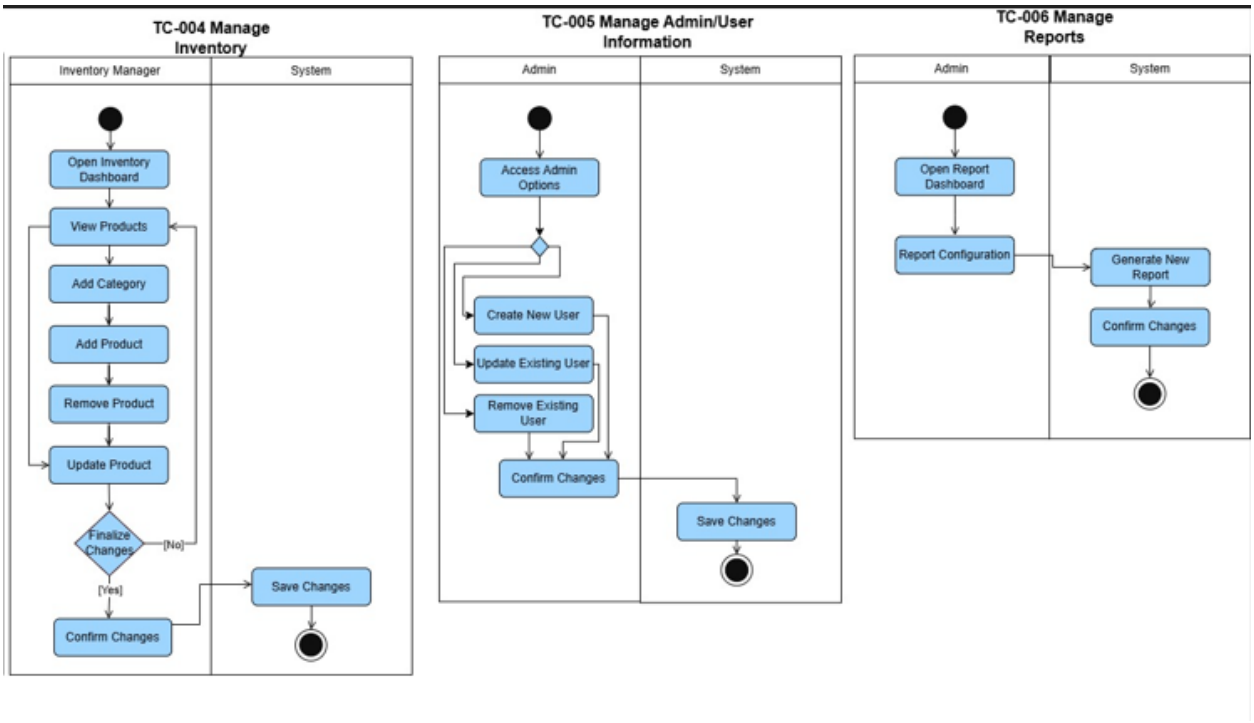
| STEP # | STEP DETAILS | EXPECTED RESULTS |
|---|---|---|
| 1 | Admin selects the "Manage User" option. | Manage User screen is displayed. |
| 2 | Admin selects "Add New User" option. | Customer is successfully logged into the account. |
| 3 | Admin enters valid user details and submits the form. | New User is added successfully, and confirmation is displayed. |
| 4 | Customer modifies account information (e.g., email, phone number) and clicks "Save." | Error message is displayed for missing fields. |
| 5 | Admin updates existing admin information. | Admin information is updated successfully. |
| 6 | Admin deletes a user record. | User record is deleted, and confirmation is displayed. |
| 7 | Admin logs out of the system. | Admin is logged out, and login screen is displayed |

| | |
|---|---|
| Test Case ID: | TC-006 (Manage reports) |
| Created by: | |
| Priority: | High |
| Description: | A test case for managing reports should verify that users can create, edit, view, and delete reports within the system, ensuring all functionalities operate correctly and data integrity is maintained. |
| Prerequisites: | 1. User has an active account with reporting access rights.<br>2. The reporting module is properly configured and accessible in the system.<br>3. The database contains sample data for generating reports.<br>4. The reporting tool is integrated with all required data sources (e.g., sales, inventory, user data). |
| Test Data Requirement: | • Admin ID: A001<br>• New Admin/User Details: Name: John Doe, Email: john@domain.com<br>• Invalid Data: Missing email, invalid name format<br>• Existing Admin ID for update: A002 |

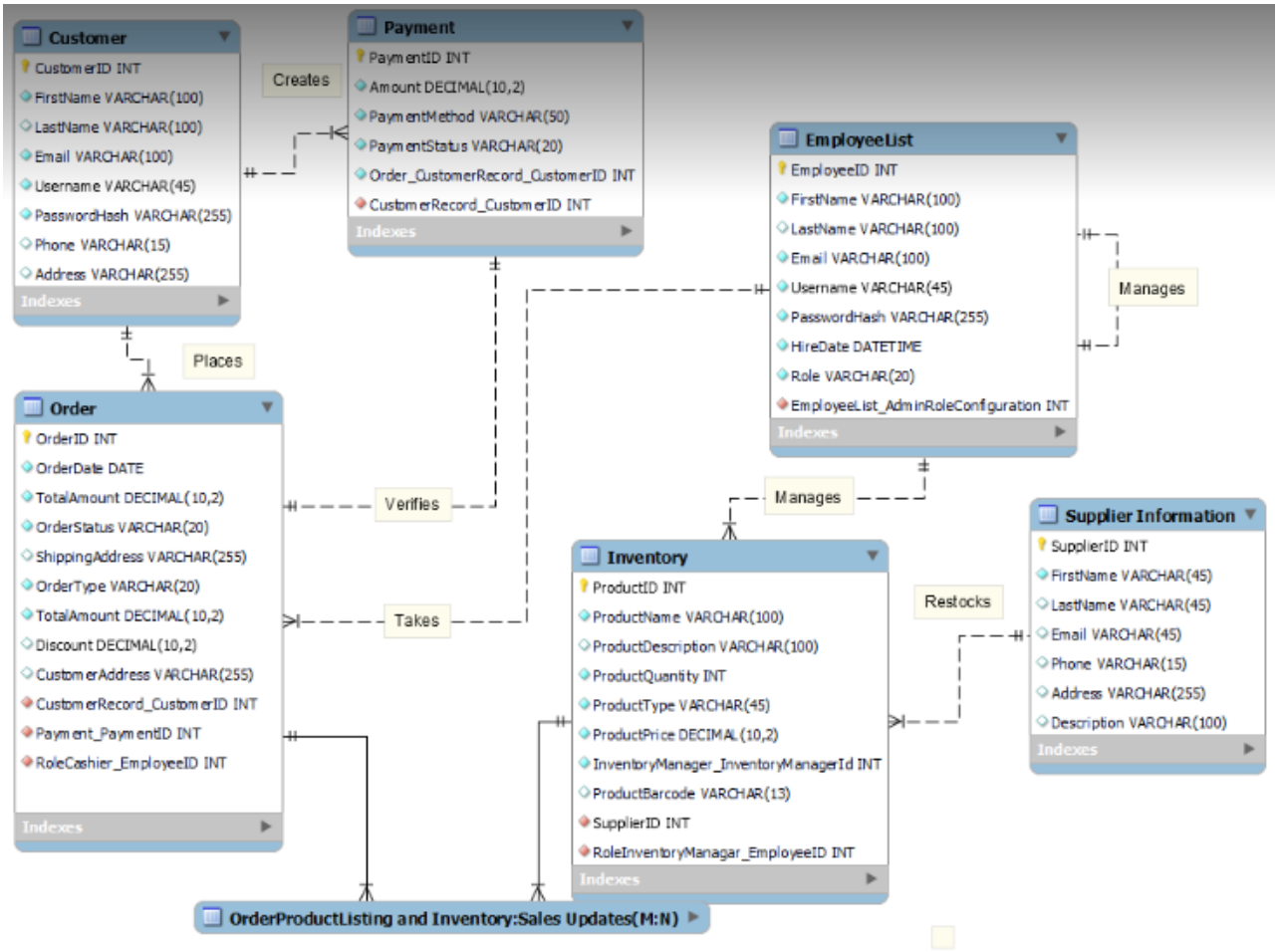
| STEP # | STEP DETAILS | EXPECTED RESULTS |
|---|---|---|
| 1 | User navigates to the "Reports" section in the system. | Reports dashboard is displayed with available report options. |
| 2 | User selects "Sales Report" and specifies the date range. | Sales Report is generated and displayed for the specified period. |
| 3 | User downloads the generated Sales Report. | Sales Report is downloaded in the chosen format (e.g., PDF, Excel). |
| 4 | User selects "Inventory Report" and specifies the date range. | Inventory Report is generated and displayed for the specified period. |
| 5 | User attempts to generate a report without specifying a date range. | Error message is displayed prompting the user to select a date range. |
| 6 | User selects "User Activity Report" for a specific user ID. | User Activity Report is generated for the specified user. |
| 7 | Admin logs out of the system. | User Activity Report is generated for the specified user. |

## VII. Activity Diagram with Swimlane






## Database Design


Customer
CustomerID INT
FirstName VARCHAR(100)
LastName VARCHAR(100)
Email VARCHAR(100)
Username VARCHAR(45)
PasswordHash VARCHAR(255)
Phone VARCHAR(15)
Address VARCHAR(255)
Indexes
Creates
Payment
PaymentID INT
Amount DECIMAL(10,2)
PaymentMethod VARCHAR(50)
PaymentStatus VARCHAR(20)
Order_CustomerRecord_CustomerID INT
CustomerRecord_CustomerID INT
Indexes
EmployeeList
EmployeeID INT
FirstName VARCHAR(100)
LastName VARCHAR(100)
Email VARCHAR(100)
Username VARCHAR(45)
PasswordHash VARCHAR(255)
HireDate DATETIME
Role VARCHAR(20)
EmployeeList_AdminRoleConfiguration INT
Indexes
Manages
Places
Order
OrderID INT
OrderDate DATE
TotalAmount DECIMAL(10,2)
OrderStatus VARCHAR(20)
ShippingAddress VARCHAR(255)
OrderType VARCHAR(20)
TotalAmount DECIMAL(10,2)
Discount DECIMAL(10,2)
CustomerAddress VARCHAR(255)
CustomerRecord_CustomerID INT
Payment_PaymentID INT
RoleCashier_EmployeeID INT
Indexes
Verifies
Takes
Manages
Inventory
ProductID INT
ProductName VARCHAR(100)
ProductDescription VARCHAR(100)
ProductQuantity INT
ProductType VARCHAR(45)
ProductPrice DECIMAL(10,2)
InventoryManager_InventoryManagerId INT
ProductBarcode VARCHAR(13)
SupplierID INT
RoleInventoryManagar_EmployeeID INT
Indexes
Restocks
Supplier Information
SupplierID INT
FirstName VARCHAR(45)
LastName VARCHAR(45)
Email VARCHAR(45)
Phone VARCHAR(15)
Address VARCHAR(255)
Description VARCHAR(100)
Indexes
OrderProductListing and Inventory:Sales Updates(M:N)

## VIII. Updated Product Backlog/User Stories

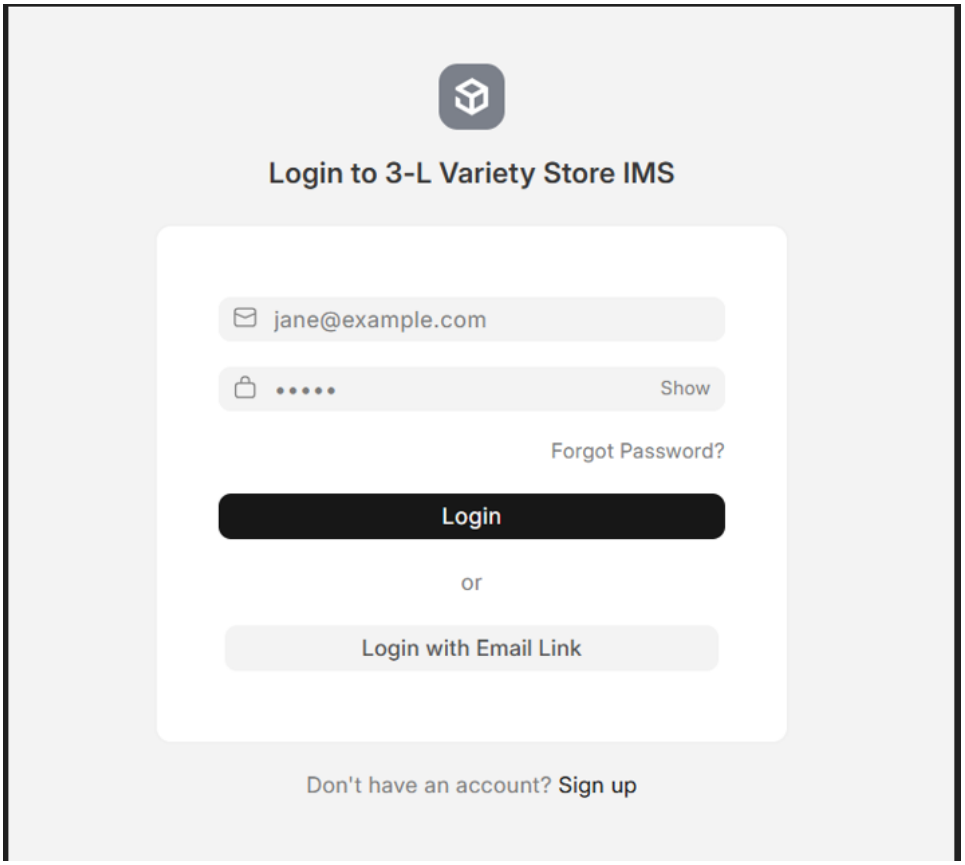
PRODUCT BACKLOG

| ID | As a/an | I want to be able to | So that... | Priority |
|---|---|---|---|---|
| **1** | Back-end Handler | Add user accounts for employees | I can add more inventory assistants to help manage | Must |
| **2** | Back-end Handler | Check Inventory status | I can make informed decisions when restocking | Must |
| **3** | Back-end Handler | View Product Reports | I can statistically see the progress of a certain product | Must |
| **4** | Back-end Handler | Login | I can safely manage who gets to access the system without risks | Must |
| **5** | Back-end Handler | Add/Update/Remove products | I can add new products and update already existing quantity of products automatically | Must |
| **6** | Back-end Handler | Generate barcodes | I can assign unique labels to each item for real-time product tracking. | Must |
| **7** | Back-end Handler | Manage parts of the inventory functions aside from user moderation | I can help the inventory manager on her behalf. | Must |
| **8** | Store Clerk | Login | I can access partially of the system related to the retail store | Must |
| **9** | Store Clerk | Customize Orders | I can adjust any conditional/ unconditional discounts while it uses the rate of that certain order | Must |
| **10** | Store Clerk | Accept Order Requests | I can prepare walk in product pickups when customers orders with our mobile app | Should |

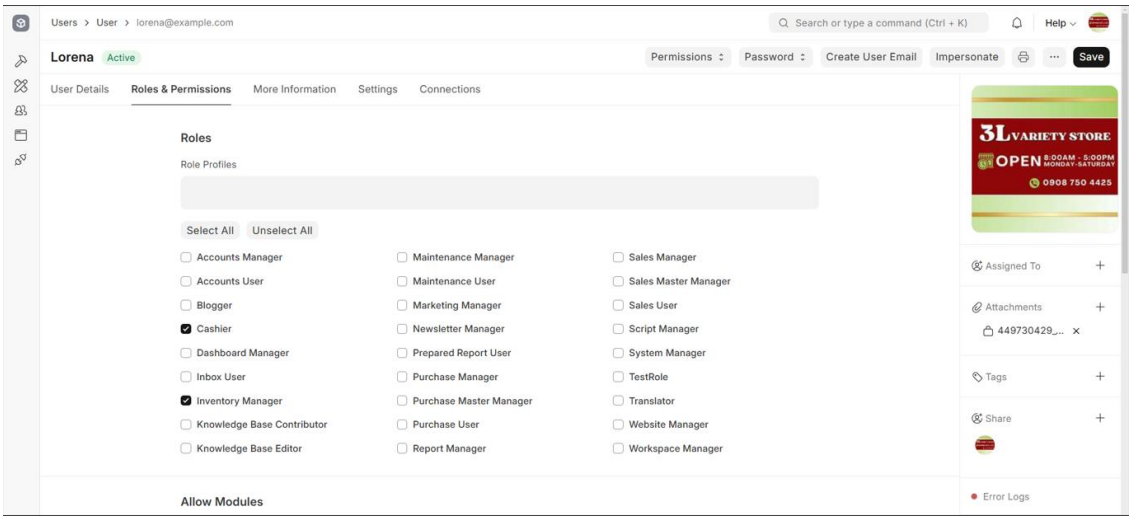
| | | | | |
|---|---|---|---|---|
| **11** | Store Clerk | Scan Barcodes | I can efficiently input purchased products, which will automatically update the inventory once purchases are confirmed | Must |
| **12** | Customer | Login/Sign Up | I can create my own personal account for orders on this establishment | Should |
| **13** | Customer | Create Order | I can create an order | Should |
| **14** | Customer | Add to Cart | I can continue looking for other products before checkout | Should |
| **15** | Customer | View Product Catalogue | I can see what the store is selling | Should |
| **16** | Customer | Manage Checkout | I can choose between pickup or delivery options for obtaining the products. | Should |
| **17** | Customer | Manage Payment Method | I can choose between cash or cashless such as GCash or Paymaya | Should |

## IX. Partially working cloud hosted prototype

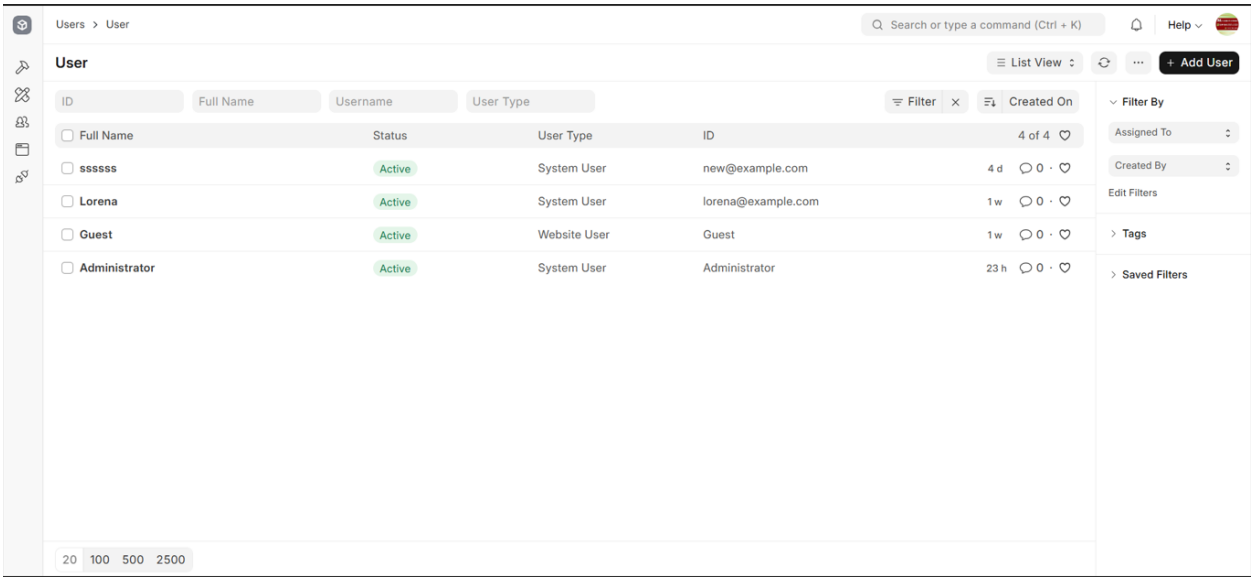
### Log in and Register



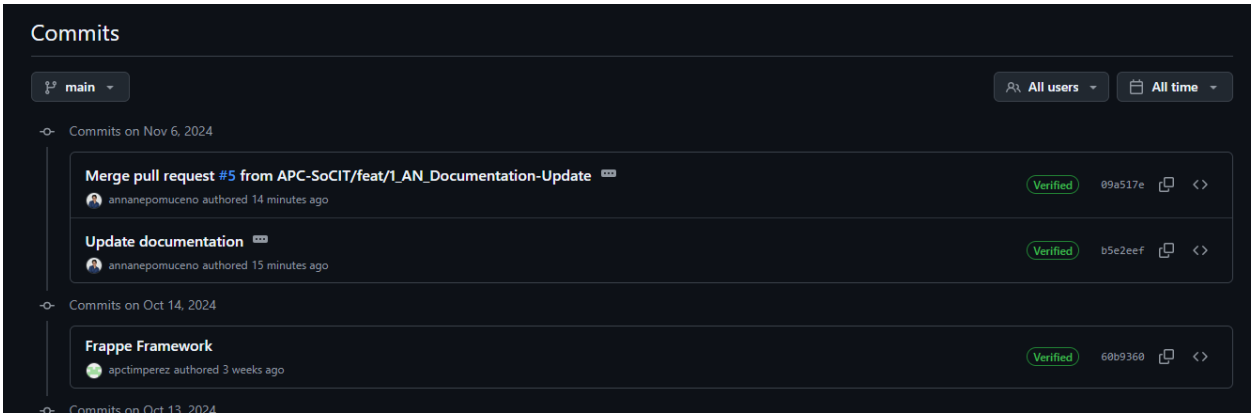

### Roles Access Control

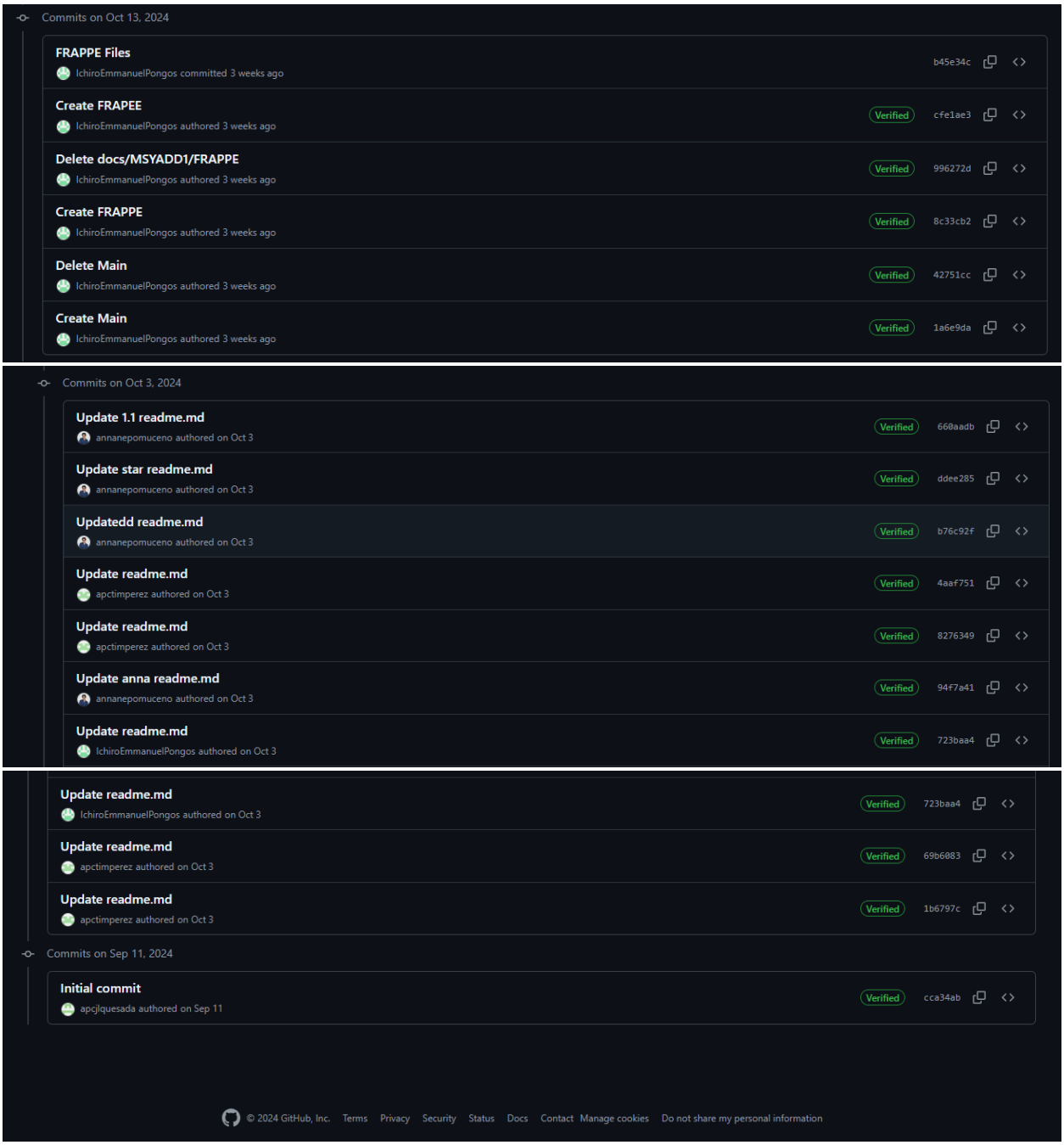


## Users




## X. Updates of contents in Project GitHub Repository






## 10.1: Technology Stack

**Framework/Backend:**

Frappe: A python-based web application framework where you can create and develop a system

**FRONTEND:**

HTML, CSS, JavaScript: the standard language for templating and styling in Frappe.

**DATABASE:**

MySQL: The relational database used for managing accounts and inventory

## GitHub Project Repository

This link leads to the GitHub Repository of Group Hextech where it contains the documentation and where members updates

LINK: https://github.com/APC-SoCIT/APC-2024-2025-T1-05-3-L-Variety-Store

## Conclusion

The Implementing of this project will make 3 L Variety Store and Frozen Goods a more efficient, customer-friendly, and technologically sophisticated business. By digitizing inventory management, an online ordering system, and a mobile application, the business will drastically decrease manual labour and mistakes and improve supply consistency. This new technology will give consumers a fast and convenient method to place orders and verify availability, lowering wait times and improving their shopping experience. The automated stock tracking and predictive analytics will allow the store's management to manage inventory more accurately and responsively where they can ensure that popular goods are always accessible, and consumer demand is satisfied constantly. This project seeks to establish a new benchmark for local retail operations by demonstrating how technology can improve operational efficiency and customer happiness, therefore establishing 3 L Variety Store for long-term development and success in the competitive frozen products industry.

# Appendices

## Appendix A: Project Vision

To transform inventory management at Lorena's local food store by deploying an innovative system that easily includes real-time inventory tracking, automatic reordering, and user-friendly consumer inquiry interfaces via mobile and web-based apps. This system will provide effective supplier management, analytics, and reliable database administration, resulting in optimal stock levels, increased customer satisfaction, and efficient operations.

**Appendix B: Schedule/Release Plan**

| MNTSDEV | MYSADD1 | MCSPROJ |
|---|---|---|
| • Research Paper<br>• Pitch Video<br>• PowerPoint Presentation<br>• Wireframe/Prototype | • Database Modelling<br>• Web Application Development and mobile application<br>• User login<br>• Interface development<br>• Beta Testing | • Integrating A.I Analytics<br>• Report analysis<br>• Bug fixes<br>• Platform integration |

*Table 1 Release Plan*

**Appendix C: Product Roadmap**

| Q1 | Q2 | Q3 |
|---|---|---|
| **Milestone 1:**<br>• Approval process<br>• Documentation<br>• Pitch Video<br>• Wireframe/Prototype | **Milestone 2:**<br>• UI/UX Design<br>• Database Modeling<br>• Design Documentation<br>• Development<br>**Milestone 3:**<br>• Revision of Paper<br>• Prototype Testing<br>• Bug Fixes | **Milestone 4:**<br>• Deployment of Project<br>• Finalizing Software<br>• Implementation<br>• Submission of Design Documentation |

*Table 2: Poduct Roadmap*

**Appendix D: Teams Meetings**

| DATE | PARTICIPANT/S | AGENDA | RESOLUTION |
|---|---|---|---|
| | | | |
| AUGUST 17, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez | • Data Flow Diagram Progress Review | • Finalize the updated data flow diagram |
| AUGUST 21, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez | • Working on fully dressed use case | • Draft alternate flows and review the use case. |
| AUGUST 29, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez | • Developing the test cases<br>• Discussion on the activity diagram | • Draft and finalize the test cases<br>• Develop the activity diagram based on the discussed components |
| AUGUST 30, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez<br>• Mr. Manuel L Calimlim Jr. | • Consultation for the diagrams | • Revising the parts that needs to be revised based on the advisers' comments |
| SEPTEMBER 13, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez<br>• Mr. Manuel L. Calimlim Jr. | • Consultation for the diagrams | • Revising the parts that needs to be revised based on the advisers' comments |

| | | | |
|---|---|---|---|
| SEPTEMBER 18, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez | • Discussing the diagrams based on the advisers' comments | • Revise the diagrams |
| OCTOBER 2, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez<br>• Mr. Manuel L. Calimlim Jr. | • Revisions based on midterm presentation comments | • Finalize the diagrams based on the comments |
| OCTOBER 14, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez | • Discussion of the frappe framework for the system<br>• Documentation plan | • Research on the frappe framework's functionalities<br>• Assign team members specific documentation tasks for different parts of the system |
| OCTOBER 22, 2024 | • Anamika Nepomuceno<br>• Timothy Louise Perez<br>• Ichiro Emmanuel Pongos<br>• Rainier Lopez<br>• Mr. Manuel L. Calimlim Jr. | • Discussed the ERD and some parts of the documentation | • Finalize the ERD and the other diagrams<br>• Finalize the frappe prototype |

*Table 3: Minutes Of The Meeting*

## Screenshots of the Meetings:

*Figure 1: Team Meeting (1):*

August 17, 2024

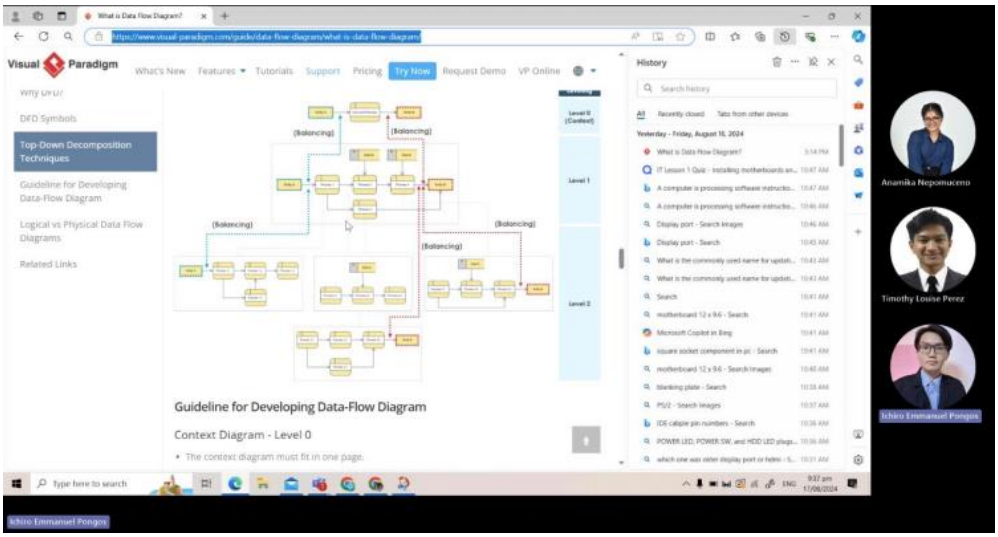



*Figure 2: Team Meeting*

August 21, 2024

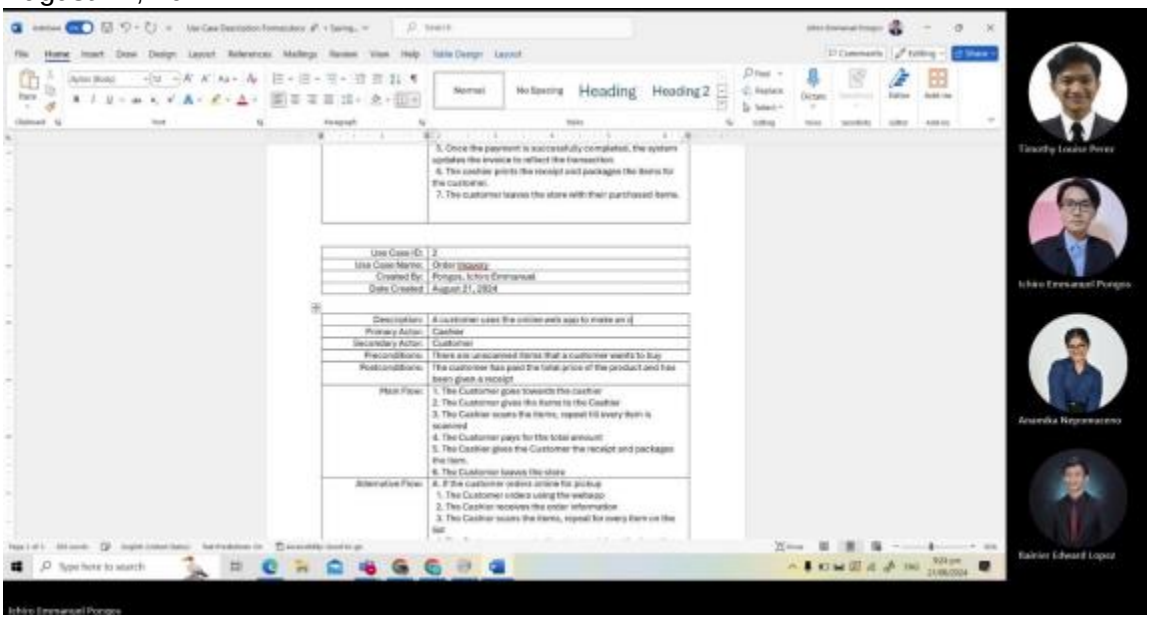



*Figure 3: Team Meeting*

August 29, 2024

*Figure 4: Consultation Meeting*

August 30, 2024

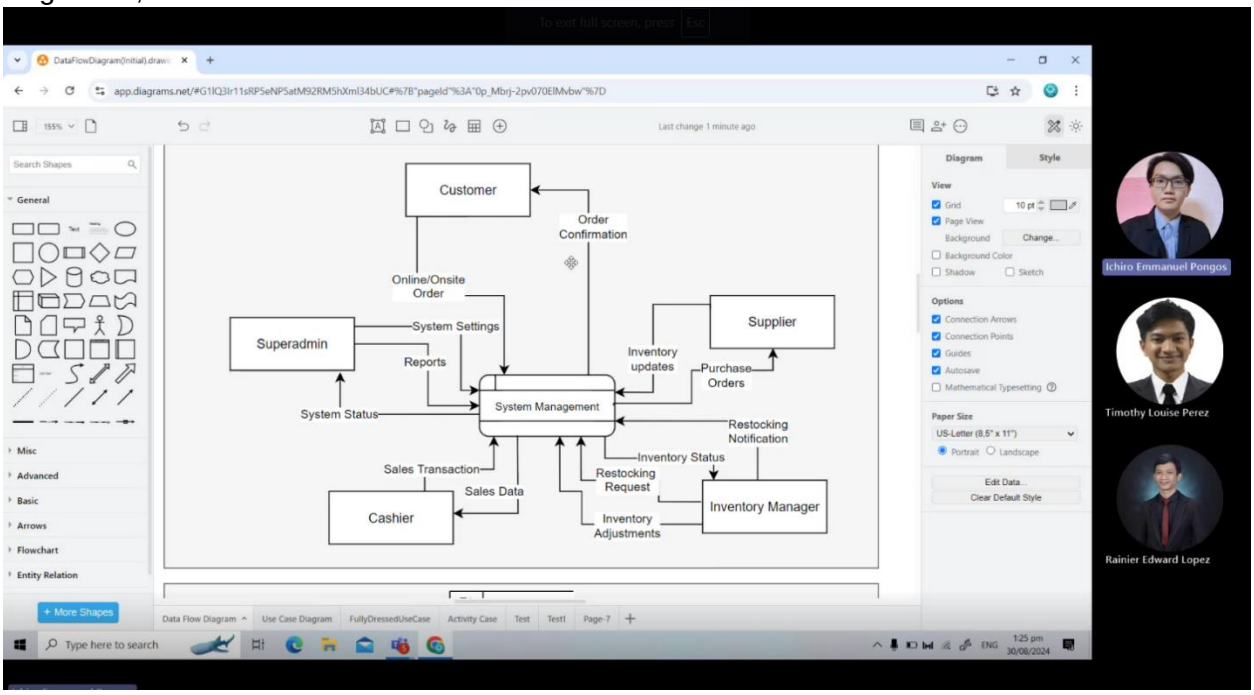



*Figure 5: Consultation Meeting*

September 13, 2024

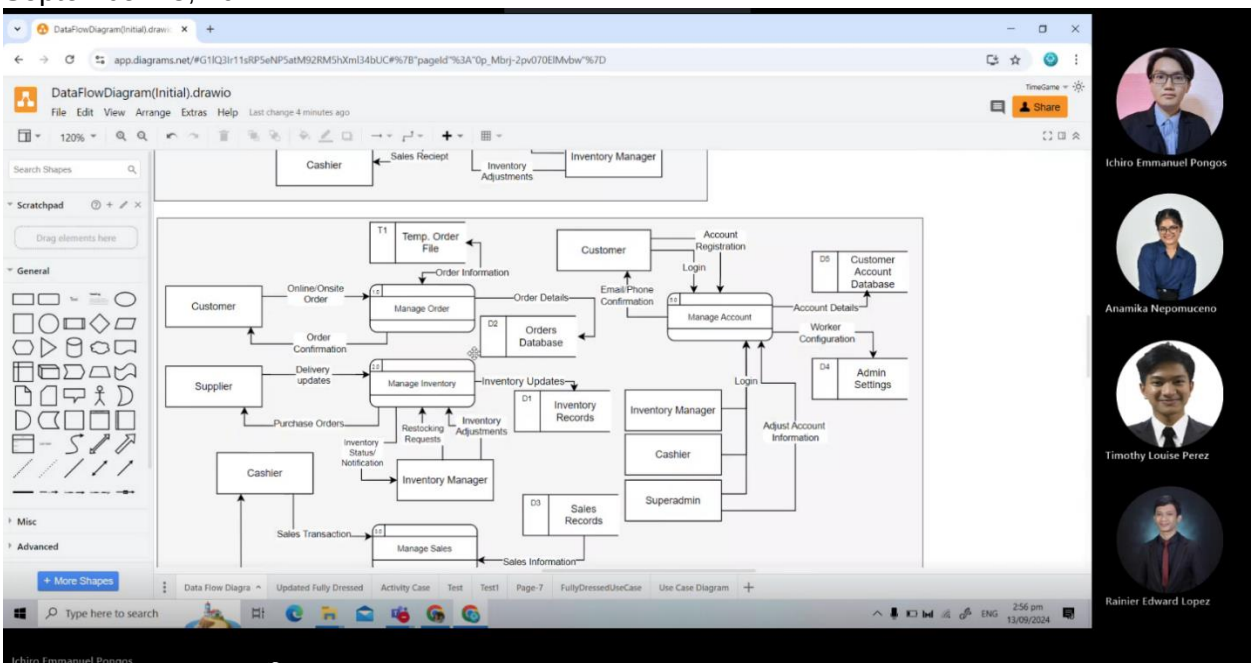



*Figure 6: Consultation Meeting*

September 18, 2024

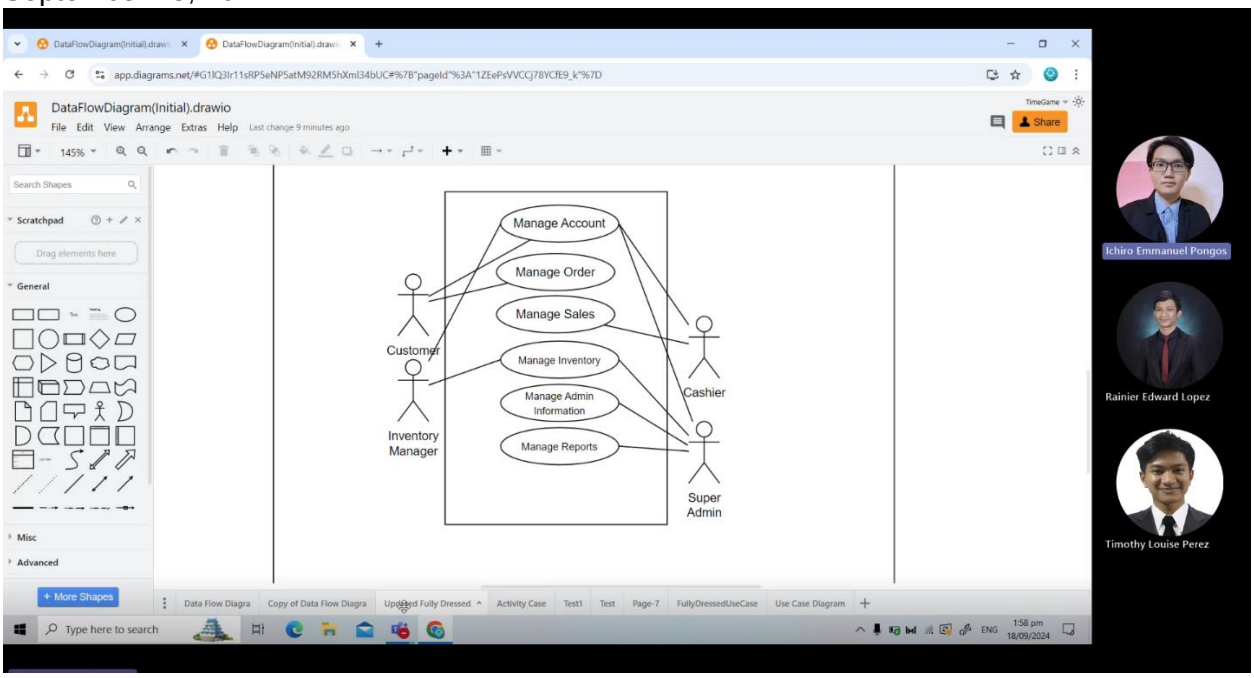



*Figure 7: Consultation Meeting*

October 2, 2024

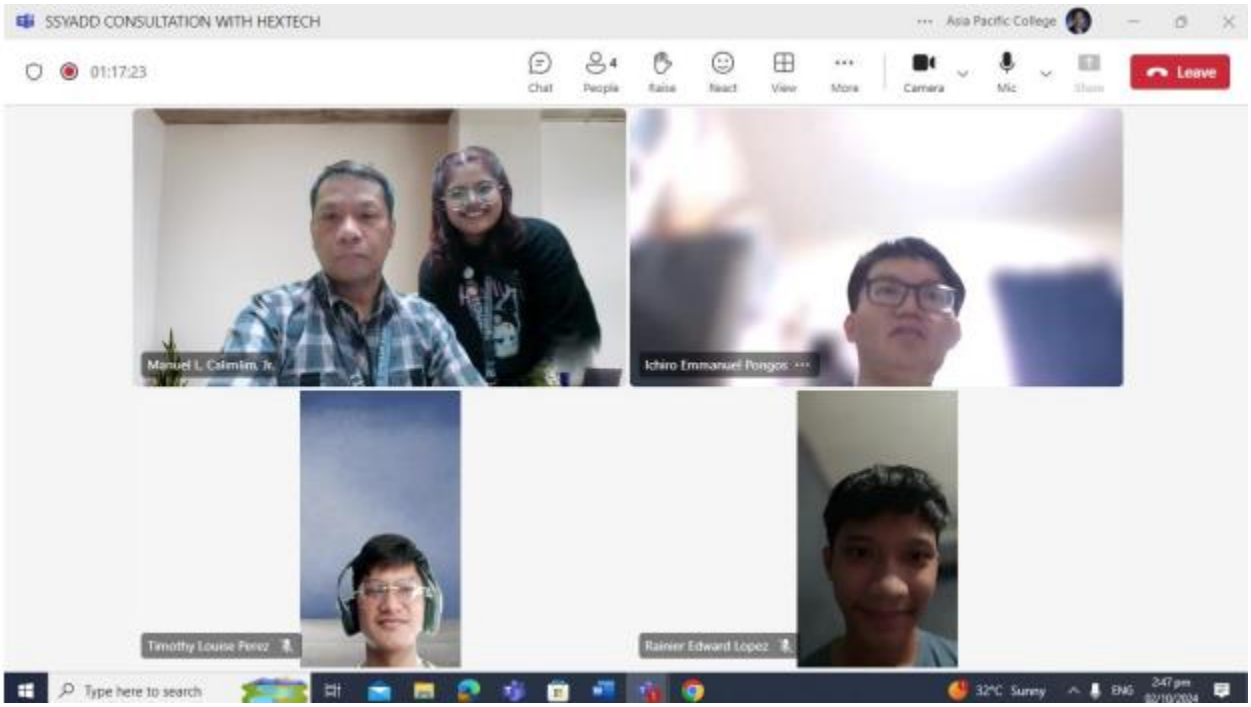



*Figure 8: Team Meeting*

October 14, 2024

*Figure 9: Team Meeting*

October 20, 2024


*Figure 10: Consultation Meeting*

October 22, 2024