INVENTORY MANAGEMENT SYSTEM FOR RETAILERS

NALAIYA THIRAN PROJECT BASED LEARNING

on

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

A PROJECT REPORT

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ABSTRACT

Inventory management system which is helpful for the business operators, where shopkeeper keep the records of purchase and sales. Mismanaged inventory means disappointed customers, too much cash tied up in slower sale and warehouses .This inventory is eliminate paper work, human faults , manual delay and speed up process .

This inventory management system will have the ability to track sales and available inventory, tells a shopkeeper when it's time to reorder and how much to purchase. Inventory management system is windows application developed for windows operating systems which focused in the area of inventory control and generate.

Inventory Management System for managing the inventory system of any organization. The Inventory Management System (IMS) refers to the system and processes to manage the stock of organization with the involvement of Technology system. This system can be used to store the details of the inventory, stock maintenance, update the inventory based on the sales details, generate sales and inventory report daily or weekly based. This project is categorized individual aspects for the sales and inventory management system. In this system we are solving different problem affecting to direct sales management and purchase management. Inventory Management System is important to ensure quality control in businesses that handle transactions resolving around consumer goods. Without proper inventory control, a large retail store may runout of stock on an important item. A good inventory management system will alert the wholesaler when it is time to record. Inventory Management System is also on important means of automatically tracking large shipment. An automated Inventory Management System helps to minimize the errors while recording the stock.

INTRODUCTION

Inventory Management Systems is a key instrument for businesses when tracking their inventory. Typically, Inventory Management Systems are used by firms that either sell a product or manufacture a product for purposes of accounting for all the tangible goods that allow for a sale of a finished product, or parts for making a product. The size and volume of a firm help dictate whether or not a firm is in need of such a system as they can be quite extensive and costly. Large firms that have thousands of components must have a system in place for the primary objective of tracking their assets.

There are three main reasons why an Inventory Management System is needed such as timing/lead time, forecasting, and utilizing economies of scale. The Inventory Management System is no different from any other information system in that there are factors that make it successful. The basis for this report is premised on the five components as outlined in our book. These five critical components are hardware, software, data, procedures and people. As these factors are discussed throughout the next several sections it becomes evident that they are contingent upon one another, and frankly will not function efficiently without the other.

Hardware:

Hardware is defined as, "the mechanical equipment necessary for conducting an activity, usually distinguished from the theory and design that make the activity possible." Computer hardware includes all physical equipment that enables computers to function that consist of the mechanical, magnetic, electronic, and electrical devices comprising a computer system, as the CPU, disk drives, keyboard, or screen. Online inventory management systems require additional hardware components than just a basic computer.

First, and most importantly, a main server that houses a database is required to store the data so that information can be provided universally to all the work systems. The information can be accessed and changed by an individual, and then the updated information will be reflected in the main database for everyone to see. Individual work stations are also a necessary hardware component of inventory management systems.

Work stations include computers that are compatible with the inventory management software, and they connect to the main server to access the database. Employees input data into their workstations to update the main database. Also, employees, if allowed, can access information from the main database from their workstation. This can be a useful tool to quickly check inventory levels to assist with customer service inquiries. In addition to the necessary hardware components, there are many additional hardware pieces that can be used to help with the efficiency of the system.

Software:

A main part in implementing an Inventory Management System is the component of software. Software is the instruction for hardware that is on the computer side of the five-component framework of developing and using an information system. The system usually runs on a remote server and then the data is delivered to clients via the internet. A software solution has a flexible scalability so as the business grows, so can the inventory control solution. Today, there are many different types of software solutions that are available to assist in managing inventory within a firm. Before being able to utilize a system efficiently there are many factors that need careful consideration.

The goal for the firm should be mapped out by both management and employees so that everyone understands the results they are hoping to get with the inventory control solution. There are a few ways to go about implementing the system. First, realize that the reason the firm needs to implement a new system is to help the people in the business achieve their goals and objectives. Although the software solutions will be able to run substantial amounts of data through different reports and analyses, the firm must understand what exactly the software solution will need to do for them to help the business grow and be successful.

If the business does not realize the need for inventory management and fail to recognize that using a software program will help them keep track of their numbers and forecast production, then it will be of little use to them overall. Second, after mapping and thinking about how the software solution should organize the data, there should be a large amount of investigation of all the various inventory control systems that are available.

Many companies offer demos to the business to help them try it and see if it will fulfill their inventory control needs. The demos will show them all the different reports that can be done, as well as, get the users familiar with the technology and see if it is something that they feel everyone could understand and use. There are different costs associated with every different software company.

The most common pricing is per user that will be needed. Some software solutions offer a flat price for unlimited users, and other charge a specific price depending upon how many users there will be.

Third, sometimes it is necessary for the firm to contact and hire an inventory control software specialist to help integrate the system and data once the software is chosen. If management does not feel comfortable with training

the employees and/or there are not enough resources to properly train all the employees on how to use the inventory control software, it is in the firms best interest to spend a little more to help implement the system properly. There are a number of reasons for this decision, and the main reason should be that because the employees are the most important component. It is mandatory for the firm to be confident that their employees will be able to use the system. If their employees and users do not know how to use the system, then the cost of the system and the implementation will be of no value to the firm.

If they have this great inventory control solution but no one knows how to run reports or use it to manage the inventory levels, then it would be cheaper and just as good for the firm to have not implemented to system in the first place. Furthermore, it is absolutely necessary to make sure that all employees have the proper training and knowledge of the system and all the aspects of how to successfully utilize all the features. Once the employees are confident with the software, this will help the business benefit and should help them reach all their goals and objectives. Technology and trends are constantly changing in today's market, and for this reason there are continuously new and improved systems available to firms.

Basic Questions of every retailer: How much inventory should I carry?

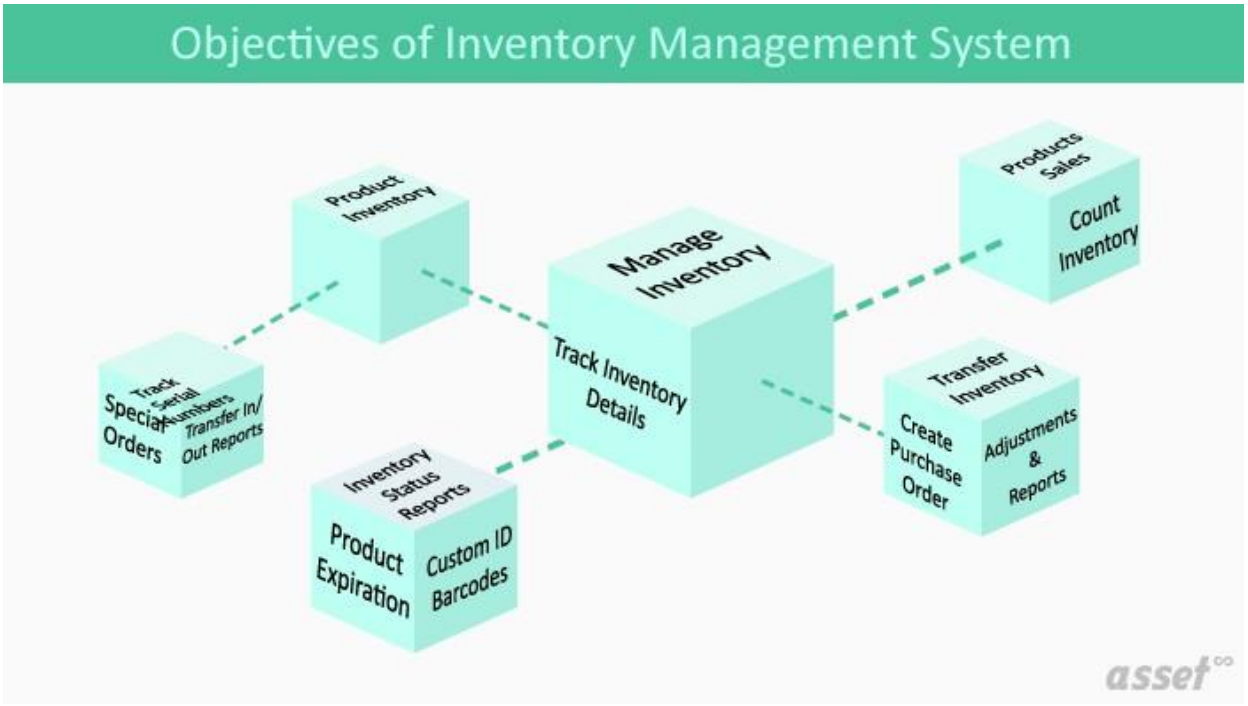
Too much inventory means working capital costs, operational costs and a complex operation, lack of inventory leads to lost sales, unhappy customers and a damaged brand.

This is why short-term forecasting is so important in the retail and consumer goods industry.

OBJECTIVE

Primary objective:

The objectives of inventory management are operational and financial. In operational, materials and stock should be available in sufficient amount whereas, in functional, the minimum working capital should be locked in.



The objectives of inventory management are as follow:

1. To ensure a continuous supply of materials and stock so that production should not suffer at the time of customer's demand.
2. To avoid both overstocking and under-stocking of inventory.
3. To maintain the availability of materials whenever and wherever required in enough quantity.
4. To maintain minimum working capital as required for operational and sales activities.
5. To optimize various costs indulged with inventories like purchase cost, carrying a cost, storage cost, etc.
6. To keep material cost under control as they contribute to reducing the cost of production.
7. To eliminate duplication in ordering stocks.

8. To minimize loss through deterioration, pilferage, wastages, and damages.
9. To ensure everlasting inventory control so that materials shown in stock ledgers should be physically lying in the warehouse.
10. To ensure the quality of goods at reasonable prices.
11. To facilitate furnishing of data for short and long-term planning with a controlled inventory.
12. To supply the required material continuously.
13. To maintain a systematic record of inventory.
14. To make stability in price.

- **Identifying Consumer Demands:**

The first task that a retailer has to perform is to identify the consumer needs and wants. The retailer does not provide raw materials, but offers finished goods and services in a ready-to-use form that the consumers want. For this, from time-to-time, retailer gathers information about consumers' liking, disliking, tastes and preferences.

- **Management of Merchandise:**

The second task that a retailer performs is the management of merchandise. The retailer performs the function of storing the merchandise and provides as and when required by the customer.

- **Convenience of timing:**

The retailer creates time utility by keeping the store open and ready for sale according to consumers' convenience. The new trend in retailing to longer trade hours reflects the socio- cultural changes where over one in ten people work outside normal hours resulting in changing trading hours and panacea for small retailers against the

cheaper prices of the super stores and other retail chains. By being available at a location that has easy access and convenient to shop, retailer creates place utility. Finally, when selected and bought by customers, retailers create ownership utility. In short, retailers are not only the final link between the consumers and the manufacturers but a vital part of modern business world. In the absence of retailing, one can easily imaging how difficult and costly for a consumer to approach a manufacturer for various things every time he wants. Retailers do not sell things in small quantities but make their shopping convenient and less risky.

Retailers have floor staff to answer their queries regarding how to use effectively and safely, guide them what to buy according to individual preferences and budget and give demonstration or display products so that the consumers should have a feel of the merchandise before buying. The successful retailer focuses its activities on meeting these objectives through effective marketing.

Inventory Management- A Review of Relevant Literature

Dynamic Control of Quality in Production-Inventory Systems: Coordination and Optimization" by David D Yao and Shaohui Zheng

"Dynamic Control of Quality in Production-Inventory Systems: Coordination and Optimization" Book Review: The book presents quality management from a modern point-of-view. In this piece of writing, the contemporary mathematical tool set is used for solving quality control problems. It develops a set of dynamic approaches characterized by coordination. The book explains a basic methodology called Markov decision programming in detail.

Inventory Control Systems for National Health Laboratory Services" by Nojiyeza Innocent Simphiwe

"Inventory Control Systems for National Health Laboratory Services" Book Review: The book gives information about the management systems that laboratories can use in order to increase their operational efficiency and effectiveness. The models like inter alia, min-max system, build to order, build to stock, ABC analysis, vendor managed inventory (VMI), electronic data interchange (EDI), automatic pipeline inventory and order-based production control system (APIOBPCS), and stochastic inventory systems and genetic algorithm that can be used to maximize the operational efficiency are discussed in this text. The book features many case studies and examples.

"Inventory Control in Manufacturing: A Basic Introduction" by Louis Bevoc

"Inventory Control in Manufacturing: A Basic Introduction" Book Review: The book is well-structured, informational, and precise text which will be useful for students and professionals related to inventory control. It starts with a definition of inventory control and the major goals of inventory control programs. Moving forward, the available methods for performing inventory control tasks are mentioned along with the systems used for reordering raw materials and finished products. The chapters explaining management responsibilities and the techniques used to improve inventory control programs are included in this book. The text is educational and, and it is written for easy reader understanding at all levels.

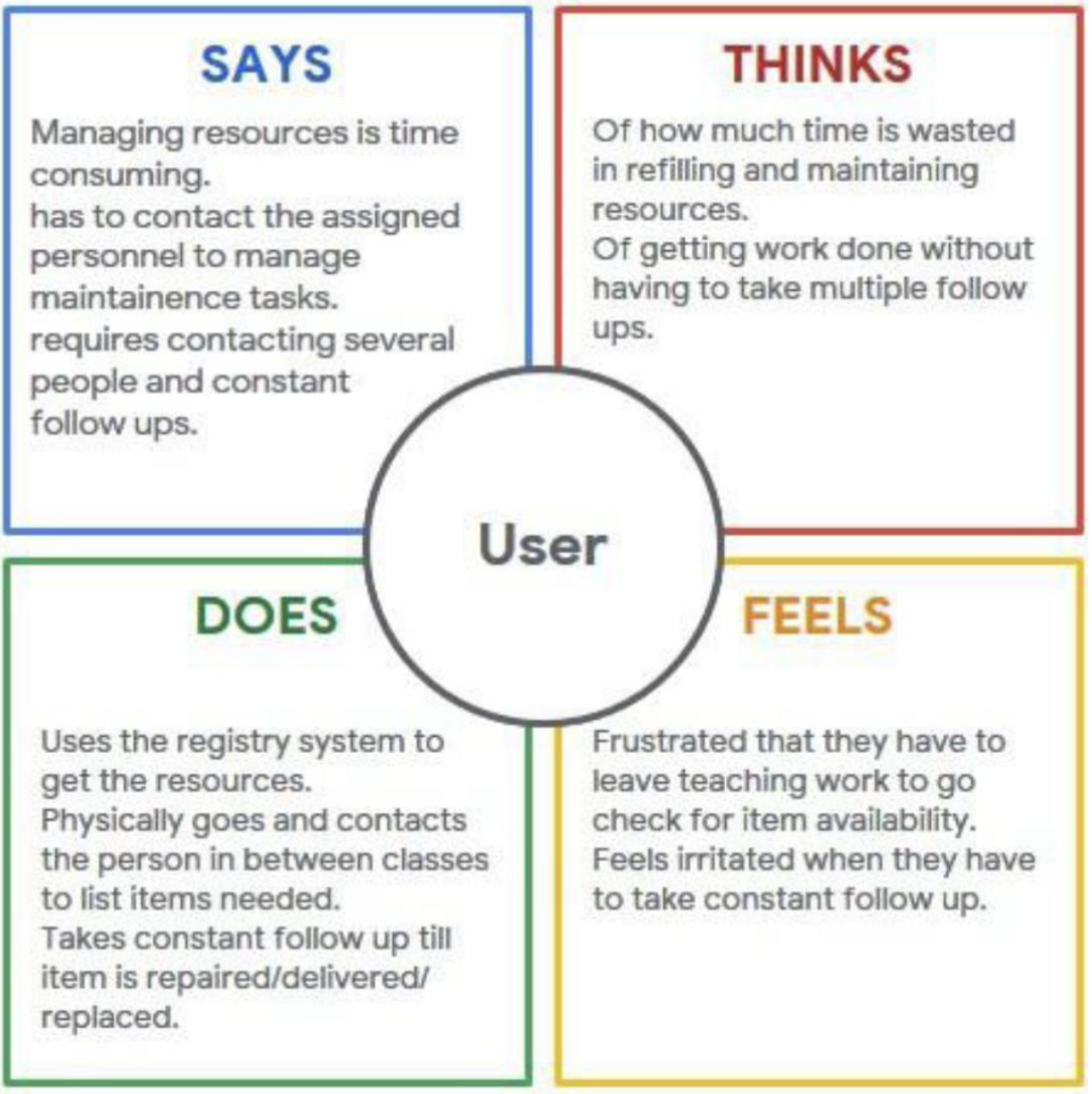
Inventory Management: Advanced Methods for Managing Inventory within Business Systems" by Geoff Ralph and Catherine Milner

"Inventory Management: Advanced Methods for Managing Inventory within Business Systems" Book Review: The book features both basic and advanced inventory management tools and techniques. This book is designed for practitioners, supply chain managers, and operations and manufacturing experts. It provides a stepwise approach on how to achieve the important link between the budget's decision and the detail level. Looking beyond the complex theory of inventory management, the book more concentrates on the most important decisions managers need to make when managing inventory. It also explains how inventory management should work, how to control it, and how to balance it, through their use of revolutionary k-curve methodology. It includes numerous case studies from various industries such as supermarkets and aerospace. It highlights working, controlling, and balancing of inventory management through many techniques and k-curve methodology. The practical aspects of inventory management are discussed in this book, along with vast theory. It contains case studies from various industries and many figures to explain the given topics. The book also features a bonus chapter about the supporting materials. The book will be helpful for the students, professionals and the business owners for enhancing their inventory planning.

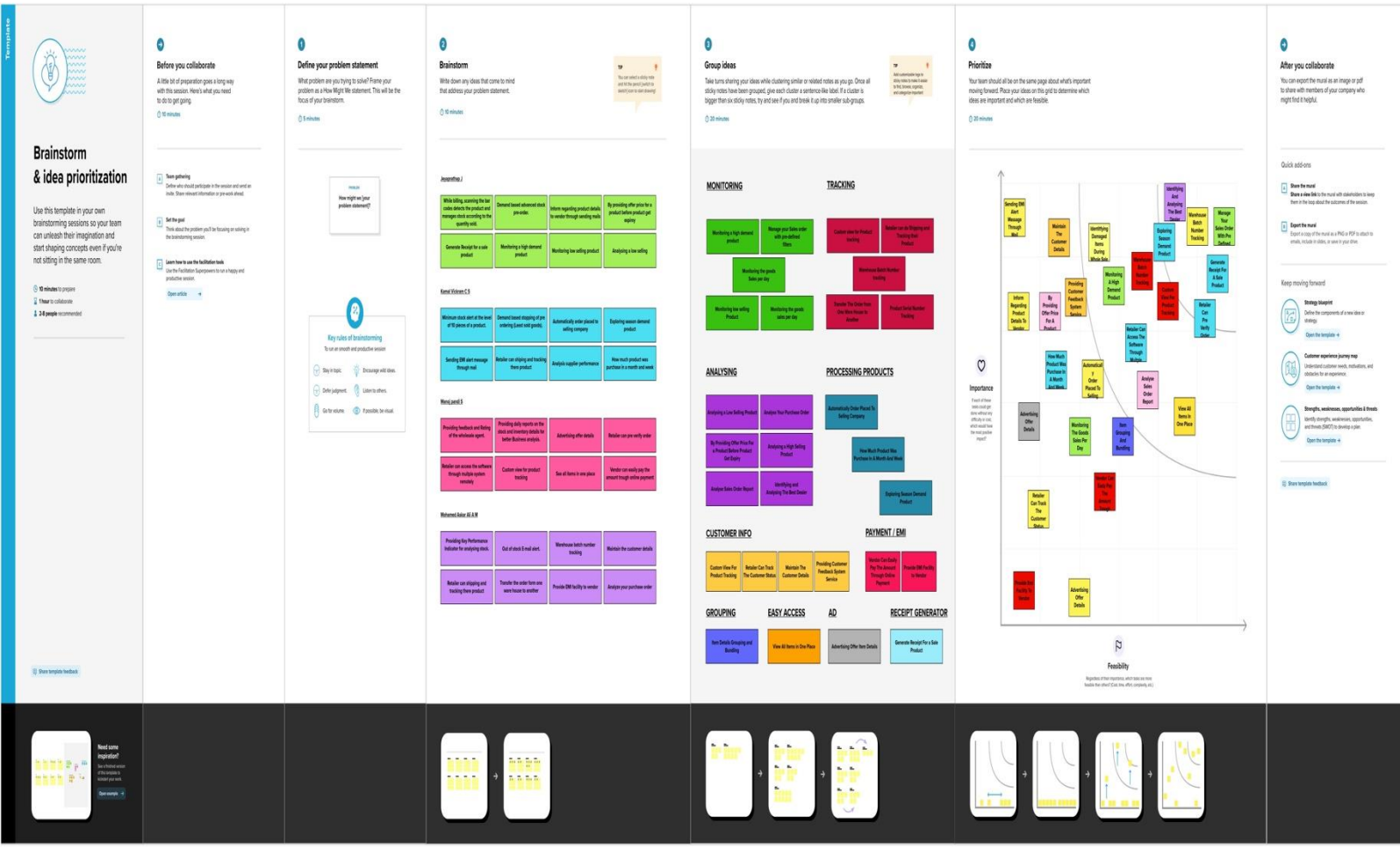
R.S. Chadda (1964)

Study had been made on inventory management practices of Indian companies. The analysis suggested application of modern scientific inventory control techniques like operations research. These modern scientific techniques furnish opportunities for the companies, Companies can minimize their investment in inventory but there is continuous flow of production. He argued that industrially advanced countries, like, USA, were engaged in developing highly sophisticated mathematical models and techniques for modernizing and redefining the existing tools of inventory investment.

Inventory Management-Empathy Map



Inventory Management-Brainstorm



INVENTORY MANAGEMENT SYSTEM FOR RETAILERS

PROBLEM STATEMENT:

Inventory Management System is extremely beneficial to business owners, as they allow shops to properly store sales and purchase records. When inventory is mismanaged, it leads to dissatisfied consumers, slower sales, too much cash on hand, and warehouses. This inventory system reduces manual work, human mistake, and manual delays while simultaneously speeding up the process. This inventory management system will be able to track sales information as well as inventories. It also has capabilities like the ability to identify stock levels, compute reorder points automatically, and highlight potential stock-outs.

In order to overcome all these problems, we are proposing the idea of an Inventory management system which helps in the management of Stocks and Supplies with the least human interaction in order to maintain time management and concentrate more on customer feedback.

ABSTRACT:

- To develop an application that deals with the day-to-day requirement of any
- production organization.
- To develop the easy management of the inventory.
- To handle the inventory details like sales details, purchase details and balance
- stock details.
- To provide competitive advantage to the organization.
- To provide details information about the stock balance.
- To make the stock manageable and simplify the use of inventory in the
- organization.

TOOLS REQUIRED:

SOFTWARE

REQUIREMENTS:

- Python IDLE

SYSTEM REQUIREMENTS:

- Processor-Minimum Intel Core i3-10110U
- RAM-Minimum 4GB
- OS- Windows/Linux/MAC.

SCHEDULE/MEETING DATES:

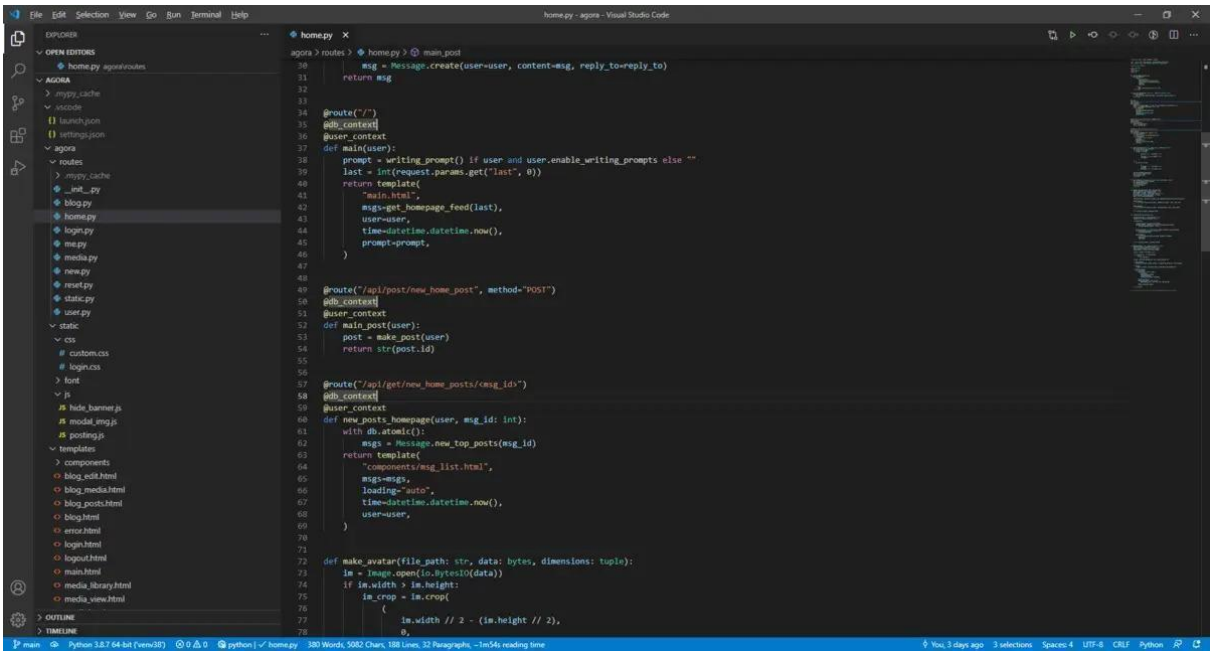
S no	Batch	Technology Track	Day	Date	Time Slot	Attended
1.	B3-3M5E	Cloud Application Development	Day 1	02-09-2022	6:00pm to 9:00pm	Yes
2.	B3-3M5E	Cloud Application Development	Day 2	07-09-2022	9:00am to 12:00pm	Yes
3.	B3-3M5E	Cloud Application Development	Day 3	09-09-2022	6:00pm to 9:00pm	Yes
4.	B3-3M5E	Cloud Application Development	Day 4	14-09-2022	9:00am to 12:00pm	Yes
5.	B3-3M5E	Cloud Application Development	Day 5	16-09-2022	6:00pm to 9:00pm	Yes
6.	B3-3M5E	Cloud Application Development	Day 6	21-09-2022	9:00am to 12:00pm	Yes
7.	B3-3M5E	Cloud Application Development	Day 7	23-09-2022	6:00pm to 9:00pm	Yes
8.	B3-3M5E	Cloud Application Development	Day 8	28-09-2022	9:00am to 12:00pm	Yes

COLLEGE MENTOR: Arockia Raj Y
INDUSTRY MENTOR: Vasudeva Hanush

REFERENCE:

1. https://www.sanfoundry.com/best-reference-books-inventory-control-management-systems/
2. https://www.worldwidejournals.com/paripex/recent_issues_pdf/2016/August/inventory-management-a-review-of-relevant-literature_August_2016_3020691594_4507440.pdf

PROJECT STATUS:



Project Design Phase-I
Proposed Solution Template

Date	21 September 2022
Team ID	PNT2022TMID04968
Project Name	Project – Inventory Management system for retailers
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
❖	Problem Statement (Problem to be solved)	• The retailers generally facing issues in recording the stocks and its threshold limit available. • The retailers don't know which product is getting expired and when it is being expired. • The retailers couldn't track the availability of all the stocks up-to date. • The customers are not satisfied with the retailers store since it doesn't have enough supplements and the deliveries were not made on time.
❖	Idea / Solution description	• This proposed system will have a daily update system whenever a product is sold or it is renewed more. • The system will have an alert triggered to indicate both the expired product and soon going to expire products. • The product availability is tracked daily and an alert system in again kept on to indicate those products which falls below the threshold limit. • All the customers can register their accounts after which they will be given a login credentials which they can use whenever they feel like buying the stocks. • The application allows the customers to know all the present time available stocks and also when the new stock will be available on the store for them to buy. • Tracking the order have become easy with this application for both the retailers and the customers.

❖	Novelty / Uniqueness	• Certain machine learning algorithms are used to predict the seasonal high selling products which can be made available during that time. • Prediction of the best-selling brand of all certain products based on their popularity, price and customer trust and satisfaction will be implemented. • Notifications will be sent to the retailers if any product that the customers have been looking for is not available so that the product can be stocked up soon. • Notification will be sent to the customers who buys any certain products regularly when the new arrivals are stocked up. • Exclusive discounts and offers are given for regular customers to keep them engaged with the store regularly.
❖	Social Impact / Customer Satisfaction	• The customers will be highly satisfied since the wasting of time while searching for an unavailable product is reduced. • The work load of the retailers will be minimized if the system is automated every day and during every purchase. • The customer satisfaction will be improved for getting appropriate response from the retailers and that too immediately.
❖	Business Model (Revenue Model)	• Hereby we can provide a robust and most reliable inventory management system by using: 1. ML algorithms for all the prediction purposes using all the past dataset since datasets are undoubtedly available in huge amounts. 2. Can deploy the most appropriate business advertising models. 3. To establish a loss preventing strategy. 4. And to ensure the all-time, any where availability of products system. 5. Usage of freebies business strategy for dragging the customer's attention.

❖	Scalability of the Solution	• This system can even work more efficiently with large volume of data. • Implementation of anyone and anywhere using system can be helpful for even a commoner to buy the products. • Daily and Each time purchase updating of the stock for preventing inventory shrinkage. • Direct chat system with the retailers and the customers for providing best customer service.

Project Title: Inventory Management System for Retailers

Project Design Phase-I – Problem Solution Fit

Team ID: PNT2022TMID04968

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Who is your customer?
i.e. working parents of 0-5 y.o. kids

- General consumers who are in need of a product.
- They can be of all ages.

6. CUSTOMER CONSTRAINTS CC

What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

- Cost of product.
- Quality product.
- Lack of network connection.
- Delivery cost.
- Product delivery delay.
- Device to order.

5. AVAILABLE SOLUTIONS AS

Which solutions are available to the customers when they face the problem
or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

- They can compare the cost of product and purchase their desired choice.
- They can return if the quality does not satisfy their expectation.
- They can see when the delivery date is and they can decide to purchase the product or not.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.

- Maintaining up-to-date products.
- Ordering the right amount and not in excess.
- Purchasing the products in lower price than selling price.
- Having competitive stock pricings.
- Product demand forecasting.
- Not having enough bandwidth to support 'n' number of consumers in the site at a time.

9. PROBLEM ROOT CAUSE RC

What is the real reason that this problem exists?
What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

- Can't predict customers needs in short period of time. Need data to have an accurate stock prediction.
- Contacting suppliers and getting good deals from them.
- Having low bandwidth to hold sufficient consumers in the site.

7. BEHAVIOUR BE

What does your customer do to address the problem and get the job done?
i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

- Estimation of sales prediction to stock up by having customer feedback.
- Finding good supplier with low cost of product.
- Customer feedback for improvement of application.
- Having sufficient bandwidth to support on demand consumers.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS TR

- Customer unable to reach the application due to high demand.
- Having the stock price high.
- Lack of application service.

4. EMOTIONS: BEFORE / AFTER EM

BEFORE – Untrusted, worried, lack of knowledge of stocks.

AFTER - Trusted, happy, referring to others, having sound knowledge of stocks, etc.

10. YOUR SOLUTION SL

If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behavior.

- Deploying the application in a cloud server that tracks the real-time inventory and manages them.
- Such as purchase details, sales, sales prediction, etc.
- It sends an email to the retailers when the stocks are low and needs to be restocked.
- Having a chatbot to guide and help the consumers who are having

8. CHANNELS of BEHAVIOUR CH

8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7

8.2 OFFLINE
What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.

ONLINE – Can access all the services and details.

OFFLINE - SMS notification for detailed list of enquiries.

Identify strong TR & EM

Project Design Phase-I
Solution Architecture

Date	19 September 2022
Team ID	PNT2022TMID04968
Project Name	Inventory Management System for Retailers
Maximum Marks	4 Marks

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Retailers can access the application to display and sell their products to customers.
- Users can log in to their account using their credentials. The application fetches their customer details and allows them to continue where they left off and have the products in the list of which they added to purchase.
- We are containerizing the application using IBM Db2 database and deploying in IBM Cloud which is highly scalable for optimizing and as well as improving anything in the future easily.
- Sales prediction is done by using machine learning to predict which products are most likely to be ranked high for selling and thus retailers can contact their suppliers in advance to restock their products.

Solution Architecture Diagram:

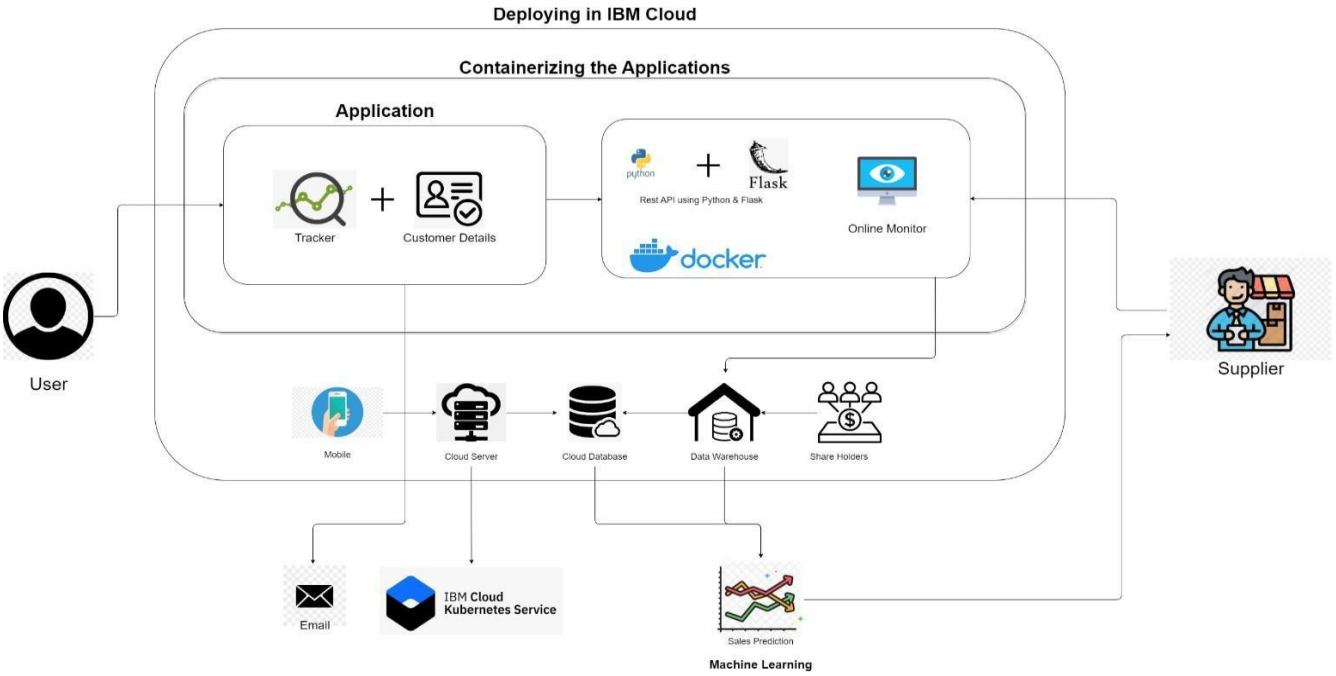
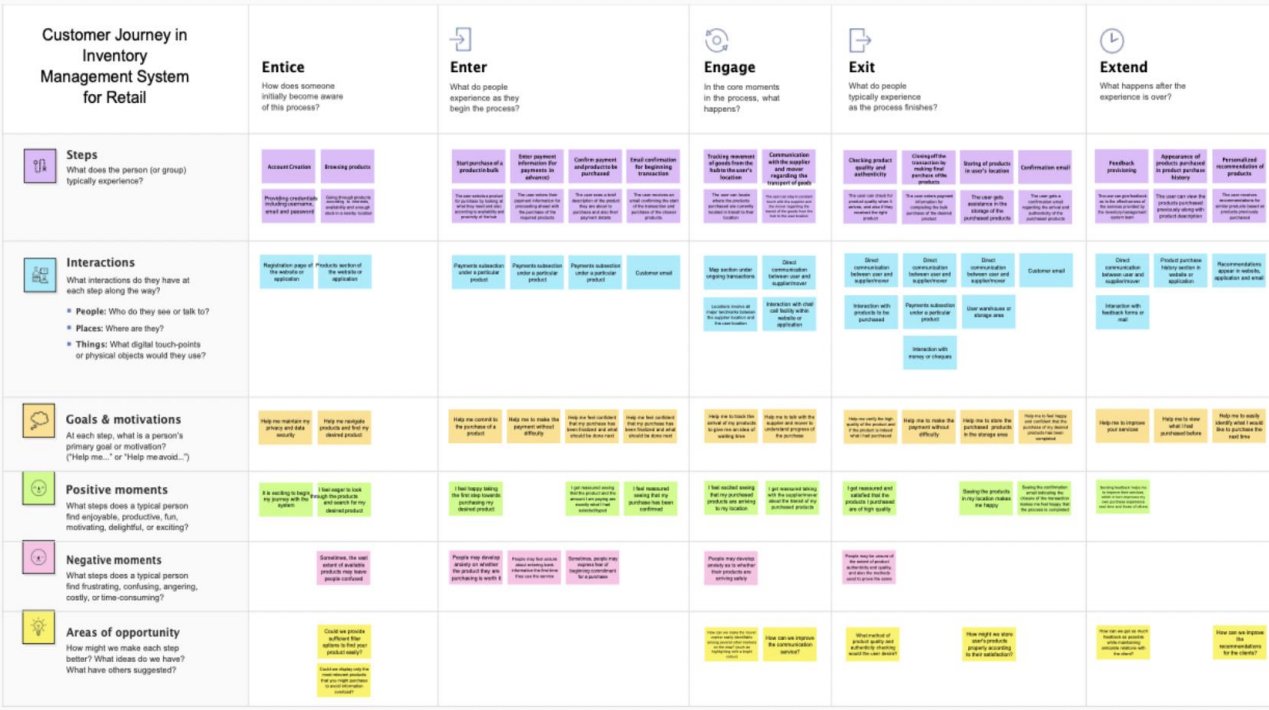


Figure 1: Architecture and data flow for inventory management system for retailers.

Customer experience journey map

Use this framework to better understand customer needs, motivations, and obstacles by illustrating a key scenario or process from start to finish. When possible, use this map to document and summarize interviews and observations with real people rather than relying on your hunches or assumptions.

Document an existing experience



Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	16 October 2022
Team ID	PNT2022TMID04968
Project Name	Project – Inventory Management System for retailers.
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through own application Form Registration through Gmail Registration through Linked IN Registration through Google Docs.
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Login	Login through User name and password. Login through mail I'D and password. Login through OTP through mail I'd and password. Login through Phone number.
FR-4	Records of the products	Product name Product category Product I'd Stock Count Vendor details
FR-5	Login details	Login Details along with time through E-mail. Login Details along with time through phone number.
FR-6	Updation of inventory Details.	Update through E-mail Update through User account.
FR-7	Unavailability Alert	Alert Message through mail or phone number.
FR-8	Monitoring of stock	Audit monitoring through incoming and outgoing stock.
FR-9	Database	Usage of standard database for storing the data.

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	• Once retailers successfully log in to the application they can update their inventory details, also users will be able to add new stock by submitting essential details related to the stock. They can view details of the current inventory. The System will automatically send an email alert to the retailers if there is no stock found in their accounts. So that they can order new stock. • It can use by wide variety of client as it is very simple to learn and not complex to proceed • Easy to use, User-friendly and Responsive.
NFR-2	**Security**	• Applications have been developed to help retailers track and manage stocks related to their own products. The System will ask retailers to create their accounts by providing essential details. Retailers can access their accounts by logging into the application. With Registered Mail id only retailers can log into the application. So it provide authentication. • We are using login for the user and the information will be hashed so that it will be very secure to use.
NFR-3	**Reliability**	• It will be reliable that it can update with very time period so that the accuracy will be good.
NFR-4	**Performance**	• User can track the record of goods available using the application. Inventory tracking helps to improve inventory management and ensures that having optimal stock available to fulfill orders. Reduces manpower , cost and saves time. Emails will be sent automatically While stocks are not available. Makes the business process more efficient. Improves organizations performance. • It will be perform fast and secure even at the lower bandwidth
NFR-5	**Availability**	• The availability of product is just one way in which an inventory management system creates customer satisfaction. Inventory management systems are designed to monitor product availability, determine

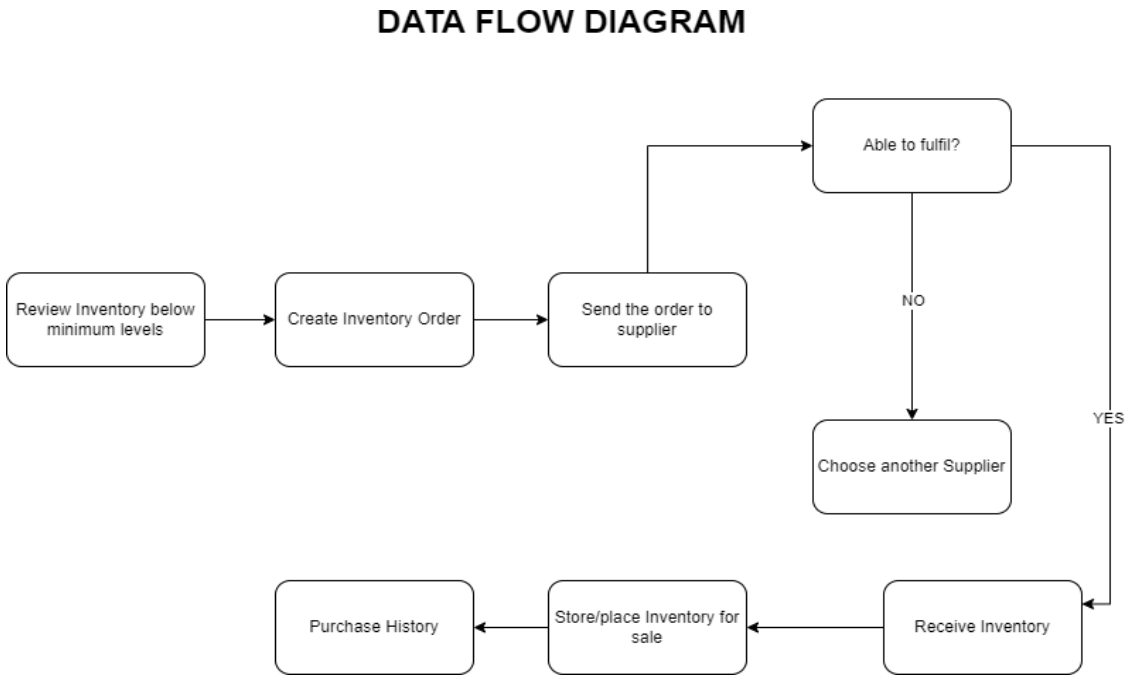
		purchasing schedules for better customer interaction. • Prediction will be available for every user but only for premium user news, database and price alert will be alert
NFR-6	**Scalability**	• Scalability is an aspect or rather a functional quality of a system, software or solution. This proposed system for inventory management system can accommodate expansion without restricting the existing workflow and ensure an increase in the output or efficiency of the process • It is scalable that we are going to use data in kilobytes so that the quite amount of storage is satisfied

Project Design Phase-II
Data Flow Diagram & User Stories

Date	16 October 2022
Team ID	PNT2022TMID04968
Project Name	Project – Inventory Management System for retailers
Maximum Marks	4 Marks

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-3
		USN-4	As a user, I can register for the application through Gmail	I can register for the application through Gmail	Medium	Sprint-2
	Login	USN-5	As a user, I can log into the application by entering email & password	I can log in by entering Gmail & password	High	Sprint-1
	Dashboard	USN-6	As a user, I can track data of sales of products and inventory levels	I can track data of sales of products and inventory levels.	High	Sprint-1
Customer (Web user)	Registration	USN-7	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-8	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-9	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-3
		USN-10	As a user, I can register for the application through Gmail	I can register for the application through Gmail	Medium	Sprint-2
	Login	USN-11	As a user, I can log into the application by entering email & password	I can log in by entering Gmail & password	High	Sprint-1
	Dashboard	USN-12	As a user, I can track data of sales of products and inventory levels	I can track data of sales of products and inventory levels.	High	Sprint-1
Customer Care Executive	Support	USN-13	As a Executive, I Provide answers for the queries asked by users.	I provide the answers for the queries asked by the users.	High	Sprint-1

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Administrator	Manage the Stocks	USN-14	As an administrator, I manage the stocks by adding, shipping and storing the stocks in the storage units	I manage the stocks by adding, shipping and storing the stocks in the storage units.	High	Sprint-1
	Control all the users	USN-15	As a administrator, I can control all the users by performing basic CRUD operations.	I can control all the users by performing basic CRUD operations	High	Sprint-1
	Access the database	USN-16	As an administrator, I can control and access the database	I can control and access the database.	High	Sprint-1

Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	16 October 2022
Team ID	PNT2022TMID04968
Project Name	Project – Inventory Management System for Retailers
Maximum Marks	4 Marks

Technical Architecture:

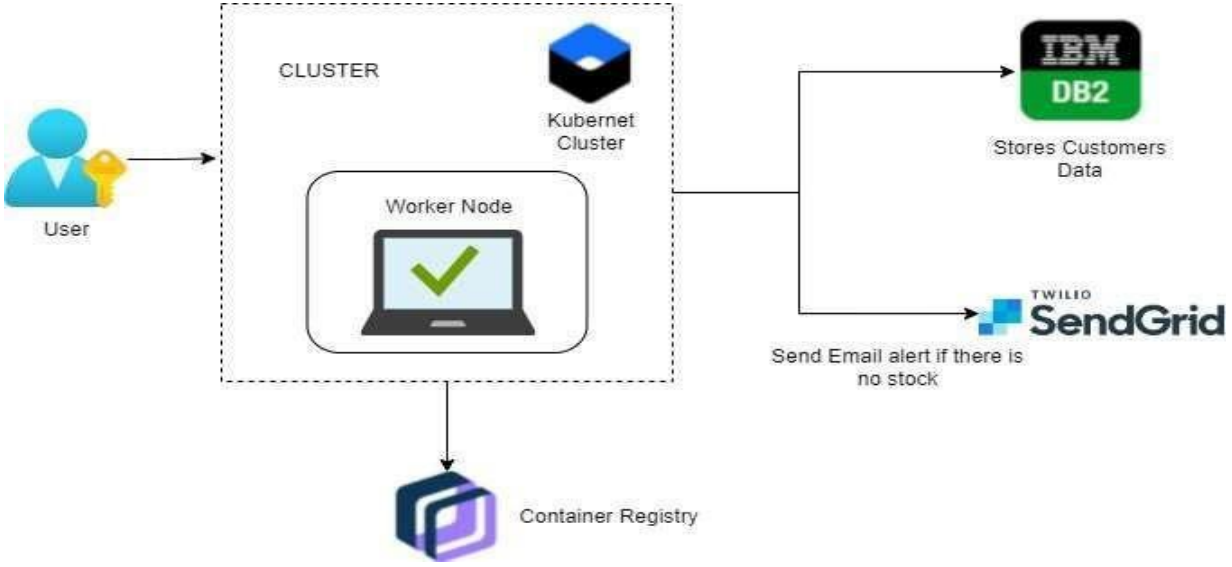


Table-1 : Components & Technologies:

S. No	Component	Description	Technology
1.	User Interface	Through web application, the information processed will be sent to the user via mail.	HTML, CSS, jQuery, JavaScript, python, etc.
2.	Application Logic-1	User registration through form and confirmation will be sent to the user via email.	Flask, SendGrid
3.	Application Logic-2	Dashboard is used by which the system will Maintain tracking of sales of product and inventory levels.	Flask
4.	Application Logic-3	User will get notified about the stock status.	Flask
5.	Database	The data can be stored in database and user can retrieve or manipulate the data whenever required.	IBM DB2.
6.	Cloud Database	Information of the stocks will be stored and hosted on the cloud.	IBM DB2.
7.	File Storage	Requirements to store files	IBM Block Storage or Other Storage Service or Local File system
8.	External API-1	SendGrid used in application will send the email alert if there is less number or no stock to the user	SendGrid
9.	External API-2	IBM container Registry enables you to store and distribute Docker images in a managed private registry	IBM container registry
10.	Machine Learning Model	Purpose of Machine Learning Model	Object Recognition Model, etc.
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration:localhost:5001(Flask) Cloud Server Configuration : Kubernetes	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	SendGrid will send email alert, if there is less number of stock to user, Kubernetes for manipulating Kubernetes API objects, IBM DB2 is used for storing and retrieving the data efficiently.	Flask, SendGrid, IBMDB2, Kubernetes
2.	Security Implementations	We use login for the user and the information will be hashed so that it will be very secure to use.	IBM container registry.
3.	Scalable Architecture	It is scalable that we are going to use data in kb so that the quite amount of storage is satisfied.	Flask
4.	Availability	Prediction will be available for every user but only for premium user news, database and price alert will be alert.	Flask.
5.	Performance	It will perform fast and secure even at the lower bandwidth.	Flask, IBM container registry, IBM DB2.

References:

https://c4model.com/

https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

https://www.ibm.com/cloud/architecture

https://aws.amazon.com/architecture

https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d

Project Planning Phase
Milestone and Activity List

Date	22 October 2022
Team ID	**PNT2022TMID04968**
Project Name	Inventory Management System for Retailers

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on selected project and gathering information by referring the project's related technical papers, research publications, etc.	28 SEPTEMBER 2022
Prepare Empathy Map	Prepare empathy map canvas to capture the user's pains & gains and prepare the list of problem statements.	24 SEPTEMBER 2022
Ideation	To list by the organizing brainstorm sessions and prioritize the top three ideas based on the feasibility and importance.	25 SEPTEMBER 2022
Proposed Solution	To prepare the proposed solution documents, which includes the novelty, feasibility of ideas, business model, social impact, scalability of the solution, etc.	23 SEPTEMBER 2022
Problem Solution Fit	Preparing the problem solution fit document.	30 SEPTEMBER 2022

Solution Architecture	To prepare the solution architecture document	28 SEPTEMBER 2022
Customer Journey	Prepare the customers journey map help the customers understand the user interaction and experiences with the application from the beginning to the end.	20 OCTOBER 2022
Functional Requirement	Prepare the functional requirement document.	8 OCTOBER 2022
Data Flow Diagrams	Draw the data flow diagrams and submit for the review.	9 OCTOBER 2022
Technology Architecture	Prepare technical architecture diagram.	10 OCTOBER 2022
Prepare Milestone & Activity List	Prepare the milestones and activity of the project.	22 OCTOBER 2022
Project Development – Delivery of Sprint-1, 2, 3 & 4	Develop and submit the developed code by testing it and having no errors.	IN PROGRESS...

Sprint Delivery Plan

Date	29 October 2022
Team ID	PNT2022TMID04968
Project Name	Inventory Management System For Retailers
Maximum Marks	8 marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint 1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	5	High	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 1		USN-2	As a user, I will receive confirmation email once I have registered for the application	4	High	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 1		USN-3	As a user, I can register for the application through Gmail	3	Medium	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 1	Login	USN-4	As a user, I can log into the application by entering email & password	4	High	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 1	Dashboard	USN-5	As a user, I can see the stock in hand and how much stock will be received and check other details.	4	High	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 2	Customer details	USN-6	As a user, I can see the customer details like name, company, location, and so on.	3	Low	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali

Sprint 2	Invoice management	USN-7	As a user, I can see, manage, and update or modify the invoice of my shop	1	Low	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 2	Sale and order manage ment	USN-8	As a user, I can see, manage, and update the sale and order	5	Medium	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 2	Return management	USN-9	As a user, I can manage the returned items and check for damaged or defective items.	5	Medium	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 2	Purchase order managem ent	USN-10	As a user, I can enter the newly purchased stock and add or remove the stocks. And upload the purchased details as well.	5	Medium	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 3	Stocks	USN-11	As a user, I can see the stock level, fast-moving, and death stocks.	4	High	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 3	Report	USN-12	As a user, I can see the report of the stock	1	Low	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 3	Notification	USN-13	As a user, it is good if I get a notification for low stock.	2	Medium	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 3	Supplier	USN-14	As a user, I can see the supplier details for a better understanding.	3	Low	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 3	Profile	USN-15	As a user, I can see my profile and give my details after registering as well.	1	Low	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 4	Bill	USN-16	As a user, I like to print the product that is sold now and maintain it.	4	Medium	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 4	Chatbot	USN-17	As a customer care executive,I can view the	4	High	Jeyaprathap Kamal Vickram

			complaints on chat box, As a customer, I should be able solve and reply for the customers queries and as a customer, I can close the complaint after assisting			Manoj Pandi Mohamad Askar Ali
Sprint 4	Containerization	USN-18	As a user, I can access the software with high performance	10	High	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali
Sprint 4	Deployment	USN-19	As a user, I can access the software in the web	10	High	Jeyaprathap Kamal Vickram Manoj Pandi Mohamad Askar Ali

Project Tracker, Velocity & Burndown Chart (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint 1	20	6 Days	24 Oct 2022	29 Oct 2022	20	31 Oct 2022
Sprint 2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint 3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint 4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity

Sprint Duration - 6 Days

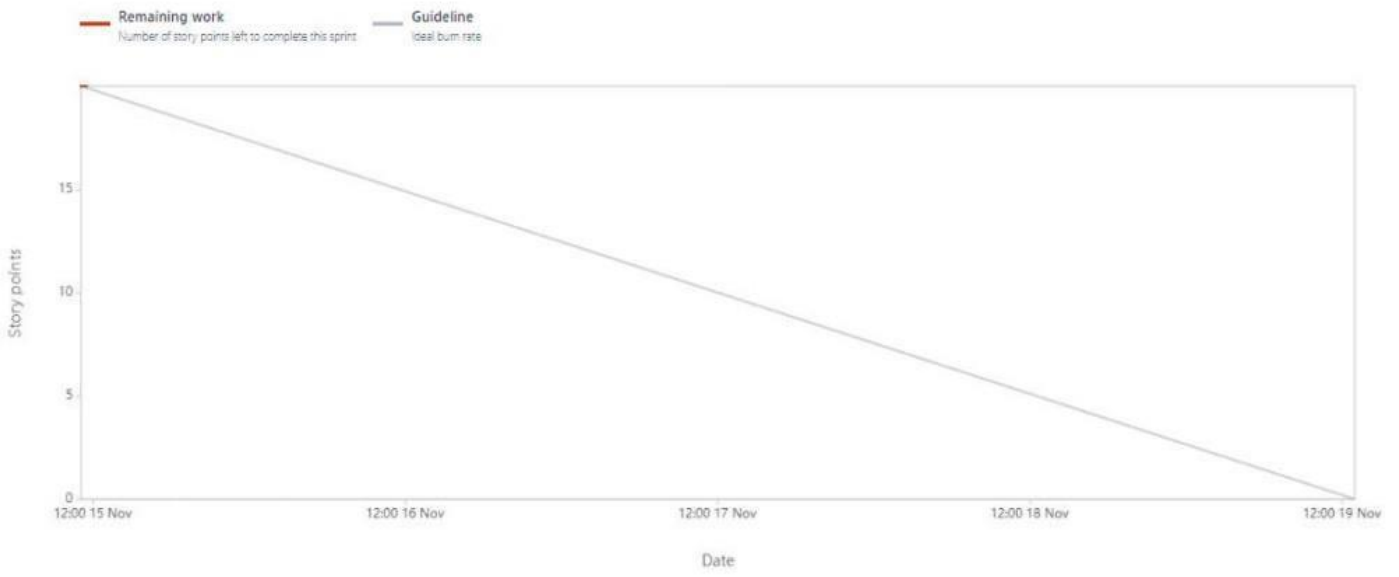
Velocity of the Team - 20 (points per sprint)

Team’s Average Velocity AV = story points / velocity sprint duration = 206 = 3.3

Burndown Chart

Date - October 24th, 2022 - October 29th, 2022

Sprint goal - to complete user registration ,login, and product dashboard

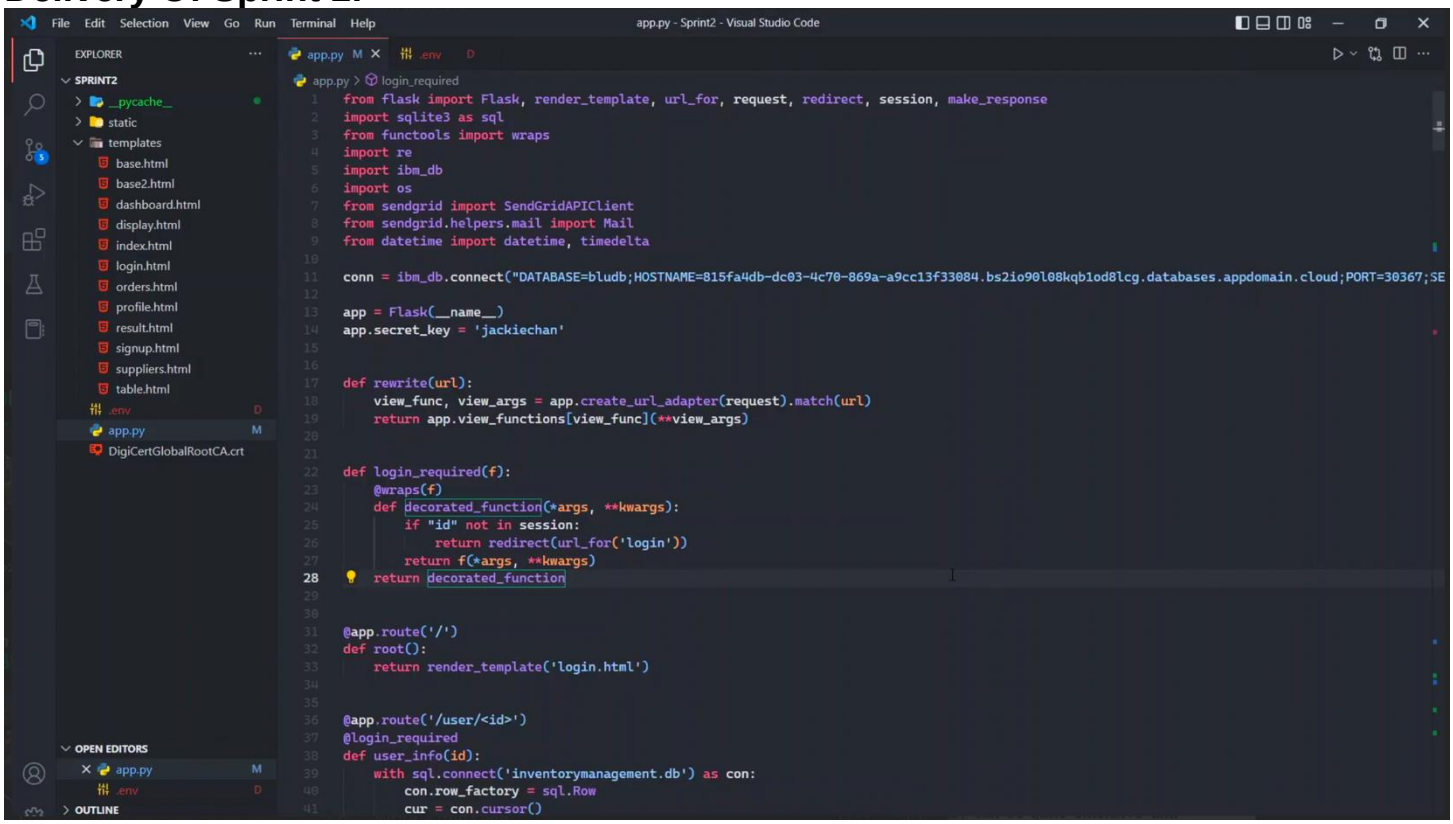


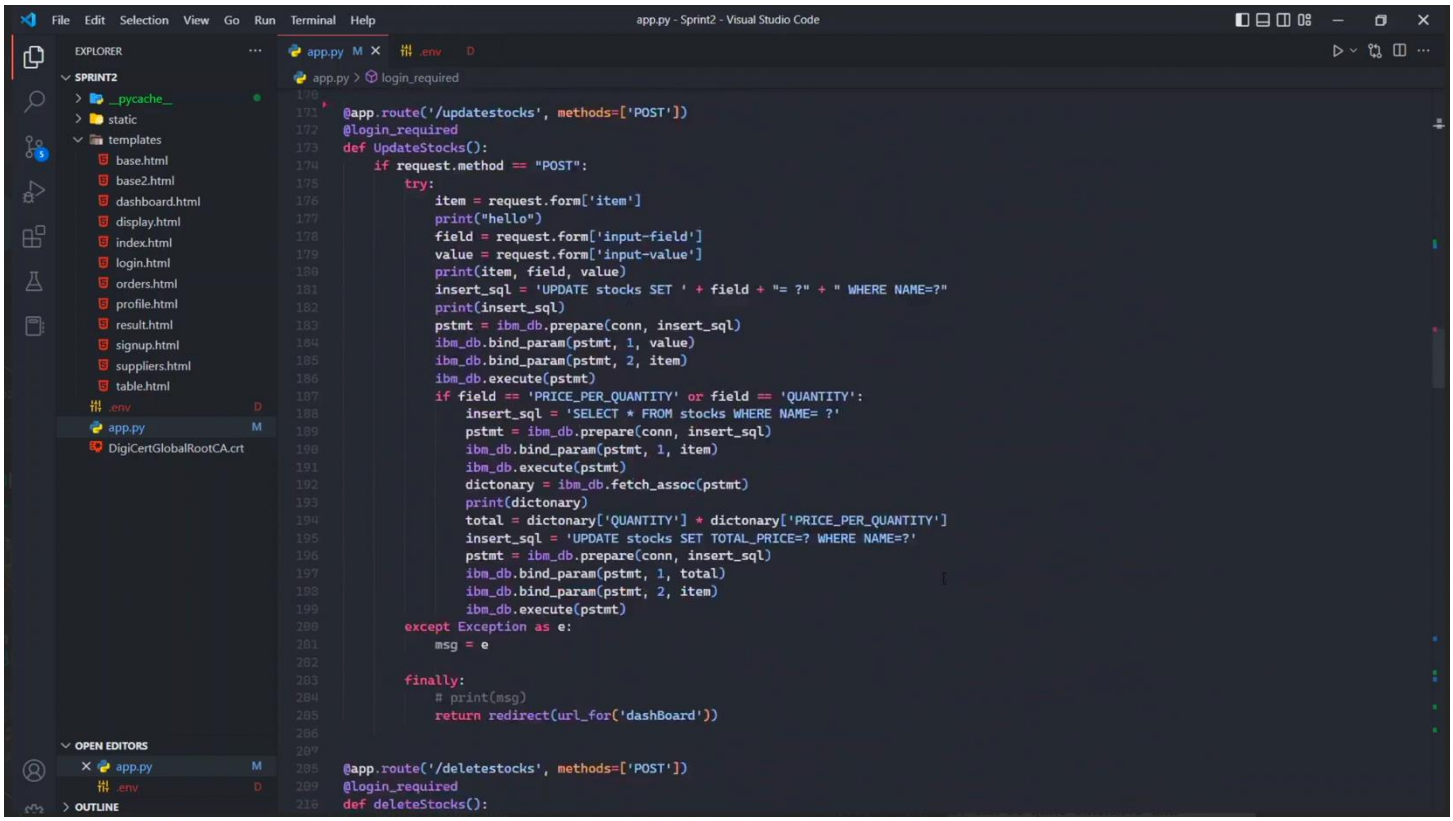
Report: IMSFR Sprint 1

*Issue added after sprint start

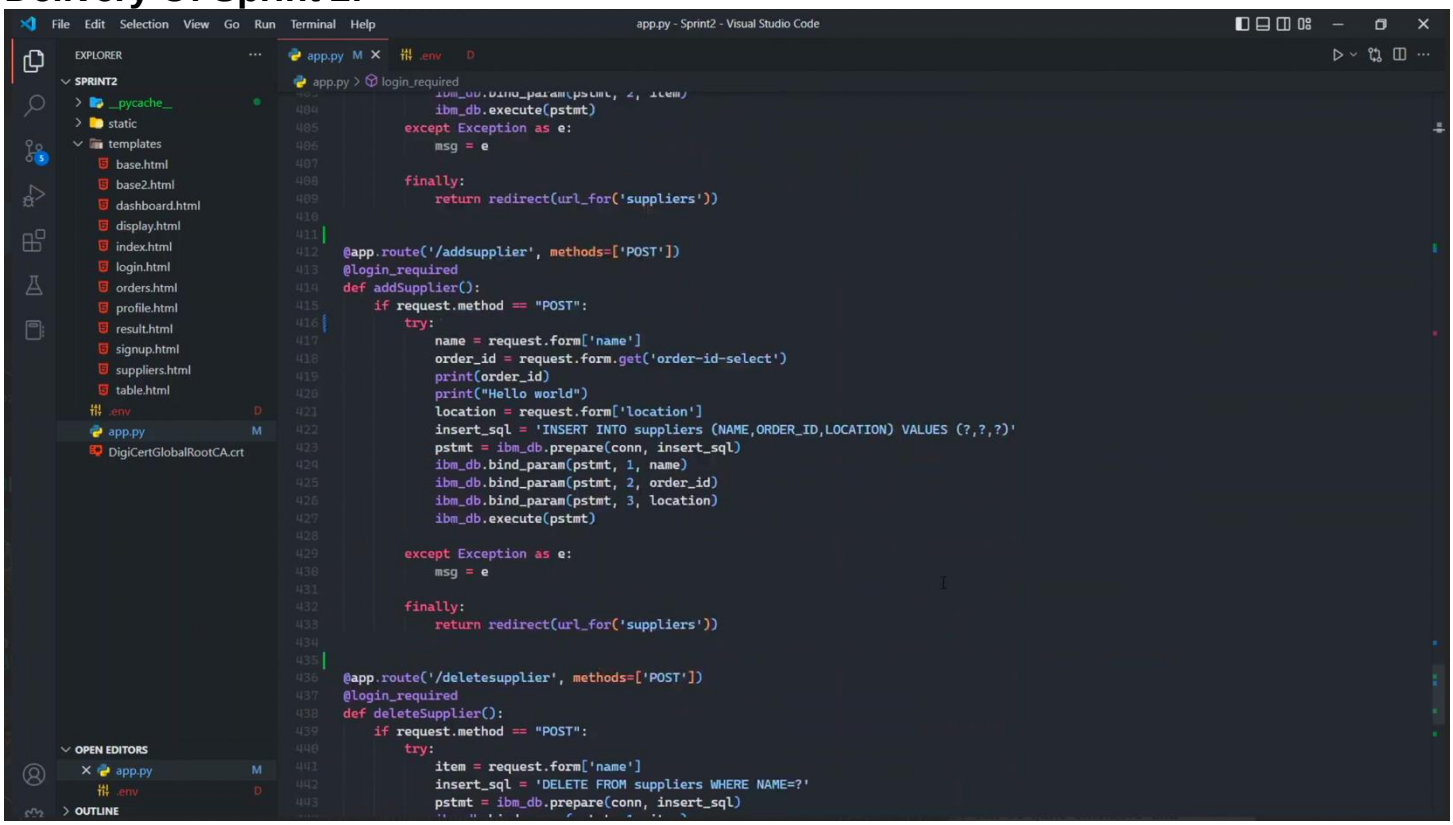
PROJECT DEVELOPMENT PHASE

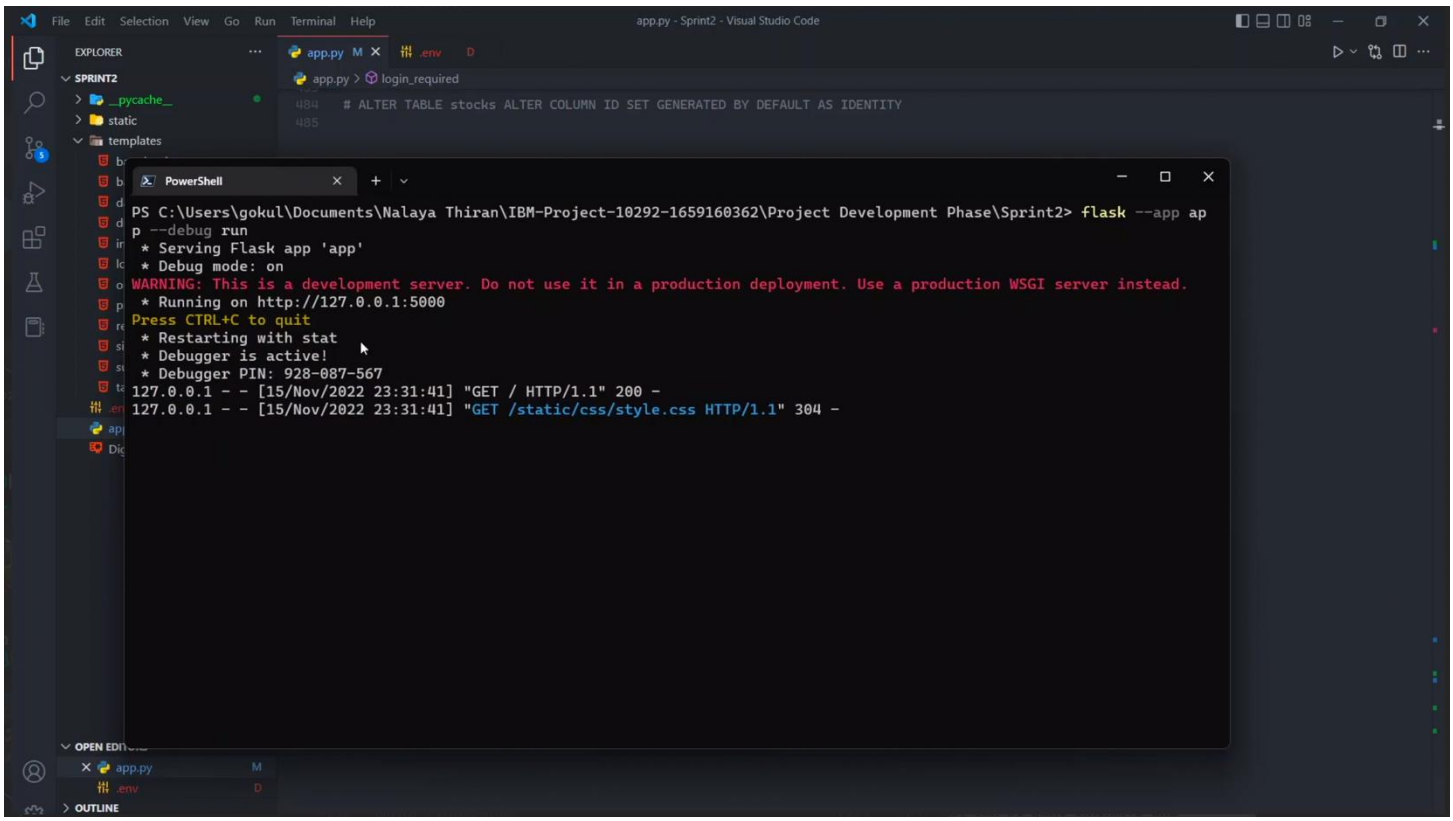
Delivery Of Sprint 1:



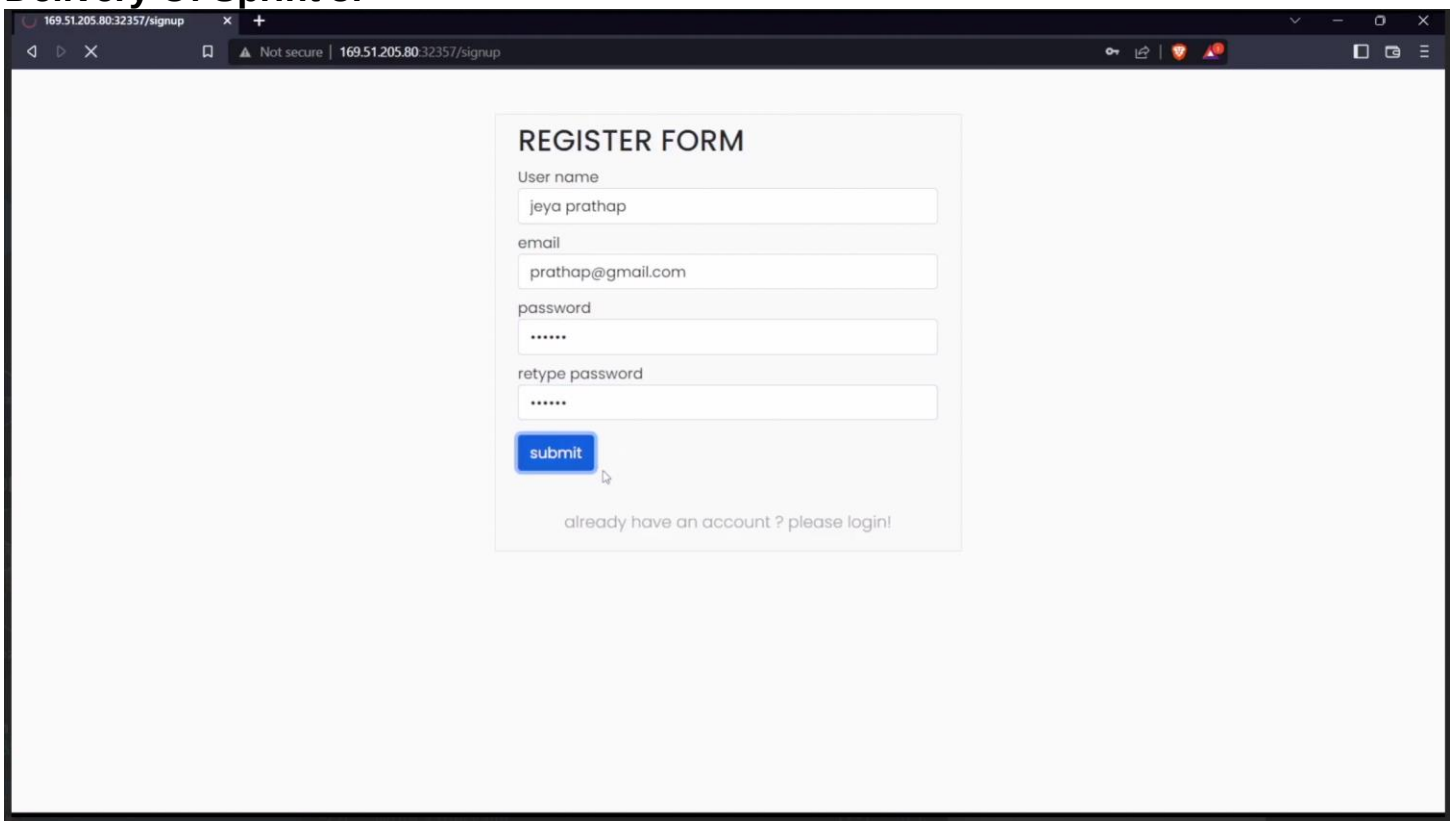


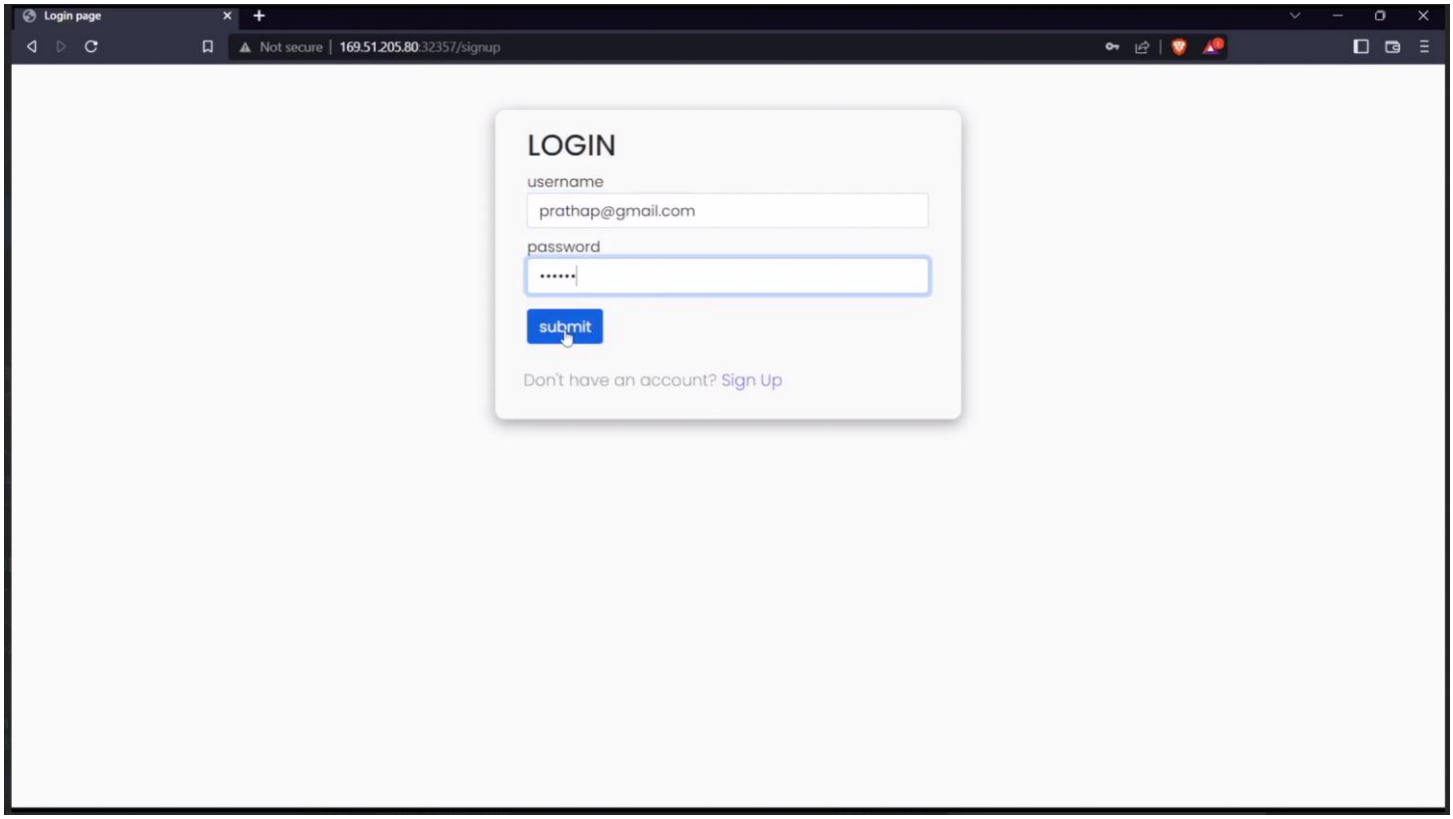
Delivery Of Sprint 2:



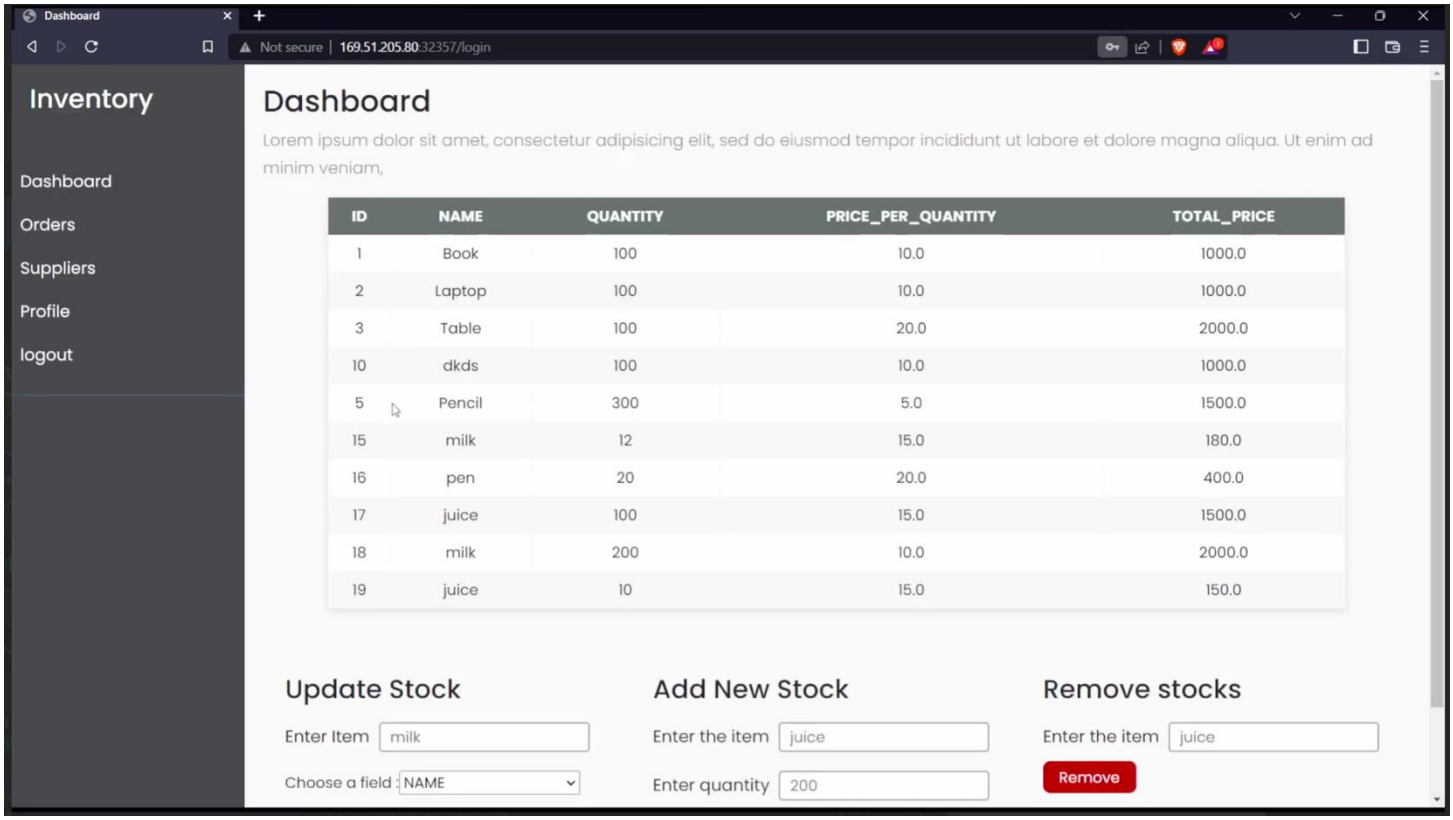


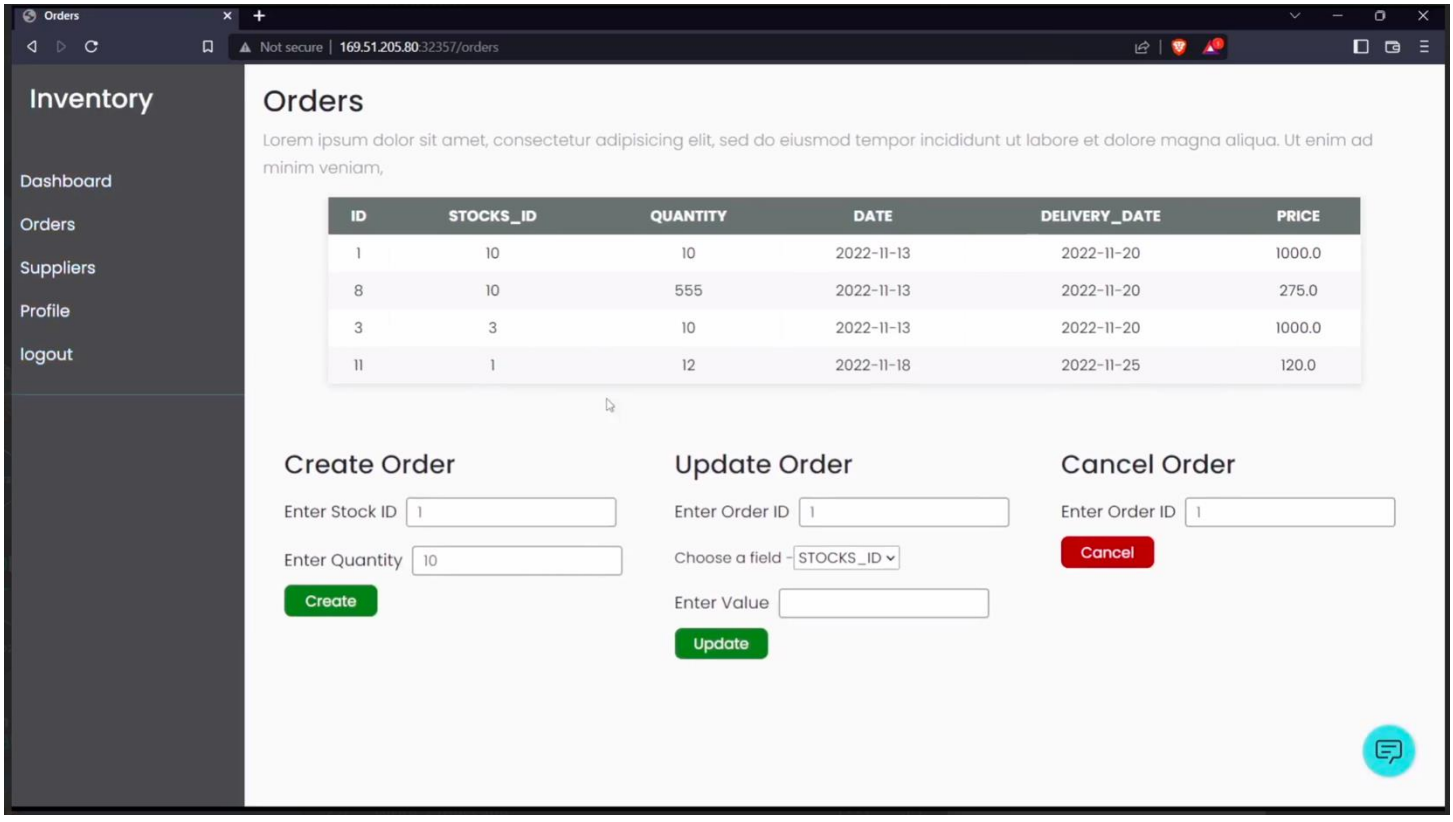
Delivery Of Sprint 3:

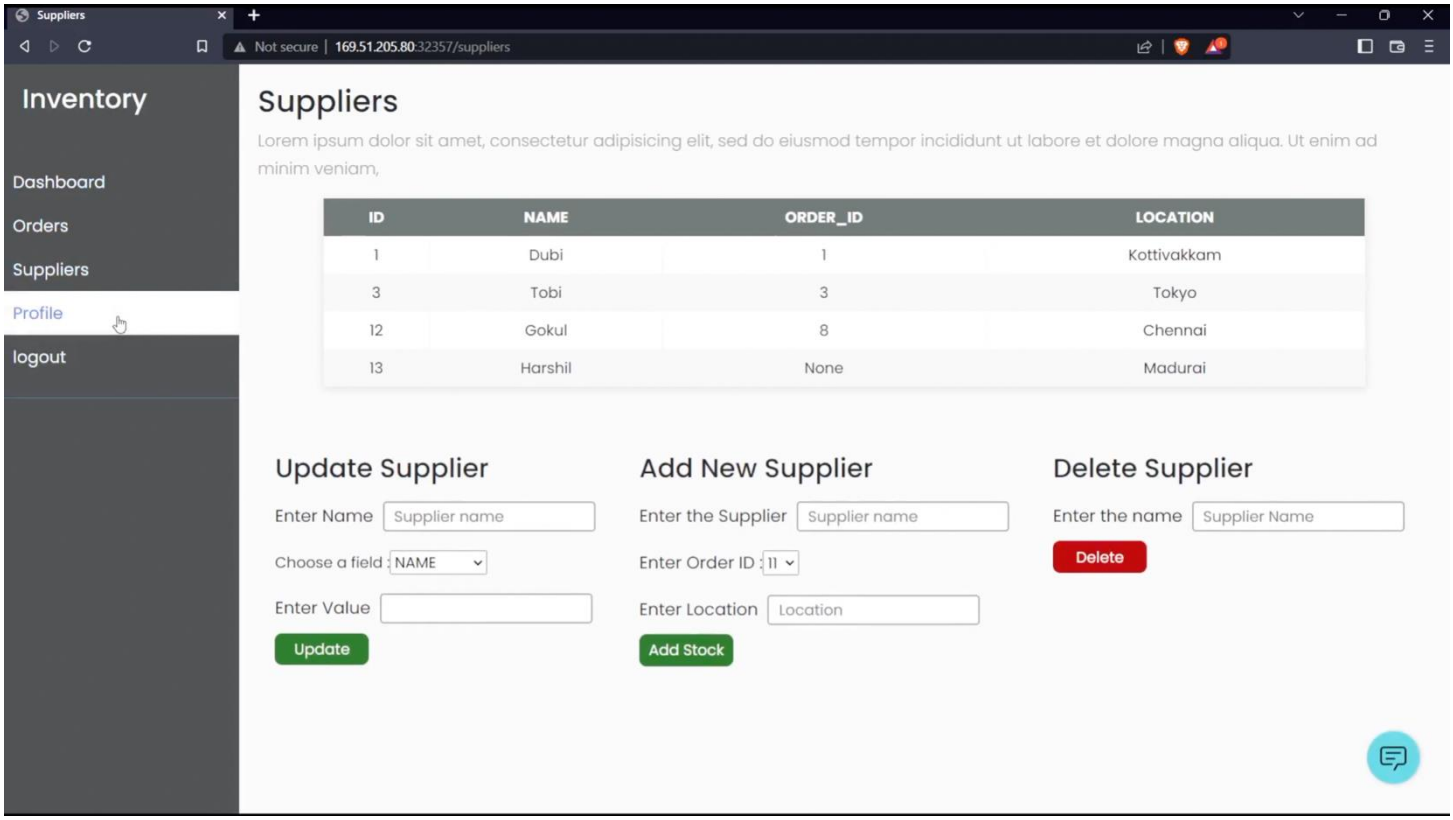




Delivery Of Sprint 4:



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3 Tobi 3 Tokyo
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13 Harshil None Madurai
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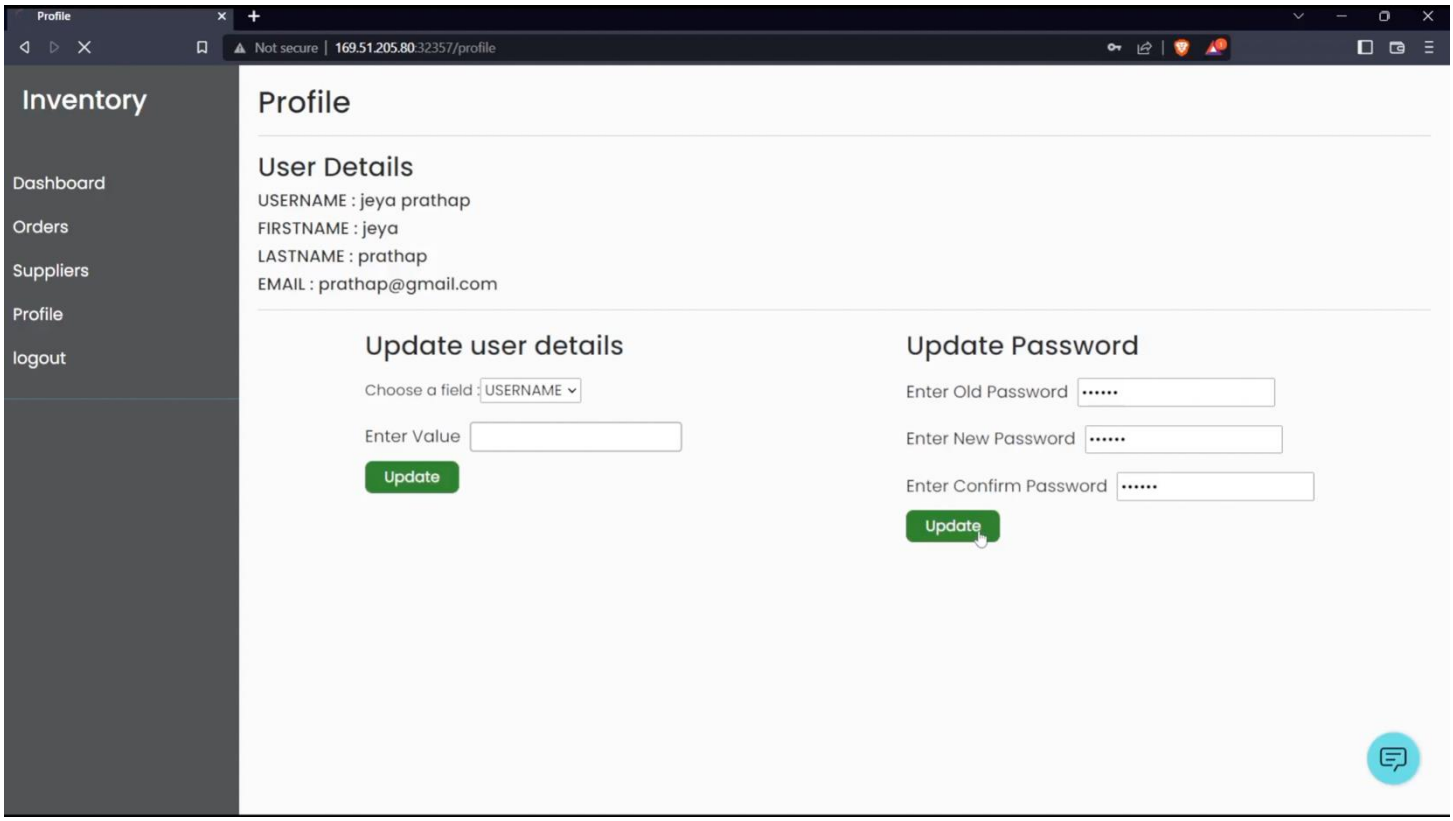
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Orders
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EMAIL : prathap@gmail.com
Update user details
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Enter Value
Update
Update Password
Enter Old Password
Enter New Password
Enter Confirm Password
Update

CONCLUSION:

In conclusion, customer care, involves the use of basic ethics and any company who wants to have success and grow, needs to remember, that in order to do so, it must begin with establishing a code of ethics in regards to how each employee is to handle the dealing with customers. Customers are at the heart of the company and its growth or decline. Customer care involves, the treatment, care, loyalty, trust the employee should extend to the consumer, as well in life. This concept can be applied to so much more than just customer care. People need to treat others with respect and kindness, people should try to take others into consideration when making any decision. If more people were to practice this policy, chances are the world would be a better, more understanding place for all to exist.