Dynamic Inventory System for Akash Chaat House

Akash Brar

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1. Project Management

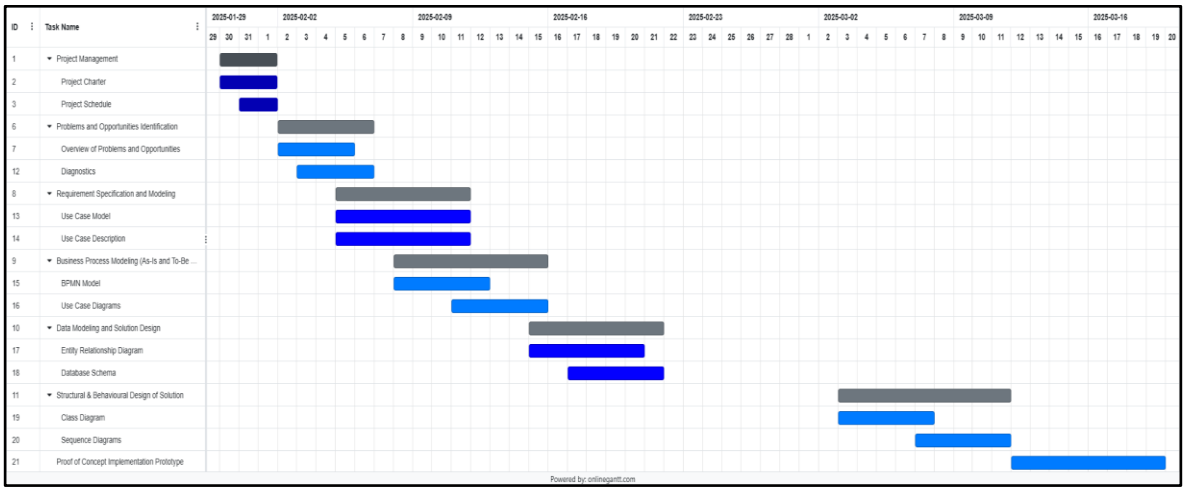
1.1 Project Charter

Project Name	Dynamic Inventory System for Akash Chaat House
Project Sponsor	ITM Department Toronto Metropolitan University
Project Manager	Akash Brar
Project Start Date	January 30th 2025
Project End Date	April 3rd 2025

Business Case Justification
Akash Chaat House is dealing with heavy inventory issues such as inventory loss, inventory damage, and storage issues. These issues are key drivers to sales loss and inventory loss, and after careful consideration the business is now seeking out an inventory management system.
Objective
Akash Chaat House is seeking to implement an inventory management system with the following goals in mind: ● Minimize product loss by 10% ● Optimize stock level
Scope Statement
The project is looking at the inventory items used at Akash Chaat House. All products used to provide the service they offer needs to be accounted for - this means product overview, cost, importance, and threshold optimization.
Major Deliverables
- Project Scope and Objective - Requirement Analysis - System Design and database development - Prototype development
Key Stakeholders
Akash Chaat House

Roles and Responsibilities		
Name	**Role**	**Contact Information**
Akash Brar	Project Manager	Brar.akashh@gmail.com
Budget and Resources		
Akash Chaat House has a budget of $5,000 as an initiation fee and is open to budgeting $500/yearly on ongoing costs. Currently, the company has the following materials which could be used for the Inventory System: Tablets, POS, and computers.		

1.2 Project Schedule (Gantt Chart)



During the development of our Gantt Chart, our group prioritized creating a realistic and achievable timeline while carefully considering our individual schedules with the project's objectives. To ensure this, we held multiple meetings amongst each other as well as with our client to assess our tasks, and potential constraints to our schedules. There is a gap in our schedule to accommodate for midterm season, so that our members are able to focus on other responsibilities as well.

2. Identification of the problem /opportunities

2.1 Overview of the actual problems /opportunities

Akash Chaat House is a small Surrey BC, business specializing in Indian street food. The business is currently facing significant challenges due to its lack of a proper inventory management system. The company is having various operational inefficiencies due to an improper inventory system. One of the main issues is inventory loss, which is currently estimated at 15%. This significant loss occurs due to no tracking system that can help them identify the foods that must be sold fast to avoid spoilage. Additionally, due to no centralized inventory management system, the restaurant buys ingredients like lettuce, tomatoes, cucumbers, pickles, and so on in bulk without understanding the actual amount of stock that is needed for the restaurant. Without an inventory system, the purchasing decision is made on assumption rather than exact numbers, which results in overstocking and wastage that leads to cost increases and reduced profitability.

2.2 Diagnostic (causes-problem-consequences)

Throughout the years, Akash Chaat House has grown comfortable using the same manual inventory system. The process currently in use has worked well for them in the past. Due to this, they feel reluctant to start using new approaches, as they feel as though it might throw disorder into their daily performances. Moreover, they are uncertain about how to adapt to a more organized inventory management system and do not have enough technical knowledge to utilize one efficiently. One other challenge that they are facing is their limited budget. It prevents them from effectively financing the management software or hiring others to manage the stock proficiently. As a consequence, they rely on outdated techniques and estimations, leading to inefficiency.

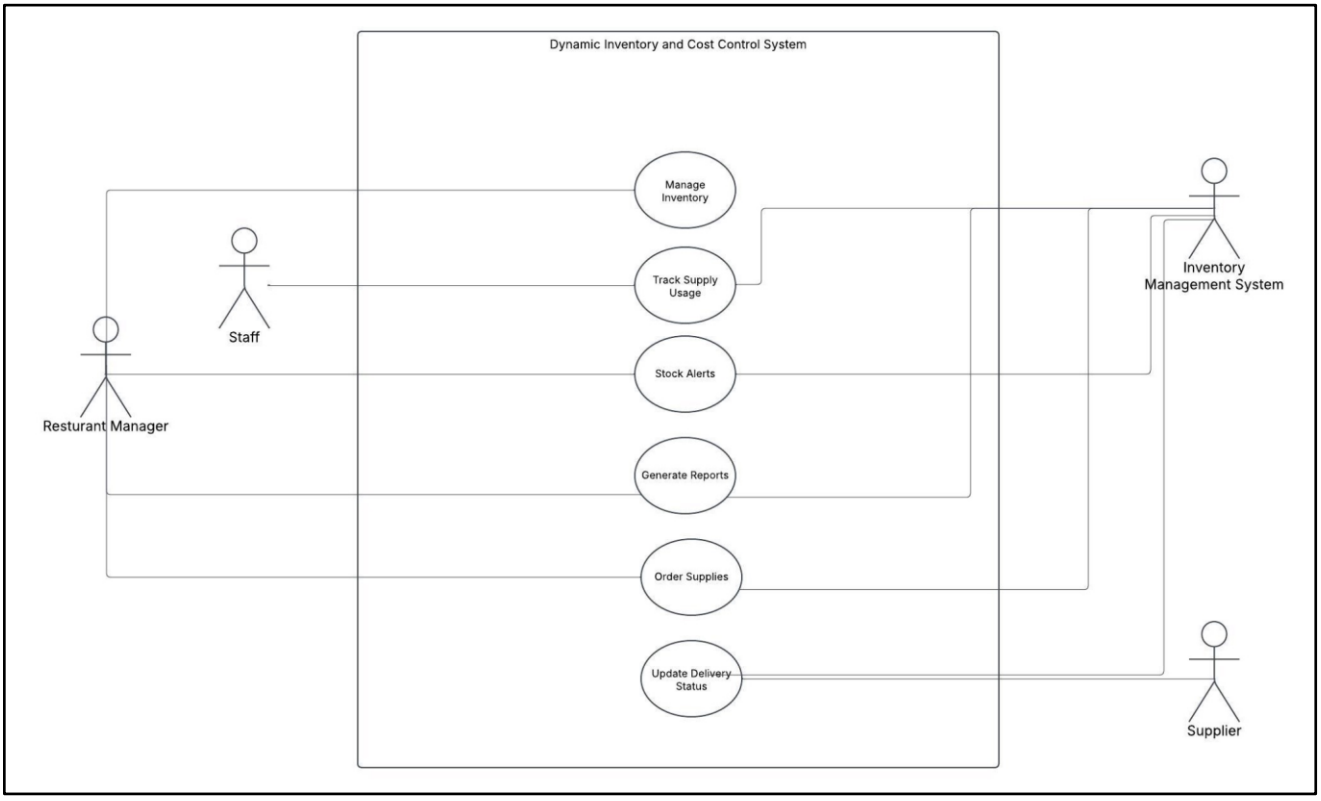
Because of the lack of an inventory system, the business has trouble keeping the stock well-organized. Some menu items sit unpurchased for long periods and spoil before they can be used. On the other hand, overstocking without accurate data causes problems. They end up having to choose which items to keep and which to throw away. Without tracking, they end up throwing away more instead of improving how they buy items to reduce waste. This leads to unnecessary losses and problems in daily operations.

Poor inventory management has serious consequences. The restaurant loses potential profits when popular ingredients run out or when stock isn't managed well. Frequent waste and spoilage also add extra costs, as expired or unused ingredients have to be thrown away. These problems reduce profits and put financial struggles on the business, making it harder to invest in modifications. Without a proper inventory system, this ongoing pattern of waste and inefficiency keeps going, hurting both revenue and long-term sustainability/success.

3. Requirement Specification & Modeling

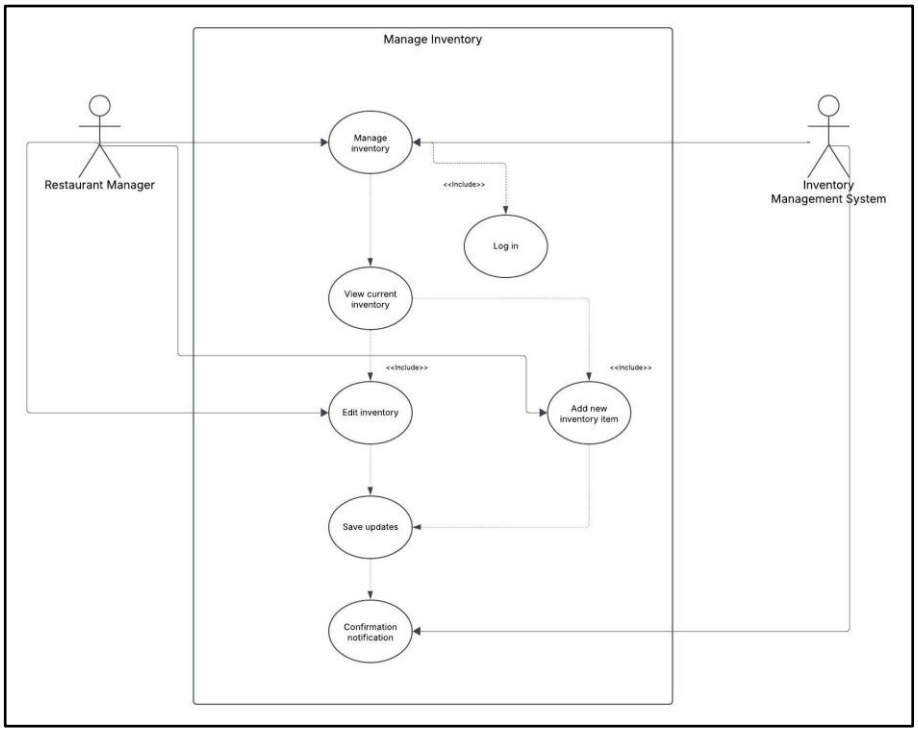
3.1 Use Case Model (Future Requirements)

The diagram below represents the overall structure of the Inventory Management System (IMS) and the various features available to users. Each functional requirement is associated with its own set of use cases, providing a detailed breakdown of system interactions and user functionalities. These use cases are further explained in **Section 3.2: Use Case Description**, which offers a comprehensive understanding of how different components of the IMS operate within the system.



3.2 Use Case Descriptions

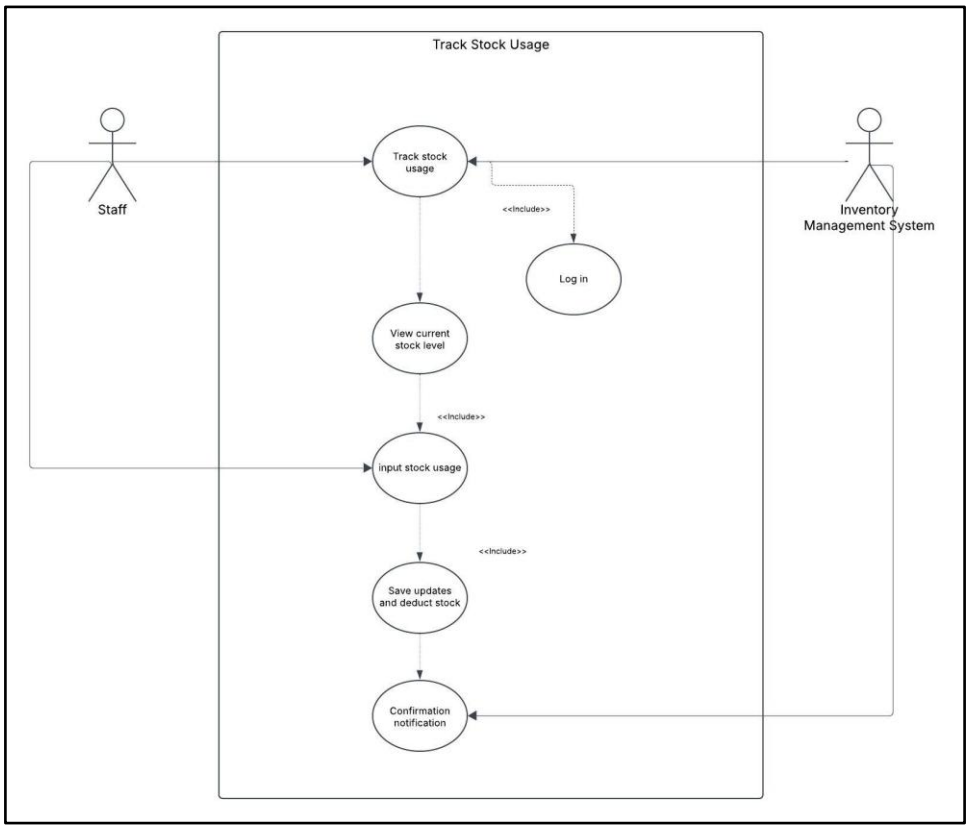
Use Case 1: Manage inventory



Use Case	Manage Inventory
Actors	Restaurant Manager, Inventory Management System
Short Description	Manage Inventory will allow the company to manage their inventory in real time. Before being able to use the system, the manager must login into the system.
Trigger	User clicks “Manage Inventory” to (view/add/remove) the restaurant’s inventory.
Precondition	Restaurant Manager must be logged in
Normal flow (View inventory level)	1. Restaurant Manager selects “Manage Inventory” 2. The system will retrieve the entire inventory list with their current stock level 3. Restaurant manager selects inventory x and sees current levels. a. Edit permission allows adding or removing 4. System will bring up inventory x and show current level with recent usage data

Alternative flow A (Edit inventory item)	1. Restaurant Manager selects “Manage Inventory” 2. The system will retrieve the entire inventory list with their current stock level 3. Restaurant manager selects inventory x and edits the current level. a. Edit permission allows adding or removing 4. System saves changes 5. System will send confirmation notification of saved actions
Alternative flow b (create new inventory item)	1. Restaurant Manager selects “Manage Inventory” 2. The system will retrieve the entire inventory list with their current stock level 3. Restaurant manager selects “add new” 4. System will create a new inventory form to fill out 5. Restaurant manager will fill out form and add the stock in store 6. System saves changes 6. System will send confirmation notification of saved actions
Exceptions	If the system has an error, an error code will pop up - stating what happened.
Post Condition	Inventory level should have been manually inputted before being able to edit it in the system.
Includes	N/A

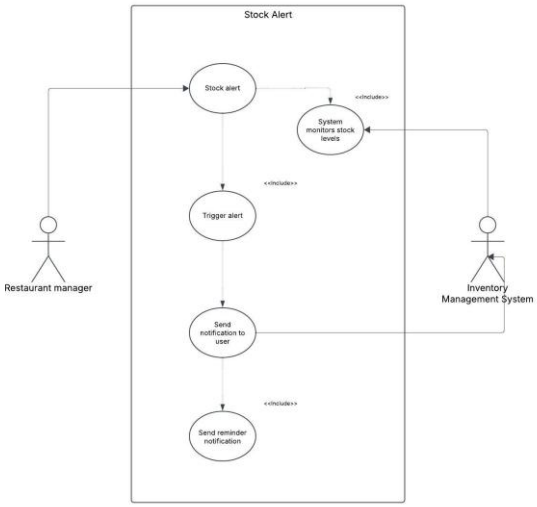
Use case 2: Track Stock Usage



Use Case	Track Stock Usage
Actors	Staff, Inventory Management System
Short Description	Track stock usage will allow members from the restaurants to view and update in real time usage rates of their inventory. The staff member must have a log in with edit permission.
Trigger	User clicks “Track Stock Usage” to update stock usage on the restaurant’s inventory.
Precondition	Staff must be logged into the system
Normal flow (Input usage of stock)	1. User selects “Track Stock Usage” 2. The system will retrieve the entire inventory list with their current stock level 3. User selects inventory x and sees current levels 4. System will bring up inventory x and show current level with recent usage data 5. User fills out the form of inventory item(s) and quantity used 6. System saves changes

	7. System will send confirmation notification of saved actions
Exceptions	If a item is low in stock or out of stock, an alert will be triggered
Post Condition	The inventory level will be updated instantly after the update.
Includes	N/A

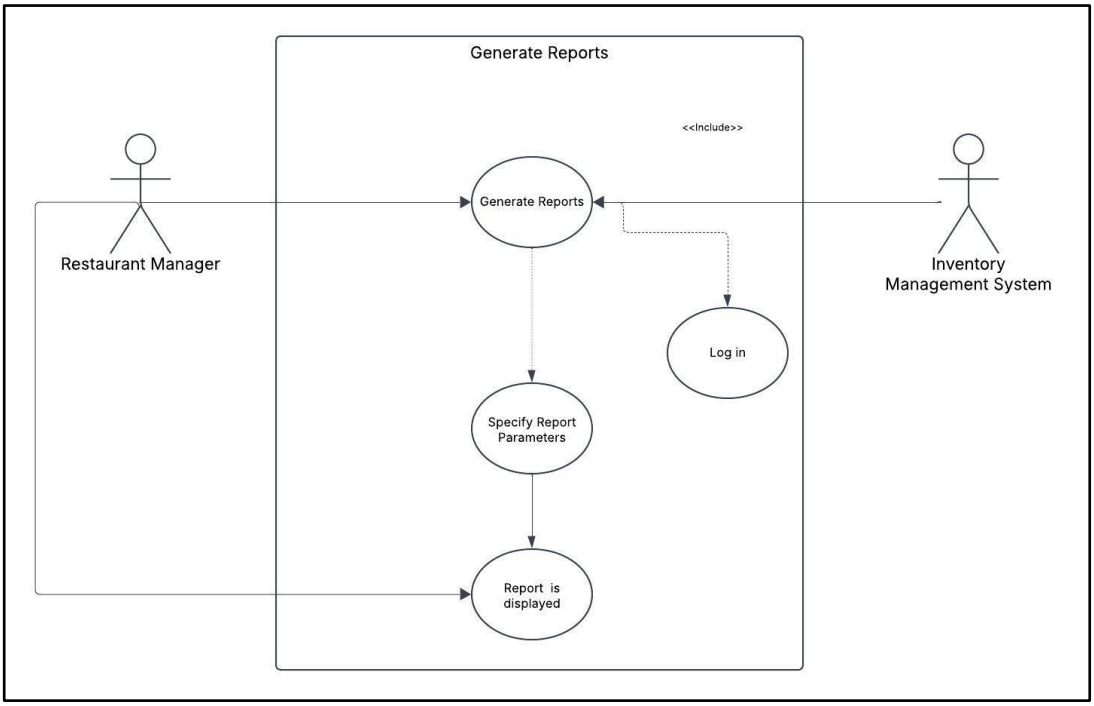
Use case 3: Stock Alert



Use Case	Stock Alert
Actors	Restaurant Manager, Inventory Management System
Short Description	When setting up the inventory in the system, one of the fields requires to input a threshold for when a reminder/alert should be sent that the product is low and it needs to be re-order with enough time without losing it's availability.
Trigger	Once stock gets to the predetermined threshold outlined in the creation of the system, the system will trigger a notification.
Precondition	- The system will have the predetermined stock threshold outline for each product - The system will actively monitor the inventory
Normal flow (System send low stock alert)	1. The system is scanning stock level for each product 2. When the stock of a product reaches its threshold, the system will trigger a notification 3. The restaurant manager receives the notification 4. The restaurant manager will begin an order

Exceptions	If the alert fails and doesn't get sent to the manager, the system will log an error.
Post Condition	The restaurant manager will be alerted about the low stock.
Includes	N/A

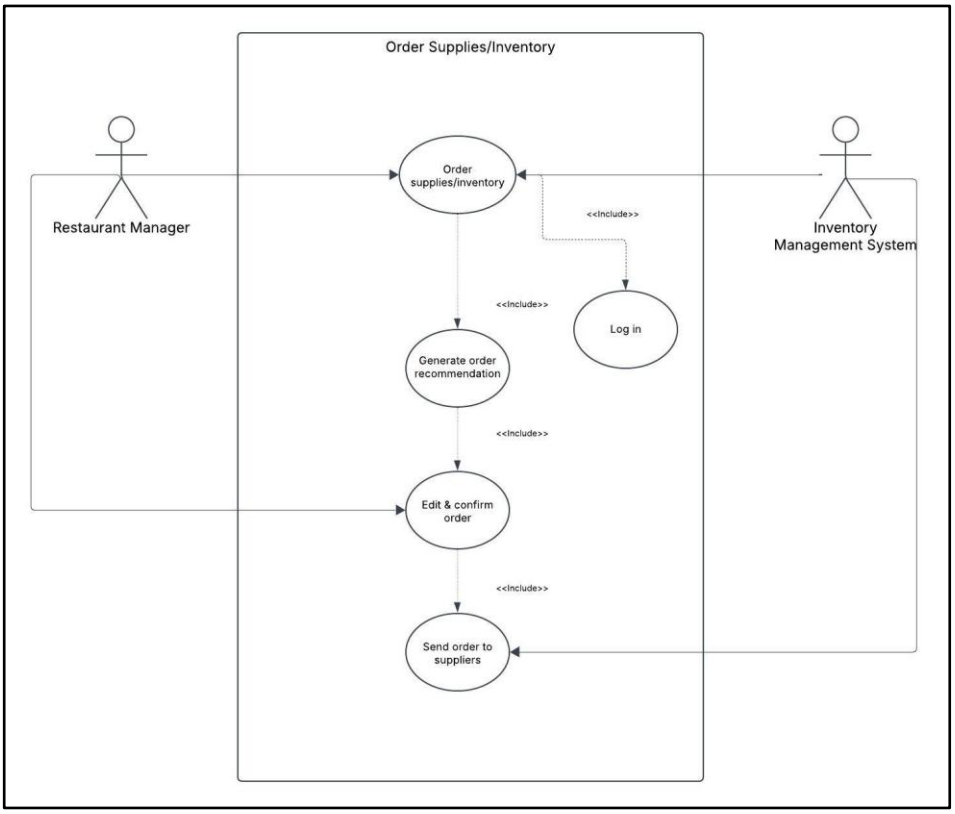
Use case 4: Generate Reports



Use Case	Generate Reports
Actors	Restaurant Manager, Inventory Management System
Short Description	The inventory management system will be able to create reports based on the stock data it has been tracking. The report option varies and can be based on time ranges specified by a user.
Trigger	Restaurant Manager clicks "generate reports" to see data driven reports on the restaurant's inventory.
Precondition	- Restaurant Manager must be logged in - The system must have at least a quarter of product turnover/ ordering to generate the report
Normal flow (Generate stock	1. Restaurant Manager selects "Generate Reports" 2. The system will prompt two fields that must be filled out

consumption report)	a. Report type: b. Date Range: 3. Restaurant manager selects both Report type and date range fields 4. The system generates the report 5. The system will display the report on screen
Exceptions	If data is missing or cannot be calculated, an error message will appear with the reason.
Post Condition	the IMS will display the report
Includes	N/A

Use case 5: Order Supplies



Use Case	Order Supplies/Inventory
Actors	Restaurant Manager, Inventory Management System
Short Description	The system will recommend an order list based on current inventory levels and consumption data to expedite the ordering process. The restaurant manager will review the list and confirm it.

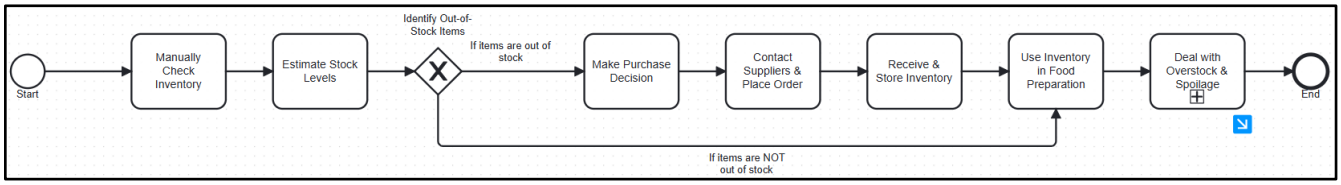
Trigger	Once enough products are at a low enough stock to create an order, the system will recommend an order list with quantities.
Precondition	- Restaurant Manager must be logged in - The system must have at least a quarter of product turnover/ ordering to generate recommendation
Normal flow (Order inventory recommended)	1. The system generates a recommended order list based on stock level and consumption patterns 2. The restaurant manager will review the proposed order and be allowed to edit the order 3. The Restaurant manager will confirm order 4. The system will send the order to the required suppliers
Exceptions	If the suppliers cannot fulfill the order or could not be contacted, an alert will be triggered.
Post Condition	The supplier will receive the order requested by the Restaurant.
Includes	N/A

4. Business Process Modeling (As-is and To-be diagrams)

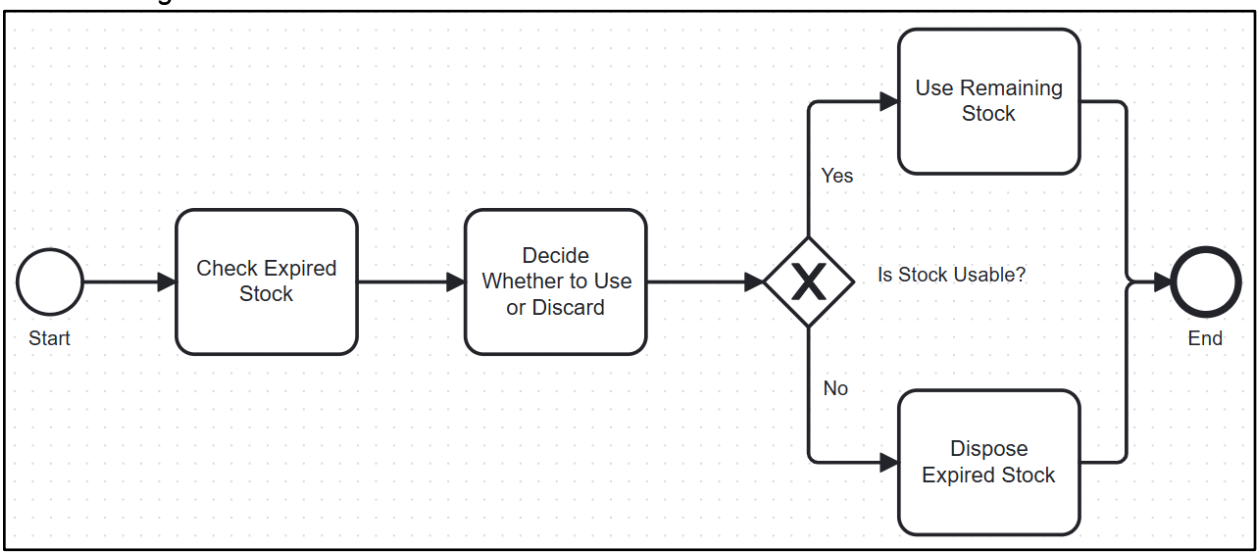
4.1 As-Is BPMN Model Diagram (the entire actual system)

The restaurant currently relies primarily on a word-of-mouth system for managing its inventory. The owner trusts that employees, who were trained to recognize when stock needs replenishing, can handle this responsibility, as this method worked well in the early stages of the business. However, as the restaurant grew and the volume of orders increased, this approach became increasingly unreliable. With a higher demand for stock, the responsibility of deciding when to place orders falls on the employees, which introduces inconsistencies. Different employees may have varying standards for when to reorder, and without a formal tracking system, the task is often forgotten or overlooked amidst their daily operations. This lack of structure has made the current inventory management process inefficient and prone to errors.

Entire Process:



Stock Management:

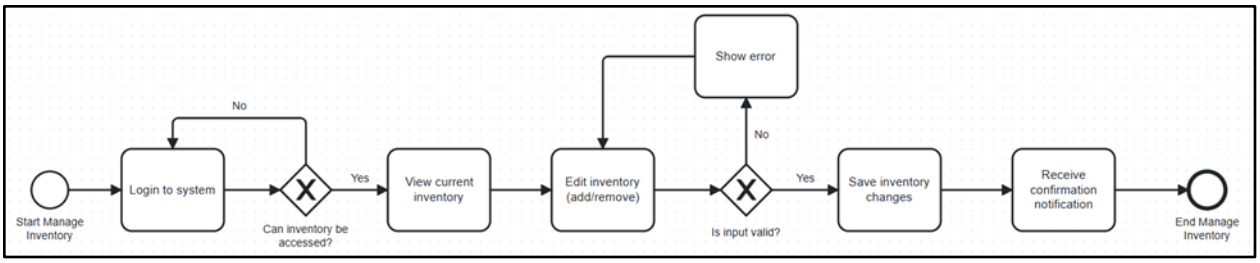


4.2 To-Be BPMN diagram (the entire To-Be system)

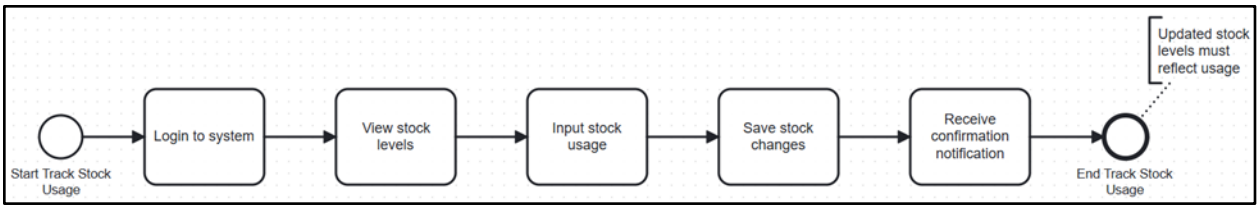
With our proposed update to their inventory system, we recommend that the employees manage and track the inventory once per day. The process begins with an employee logging into the system, and then accurately updating the inventory with current stock levels. We are suggesting that this is done at the end of each shift, so that the stock levels are updated for the beginning of the work day. We want to recommend a software/program to the restaurant that will notify the restaurant's managers when stock levels will soon be insufficient, and a further reminder if no action is taken. The software should also be capable of generating reports of the stock. This is important as patterns and trends might be known, such as certain days or holidays requiring more stock, but may not be officially tracked with the current at specific stock levels of items. We also want the program to have the capability to automate orders, especially for items that are always in use. This includes specific ingredients that are used in many of the restaurant's recipes, and things like tissue paper, cleaning supplies, etc. word-of-mouth and paper system. After reports are generated, further alerts can be customized to be sent

Entire System BPMN Diagram:

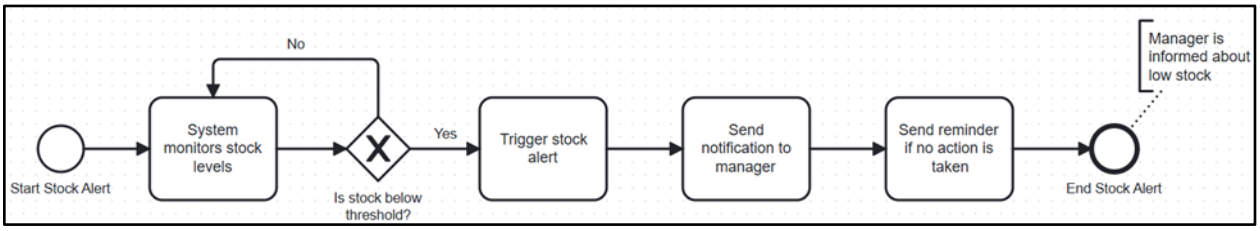
Manage Inventory Subprocess:



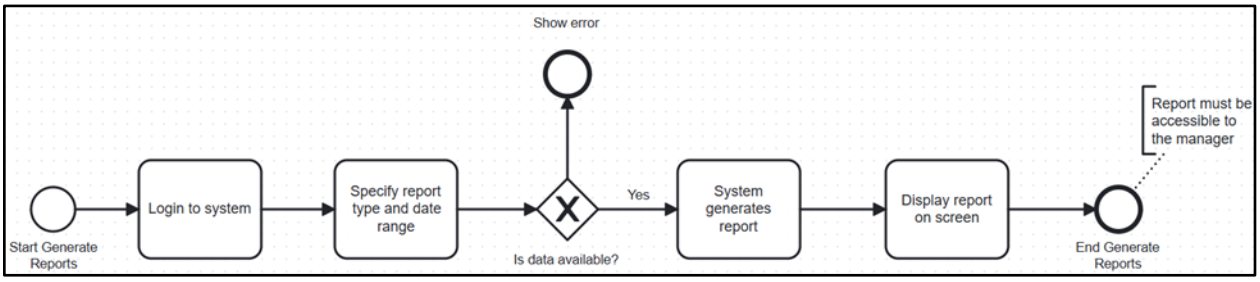
Track Stock Usage Subprocess:



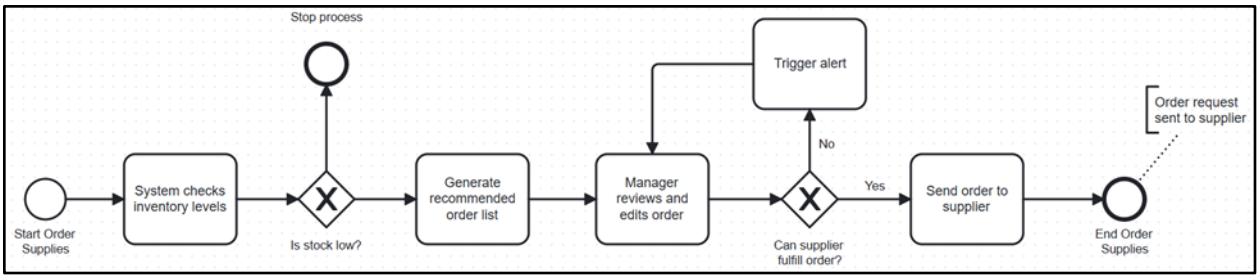
Stock Alert Subprocess:



Generate Reports Subprocess:



Order Supplies Subprocess:



5. Data Modeling & Design of the new IS solution

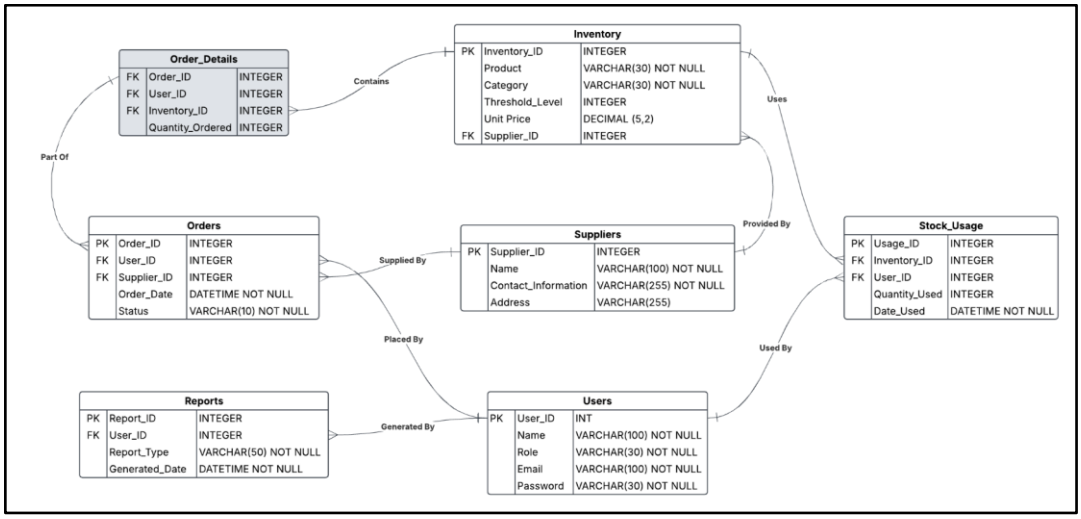
5.1 Entity Relationship Diagram (the entire To-Be system)

Entities	Attributes
Users	User_ID (PK), Name, Role, Email, Password
Inventory	Inventory_ID (PK) , Name, category, quantity, threshold_level, unit_price, supplier_ID
Stock	Usage_ID(PK), Inventory_ID(FK), User_ID)FK), Quantity_Used, Date_Used
Suppliers	Supplier_ID(PK), Name, Contact _information, Address
Orders	Order_ID(PK), User_ID(FK), Supplier_ID(FK), Order_Date, Status
Order Details	Order_ID(FK), User_ID(FK), Inventory_ID(FK), Quantity_Ordered
Reports	Report_ID(PK), User_ID(FK), Report_Type, Generated_Date

Entities Name	Datatype
User_ID (PK)	INTEGER
Name	VARCHAR(100) NOT NULL
Role	VARCHAR(30) NOT NULL
Email	VARCHAR(100) NOT NULL
Password	VARCHAR(30) NOT NULL
Inventory_ID (PK)	INTEGER
Category	VARCHAR (50) NOT NULL
Quantity	INTEGER NOT NULL
Threshold Level	INTEGER
Unit price	DECIMAL (5,2)
Supplier ID(PK)	INTEGER
Usage ID (PK)	INTEGER
Quantity Used	INTEGER NOT NULL

Date Used	DATETIME NOT NULL
Contact Information	VARCHAR(255)
Address	TEXT
Order ID (PK)	INTEGER
Order Date	DATETIME NOT NULL
Quantity Ordered	INTEGER NOT NULL
Status	VARCHAR(9) NOT NULL
Report ID	INTEGER
Report Type	VARCHAR(40) NOT NULL
Generated Date	DATETIME

Entity Relationship Diagram:

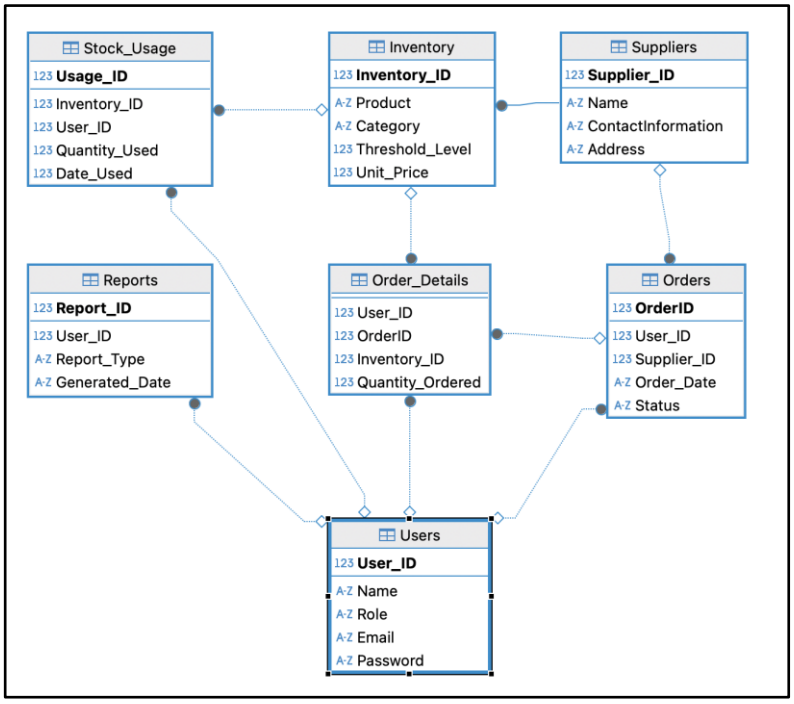


Relationship	Label	Multiplicity
User → Order	Places	1 → *
User → Report	Generates Report	1 → *
User → StockUsage	Records	1 → *
Inventory → StockUsage	Used In	1 → *
Order ↔ Inventory	Consists Of	* ↔ *
Supplier → Inventory	Supplies	1 → *

Supplier → Order	Receives Orders From	1 → *

5.2 Database schema (the entire To-Be system)

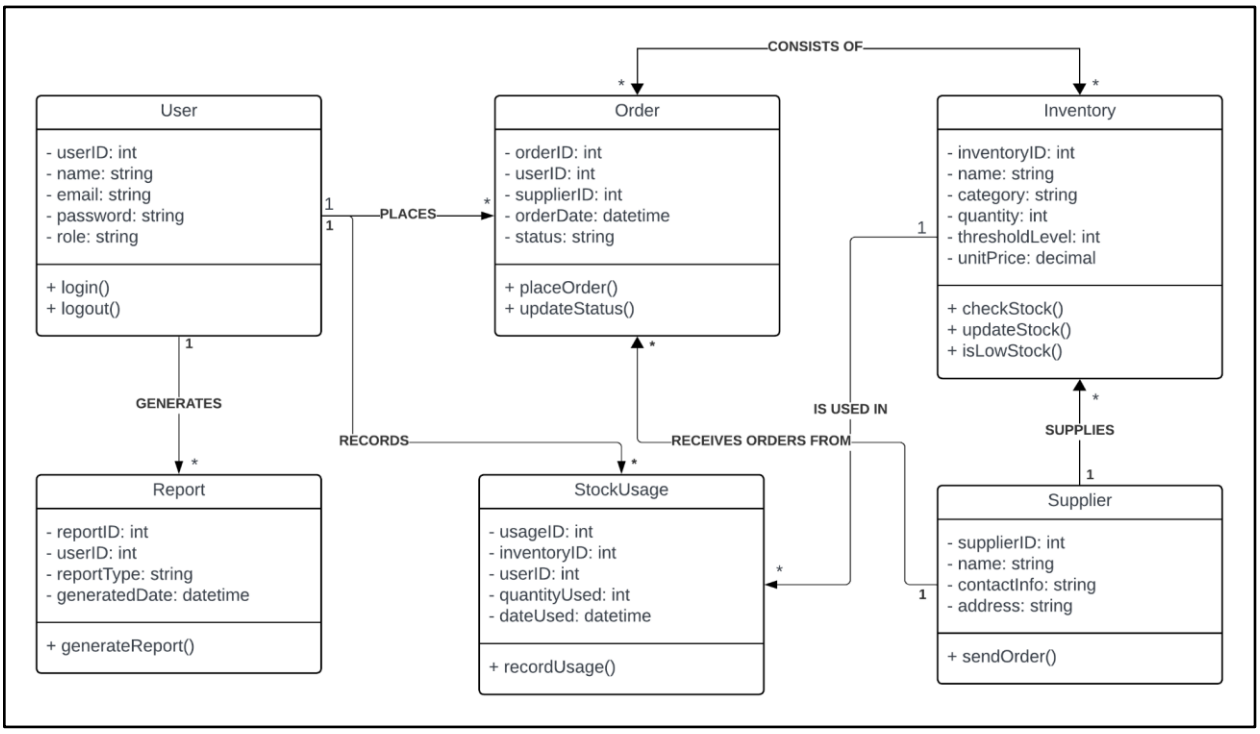
Database Schema:



6. Structural & Behavioral Design of the new IS solution

6.1 Class Diagram (the entire To-Be system)

The class diagram provides a structural blueprint of the new inventory management system for Akash Chaat House. It defines the core objects involved in the system such as users, inventory, suppliers, orders, and reports along with their attributes and how they interact with one another. Each relationship was carefully modeled to reflect how these entities connect in real life for example, users place orders, generate reports, and record inventory usage, while suppliers provide the stock and receive orders. This diagram helps ensure that the system design reflects real operational processes and serves as a foundation for both development and database design.



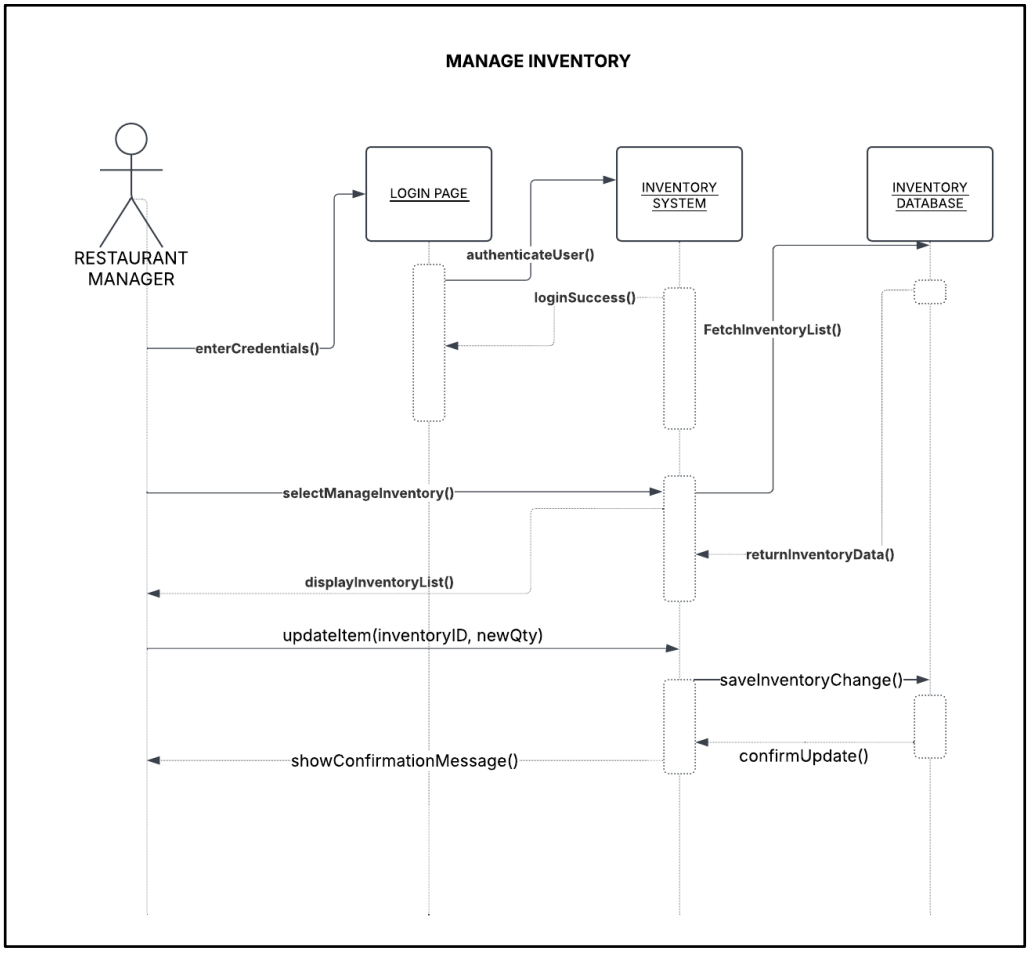
Relationship	Label	Multiplicity
User → Order	Places	1 → *
User → Report	Generates Report	1 → *
User → StockUsage	Records	1 → *
Inventory → StockUsage	Used In	1 → *
Order ↔ Inventory	Consists Of	* ↔ *

Supplier → Inventory	Supplies	1 → *
Supplier → Order	Receives Orders From	1 → *

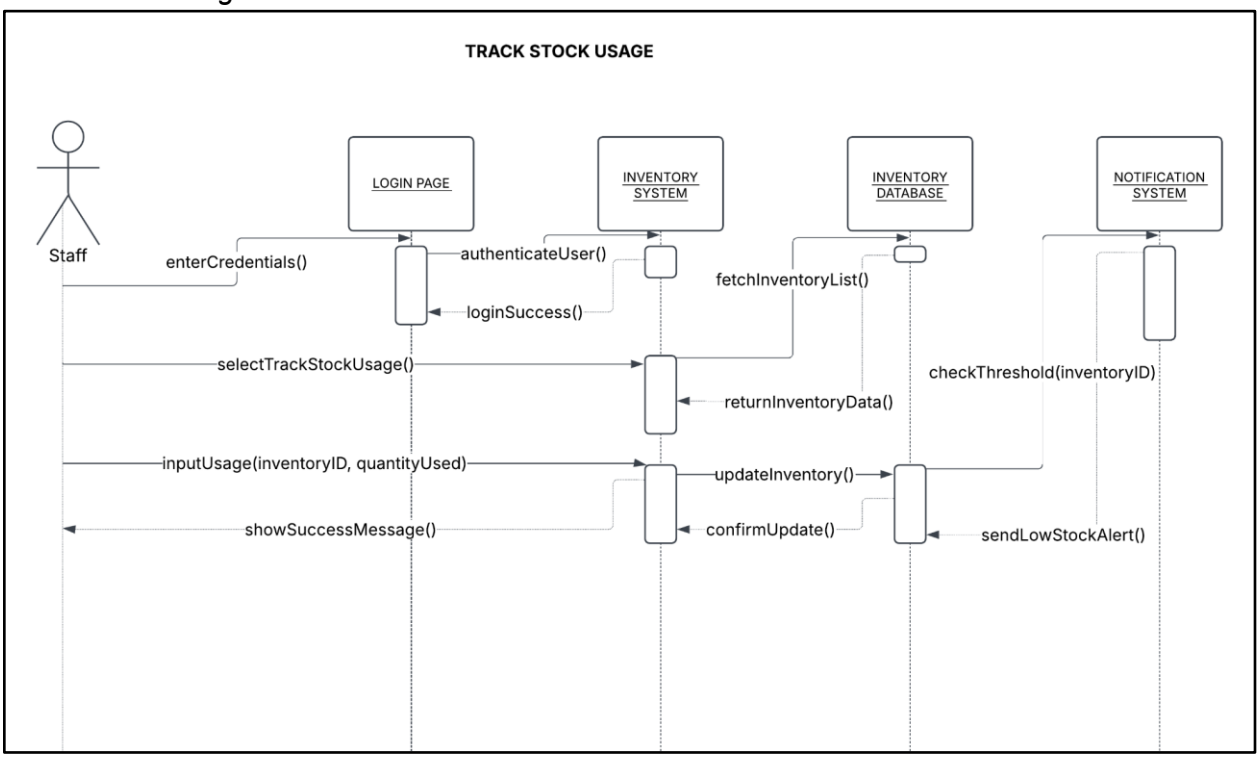
6.2 Sequence diagrams (the entire To-Be system)

The sequence diagrams illustrate how different parts of the system interact over time to carry out key business processes. Each diagram represents a specific use case including managing inventory, tracking stock usage, generating reports, triggering stock alerts, and ordering supplies. These diagrams help visualize the step-by-step communication between users (like staff or managers) and the system's components, such as the database, notification system, and supplier module. They also reflect the timing and order of operations, making it easier to understand the user experience and identify areas where automation and efficiency can be improved.

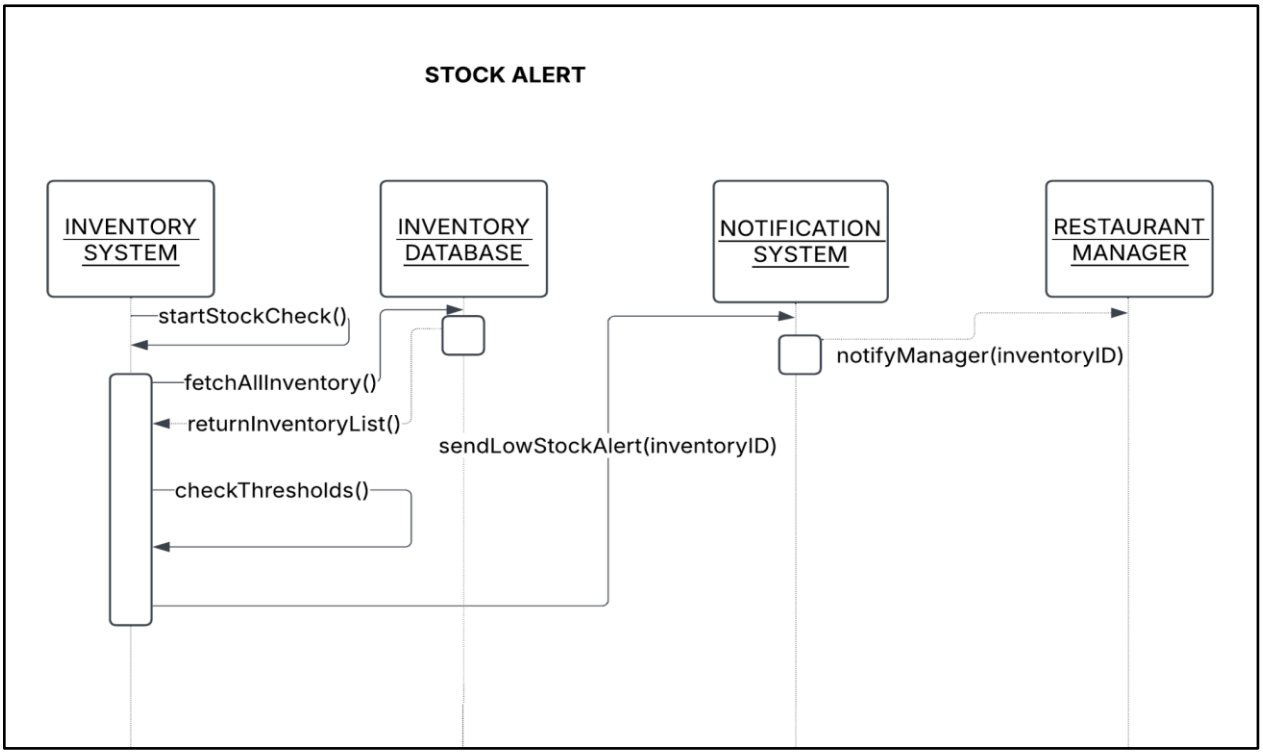
Manage Inventory:



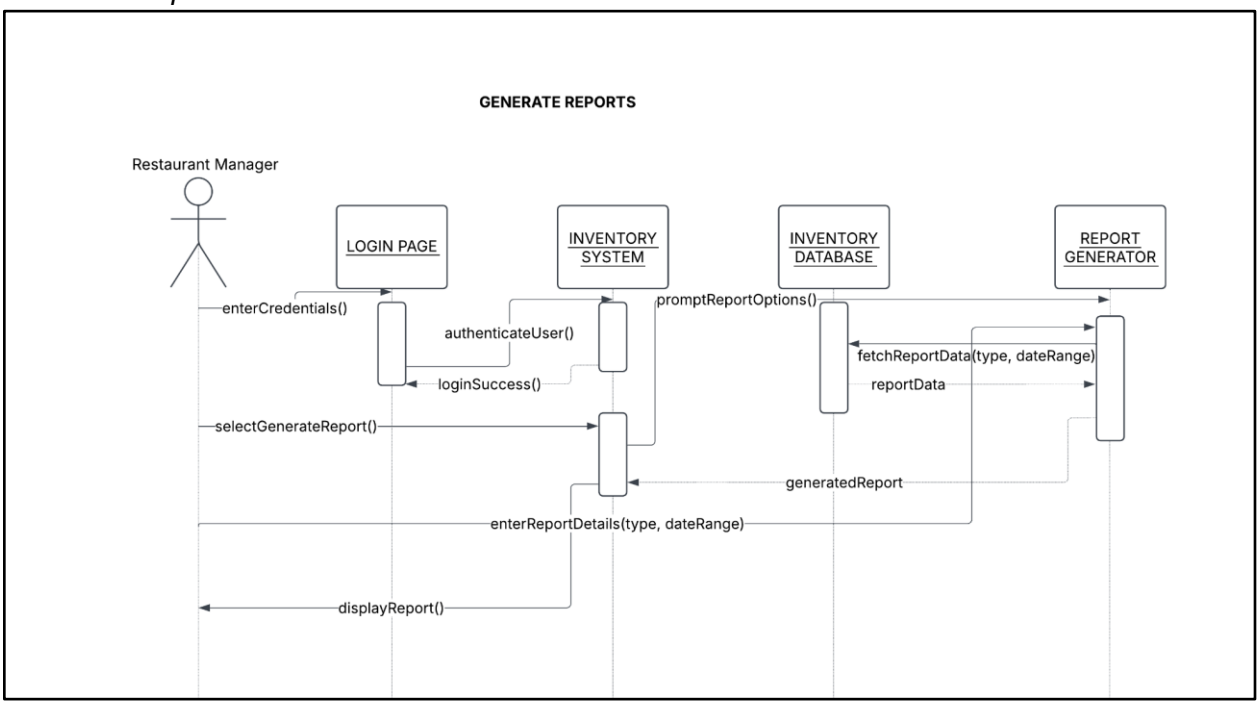
Track Stock Usage:



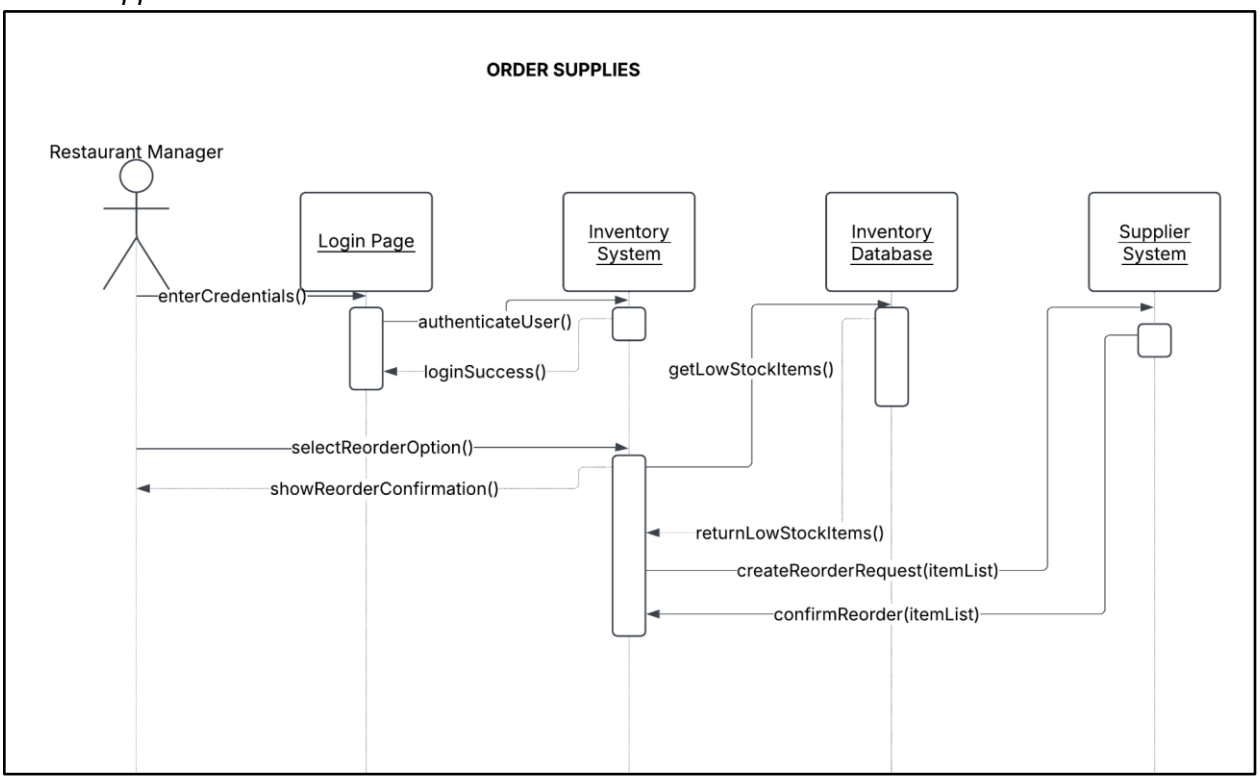
Stock Alert:



Generate Reports:



Order Supplies:



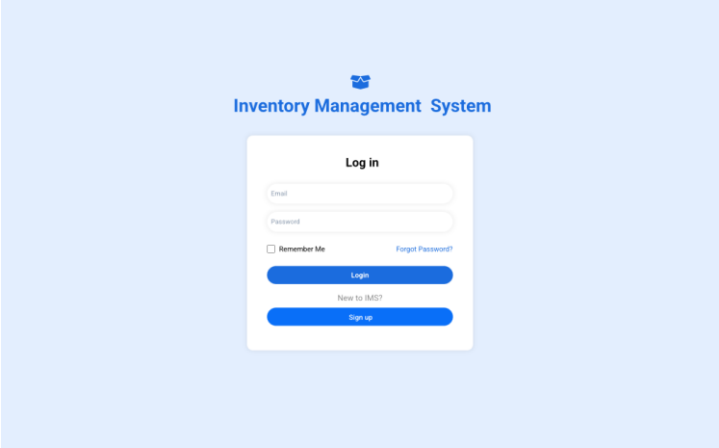
7. Proof-of-Concept Implementation prototype

7.1 Prototype for the entire To-Be system

The following images are prototypes of the Inventory Management System (IMS) we're proposing to implement.

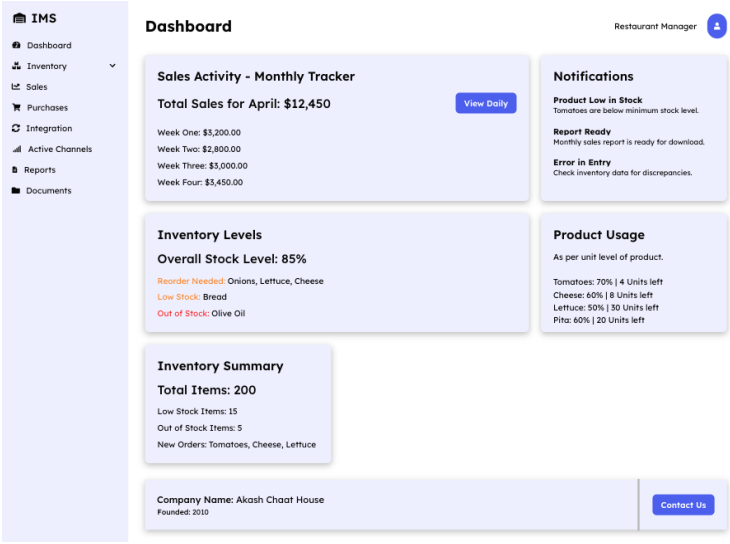
Log-in Screen

As a user, here you securely log into the system using your credentials or sign up for the system. If the credentials are incorrect or any type of error, an error message will provide context and guidance.



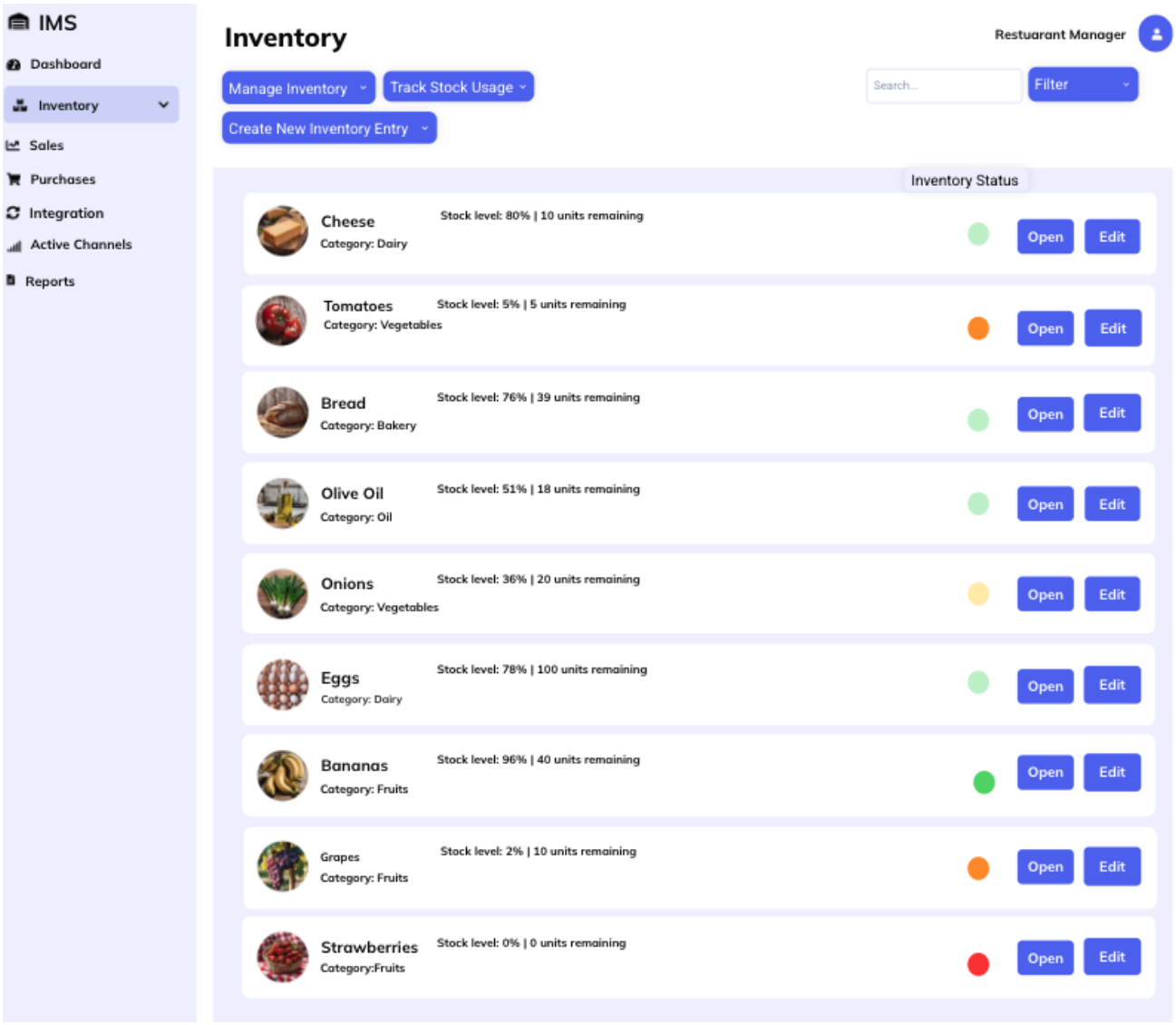
Home Page

The home page is actually utilized as an overview screen of the entire system, highlighting key metrics, notifications, and navigation options to quickly access the system's different components.



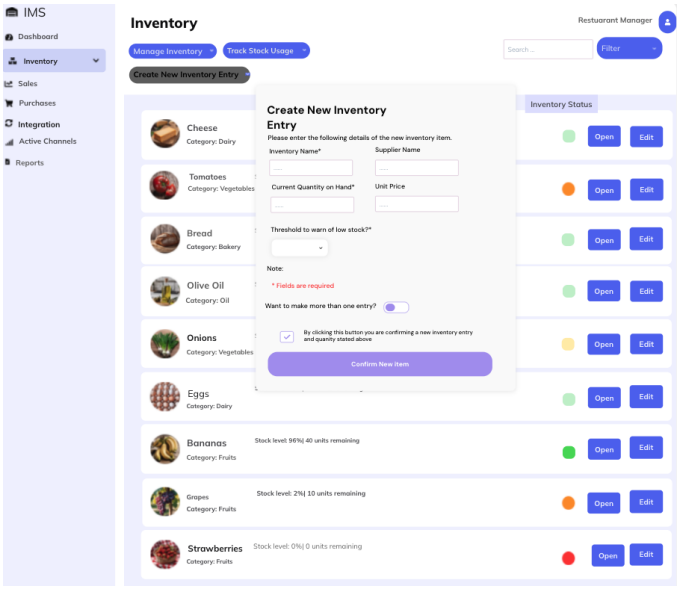
Inventory Management Screen

The inventory screen provides a list of all inventory items logged into the system. Here, you can track and manage your inventory, including adding new inventory items, updating usage, and removing inventory to maintain an accurate log of inventory on hand. For each item, one can see the detail/specification assigned to it as stock level, supplier, unit cost, status related to how close we are to the threshold.



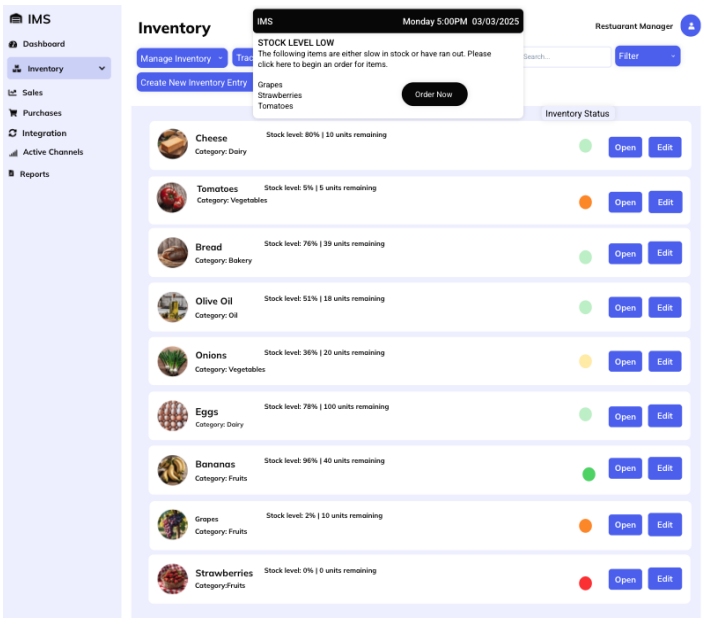
Create New Inventory Entry

The 'Create New Inventory Entry' button allows users to add new inventory items to the system for proper tracking. A form will appear, requesting key details such as the item name, price, quantity on hand, low-stock threshold, and supplier name.



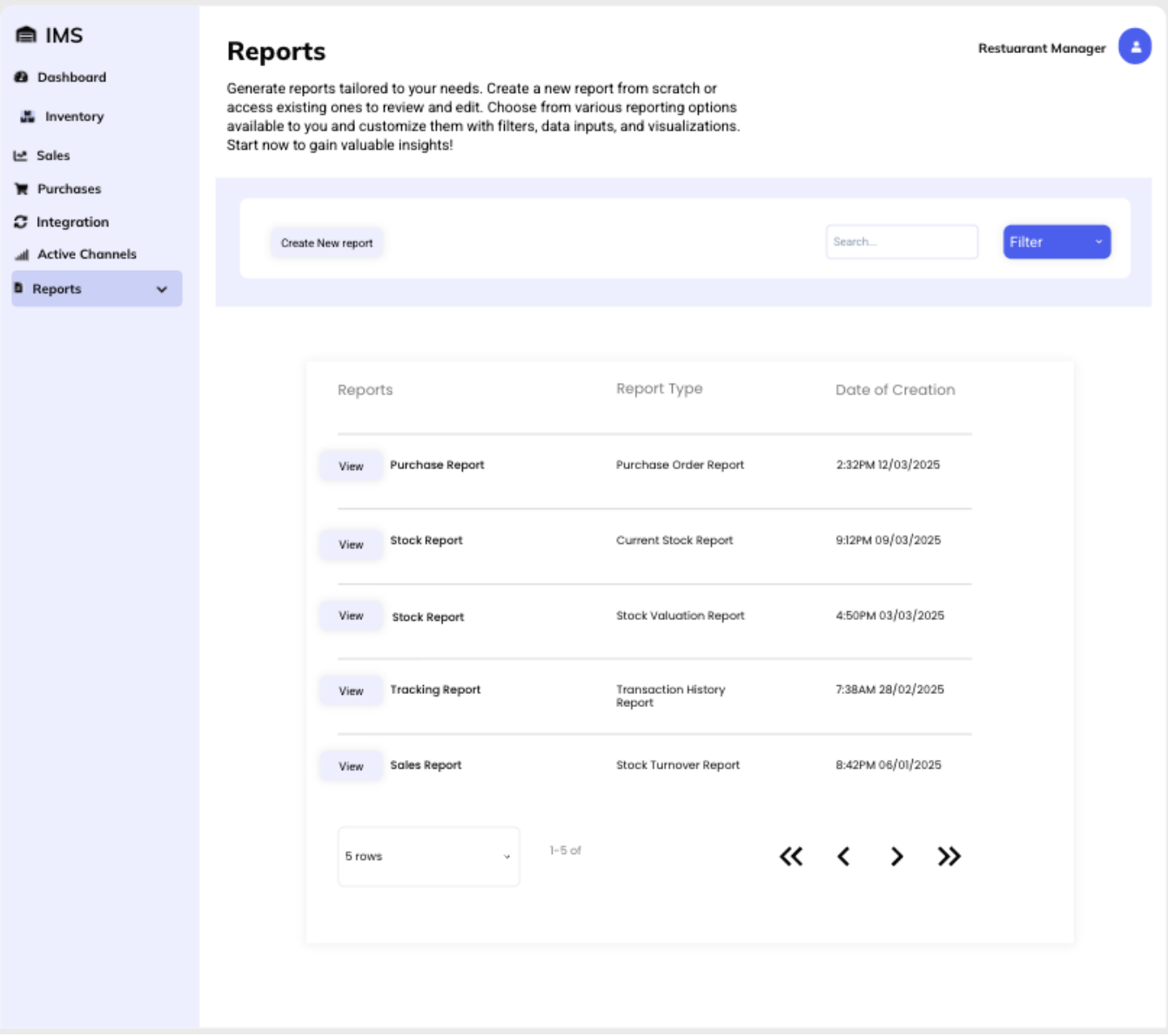
Notification Screen

Real-time notification. In the system creation parameters, notifications are to be sent about low stock level, pending order, changes made and other critical updates so the necessary actions can be done in a timely manner.



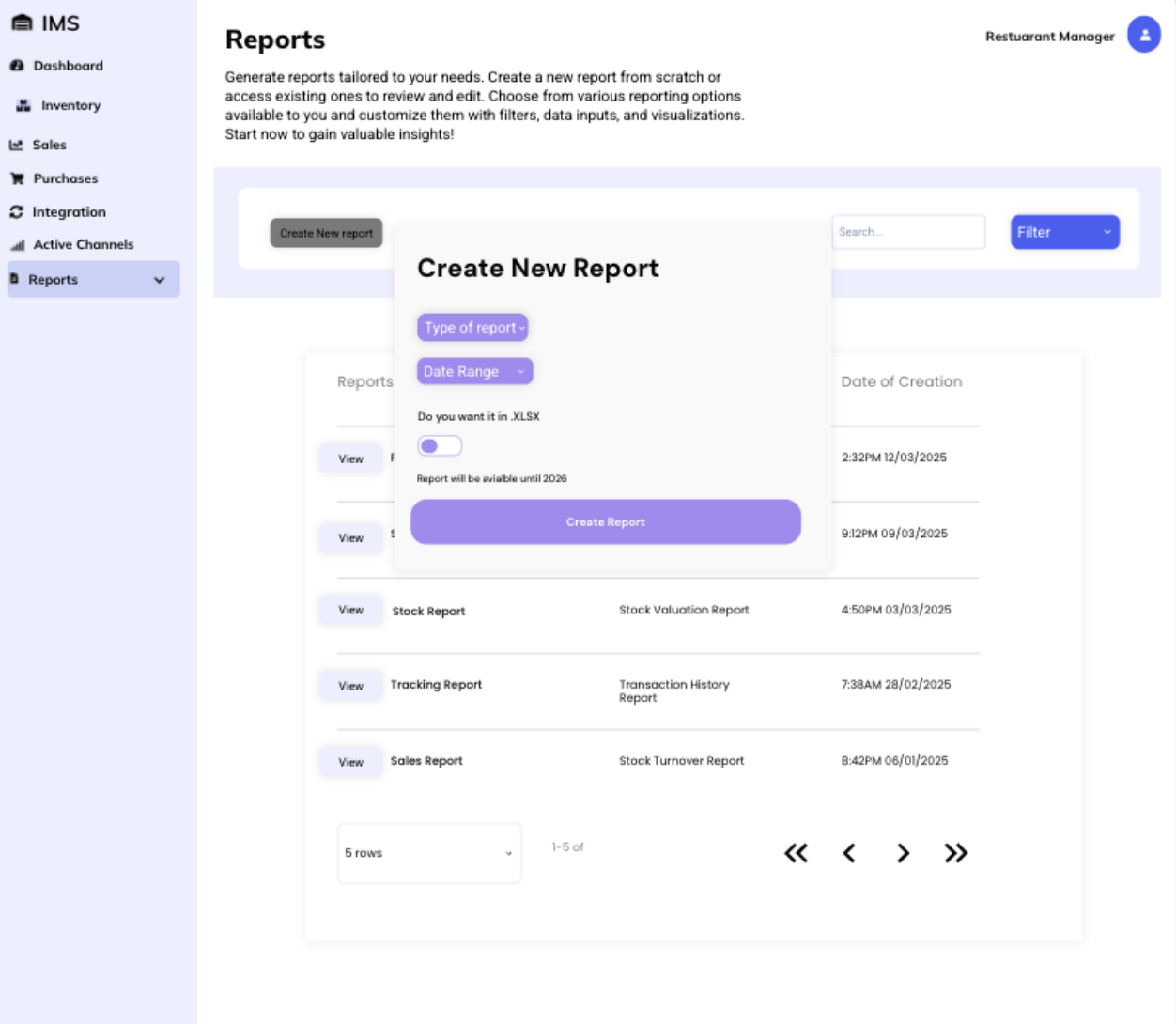
Report Screen

Reports, will have a list of all previously generated reports with the creation date as well. The system will allow users to sort reports by date, category, and other relevant filters. The “View” button will allow you to interact with previous reports and even allow you to re-download the PDF.



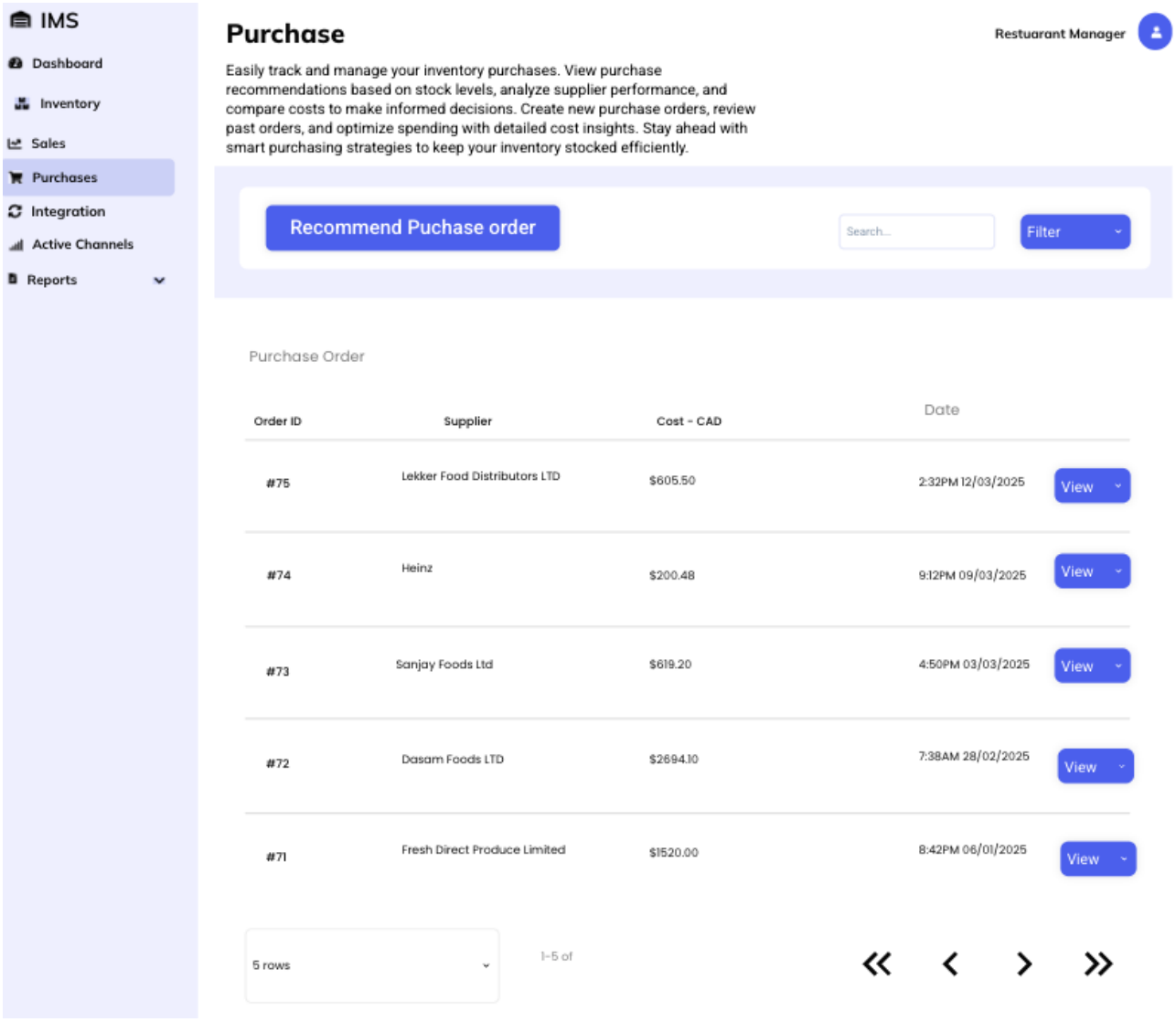
Report Screen - Report Request Form

The “Create New Report” button will allow users to create new reports. A form will be prompted to the user with the following fields: type of report & date range. For the report to be generated, the fields need to be selected.



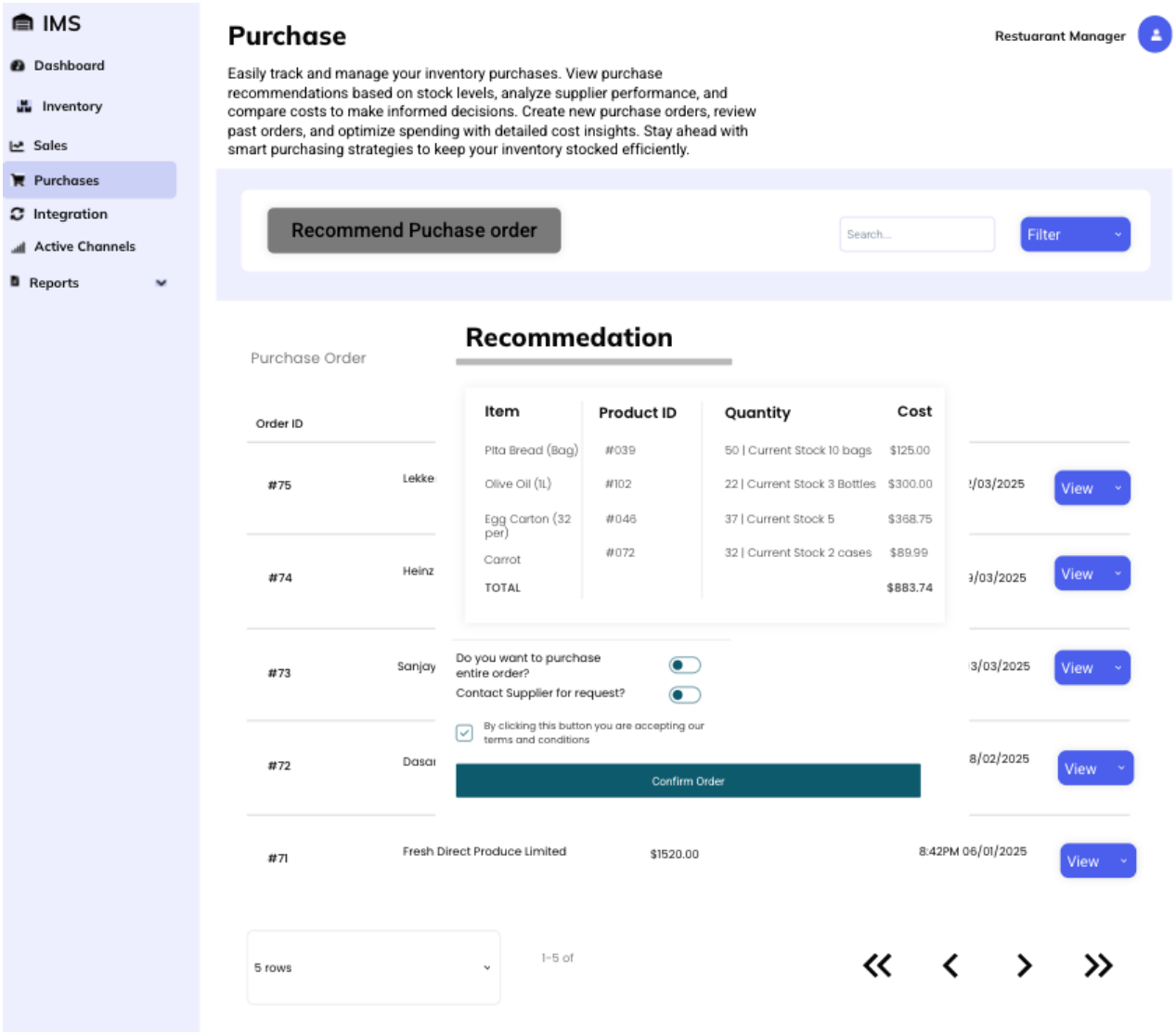
Purchase Screen

The purchase screen provides a list of all current and previous purchase orders, including order details, supplier information, and cost of order. Here, the user can view the order in more detail by clicking on the view button.



Purchase Screen - Recommended Order

As a feature from the system, they will recommend an order based on the level of inventory and the threshold the organization has put on them. This recommendation is based on stock levels, sales trends, and past orders to optimize inventory restock and avoid shortage. The system should generate data-driven suggestions to improve purchasing efficiency.



8. Implementation and deployment & Risk Management Plan for New IS Solution

8.1 Implementation and deployment activities

The steps involved in the installation of the new inventory management system at Akash Chaat House enable a gradual transition from the manual processes that are currently in use.

Step 1: Initial Setup

The first step involves installing the system on the existing devices at the restaurant. It includes the creation of accounts for each of the staff members, setting up access permissions (for example, who can actually update stock levels or make reports), and entering all the current inventory information. We will also set up the supplier information so that the ordering feature will integrate well later.

Step 2: Staff Training

Next, we will run a short training session with the restaurant manager and team about how to login and update the inventory, track inventory usage, set reorder alerts, and generate reports. Because the whole purpose is to make their work easier, we will focus on how each functionality is interconnected with their daily tasks.

Step 3: Going Live: The Trial Week

Before fully switching over, we will try a one-week implementation of the system, training the staff to use it alongside their old manual system. This would be effectively giving them a chance to become comfortable while allowing us to spot any issues early on. This will also help us test the functionality of the alert and reporting features.

Step 4: Full Launch

The one-week trial is done and it is the time to move on to the new system. The old manual process would be discontinued, and the staff would use the digital system for all inventory work. We will also make sure there will be a strategy for regular backups and further performance checks.

Step 5: Ongoing Support

After deployment, we will continue to monitor the team. We will be collecting feedback, debugging, and looking out for early results—such as reduced wastage stocks in inventory—to assess the success of the system. We'll do a more in-depth review after the first month and again at the three-month mark.

8.2 Risk assessment and mitigation activities

1. Resistance to Change (High Risk)

Since the staff has been using a manual system for a long time, there may be hesitation or lack of interest in learning something new. This can slow down adoption or lead to mistakes in usage.

Mitigation:
We'll provide easy-to-understand and practical training more focused on only the features necessary for them. Also, it will be simple and give staff time to use the systems in the first week to get used to it. Getting the restaurant manager involved early on will help drive team buy-in.

2. Technical Problems at the Time of Setting (Medium Risk)
It may happen that the system won't get installed correctly, or it won't function properly with the existing hardware of the restaurant or internet connection.

Mitigation:
We will make a very random check of the devices used before the obtaining of the installation. Alongside that, there will be a backup device ready (if available), and all setup steps have been documented in case they need to be repeated. If issues come up, we'll troubleshoot immediately or switch to a cloud-based version temporarily.

3. Data Entry Errors (Medium Risk)
If inventory data is entered incorrectly at the start (like wrong quantities or thresholds), the system might generate inaccurate alerts or reports.

Mitigation:
We'll have two people cross-check the initial data during setup. We would also ensure that the system is easily editable in case of any needs in future to have something corrected. The inventory logs will then be reviewed regularly during the first few weeks for catching errors early.

4. System Downtime or Bugs (Low to Medium Risk)
Like any new software, bugs or short-term crashes might happen, especially in the early stages.

Mitigation:
We plan to test the system thoroughly in the trial week before the actual launch to pick such instances. We also will give easy instructions on what to do at the event it goes frozen or offline (e.g., switching to manual logbook temporarily). In addition, we shall keep the developer or system provider in loop in case urgent needs for assistance arise.

5. Limited Budget for Maintenance (Low Risk)
The restaurant has a limited budget, so the future updates or support will be of concern regarding the system.

Mitigation:

We chose to install a low-cost and easy-to-maintain system. Most of these features are automated and do not need frequent updates. In the case of a budget, we will focus on only essential functions and will avoid add-ons that are unnecessary.

Executive Summary

The implementation of the Dynamic Inventory System for Akash Chaat House represents a major step forward in how the restaurant manages its day-to-day operations and long-term business strategy. After analyzing the current challenges faced by the restaurant, such as inconsistent stock levels, food wastage, inefficient manual processes, and difficulty keeping up with demand fluctuations, it became clear that a centralized, intelligent inventory system was not just beneficial, but necessary.

The Inventory Management System (IMS) directly meets the needs of both management and frontline staff. For staff, it simplifies daily workflows by enabling quick and accurate logging of inventory usage, reducing guesswork, and making sure everyone has up to date information. Some of the features including real-time stock tracking and automated low-stock alerts help eliminate the risk of running out of critical ingredients during service. This improves staff confidence, efficiency and ensures smoother operations during busy periods.

System offers a deeper visibility and control to restaurant management. The decision makers can now generate detailed reports on inventory trends, usage patterns, and supplier orders. The data driven insight makes it easier to forecast demand, reduce over-ordering or under-ordering, and plan for future growth. The management no longer needs to rely on guesswork or manual tracking spreadsheets. The Inventory Management System (IMS) makes everything organized, accessible, and easy to interpret.

One of the most impactful features of Inventory Management System (IMS) is the automated reordering process, which strengthens relationships with suppliers by ensuring timely and accurate order and save time for both staff and suppliers. In addition to that, the report generation module gives management the ability to analyze performance, cost and waste, supporting more strategic, and informed decision making.

By introducing this system, Akash Chaat House is positioning itself to operate more efficiently, reduce waste, and ultimately improve its bottom line. The Inventory Management System (IMS) supports the restaurant’s mission of delivering high-quality, consistent food experiences to its customers. When staff are empowered with the right tools and management has access to meaningful insights, the entire organization becomes more responsive, proactive, and capable of maintaining high standards even as the business grows.

In conclusion, the Dynamic Inventory System does more than just solve operational problems, it creates a strong foundation for future success. It aligns technology with real-world restaurant needs, giving Akash Chaat House a modern, reliable, and scalable solution that helps achieve both short-term efficiency and long-term business goals.