

INVENTORY MANAGEMENT SYSTEM FOR RETAILERS

TEAM ID: PNT2022TMID11934

TEAM MEMBERS:

**Venkatesh J
Mohana Raj K
Sedhuragavan L
Shankar K R**

**In partial fulfilment for the award of the degree
of
BACHELOR OF TECHNOLOGY
In
INFORMATION TECHNOLOGY**

K.S. Rangasamy College of Technology

TIRUCHENGODE

TABLE OF CONTENT

CHAPTER	CONTENTS	PAGE NO
	INTRODUCTION	
1	1.1 PROJECT OVERVIEW	05
	1.2 PURPOSE	05
	LITERATURE SURVEY	
2	2.1 EXISTING PROBLEM	06
	2.2 REFERENCES	07
	2.3 PROBLEM STATEMENT DEFINITION	08
	IDEATION & PROPOSED SOLUTION	
	3.1 EMPATHY MAP CANVAS	09
3	3.2 IDEATION & BRAINSTROMING	10
	3.3 PROPOSED SOLUTION	10
	3.4 PROBLEM SOLUTION FIT	12
	REQUIREMENT ANALYSIS	
4	4.1 FUNCTIONAL REQUIREMENT	13
	4.2 NON-FUNCTIONAL REQUIREMENTS	14
	PROJECT DESIGN	
5	5.1 DATA FLOW DIAGRAMS	15
	5.2SOLUTION&TECHNICAL	17

	ARCHITECTURE	
	5.3 USER STORIES	18
6	PROJECT PLANNING & SCHEDULING	
	6.1 SPRINT PLANNING & ESTIMATION	19
	6.2 SPRINT DELIVERY SCHEDUL	20
	6.3 REPORTS FROM JIRA	24
7	CODING & SOLUTIONING	
	7.1 FEATURE1	26
	7.2 FEATURE2	26
	7.3 DATABASE SCHEMA	27
	TESTING	
8	8.1 TEST CASES	28
	8.2 USER ACCEPTANCE TESTING	30
9	RESULTS	
	9.1 PERFORMANCE METRICS	37
10	ADVANTAGES & DISADVANTAGES	38
11	CONCLUSION	40
12	FUTURE SCOPE	41

APPENDIX

13	SOURCE CODE	42
	GITHUB & PROJECT DEMO LINK	53

1.INTRODUCTION

Inventory management information system is high performance software, which speed up the business operation of the organization. Every organization, which deals with the raw materials, put its great effort in the efficient utilization of its raw, material according to its need and requirement. The organization has to perform number of tasks and operations in order to run its business in manual system.

For example, From NaavebUROM

- Estimation of new raw material required.
- Preparation of purchase order.

Preparation of inward sale invoice This Software “Inventory Management System”, is used for recording the information about the day-to-day transaction of stock of an organization. It stores purchase information of the products with credit/debit information form the supplier. Similarly, it stores sales information with credit/debit about the customer. If a product is purchased, then the related information is stored in stocks, that is, stocks are up to date. Another part I it prepares sales report after product it sold. in the sales information, the information about who sold the product is also kept, so there is no problem for misunderstandings in future.

1.1. PROJECT OVERVIEW

Inventory management system is an application which is helpful for business operate. Inventory management is a challenging problem area in supply chain management. Companies need to have inventories in warehouses in order to fulfil customer demand, meanwhile these inventories have holding costs and this is frozen fund that can be lost. Therefore, the task of inventory management is to find the quantity of inventories that will fulfil the demand, avoiding overstocks. This paper presents a case study for the assembling company on inventory management. It is proposed to use inventory management in order to decrease stock levels and to apply an agent system for automation of inventory management. processes Inventory management system (IMS) use for a departmental store.

1.2. PURPOSE:

A case study at ‘Guckenheimer’ (an on-site corporate restaurant management and catering company) cited issues regarding a basic resources requirement list that has to be maintained manually by the staff. To keep track of their inventory levels they have to calculate a list of the groceries utilized during a course of time, calculate and analyze the requirements for the future, and place their next order to the vendors if needed. This process takes up a lot of time and human effort, and is also prone to human error. This poses a problem of a situation that the staff at ‘Guckenheimer,’ as well as many other restaurants faces. It takes up a lot of time to manually keep track of sales and place correct orders to vendors, wasting useful labor in trivial works. A product which would assist in tackling the above mentioned problems would prove to be fruitful to clients such as ‘Guckenheimer’ and similar enterprises as this product would help convert the unproductive time to something more useful, by removing the unnecessary errorprone complications and efforts.

2. LITERATURE SURVEY

2.1. EXISTING PROBLEM

Products are considered as the business resources for the organization. This includes managing the product with appropriate way to review any time as per the requirement. Therefore, it is important to have a computer-based IMS which has the ability to generate reports, maintain the balance of the stock, details about the purchase and sales in the organization. Before developing this application, we came up with 2Inventory Management System existing in the market, which helps to give the knowledge for the development of our project. This application software is only used by the large organization but so we came up with the application which can be used by the small company for the management of their stock in the production houses. After analyzing the other inventory management system, we decided to include some of common and key features that should be included in every inventory management system. So, we decided to include those things that help the small organization in away or other.

2.2. REFERENCES

We have referred several documentations for the purpose of development phases.

- [1] <https://www.camcode.com/asset-tags/what-is-an-inventory-management-system/>

- [2] Jimmy Wales, online encyclopedia Wikipedia,
<http://www.wikipedia.org>

- [3] James Gosling. Java (Programming Language),
<http://www.java.com>

- [4] Names Allaire, NetBeans-Fully-featured Java IDE,
<http://www.netbeans.org>

- [5] James Gosling, Welcome to java world.com:
how-to feature and columns by Java expert; news; Java applets;
sample code; tips,
<http://www.javaworld.com>

- [6] Pressman, Roger S.
“Software Engineering a Practitioner” Approach

- [7] John Osborn, JavaBeans:
Developing Component Software in Java

- [8] Doug Lea Concurrent Programming in Java:
Design Principles and Pattern, Addison-Wesley, November,1996

- [9] Design Report, submitted 9th November 2012.
[https://skydrive.live.com/redir?resid=2CEDE9F7F5F99604!196&authkey=](https://skydrive.live.com/redir?resid=2CEDE9F7F5F99604!196&authkey=!AO5I_ghTCML6xAk8)
[!AO5I_ghTCML6xAk8](https://skydrive.live.com/redir?resid=2CEDE9F7F5F99604!196&authkey=!AO5I_ghTCML6xAk8)

- [10] Testing Document, submitted 26th November 2012.
[https://www.camcode.com/asset-tags/what-is-an-inventory-](https://www.camcode.com/asset-tags/what-is-an-inventory-management-)
[management-](https://www.camcode.com/asset-tags/what-is-an-inventory-management-)

2.3. PROBLEM STATEMENT DEFINITION

The problem statement aims to make desktop application for retailers and to track all areas of IMS like purchase details, sales details, stock management. The application helps the retailer to have complete insights about the products stored in the inventory and can manage them flexibly.

I am	I'm trying to	But	Because	Which makes me feel
A retailer	Find the product details	It's hard and difficult	It takes long time	Feel irritated and frustrated on continuous validation

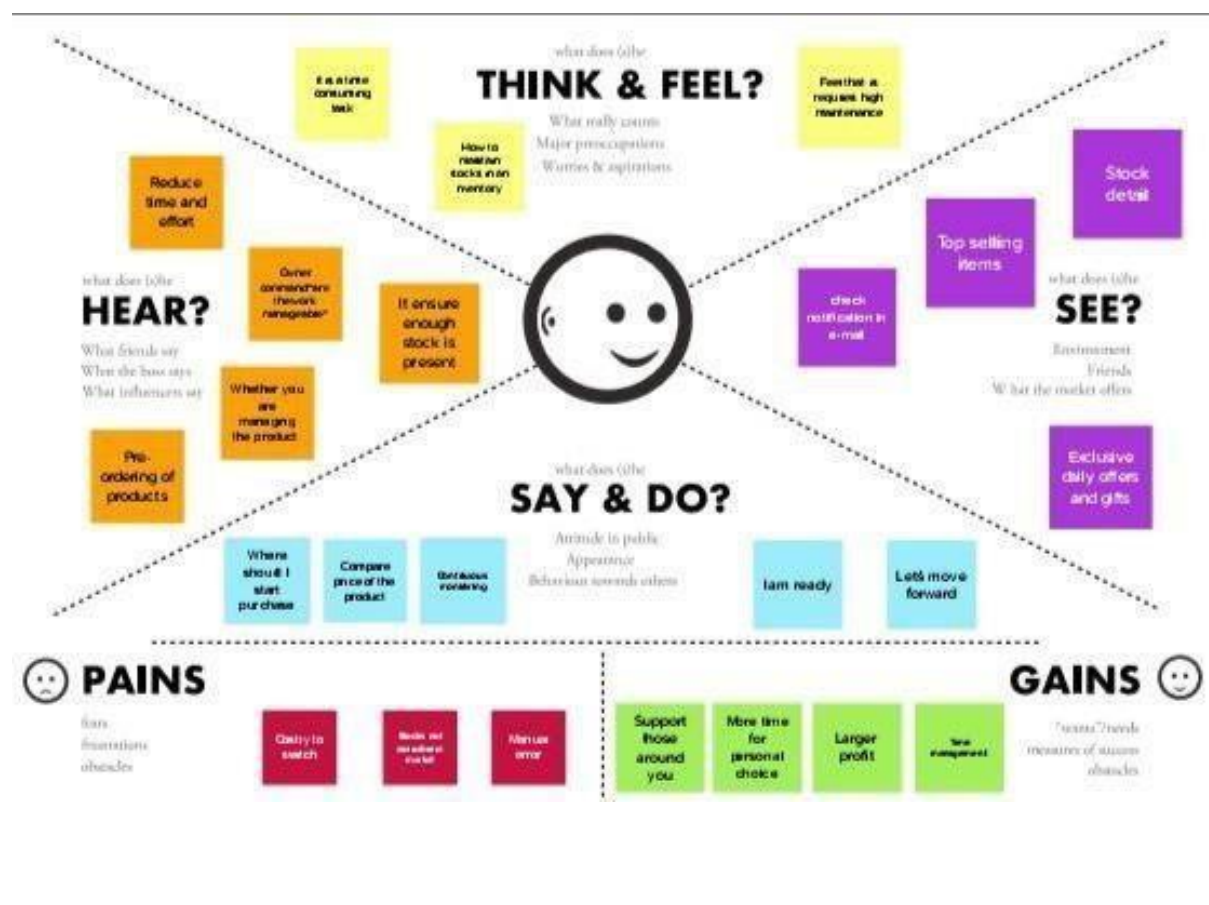
Problem statement(PS)	I am (customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Retailer	Find the product counts in the stock	It's hard	It takes more time	Tired
PS-2	Retailer	Calculate the bill for transportation purpose	It's hard	It take long time	Uninterested
PS-3	Retailer	Find the customer's review	It's hard to gathering information	I don't have enough contacts	Disappointed
PS-4	Retailer	Maintain the ledger	It's difficult to secure	It may be lost	Afraid
PS-5	Retailer	Find the high demand	It's difficult to calculate	It takes more	Challenging

3. IDEATION & PROPOSED SOLUTION

We have analyzed different systems and proposed an ideation phase of our developed management system.

3.1. EMPATHY MAP CANVAS

An empathy map canvas helps brands provide a better experience for users by helping teams understand the perspectives and mindset of their customers. Using a template to create an empathy map canvas reduces the preparation time and standardizes the process so you create empathy map canvases of similar quality.



<https://app.mural.co/invitation/mural/inventorysystem8245/1662990247889?sender=uc8206468e212748e2eea2294&key=b38a607b-b295-4de9-ab1d-1c6c5deba47b>

3.2. IDEATION & BRAINSTORMING

Noting down any ideas that come to mind that address your problem statement.



<https://app.mural.co/invitation/mural/inventorymanagementsystem0923/1663999065743?sender=uc8206468e212748e2eea2294&key=6cb9805a-42b7-42db-89f0-7900f1f71c90>

3.3. PROPOSED SOLUTION

PREPROCESSING PHASES

Home:

This first module manages Home Screen Which is Provide a Home Page of my Software. After clicking home Button. Button will provide Welcome Screen of the Software etc.

Sales

This is Provide Sales information And Sales Page it is contain sales_id, Product_code, Product_name, Quantity, Revenue, Sold by etc.

Suppliers

Suppliers page contain supplier's details and its hold basic value with attributes it is provide a supplier's code, full name, location, phone etc. Products: It is holding the details of product with product code, product name, cost price sellingprice brand etc.

Purchase

This is contained detail about purchase. It will provide purchase screen which is hold some value like purchase id, product code, product name, quantity, total cost etc. And Each page has refresh facilities and search facilities and Direct inputvalue interface etc.

Edit

Many Modules contains Edit facilities Which has control of editing value from data base directly and insert new value etc.

Clear and Delete

Clear and delete is provide advance facilities of this software Because it is Provide a deletion and clear data process etc.

In the proposed system, all the business operations will be automated. Some of the features which the new system will provide are Auto generation of Daily Demand report, Auto generation of Purchase Order of various raw materials. As everything is auto generated, the production delays are avoided. It makes the system more secure as only authenticated users can access the system. Also, there are privileges in which we can authorize a particular user for accessing system or particular modules of the application.

3.4. PROBLEM SOLUTION FIT

- To develop a system that will enhance the monitoring of the sales and inventory
- To develop a module that can generate monthly sales and inventory report.
- To develop security in terms of keeping the records of the inventory
- To develop a system that can monitor the stocks inventory in a fast and efficient manner.
- To accurately record, compute and produce a report of sales.

4. REQUIREMENT ANALYSIS

4.1. FUNCTIONAL REQUIREMENTS

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 Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Business regulations	Many needs may fit under this category
FR-4	Product management	Easily track product information Quickly produce reports for single or multiple sold products
FR-5	Audit Monitoring	The technique of tracking crucial data is known as audit tracking
FR-6	Historical Data	Specify the amount of storage you need to handle this expansion

4.2 NON-FUNCTIONAL REQUIREMENTS

Non-functional Requirements:

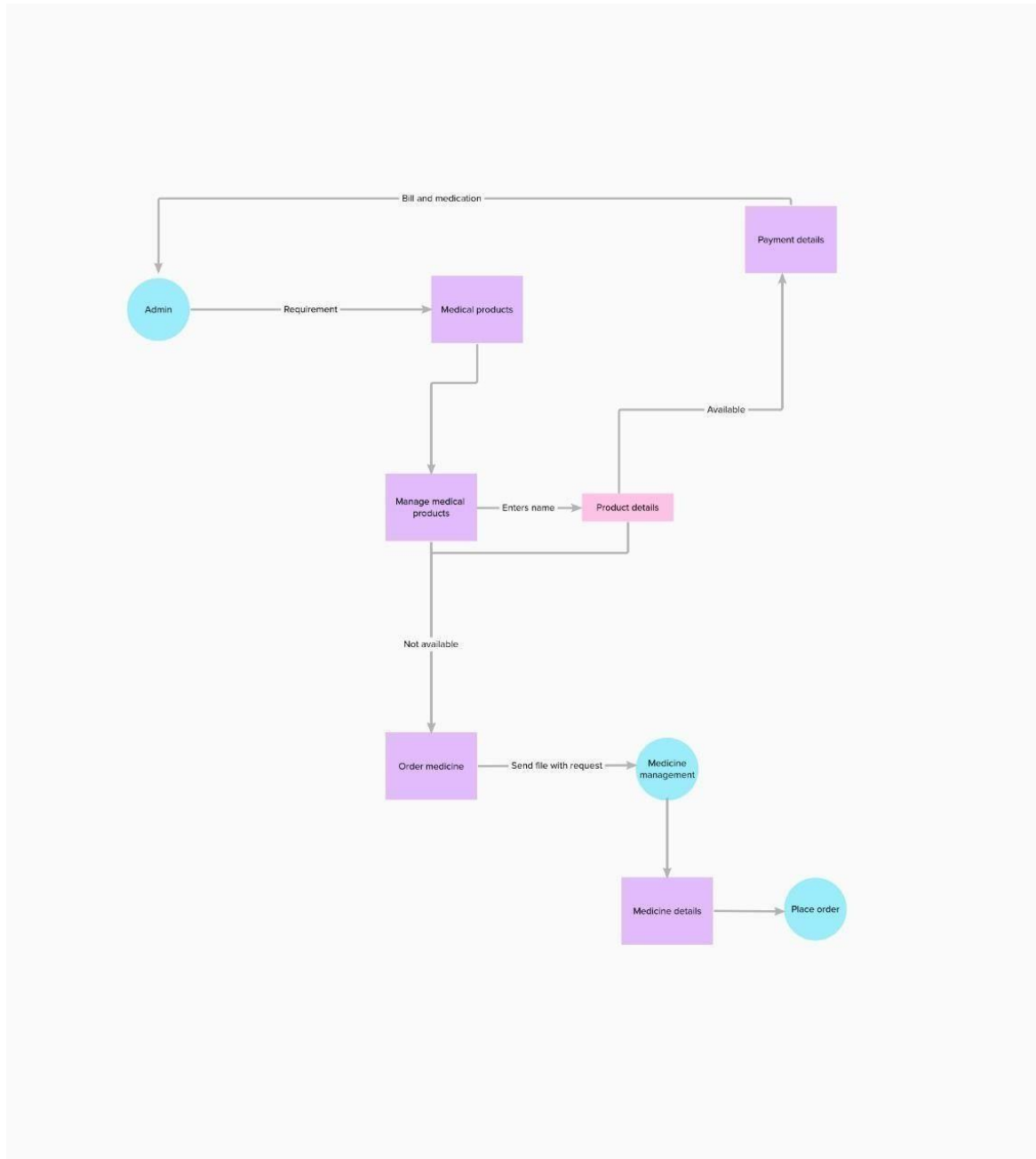
Following are the non-functional requirements of the proposed solution.

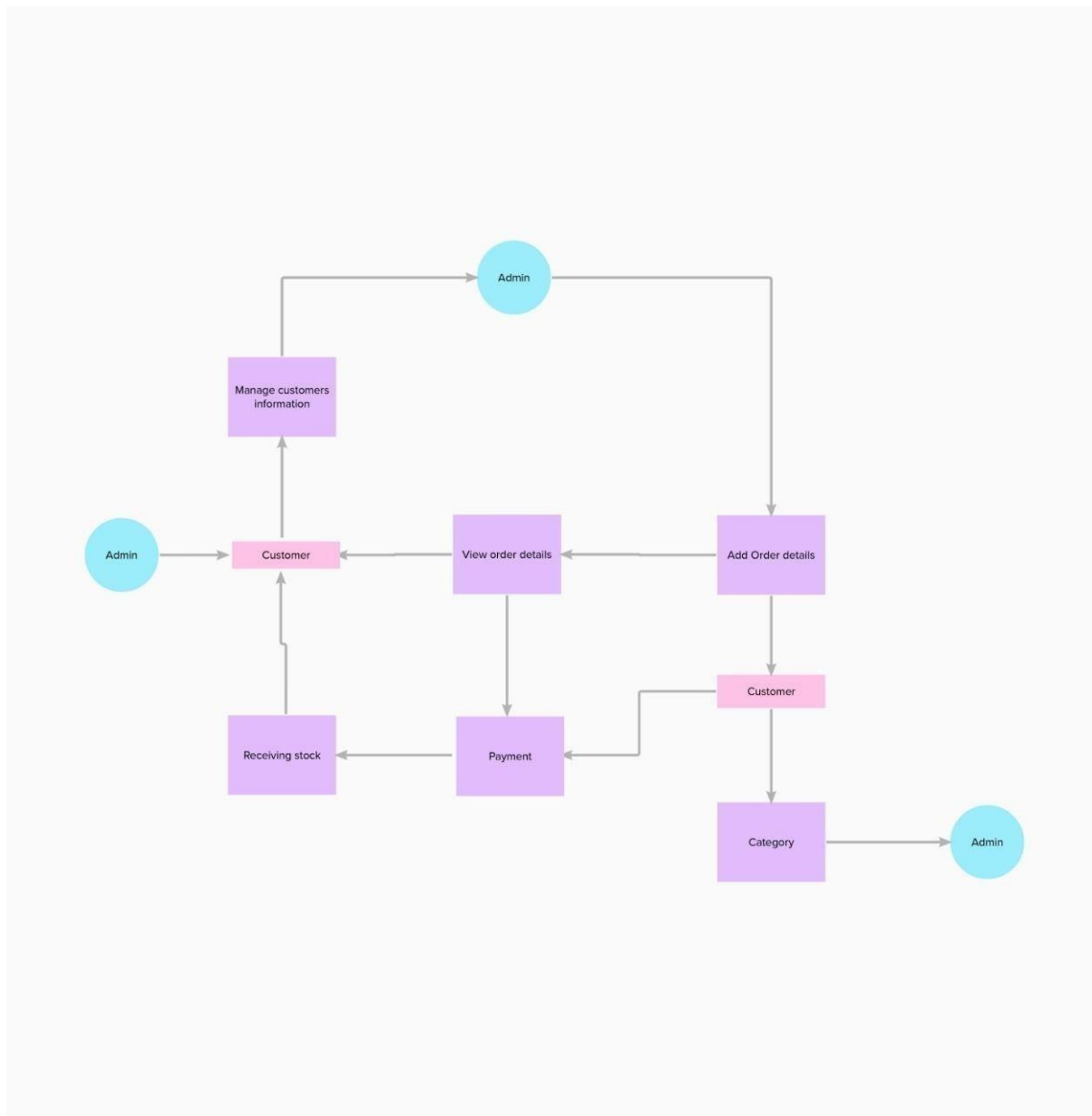
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Backups for database are available
NFR-2	Security	The security requirements deal with the primary security. only authorized users can access the system with user name and password of administrator
NFR-3	Reliability	The software will not be able to connect to the database in the event of the server being down due to a hardware or software failure
NFR-4	Performance	Easy tracking of records and updating can be done
NFR-5	Availability	The software will be available only to administrator of the organization and the product as well as customer details will be recorded by him. He can add customers, Update and delete them as well as add new products and manage them

NFR-6	Scalability	The ability of a system to handle a growing amount of work
-------	-------------	--

5.PROJECT DESIGN

5.1.DATAFLOWDIAGRAMS



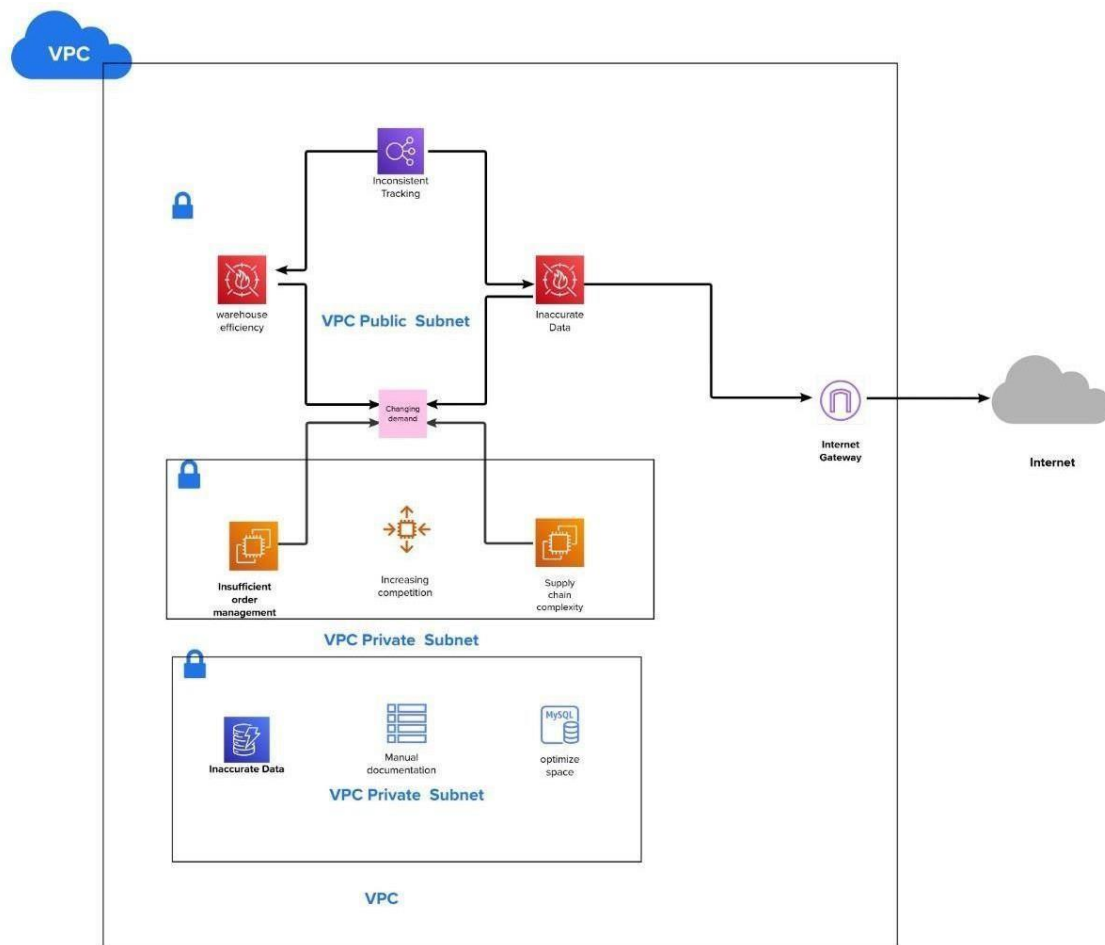


LINK-

<https://app.mural.co/t/inventorymanagementsystem0923/m/inventorymanagementsystem0923/1664960409961/8cbc41047cb30e69c69d9a7fe1a3e594bc5891e1?sender=ufaa8829900151ad6bb0c3652>

5.2. SOLUTION & TECHNICAL ARCHITECTURE

- There was no efficient solution available in many companies these days.
- Every process was based on paper work.
- Human fault rate was high.
- Tracing the inventory losses were not possible
- There was no efficient login system.
- After the computer age, every process is started to be integrated into computer environment.
- Now, we have qualified technology to implement new solution to these problems.



<https://app.mural.co/t/inventorymanagementsystem0923/m/inventorymanagementsystem0923/1664949289401/f06301abdbcca5e1f3940d03bbdcd01f086dce72?sender=ufaa8829900151ad6bb0c3652>

5.3. USER STORIES

A user story is the smallest unit of work in an agile framework. It's an end goal, not a feature, expressed from the software user's perspective.

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-2
		USN-4	As a user, I can register for the application through Gmail.	I can register & application Through Gmail	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can access my account	High	Sprint-1
	Dashboard	USN-6	As a user, I can log into my account for the mobile.	I can access my account /Dashboard	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-2
		USN-10	As a user, I can upload a Profile photo and add my name to my account.	I can upload my Profile photo/Name in my account	Medium	Sprint-1
Customer Care Executive	Customer Support	USN-11	As a user, I can support for customers to handle queries and complaints from their customers.	I can support for customers to clear complaints	High	Sprint-1
Administrator	Responsibility	USN-12	As a system administrator, I want to be able to add new users when required so that	I Can add new users	High	Sprint -1

6. PROJECT PLANNING & SCHEDULING

6.1. SPRINT PLANNING & ESTIMATION

Sprint 1:

1. We created a Flask Project.
2. Added all the routes needed for our project
3. Created Tables in IBM Cloud.

Sprint 2:

1. We added all the html templates needed for our project.
2. We styled those pages using CSS and Bootstrap
3. We wrote Queries to connect IBM Cloud Database
4. Finished all the Fetching and Posting Stuff of IBM Cloud Database Integration.

Sprint 3:

1. Integration of Send grid into our application

Sprint 4:

1. Deploying the application using Docker and Kubernetes

6.2. SPRINT DELIVERY SCHEDULE

Project Planning Phase

Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Date	22 October 2022
Team ID	PNT2022TMID50120
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	Darlin Jena P Deepika T Devi Bala S
Sprint-2		USN-2	As a user, I will receive confirmation email once I have registered for the application	3	Medium	Darlin Jena P Deepika T Devi Bala S
Sprint-4		USN-3	As a user, I can register for the application through Face book	8	Low	Darlin Jena P Deepika T Devi Bala S
Sprint-3		USN-4	As a user, I can register for the application through Gmail	8	High	Anitta A Darlin Jena P Deepika T Devi Bala S
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	5	High	Anitta A Darlin Jena P Deepika T Devi Bala S
Sprint-2		USN-4	As a user, I can login into the application through Google one Tap Sign in	3	Medium	Anitta A Darlin Jena P Devi Bala S
Sprint-1	Dashboard	USN-5	As a user, I must be able to see my details on the dashboard.	3	High	Anitta A Darlin Jena P Deepika T

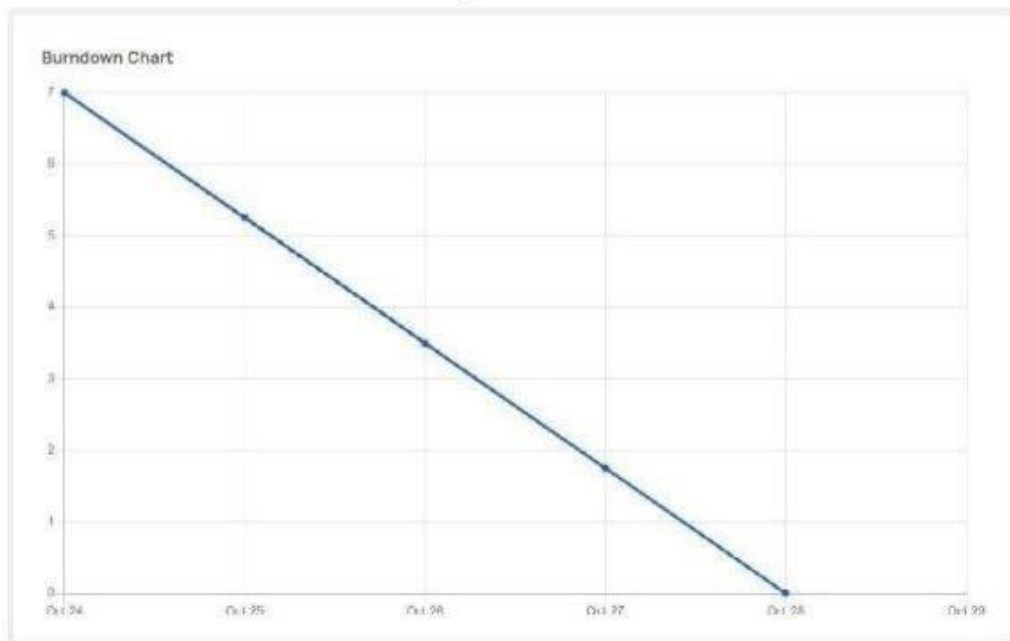
Sprint-2		USN-6	As a user, I should be able to change password whenever I prefer.	2	Medium	Anitta A Deepika T Devi Bala S
Sprint-1	Inventory	USN-7	As a retailer, I should be able to alter product details in the app	2	Medium	Anitta A Darlin Jena P Deepika T
Sprint-2		USN-8	As a retailer, I should be able to add or remove quantity of products in the app.	3	Medium	Anitta A Darlin Jena P Devi Bala S
Sprint-2		USN-9	As a retailer, I should get alert on stock shortage or unavailability.	5	Medium	Anitta A Darlin Jena P
Sprint-1	Order	USN-7	As a user, I should be able to order items on the app	2	High	Darlin Jena P Deepika T Devi Bala S
Sprint-1		USN-8	As a user, I should be able to verify and pay in a secure payment gateway	3	High	Anitta A Darlin Jena P Deepika T Devi Bala S
Sprint-3		USN-9	As a user, I should be able to get the product on time.	5	Low	Darlin Jena P Deepika T Devi Bala S
Sprint-4	Maintenance	USN-1	As a administrator, I should be able to edit details of the users of the app.	8	High	Anitta A Darlin Jena P Deepika T Devi Bala S
Sprint-4		USN-2	Termination user accounts temporarily or permanently if needed.	5	Low	Darlin Jena P Deepika T
Sprint-2	Feedback	USN-1	As a customer care team member, I should be able to get feedback from the users.	2	High	Anitta A Darlin Jena P Deepika T Devi Bala S
Sprint-3		USN-2	As a customer care team member, I should be available 24/7 to increase customer base	8	Medium	Anitta A Darlin Jena P Deepika T Devi Bala S

Project Tracker, Velocity & Burndown Chart: (4 Marks)

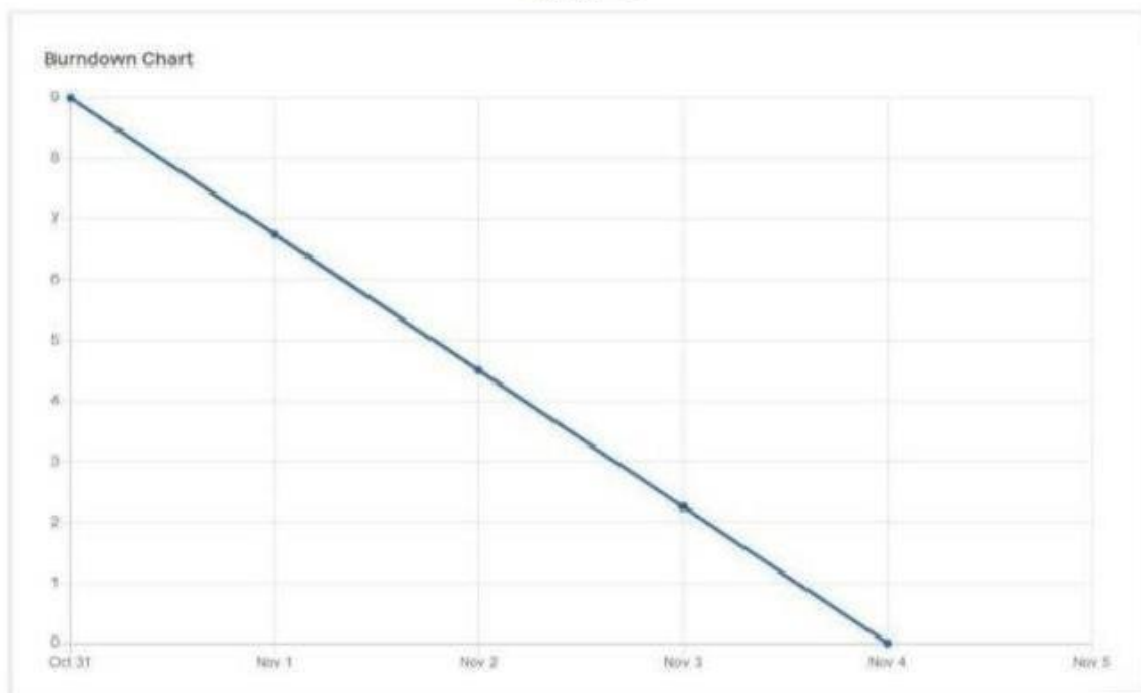
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	18	6 Days	31 Oct 2022	05 Nov 2022	18	05 Nov 2022
Sprint-3	21	6 Days	07 Nov 2022	12 Nov 2022	21	12 Nov 2022
Sprint-4	21	6 Days	14 Nov 2022	19 Nov 2022	21	19 Nov 2022

Burndown Chart:

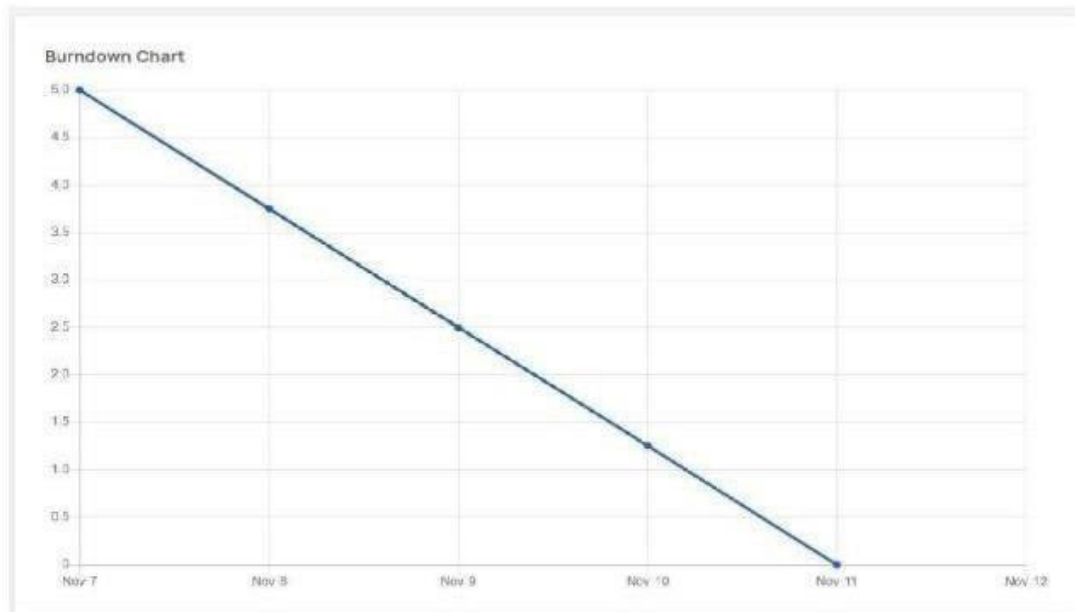
Sprint - 1



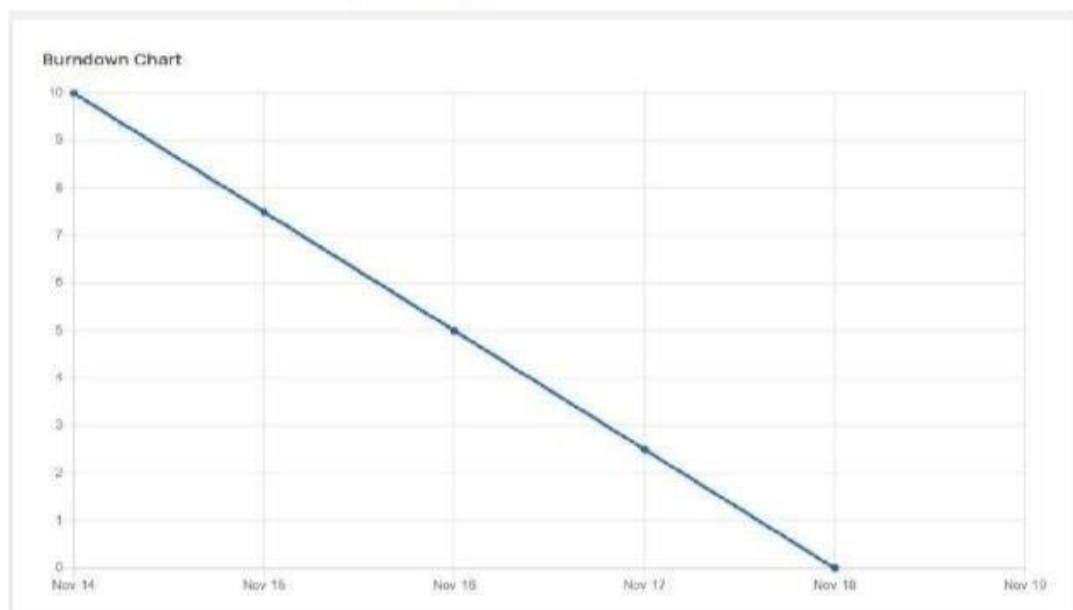
Sprint - 2



Sprint - 3



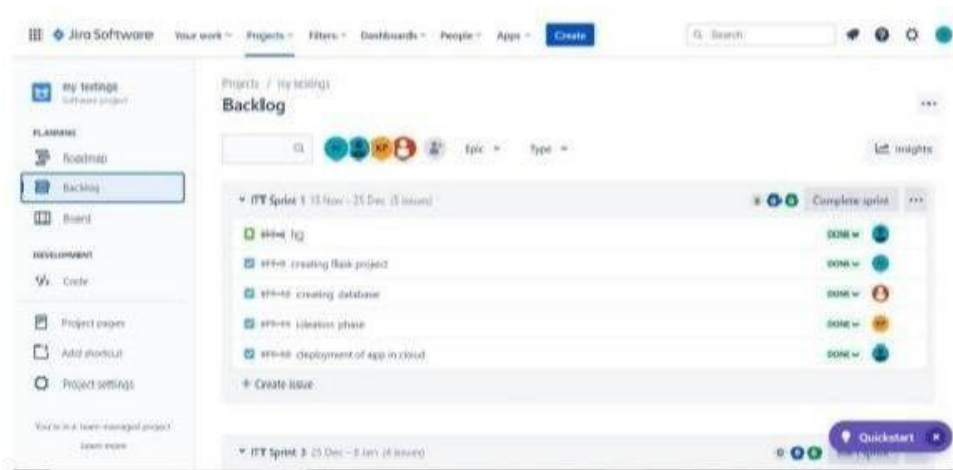
Sprint - 4 Project Tool: JIRA



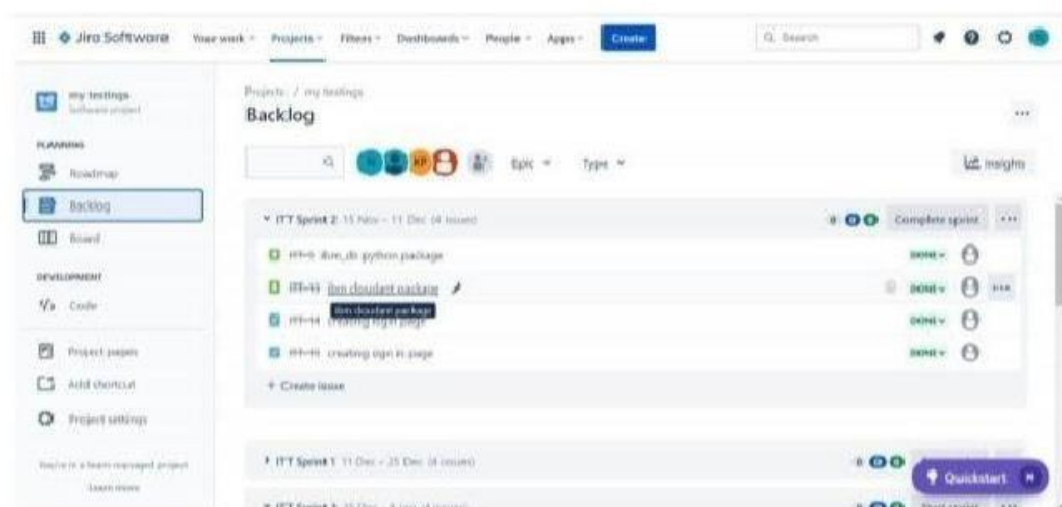
6.3. REPORTS FROM JIRA

IT organizations have the challenge of ensuring system uptime, supporting users, and managing inventory of both hardware and software. IT teams gain significant efficiencies when one tool can support multiple business operations. According to Gartner, mastering the discipline of effective asset management is a huge cost savings for companies.

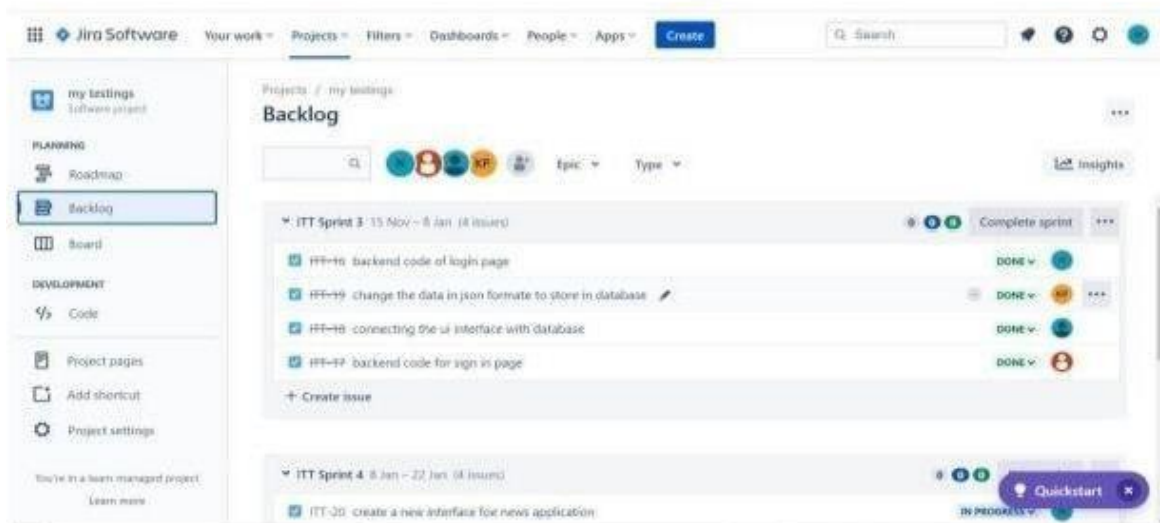
Sprint-1



Sprint-2



Sprint-3



The screenshot shows the Jira Software interface for a project named "my testings". The left sidebar contains navigation options: "my testings" (selected), "PLANNING" (Roadmap, Backlog, Board), "DEVELOPMENT" (Code), "Project pages", "Add shortcut", and "Project settings". The main area displays the "Backlog" for "my testings". The top navigation bar includes "Your work", "Projects", "Filters", "Dashboards", "People", "Apps", and a "Create" button. A search bar is also present. The "Backlog" section shows two sprints: "ITT Sprint 3: 15 Nov - 8 Jan (4 issues)" and "ITT Sprint 4: 8 Jan - 22 Jan (4 issues)". The first sprint is expanded, showing four issues, all marked as "DONE". The second sprint is collapsed, showing one issue. A "Quickstart" button is visible in the bottom right corner.

my testings
Software project

PLANNING
Roadmap
Backlog
Board

DEVELOPMENT
Code

Project pages
Add shortcut
Project settings

You're in a team-managed project
Learn more

Projects / my testings
Backlog

ITT Sprint 3: 15 Nov - 8 Jan (4 issues) Complete sprint

- ITF-16: backend code of login page DONE
- ITF-19: change the data in json format to store in database DONE
- ITF-18: connecting the ui interface with database DONE
- ITF-17: backend code for sign in page DONE

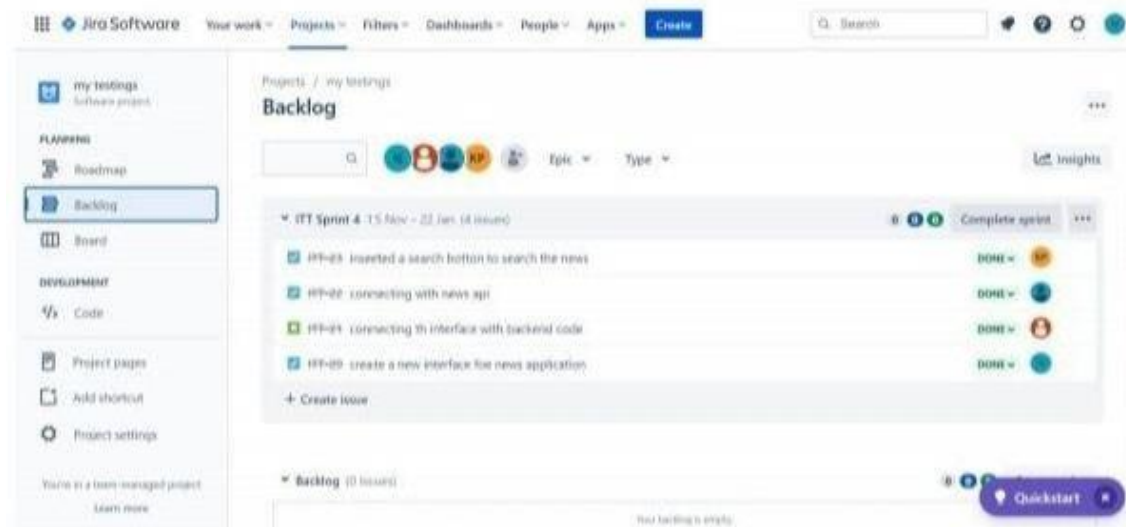
+ Create issue

ITT Sprint 4: 8 Jan - 22 Jan (4 issues)

- ITF-20: create a new interface for news application IN PROGRESS

Quickstart

Sprint-4



The screenshot shows the Jira Software interface for a project named "my testings". The left sidebar contains navigation options: "my testings" (selected), "PLANNING" (Roadmap, Backlog, Board), "DEVELOPMENT" (Code), "Project pages", "Add shortcut", and "Project settings". The main area displays the "Backlog" for "my testings". The top navigation bar includes "Your work", "Projects", "Filters", "Dashboards", "People", "Apps", and a "Create" button. A search bar is also present. The "Backlog" section shows two sprints: "ITT Sprint 4: 15 Nov - 22 Jan (4 issues)" and "Backlog (0 issues)". The first sprint is expanded, showing four issues, all marked as "DONE". The second sprint is collapsed, showing no issues. A "Quickstart" button is visible in the bottom right corner.

my testings
Software project

PLANNING
Roadmap
Backlog
Board

DEVELOPMENT
Code

Project pages
Add shortcut
Project settings

You're in a team-managed project
Learn more

Projects / my testings
Backlog

ITT Sprint 4: 15 Nov - 22 Jan (4 issues) Complete sprint

- ITF-25: inserted a search button to search the news DONE
- ITF-26: connecting with news api DONE
- ITF-21: connecting the interface with backend code DONE
- ITF-20: create a new interface for news application DONE

+ Create issue

Backlog (0 issues)

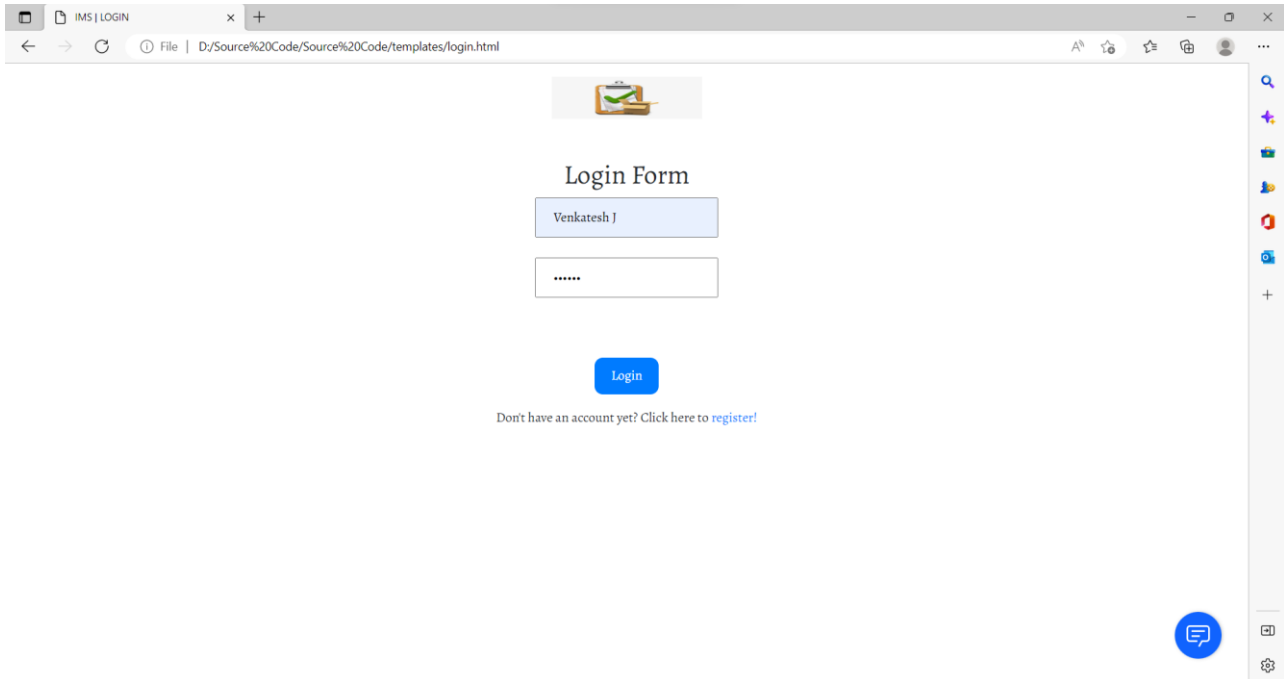
Your backlog is empty.

Quickstart

7.

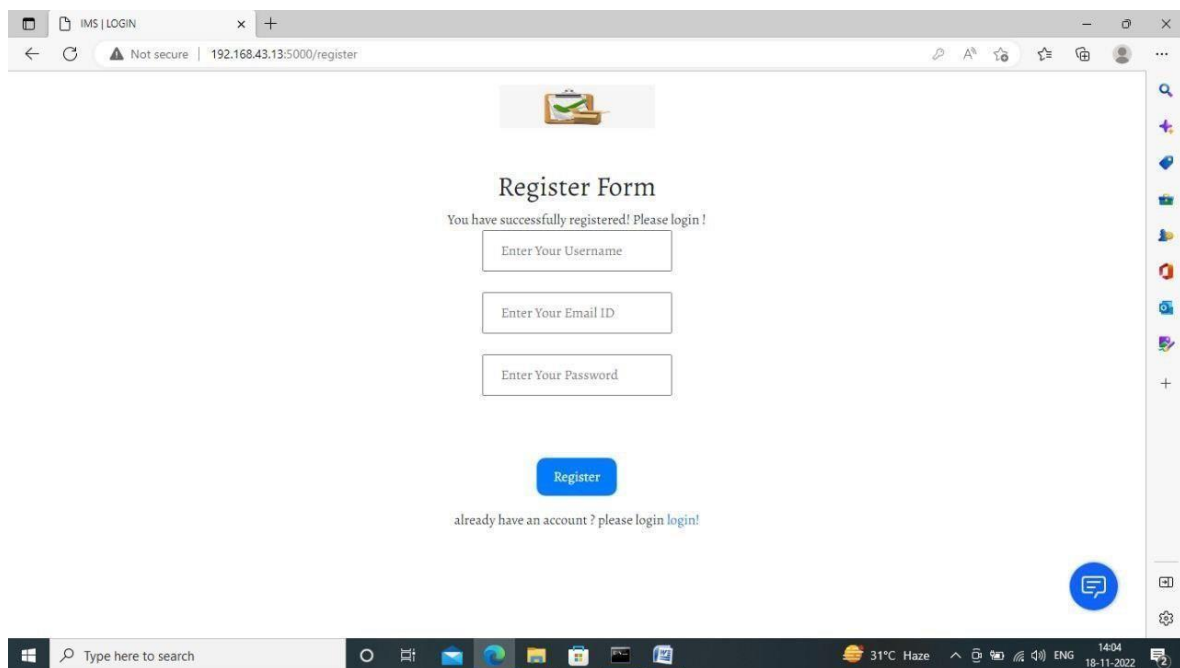
CODING & SOLUTIONING

7.1. FEATURE1



The screenshot shows a web browser window with the title "IMS | LOGIN". The address bar displays the file path "D:/Source%20Code/Source%20Code/templates/login.html". The page features a login form with a header icon of a clipboard with a checkmark. The form includes a text input field containing "Venkatesh J", a password input field with masked characters "*****", and a blue "Login" button. Below the button, a message reads "Don't have an account yet? Click here to [register!](#)". The browser's right sidebar shows various extension icons, and a blue chat bubble icon is visible in the bottom right corner.

7.2. FEATURE 2



The screenshot shows a web browser window with the title "IMS | LOGIN". The address bar displays the URL "192.168.43.13:5000/register" with a "Not secure" warning. The page features a register form with a header icon of a clipboard with a checkmark. The form includes a message "You have successfully registered! Please login!", three text input fields labeled "Enter Your Username", "Enter Your Email ID", and "Enter Your Password", and a blue "Register" button. Below the button, a message reads "already have an account ? please login [login!](#)". The browser's right sidebar shows various extension icons, and a blue chat bubble icon is visible in the bottom right corner. The Windows taskbar at the bottom shows the search bar, task view, and several application icons, along with system tray information including "31°C Haze", "ENG", and the date "18-11-2022".

7.3. DATABASE SCHEMA

The screenshot shows a web browser window with the address bar displaying "192.168.43.13:5000/view_stock". The page has a blue sidebar on the left with the following menu items: "Add stock", "Update stock details", "View stock", "Delete stock", and "Log out". The main content area displays a table with the following data:

Product name	Item quantity	Warehouse location
tomoto	9	Chennai
milk	20	Chennai

At the bottom right of the page, there is a blue chat bubble with the text: "Hi! I'm a virtual assistant. How can I help you today?". The Windows taskbar at the bottom shows the search bar, taskbar icons, system tray with weather (31°C Haze), and the date/time (14:08, 18-11-2022).

8. TESTING

8.1. TEST CASE

Features to be tested	Test Description
Login to the system	This tests the login interface of the system.
Adding a Recipe to database	This test is conducted to verify if a recipe is successfully added to the database. This will check if the recipe is added to its header table and also check if the recipe details are added to the recipe details table.
Adding an Ingredient to database	This tests checks if new ingredient is added correctly to the database with the specified details.
Adding a Vendor to the database	This test checks if the newly added vendor is correctly added to the database with the specified details.
Checking the threshold levels	This test is conducted to verify if the ingredients that are below the threshold levels are listed by the function when called by the user. The verification is done by referring to the database.
Updating the sales for the day	This test is conducted to test the sales update in the database. The test checks if the database is updated with the correct ingredient values based on the sales data input to the system.
Updating the order reception to database	This test is conducted to test the correct updating of the database after receiving the order from the vendor.
Create Orders	This test is conducted to check the order creation capability of the system. The list of ingredients that is generated for order must comply with the set conditions of threshold levels

8.2. USER ACCEPTANCE TESTING

Test case: Testing the Add Recipe Interface and its functioning

Case 1: Testing the Quantity input field.

Case 2: Testing the Recipe Name field.

Case 3: Testing the Ingredients in recipe list and Quantity of ingredient list.

Case 4: Testing the available ingredients list.

Case 5: Testing the all the above cases together and checking if the entries are updated to the tables in database.

Test Case: Check Threshold Interface

Case 1: Check if the ingredients under the threshold values are shown in the ingredients below threshold list.

Case 2: Check if the Create order button asks the user to enter values for all the ingredients listed under the ingredients below threshold list.

Case 3: Check if pressing the Process Order button creates a file with the order details in it.

Test Case: Testing the Update after sales interface

Case 1: Test the Recipe list box.

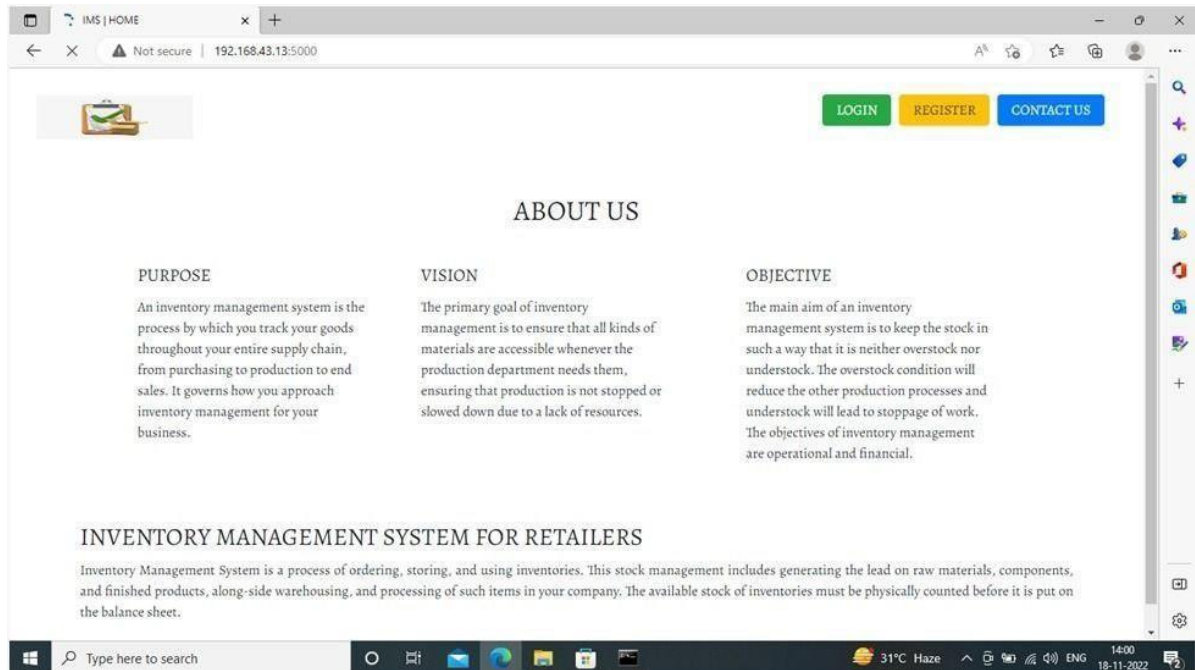
Case 2: Test the quantity text field.

Case 3: Test the recipe sold list box quantity sold list box.

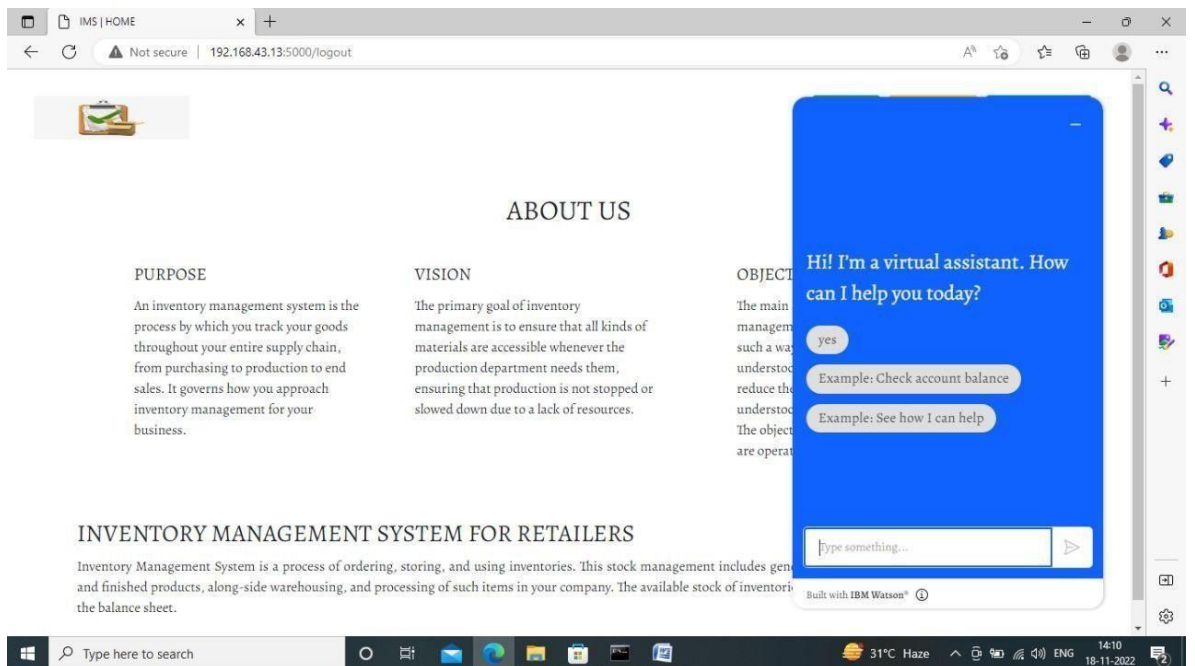
Case 4: Test if the details are updated to the database when requested.

9. RESULTS

HOME PAGE



HOME PAGE WITH VIRTUAL ASSISTANT



REGISTRATION FORM

Register Form

[[msg]]

Venkatesh J

venkateshw2397@gmail.com

Register

already have an account ? please login [login!](#)

REGISTRATION SUCCESSFULLY

Register Form

You have successfully registered! Please login!

Enter Your Username

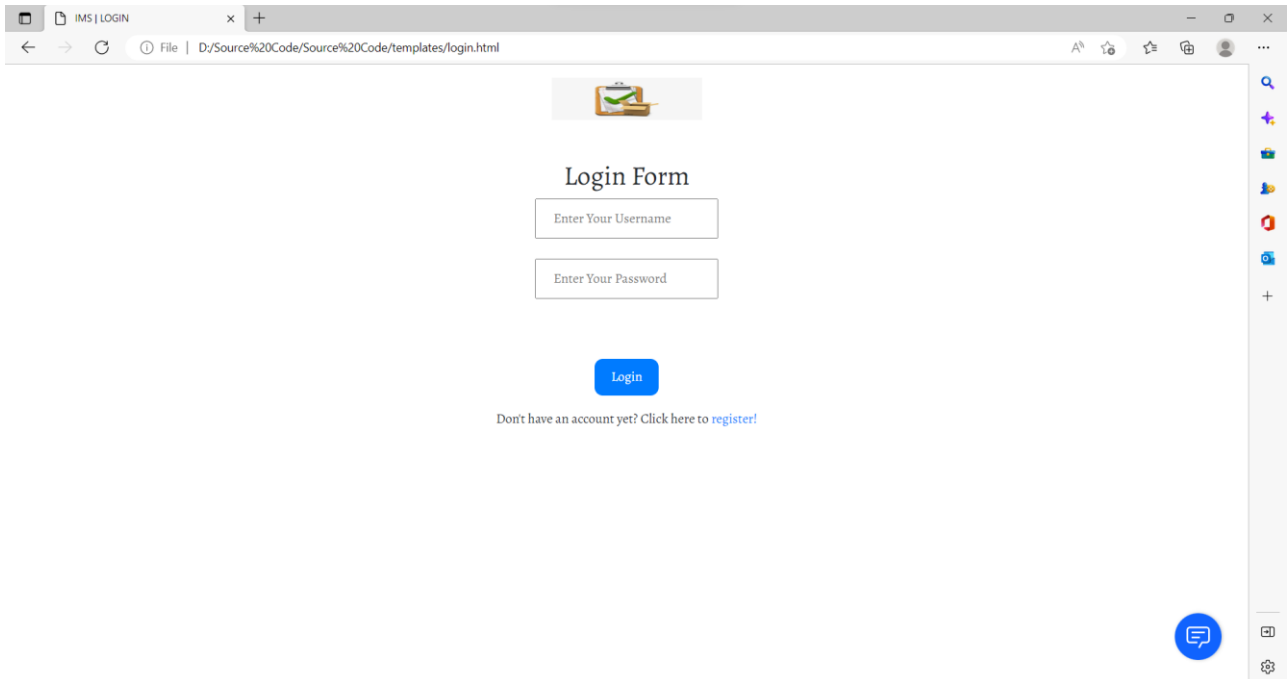
Enter Your Email ID

Enter Your Password

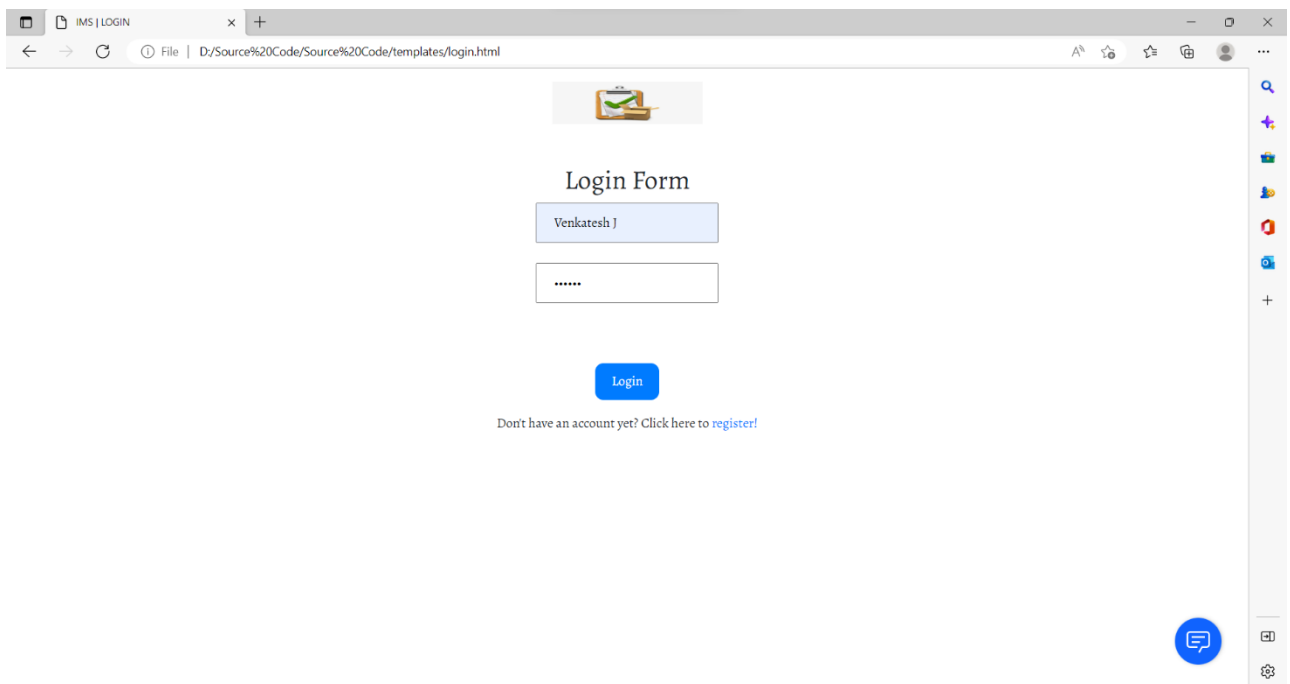
Register

already have an account ? please login [login!](#)

LOGIN FORM

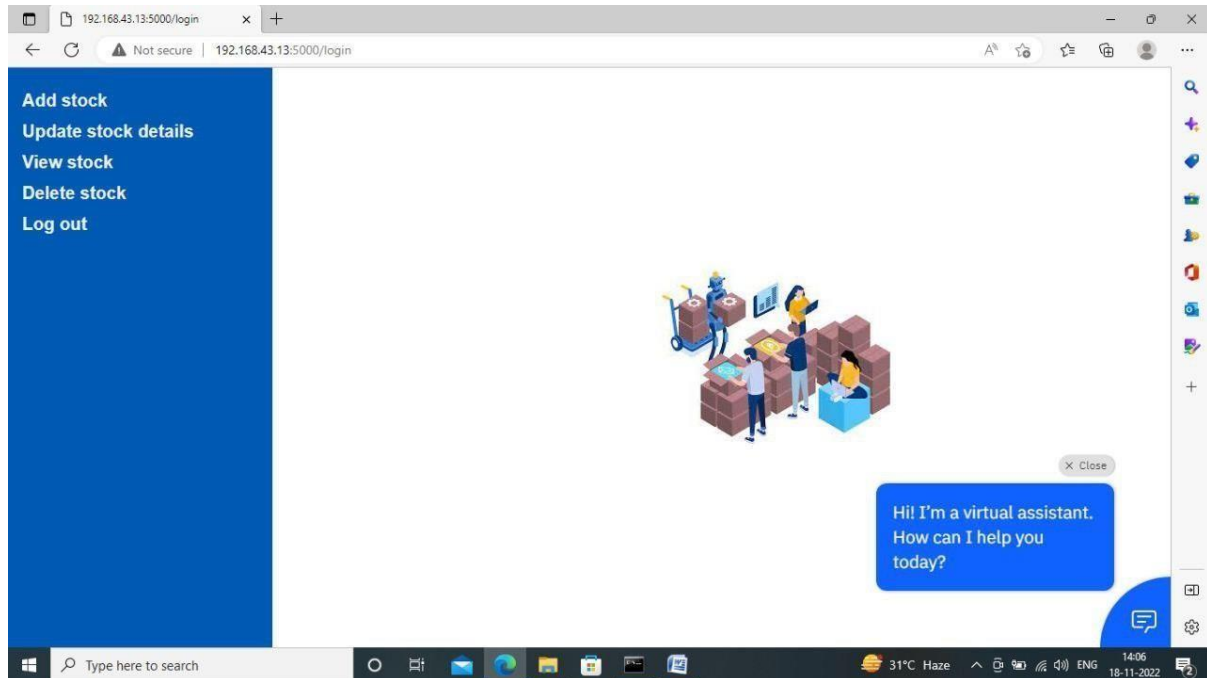


A screenshot of a web browser window displaying a login form. The browser's address bar shows the file path: `D:/Source%20Code/Source%20Code/templates/login.html`. The page features a header with the text "IMS | LOGIN" and a plus sign icon. Below the header, there is a logo of a laptop with a green checkmark. The main heading is "Login Form". The form consists of two input fields: "Enter Your Username" and "Enter Your Password". Below these fields is a blue "Login" button. At the bottom, there is a link that says "Don't have an account yet? Click here to [register!](#)". The browser's sidebar on the right shows various application icons.

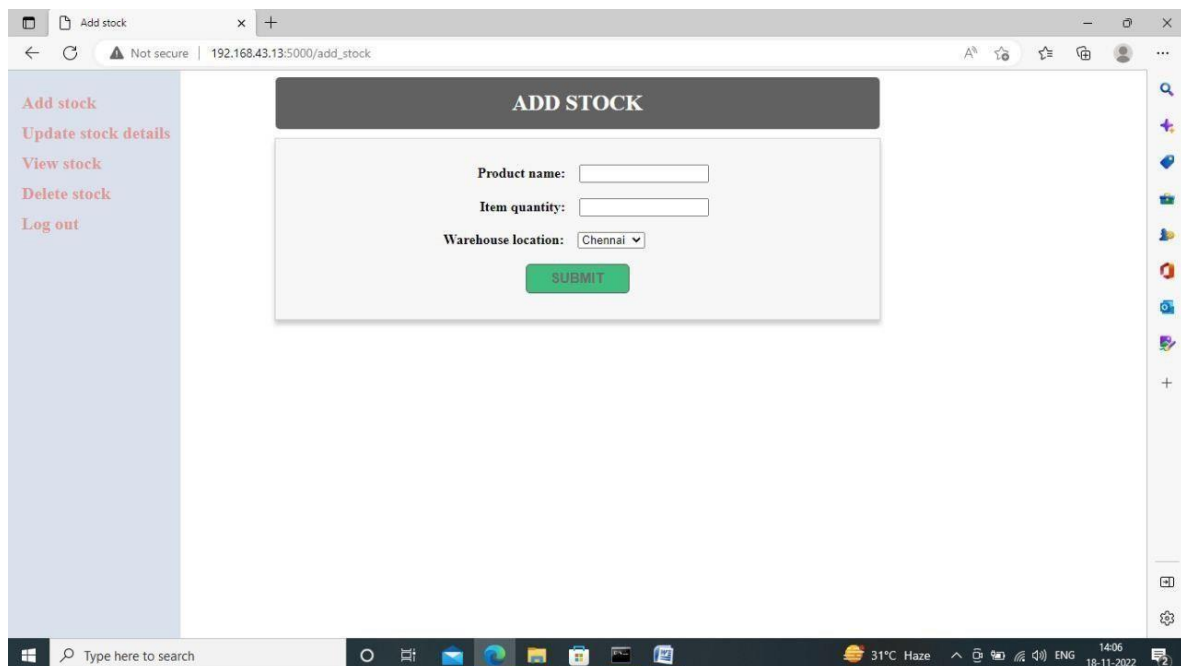


A screenshot of a web browser window displaying the same login form as above, but with user input. The "Enter Your Username" field now contains the text "Venkatesh J". The "Enter Your Password" field contains six dots, indicating masked text. The "Login" button remains blue. The rest of the page, including the header, logo, and footer link, is identical to the previous screenshot.

DASHBOARD



ADDSTOCK



VIEW STOCK

The screenshot shows a web browser window with the address bar displaying '192.168.43.13:5000/view_stock'. The page has a blue sidebar on the left with the following menu items: 'Add stock', 'Update stock details', 'View stock' (which is highlighted), 'Delete stock', and 'Log out'. The main content area displays a table with the following data:

Product name	Item quantity	Warehouse location
tomoto	9	Chennai
milk	20	Chennai

In the bottom right corner, there is a blue chat bubble with the text: 'Hi! I'm a virtual assistant. How can I help you today?'. The Windows taskbar at the bottom shows the search bar, task icons, and system tray information including '31°C Haze', 'ENG', and the date '18-11-2022'.

UPDATE STOCK

The screenshot shows the 'UPDATE STOCK' form in the web application. The browser address bar shows '192.168.43.13:5000/update'. The blue sidebar on the left contains the same menu as the previous screen, with 'Update stock details' now highlighted. The main form area has a title 'UPDATE STOCK' and contains the following fields:

- 'Product name:' with a text input field containing 'milk'.
- 'Item quantity:' with a numeric input field containing '20'.
- 'Warehouse location:' with a dropdown menu showing 'Chennai'.
- An 'UPDATE' button below the fields.

The virtual assistant chat bubble is also present in the bottom right corner. The Windows taskbar at the bottom is identical to the previous screenshot.

UPDATESTOCKDETAILS

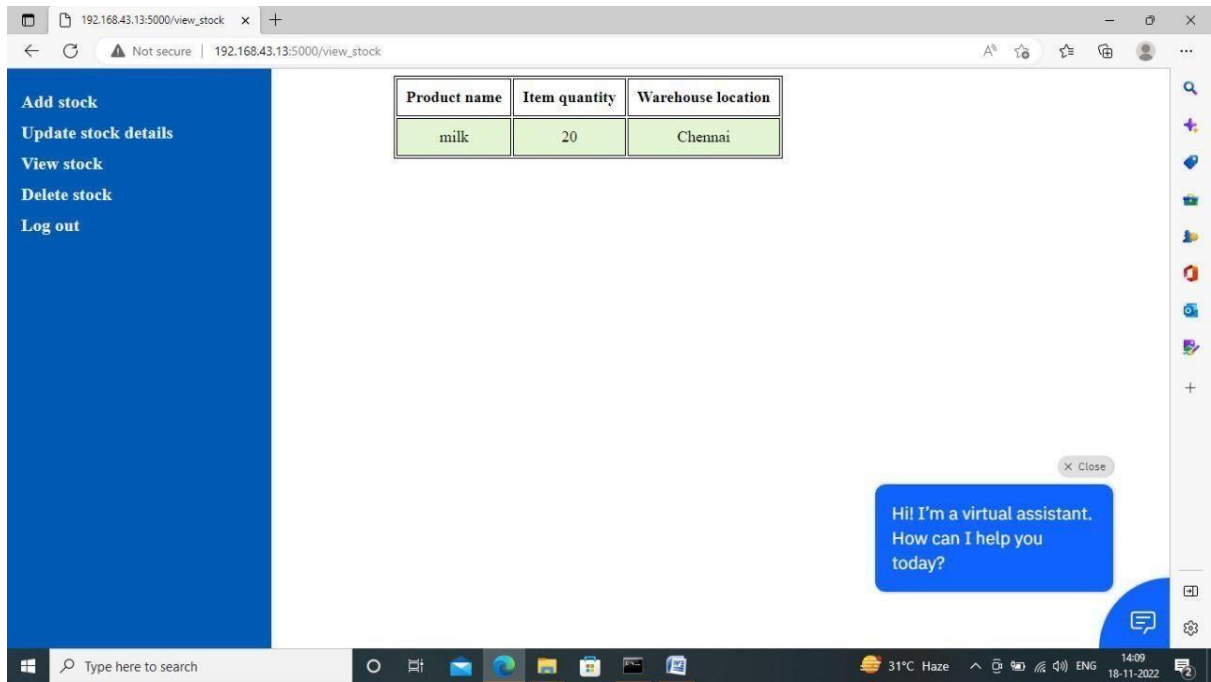
The screenshot shows a web browser window with the address bar displaying '192.168.43.13:5000/view_stock'. The page has a blue sidebar on the left with the following menu items: 'Add stock', 'Update stock details', 'View stock', 'Delete stock', and 'Log out'. The main content area displays a table with the following data:

Product name	Item quantity	Warehouse location
tomoto	9	Chennai
milk	20	Chennai

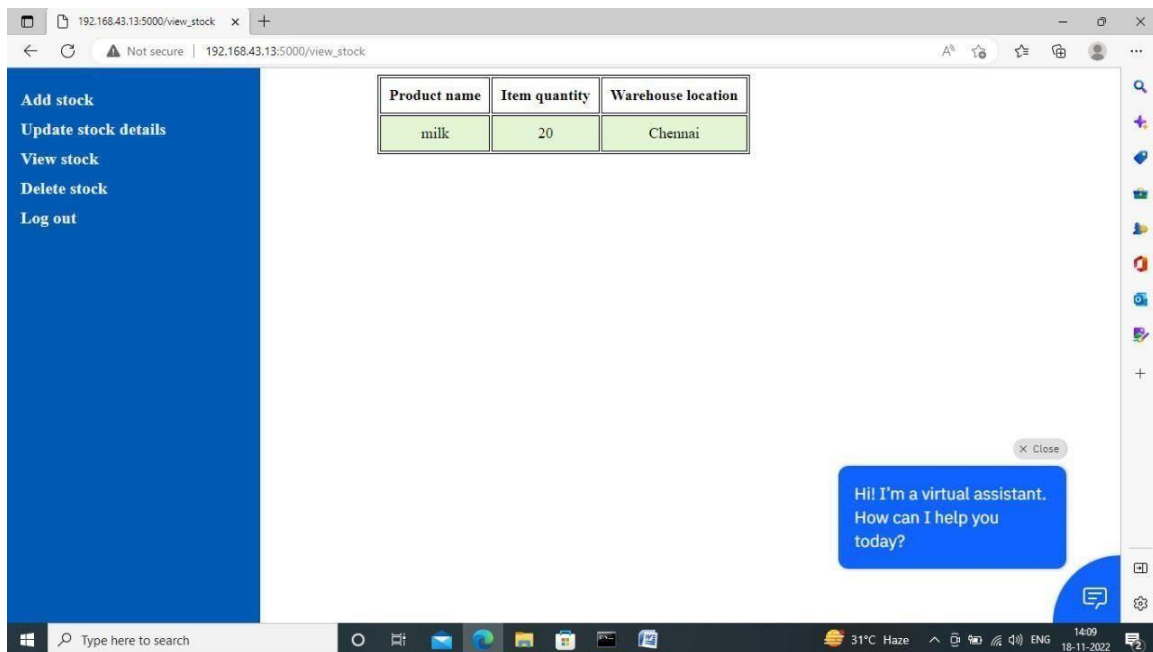
In the bottom right corner, there is a blue chat bubble with the text: 'Hi! I'm a virtual assistant. How can I help you today?'. The Windows taskbar at the bottom shows the search bar, task view button, and several application icons. The system tray on the right indicates a temperature of 31°C, 'Haze' weather, and the date '18-11-2022'.

DELETE STOCK

The screenshot shows a web browser window with the address bar displaying '192.168.43.13:5000/delete'. The page has a blue sidebar on the left with the following menu items: 'Add stock', 'Update stock details', 'View stock', 'Delete stock', and 'Log out'. The main content area features a 'Delete stock' form with a grey header bar. The form contains a 'Product name:' label, a text input field with 'tomoto' entered, and a blue 'DELETE' button. In the bottom right corner, there is a blue chat bubble with the text: 'Hi! I'm a virtual assistant. How can I help you today?'. The Windows taskbar at the bottom shows the search bar, task view button, and several application icons. The system tray on the right indicates a temperature of 31°C, 'Haze' weather, and the date '18-11-2022'. A status bar at the bottom of the application window displays the text: 'Waiting for integrations.au-syd.assistant.watson.appdomain.cloud...'.



LOGOUT



9.1. PERFORMANCE METRICS

Inventory Performance is a measure of how effectively and efficiently inventory is used and replenished. The goal of inventory performance metrics is to compare actual on-hand dollars versus forecasted cost of goods sold. Many Lean practitioners claim that inventory performance is the single best indicator of the overall operational performance of a facility. Inventory performance looks at and is measured using either Inventory Days OnHand (DOH) or Inventory Turns.

- **Inventory Days On-Hand:** The number of days it would take to consume current on-hand inventory. Always measure multiple inventory item numbers in terms of currency (i.e., COGS).
- **Inventory Turns:** The number of times inventory is replaced in a year.

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES

1. It helps to maintain the right amount of stocks: contrary to the belief that is held by some people, inventory management does not seek to reduce the amount of inventory that you have in stock, however, it seeks to maintain an equilibrium point where your inventory is working at a maximum efficiency and you do not have to have many stocks or too few stocks at hand at any particular point in time. The goal is to find that zone where you are never losing money in your inventory in either direction. With the aid of an efficient inventory management strategy, it is easy to improve the accuracy of inventory order.

2. It leads to a more organized warehouse: with the aid of a good inventory management system, you can easily organize your warehouse. If your warehouse is not organized, you will find it very difficult to manage your inventory. A lot of businesses choose to optimize their warehouse by putting the items that have the highest sales together in a place that is easy to access in the warehouse. This ultimately helps to speed up order fulfilment and keeps clients happy.

DISADVANTAGES

1. Bureaucracy: even though inventory management allows employees at every level of the company to read and manipulate company stock and product inventory, the infrastructure required to build such a system adds a layer of bureaucracy to the whole process and the business in general. In instances where inventory control is in-house, this includes the number of new hires that are not present to regulate the warehouse and facilitate transactions. In instances where the inventory management is in the hands of a third party, the cost is a subscription price and a dependence on another separate company to manage its infrastructure. No matter the choice you go for, it translates to a higher overhead cost and more layers of management between the owner and the customer. From the view point of the customer, a problem that requires senior management to handle will take a longer period of time before it will be trashed out.

2. Impersonal touch: another disadvantage of inventory management is a lack of personal touch. Large supply chain management systems make products more accessible across the globe and most provide customer service support in case of difficulty, but the increase in infrastructure can often mean a decrease in the personal touch that helps a company to stand out above the rest. For instance, the sales manager of a small manufacturing company that sells plumbing supplies to local plumbers can throw in an extra box of washers or elbows at no charge to the customer without raising any alarms. This is done for the sake of customer relations and often makes the customer feel like he is special. While free materials can also be provided under inventory management, processing time and paper work make obtaining the material feel more like a chore for the customer or even an entitlement.

11. CONCLUSION

The project “Inventory Management System for Retailers” mainly as the name suggests deals with the calculation of the available and processed resources for an accurate inventory control and process management for a domain specific client who are related to the subject of food chains/outlets. This enables the inventory to be applied at every level in the hierarchy of the products and its complex combinations of recipes. A system that accurately calculates the atomic ingredients used for making a recipe then automatically performs the back end operation pertaining to a database of many relational tables onto which the changes are being made with each and every operation performed on the front end and which also shows up if at the time of retrieval. The most important part of Inventory controlling is its ability to check for threshold levels and alert the manager to replenish the stock before it reaches a danger zone. So as when an ingredient level goes below the threshold level then it routes an alert to the manager. Then if needed accordingly an automated order form is produced so as to each specific vendor along with the quantities needed for replenishment. As a part of the standard maintaining a drill of risk management is done in order to sustain during the days of special occasion or holidays when the demand reaches to rather more different scale as compared to other days. These occasions call on for special inclusions into the menu which reflects on the recipes and in turn reflects the ingredients being used up eventually. Thus, was provided the liberty of adding special recipe to the menu for some special occasion and is regarded as a key feature.

12. FUTURE SCOPE

- The Fourth Industrial Revolution will continue to drive technological change that will impact the way that we manage inventories.
- Successful companies will view inventory as a strategic asset, rather than an aggravating expense or an evil to be tolerated.
- Collaboration with supply chain partners, coupled with a holistic approach to supply chain management, will be key to effective inventory management.

App.py

```
from flask import Flask, render_template, request, redirect, url_for, session,
flash
import ibm_db
import sqlite3 as sql
import re

app = Flask(name)

app.secret_key = 'a'

conn = ibm_db.connect("DATABASE=bludb;HOSTNAME=1bbf73c5-d84a-
4bb0-85b9-
ab1a4348f4a4.c3n41cmd0nqnrk39u98g.databases.appdomain.cloud;PORT=322
86;SECURITY=SSL;SSLServerCertificate=DigiCertGlobalRootCA.crt;UID=w
jy24066;PWD=3w6H3sui635KMvWX",",")
print(conn)
print("Connecting Successful!!!!!!!!!!")

@app.route('/')

def homer()
    return render_template('home.html')

@app.route('/login',methods=['GET', 'POST'])
def login():
```

```

global userid
msg = "

if request.method == 'POST' :
    username = request.form['username']
    password = request.form['password']
    sql = "SELECT * FROM users WHERE username =? AND password=?"
    stmt = ibm_db.prepare(conn, sql)
    ibm_db.bind_param(stmt,1,username)
    ibm_db.bind_param(stmt,2,password)
    ibm_db.execute(stmt)
    account = ibm_db.fetch_assoc(stmt)
    print (account)
    if          account:
        session['loggedin'] = True
        session['id'] = account['USERNAME']
        userid= account['USERNAME']
        session['username'] = account['USERNAME']
        msg = 'Logged in successfully !'
        return render_template('dashboard.html', msg = msg)
    else:
        msg = 'Incorrect username / password !'
    return render_template('login.html', msg = msg)

@app.route('/register', methods =['GET', 'POST'])
def registet():
    msg = "
    if request.method == 'POST' :

```

```

username = request.form['username']
email = request.form['email']
password = request.form['password']
sql = "SELECT * FROM users WHERE username =?"
stmt = ibm_db.prepare(conn, sql)
ibm_db.bind_param(stmt,1,username)
ibm_db.execute(stmt)
account = ibm_db.fetch_assoc(stmt)
print(account)
if account:
    msg = 'Account already exists !'
elif not re.match(r'^@]+@^[^@]+\.[^@]+', email):
    msg = 'Invalid email address !'
elif not re.match(r'[A-Za-z0-9]+', username):
    msg = 'name must contain only characters and numbers !'
else:
    insert_sql = "INSERT INTO users VALUES (?, ?, ?)"
    prep_stmt = ibm_db.prepare(conn, insert_sql)
    ibm_db.bind_param(prepare_stmt, 1, username)
    ibm_db.bind_param(prepare_stmt, 2, email)
    ibm_db.bind_param(prepare_stmt, 3, password)
    ibm_db.execute(prepare_stmt)
    msg = 'Please fill out the form !'
if request.method == 'POST':
    msg = 'You have successfully registered! Please login !'
return render_template('register.html', msg = msg)

@app.route('/add_stock',methods=['GET','POST'])

```

```

def add_stock():
    msg=""
    if request.method == "POST":
        prodname=request.form['prodname']
        quantity=request.form['quantity']
        warehouse_location=request.form['warehouse_location']
        sql='SELECT * FROM product WHERE prodname =?'
        stmt = ibm_db.prepare(conn, sql)
        ibm_db.bind_param(stmt,1,prodname)
        ibm_db.execute(stmt)
        acnt=ibm_db.fetch_assoc(stmt)
        print(acnt)

        if acnt:
            msg='Product already exists!!'
        else:
            insert_sql='INSERT INTO product VALUES (?,?,?)'
            pstmt=ibm_db.prepare(conn, insert_sql)
            ibm_db.bind_param(pstmt,1,prodname)
            ibm_db.bind_param(pstmt,2,quantity)
            ibm_db.bind_param(pstmt,3,warehouse_location)
            ibm_db.execute(pstmt)
            msg='You have successfully added the products!!'
            return render_template("dashboard.html")

    else:
        msg="fill out the form first!"
        return render_template('add_stock.html',msg=msg)

```

```

@app.route('/delete_stock',methods=['GET','POST'])
def delete_stock():
    if(request.method=="POST"):
        prodname=request.form['prodname']
        sql2="DELETE FROM product WHERE prodname=?"
        stmt2 = ibm_db.prepare(conn, sql2)
        ibm_db.bind_param(stmt2,1,prodname)
        ibm_db.execute(stmt2)

        flash("Product Deleted", "success")

    return render_template("dashboard.html")

```

```

@app.route('/update_stock',methods=['GET','POST'])
def update_stock():
    mg="
    if request.method == "POST":
        prodname=request.form['prodname']
        quantity=request.form['quantity']
        quantity=int(quantity)
        print(quantity)
        print(type(quantity))
        warehouse_location=request.form['warehouse_location']
        sql='SELECT * FROM product WHERE prodname =?'
        stmt = ibm_db.prepare(conn, sql)
        ibm_db.bind_param(stmt,1,prodname)
        ibm_db.execute(stmt)
        acnt=ibm_db.fetch_assoc(stmt)

```

```

print(acnt)

if acnt:
    insert_sql='UPDATE  product  SET  quantity=?,warehouse_location=?
WHERE prodname=? '
    pstmt=ibm_db.prepare(conn, insert_sql)
    ibm_db.bind_param(pstmt,1,quantity)
    ibm_db.bind_param(pstmt,2,warehouse_location)
    ibm_db.bind_param(pstmt,3,prodname)
    ibm_db.execute(pstmt)
    mg='You have successfully updated the products!!'
    limit=5 print(type(limit))
    if(quantity<=limit):
        ("Please update the quantity of the product {}, Atleast {} number of
pieces must be added!".format(prodname,10))
        return render_template("dashboard.html",meg=msg)

    else:
        mg='Product not found!!'

else:
    msg="fill out the form first!"
    return render_template('update_stock.html',meg=msg)

@app.route('/view_stock')
def view_stock():

    sql = "SELECT * FROM product"

```

```

stmt = ibm_db.prepare(conn, sql)
result=ibm_db.execute(stmt)
print(result)

products=[]
row = ibm_db.fetch_assoc(stmt)
print(row)
while(row):

products.append(row)
    row = ibm_db.fetch_assoc(stmt)
    print(row)
products=tuple(products)
print(products)

if result>0:
    return render_template('view.html', products = products)
else:
    msg='No products found'
    return render_template('view.html', msg=msg)

@app.route('/delete')
def delete():
    return render_template('delete_stock.html')

@app.route('/update')
def update():

```



```
return render_template('update_stock.html')
```

```
@app.route('/logout')
```

```
def logout():
```

```
    session.pop('loggedin', None)
```

```
    session.pop('id', None)
```

```
    session.pop('username', None)
```

```
    return render_template('home.html')
```

```
if name == 'main':
```

```
    app.run(host='0.0.0.0')
```

home.html

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<meta name="viewport" content="width=device-width, initial-scale=1">
```

```
<link    rel="stylesheet"    href="https://cdnjs.cloudflare.com/ajax/libs/font-  
awesome/4.7.0/css/font-awesome.min.css">
```

```
<style>
```

```
body {
```

```
    font-family: "Lato", sans-serif;
```

```
}
```

```
/* Fixed sidenav, full height */
```

```
.sidenav {  
    height: 100%;  
    width: 300px;  
    position: fixed;  
    z-index: 1;  
    top: 0;  
    left: 0;  
    background-color: #0059b3;  
    overflow-x: hidden;  
    padding-top: 20px;  
}
```

```
/* Style the sidenav links and the dropdown button */
```

```
.sidenav a{  
    padding: 6px 8px 6px 16px;  
    text-decoration: none;  
    font-size: 20px;  
    color: rgb(239, 239, 239);  
    display: block;  
    border: none;  
    background: none;  
    width: 100%;  
    text-align: left;  
    cursor: pointer;  
    outline: none;  
}
```

```
/* On mouse-over */
```

```
.sidenav a:hover{
  color: #111;
}
```

```
/* Some media queries for responsiveness */
```

```
@media screen and (max-height: 450px) {
  .sidenav {padding-top: 15px;}
  .sidenav a {font-size: 18px;}
}
```

```
</style>
```

```
</head>
```

```
<body>
```

> Deeps:

```
<div class="sidenav">
```

```
  <a href="{ {url_for('add_stock') } }"><strong>Add stock<strong></a>
```

```
  <a href="{ {url_for('update') } }"><strong>Update stock details<strong></a>
```

```
  <a href="{ {url_for('view_stock') } }"><strong>View stock<strong></a>
```

```
  <a href="{ {url_for('delete') } }"><strong>Delete stock<strong></a>
```

```
  <a href="{ {url_for('logout') } }"><strong>Log out<strong></a>
```

```
  </div>
```

```
<nav>
```

```
  <script>
```

```
    window.watsonAssistantChatOptions = {
```

```
      integrationID: "4bd6f313-33d4-4e87-8825-22b90b8e3c2c", // The ID of
this integration.
```

```
      region: "au-syd", // The region your integration is hosted in.
```

serviceInstanceID: "60e1396a-421f-4091-b39a-a23a546843e8", // The ID
of your service instance.

```
onLoad: function(instance) { instance.render(); }  
};  
setTimeout(function(){  
    const t=document.createElement('script');  
    t.src="https://web-  
chat.global.assistant.watson.appdomain.cloud/versions/" +  
(window.watsonAssistantChatOptions.clientVersion || 'latest') +  
"/WatsonAssistantChatEntry.js";  
    document.head.appendChild(  
});  
</script>  
</nav>  
  
</body>  
</html>
```

GITHUB:

<https://github.com/IBM-EPBL/IBM-Project-15012-1659593344>

DEMOLINK:

https://drive.google.com/file/d/136QYiBomgrO_m9vb3P1vZhKQIvK0xtSW/view?usp=share_link