

INVENTORY MANAGEMENT SYSTEM FOR RETAILERS

PROJECT REPORT

Domain	Cloud App Development
Team ID	PNT2022TMID29529
College	Arunai Engineering College

Department: Electronics And Communication Engineering

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INTRODUCTION

1. Project Overview:

The project Inventory Management System is a complete desktop based application designed on .Net technology using Visual Studio Software. The main aim of the project is to develop Inventory Management System Model software in which all the information regarding the stock of the organization will be presented. It is an intranet based desktop application which has admin component to manage the inventory and maintenance of the inventory system.

This desktop application is based on the management of stock of an organization. The application contains general organization profile, sales details, Purchase details and the remaining stock that are presented in the organization. There is a provision of updating the inventory also. This application also provides the remaining balance of the stock as well as the details of the balance of transaction.

Each new stock is created and entitled with the named and the entry date of that stock and it can also be update any time when required as per the transaction or the sales is returned in case. Here the login page is created in order to protect the management of the stock of organization in order to prevent it from the threads and misuse of the inventory.

2. Purpose:

The main purpose of Inventory Management is to help businesses easily and efficiently manage the ordering, stocking, storing, and using of inventory. By effectively managing your inventory, you will always know what items are in stock, how many of them are, and where they are located. The primary purpose is to ensure there is enough goods are materials to meet demand without creating over stock, or excess inventory.

LITERATURE SURVEY

1. Existing problem

Beyond having too little or too much inventory, poor inventory management causes inefficiencies because you don't have accurate real-time information on how much inventory you have. This increases the risk of mistakes in reordering inventory from suppliers or of selling nonexistent inventory.

In inventory systems, demand is usually uncertain, and the lead-time can also vary. To avoid shortages, managers often maintain a safety stock. In such situations, it is not clear what order quantities and reorder points will minimize expected total inventory cost. Simulation models can address this question.

2. References

The following Books were used as references for the Project and preparing this Project Report:

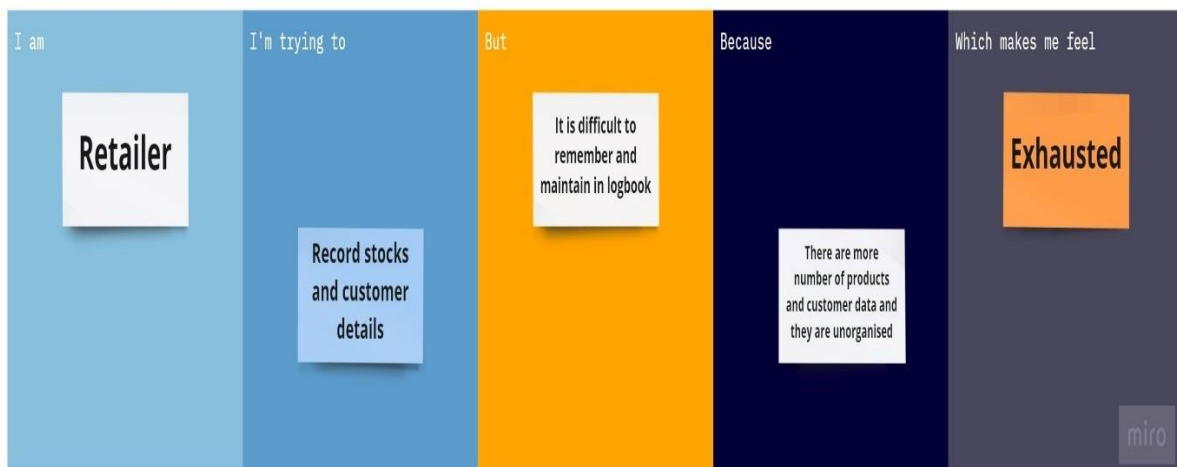
1. Cost Accounting-Board of studies, The Institute of Chartered Accountants of India
2. Management and Production Planning- By Michael Vaz, Vinayak Paralikar
3. Beginning VB.NET 2003 (Third Edition)- By Thearon Willis, Richard Blair
4. Visual Basic .NET 2003 Programming – Black Book- By Steven Holzner
5. SQL Server 2000 Bible- By Paul Nielsen
6. SQL Server 2000 Unleashed - By Paul Bertucci, Ray Rankins

The following Websites were used as references for the Project and preparing this Project Report:

1. www.startvbdotnet.com
2. www.sql-server-helper.com

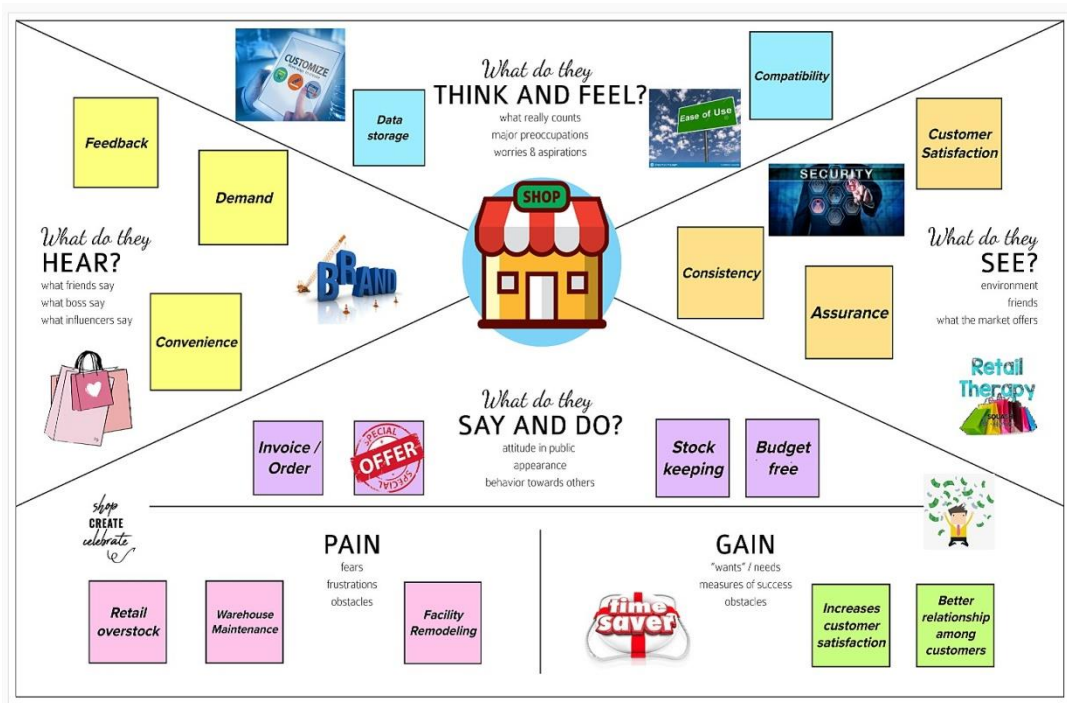
3. Problem Statement Definitions:

Nowadays, in an era that has advanced technology and a place in the world. Everything can be linked only at your fingertips in the times of rapidly developing with the sophisticated technology of today. Therefore, an inventory system is also not lagging behind in introducing a method of keeping an inventory data systematically and safely. The system plays a very important role in improving the competitiveness of a business. Usually, organizations today face too many challenges to achieve the cost, speed and reliability. Efficient inventory system really help in order to make sure the store's performance and data record is always in good condition and secured from abusers. The company problem is they using chaos system developed, the company can manage their inventory data easily, quickly and more secured.

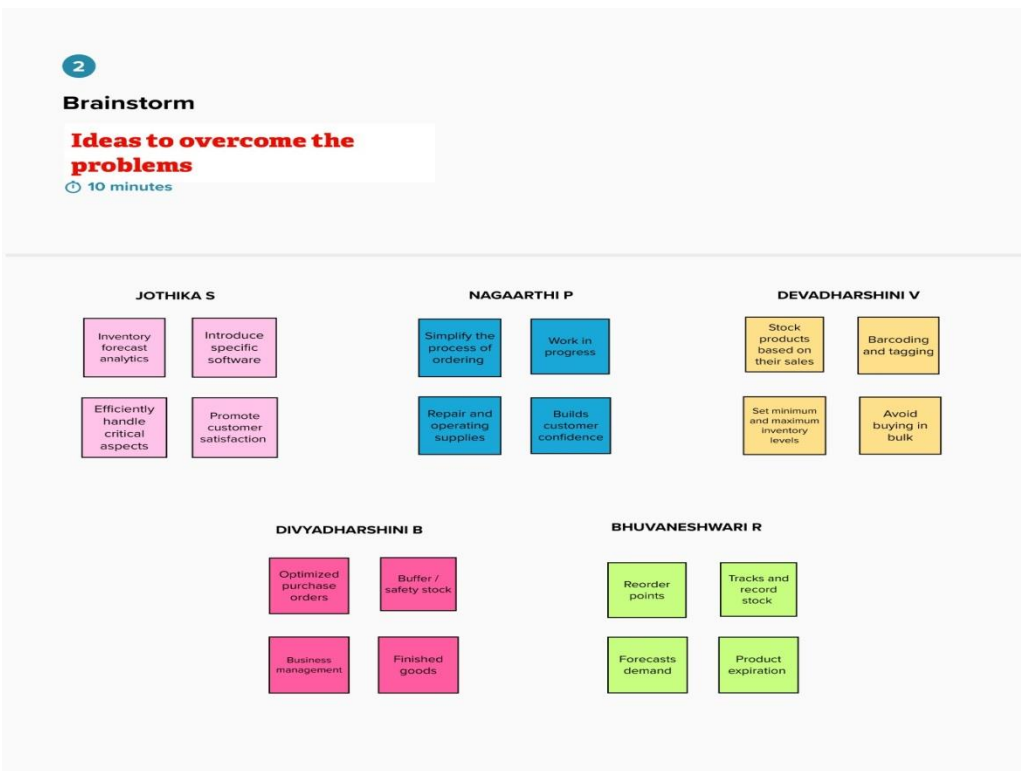


3. IDEATION & PROPOSED SOLUTION

1. Emapathy Map curve



2. Ideation & Brainstorming



3

Group ideas

Build informal connections with peers

20 minutes

Creating a inventory management app



Organize the data in that app

Set up the barcode scanner

Calculate the real time inventory level

Display "Restock needed" for low inventory products

Monitoring the inventory levels



Set stock levels for individual products

Do regular and accurate stock counts

Combine sales and inventory data

Schedule times to review data and place orders

Updating Inventory levels



Recording the stock levels

Checking for restock

Reorder the stocks

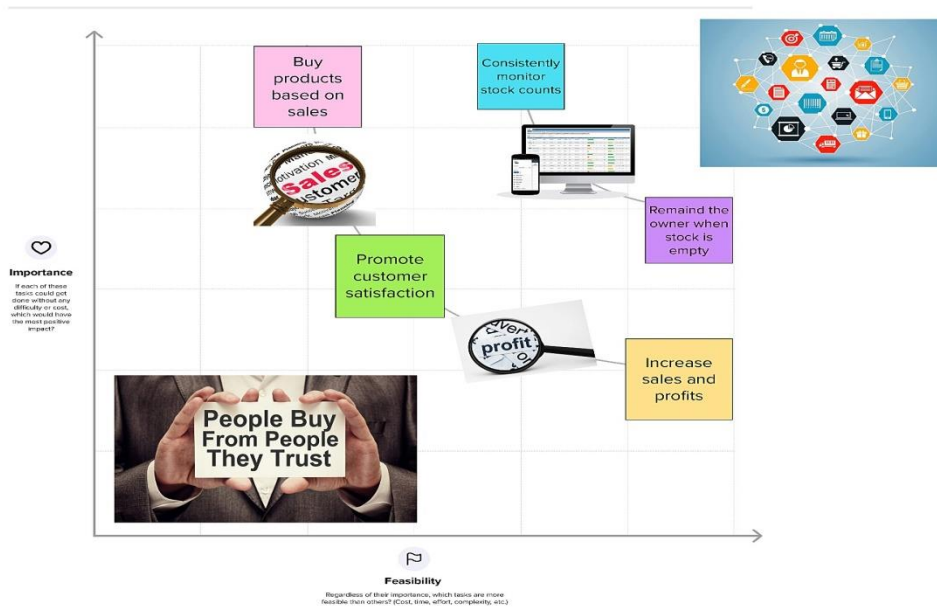
Repeat the process

4

Prioritize

Make schedules visible and transparent

20 minutes



3. Proposed Solution

1. Problem Statement (problem to be solved)

Irrespective of the size of the business, inventory management is one of the most challenging processes in the retail sector. In this industry, the efficiency of inventory management directly impacts customer satisfaction.

2. Idea/Solution description

- The best solution for these problems is to create software that has helped many retail companies address their stock management challenges.
- Manual processing is error-prone, especially in complicated processes like inventory management.
- Retail inventory management software can ease the pain of the process. It also improves overall accuracy and business productivity.

3. Novelty/Uniqueness

- The system is inappropriate for the firm and thus, needs improvement. The firm can apply a fixed time-period inventory in which reorder is placed at pre-determined intervals.
- This particular system is appropriate in a situation where customers make routine visits.

4. Social Impact/Customer satisfaction

- In this competitive business environment costs, control serves as an important instrument to remain competitive in the market.
- In such an environment, inventory management ensures control over customer's demands thereby resulting in customer satisfaction and increase financial performance.

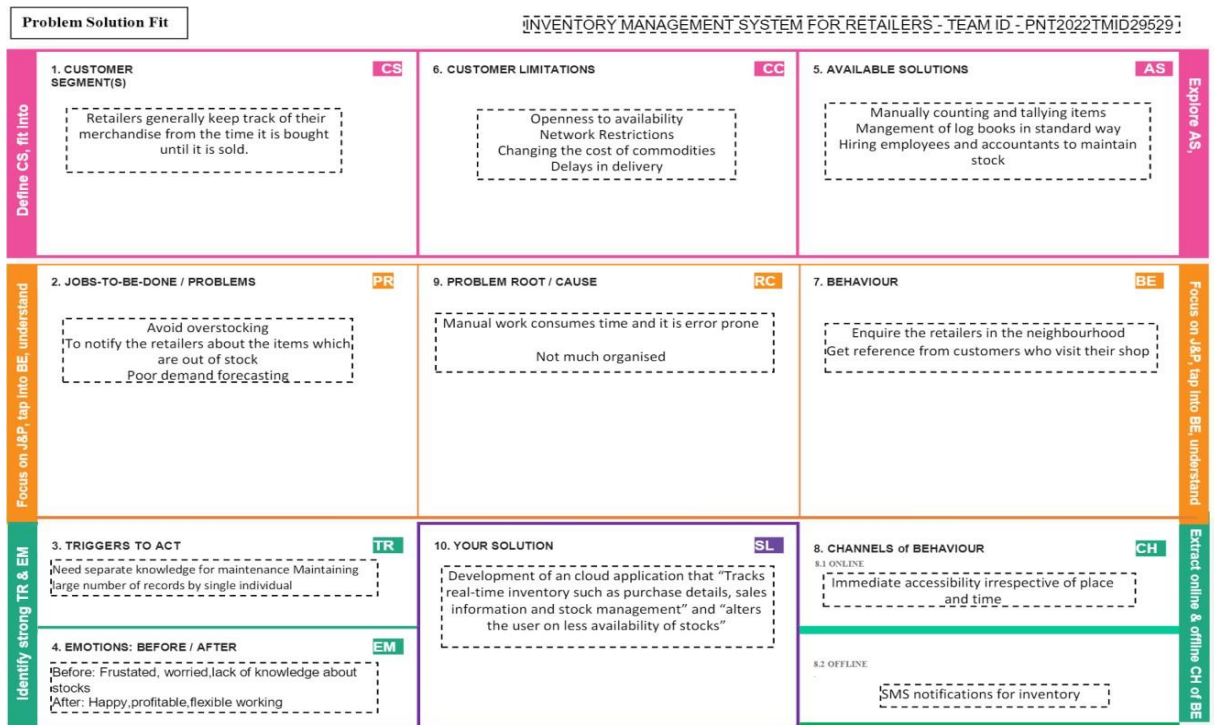
5. Business Model (Revenue Model)

- Inventory management is a systematic approach to sourcing, storing, and selling inventory—both raw materials(components) and finished goods (products).
- In business terms, inventory management means the right stock, at the right levels, in the right place, at the right time, and at the right cost as well as price.

6. Scalability of theSolution

- To increase the scalability of your business, we should use an automatedinventory management system for inventory tracking.
- This will make the business much more scalable so that we can continue building consistent growth and take advantage of increased stocks.

4. Problem Solution fit



4. REQUIREMENT ANALYSIS

1. Functional requirements:

IDENTIFIER	REQUIREMENTS
1. Add stockdetails	This applicationwill allow addstock details.
2. Delete stockdetails	This application will allow the delete stockdetails.
3. Categories of Stock	The categories of stock willbe able to be separated using thisapplication.
4. View of Dashboard	Application will allow user to view thedashboard containing stock details.
5. Mail Notification	This applicationwill allow to send mail notification to retailers when the minimum stock limit is reached.
6. Tracking System	The stock can be trackedwith this application.
7. Graph analysis	This application willdemonstrate sales patternanalysis.
8. Identifying most valuable stock	The most valuable stock for each individualretailer will be shown via this application.
9. Identifying leastvaluable stock	The least valuable stock for eachindividual retailer will be shownvia this application.
10. Display of expired stocks	This application will displaythe expired stocks to the particular retailer.
11. Passcode	This applicationhas the option to set a passcode for security.
12. Add multiple accounts	This application has the option of creating multiple accounts for the users.
13. Selection of stock report duration	This applicationhas the abilityto select the duration for displaying the stock report.
14. Update account	This applicationwill allow theuser/retailer to update their profile.
15. Add account	This application will allow the user/retailer toadd their profile.
16. Delete account	This application willallow the user/retailer to delete theirprofile.
17. PDF report	This application willgenerate the pdf report of sales patternanalysis.
18. Updation of salestrends	This application willallow constant review of sales trends and updation.

2. Non-functional requirements

❖ Performance

Easy tracking of records and updating can be done. All the requirements regarding to performance characteristics of the system are specified in the section below. There are two types of requirements.

A.Static Requirements

Number of terminals: The software makes use of underlying database that will reside at the same system, while the front end will be available to the administrative computer.

B. Dynamic Requirements

These specify constraints on the execution characteristics of the system they typically include response me and throughout of the system.

❖ 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.

❖ 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.

❖ Security

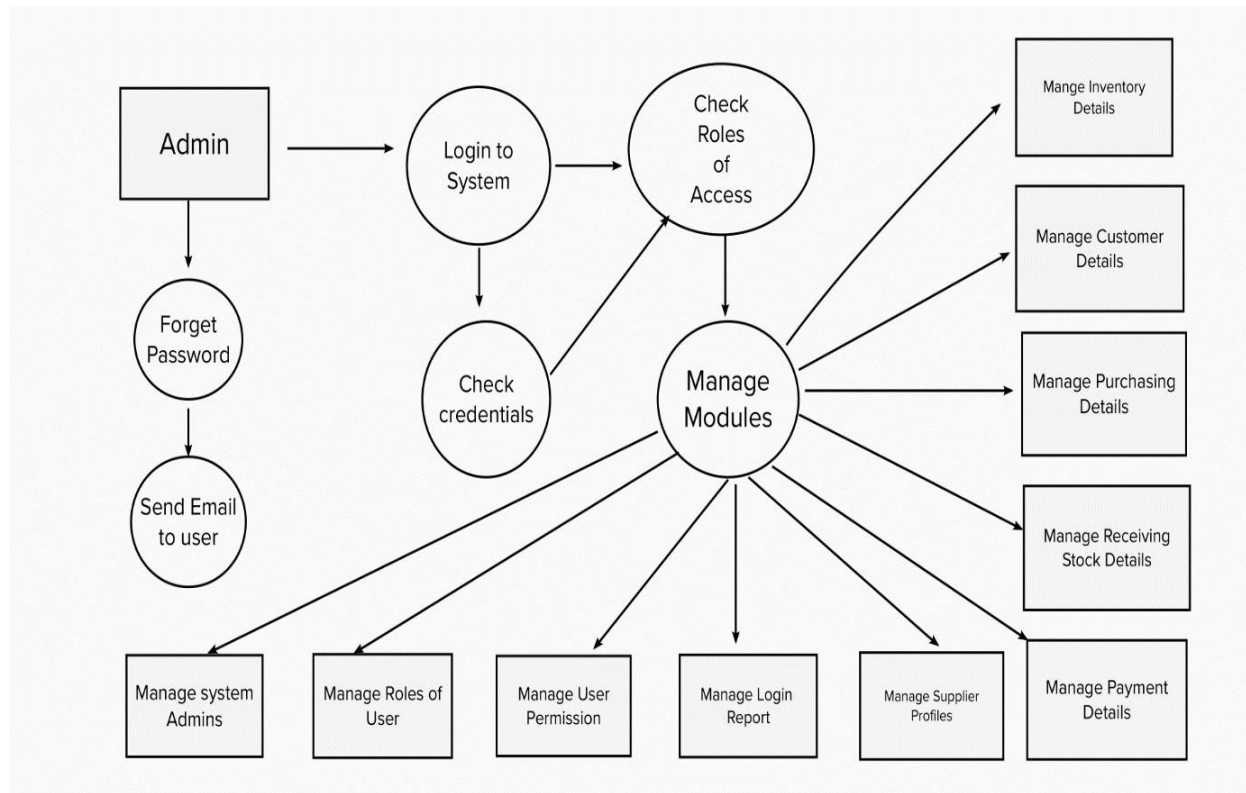
The security requirements deal with a primary security.

❖ Maintability

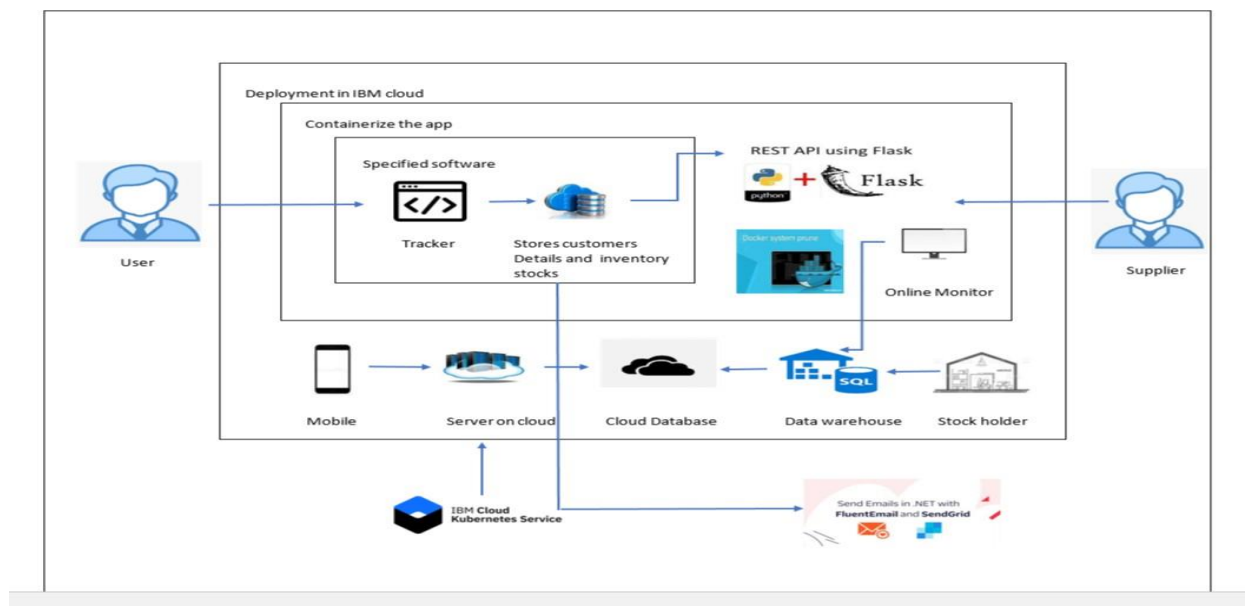
Backups for database are available.

5. PROJECT DESIGN

1. Data flow diagram



2. Solution and Technical Architecture



3. User stories

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 and access the dashboard with Gmail login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can register and access the dashboard with email and password	High	Sprint-1
	Dashboard	USN-6	As a user, I can view the stock availability status	I can view the stock availability status	High	Sprint-2
		USN-7	As a user, I can view the orders status	I can view the order status	Medium	Sprint-3
		USN-8	As a user, I can view the shipping tracking status	I can view the shipping tracking status	Medium	Sprint-4
	Alerts	USN-9	As a user, I should receive alerts on stock availability if it drops below the set threshold	I should receive prompt alerts on stock availability if it drops below the set threshold	Medium	Sprint-4
Customer (Web user)	Registration	USN-10	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-11	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-12	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-13	As a user, I can register for the application through Gmail	I can register and access the dashboard with Gmail login	Medium	Sprint-1
	Login	USN-14	As a user, I can log into the application by entering email & password	I can register and access the dashboard with email and password	High	Sprint-1
	Dashboard	USN-15	As a user, I can view the stock availability status	I can view the stock availability status	High	Sprint-2
		USN-16	As a user, I can view the orders status	I can view the order status	Medium	Sprint-3
		USN-17	As a user, I can view the shipping tracking status	I can view the shipping tracking status	Medium	Sprint-4
	Alerts	USN-18	As a user, I should receive alerts on stock availability if it drops below the set threshold	I should receive prompt alerts on stock availability if it drops below the set threshold	Medium	Sprint-4
Customer Care Executive		USN-19	As a customer care executive, I can view the complaints on chat box	I can view the complaints on chat box	Medium	Sprint-4
		USN-20	As a customer, I should be able solve and reply for the customers queries	I can reply to customer queries in the chat thread	Low	Sprint-4
		USN-21	As a customer, I can close the complaint after assisting	I can close the complaint after assisting	Low	Sprint-4
Administrator		USN-22	As a Administrator, I would take care of registrations and maintenance of accounts,	I can take care of registrations and maintenance of accounts	High	Sprint-3
		USN-23	As a Administrator, I Would resolve issues on Access	I can resolve issues in Access	High	Sprint-2
		USN-24	As a Administrator, I Would resolve issues in supply chain / Syncing of Orders	I can resolve issues in supply chain/ Syncing of Orders	High	Sprint-4

6. PROJECT PLANNING & SCHEDULING

1. Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Story points	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.	I can access my account /dashboard	High	10	Devadharshini V Bhuvaneshwari R DivyaDharshini.B Jothika.S Nagaarthi P
		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	5	Nagaarthi.P Jothika.S
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	5	DivyaDharshini.B Nagaarthi P
		USN-4	As a user, I can register for the application through Gmail	I can register & application Through Gmail	Medium	20	Devadharshini V Bhuvaneshwari.R Jothika.S
	Login	USN-5	As a user, I can log into the application by entering email & password	I can access my account	High	10	Bhuvaneshwari.R Nagaarthi.P Jothika.S Devadharshini.V
	Dashboard	USN-6	As a user, I can log into my account for the mobile	I can access my account /Dashboard	High	5	Devadharshini.V DivyaDharshini.B
Sprint 2	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	10	Nagaarthi.P Jothika.S DivyaDharshini.B Bhuvaneshwari.R
		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	10	Devadharshini.V DivyaDharshini.B Nagaarthi P Jothika.S
		USN-9	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	20	Devadharshini.V Bhuvaneshwari.R DivyaDharshini.B Jothika.S

		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	5	Devadharshini.V Bhuvaneshwari.R
Sprint 3	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	5	Divyadharshini Jothika.S Nagaarthi P
Sprint 4	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	Medium	10	Nagaarthi.P Jothika.S DivyaDharshini.B Bhuvaneshwari.R

2. Sprint Delivery Schedule

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	06 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	13 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

$$AV = \frac{\text{Sprint Duration}}{\text{Velocity}} = \frac{20}{6} = 3.34$$

Sprint 1(AV) =3.34

Sprint 2(AV) =3.34

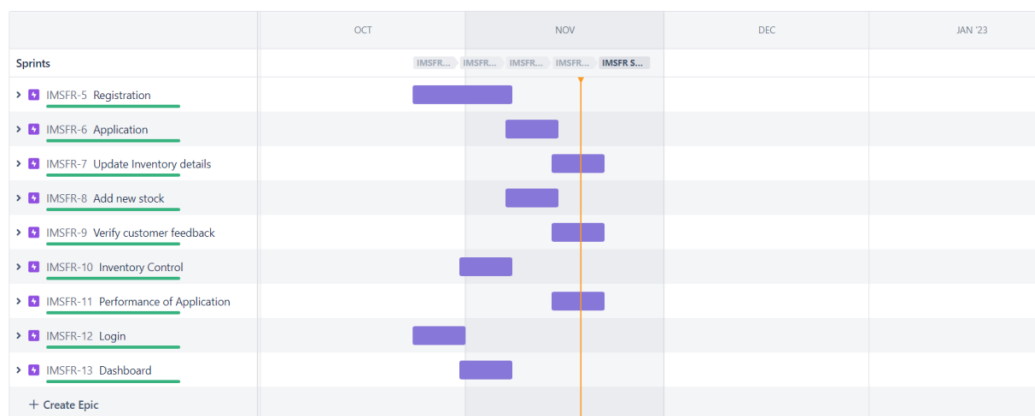
Sprint 3(AV) =3.34

Sprint 4(AV) =3.34

Burn down Chart:



3. Reports from Jira



The screenshot displays the Visual Studio Code interface with the following details:

- Explorer Sidebar:** Shows a project structure with folders like 'static' and 'templates', and files including 'Screenshot (83).png', 'Screenshot (84).png', 'style.css', and various HTML files (e.g., 'add_stock.html', 'buy.html', 'login.html', 'registration_new.html', 'stationary.html', 'vegetables.html').
- Editor Window:** The active file is 'style.css'. The content is:


```

1  body {
2      background-color: #9f9da7;
3      font-size: 1.6rem;
4      font-family: "Open Sans", sans-serif;
5      color: #2b3e51;
6  }
7
8  h2 {
9      font-weight: 300;
10     text-align: center;
11 }
12
13 p {
14     position: relative;
15 }
16
17 a,
18 a:link,
19 a:visited,
20 a:active {
21     color: #3ca9e2;
22     -webkit-transition: all 0.2s ease;
23     transition: all 0.2s ease;
24 }
```
- Terminal Panel:** Shows PowerShell output:


```

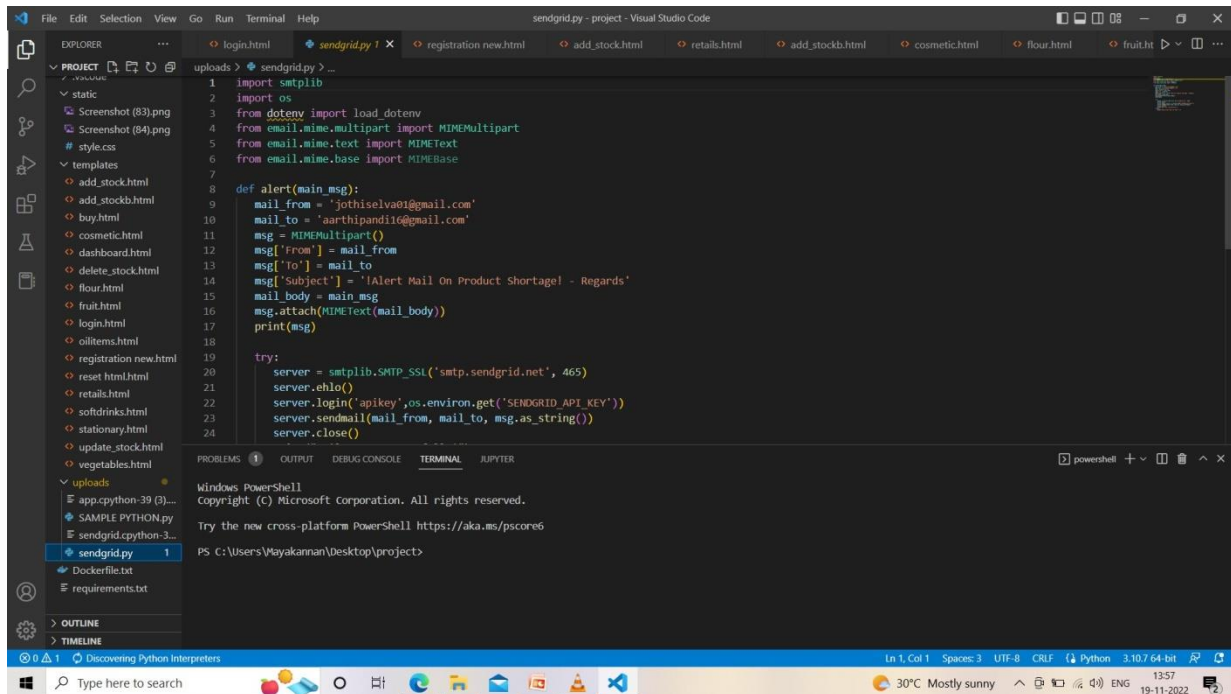
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/powershell

PS C:\Users\Mayakannan\Desktop\project>
```
- Status Bar:** Indicates 'Ln 1, Col 1', 'Spaces: 2', 'UTF-8', 'CR LF', and 'CSS'.

2. Feature 2

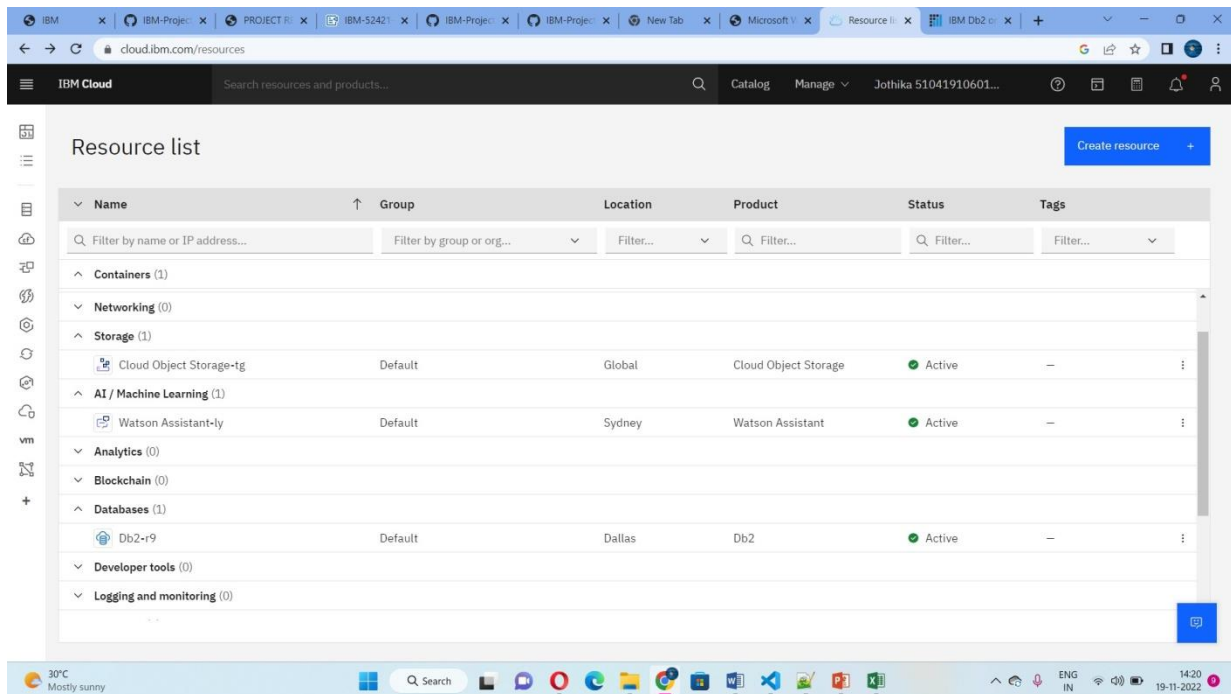
PYTHON CODE:



```
1 import smtplib
2 import os
3 from dotenv import load_dotenv
4 from email.mime.multipart import MIMEMultipart
5 from email.mime.text import MIMEText
6 from email.mime.base import MIMEBase
7
8 def alert(main_msg):
9     mail_from = 'jothiselva01@gmail.com'
10    mail_to = 'aarthipandit@gmail.com'
11    msg = MIMEMultipart()
12    msg['from'] = mail_from
13    msg['to'] = mail_to
14    msg['Subject'] = 'Alert Mail On Product Shortage! - Regards'
15    mail_body = main_msg
16    msg.attach(MIMEText(mail_body))
17    print(msg)
18
19 try:
20     server = smtplib.SMTP_SSL('smtp.sendgrid.net', 465)
21     server.ehlo()
22     server.login('apikey', os.environ.get('SENDGRID_API_KEY'))
23     server.sendmail(mail_from, mail_to, msg.as_string())
24     server.close()
```

Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Try the new cross-platform PowerShell https://aka.ms/powershell
PS C:\Users\Mayakannan\Desktop\project>

c. Database schema



Name	Group	Location	Product	Status	Tags
Filter by name or IP address... Filter by group or org... Filter... Filter... Filter... Filter...					
Containers (1)					
Networking (0)					
Storage (1)					
Cloud Object Storage-tg	Default	Global	Cloud Object Storage	Active	—
AI / Machine Learning (1)					
Watson Assistant-ly	Default	Sydney	Watson Assistant	Active	—
Analytics (0)					
Blockchain (0)					
Databases (1)					
Db2-r9	Default	Dallas	Db2	Active	—
Developer tools (0)					
Logging and monitoring (0)					

8. TESTING

1. Test cases

1					Date	18-Nov-22					
2					Team ID	PNT2022TMD29529					
3					Project Name	Inventory Management System For Retailers					
4					Maximum Marks	4 marks					
5	Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments
6	LoginPage_TC_001	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button		1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Signup popup displayed or not	https://shopenzer.com/	Login/Signup popup should display	Working as expected	Pass	
7	LoginPage_TC_002	UI	Home Page	Verify the UI elements in Login/Signup popup		1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Signup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Create account link e.Last password? Recovery password link	https://shopenzer.com/	Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Create account link e.Last password? Recovery password link	Working as expected	Fail	Steps are not clear to follow
8	LoginPage_TC_003	Functional	Home page	Verify user is able to log into application with Valid credentials		1.Enter URL(https://shopenzer.com/) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: chalam@gmail.com password: Testing123	User should navigate to user account homepage			
9	LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with invalid credentials		1.Enter URL(https://shopenzer.com/) and click go 2.Click on My Account dropdown button 3.Enter invalid username/email in Email text box 4.Enter invalid password in password text box 5.Click on login button	Username: chalam@gmail.com password: Testing123	Application should show 'incorrect email or password' validation message.			
10	LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with invalid credentials		1.Enter URL(https://shopenzer.com/) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in Email text box 4.Enter invalid password in password text box 5.Click on login button	Username: chalam@gmail.com password: Testing123678686786876876	Application should show 'incorrect email or password' validation message.			
11	LoginPage_TC_005	Functional	Login page	Verify user is able to log into application with invalid credentials		1.Enter URL(https://shopenzer.com/) and click go 2.Click on My Account dropdown button 3.Enter invalid username/email in Email text box 4.Enter invalid password in password text box 5.Click on login button	Username: chalam@gmail.com password: Testing123678686786876876	Application should show 'incorrect email or password' validation message.			
12											
13											

2.User Acceptance Testing

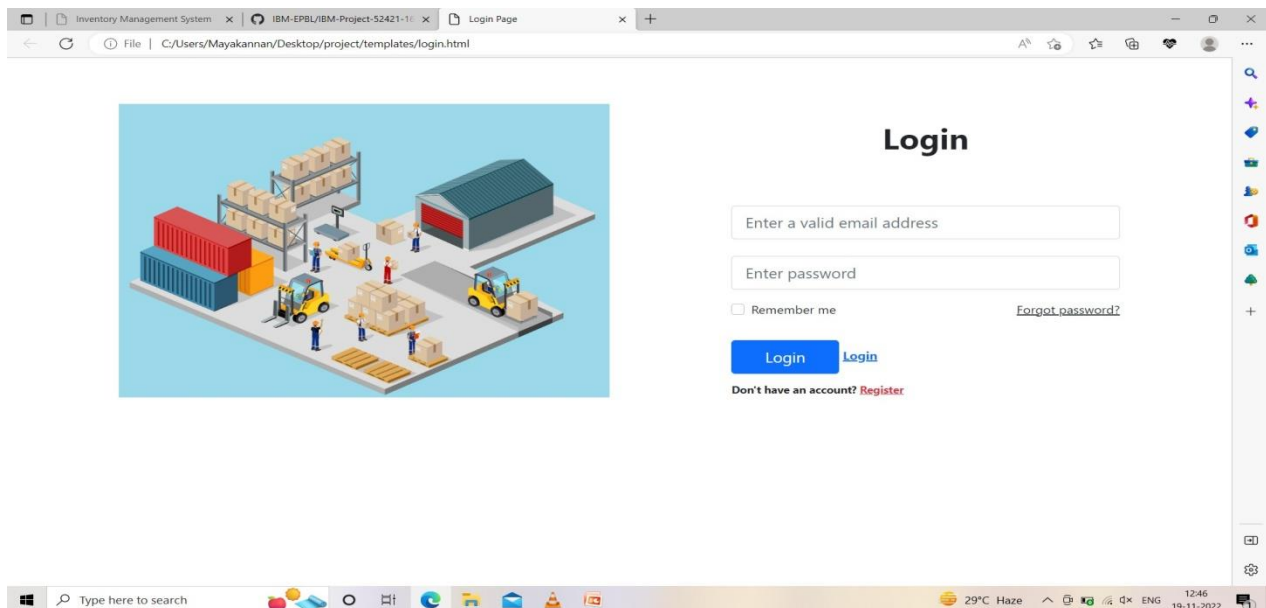
This report shows the number of test cases that have passed, failed, and untested.

Section	Total cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	50	0	0	50
Security	3	0	0	3
Outsource shipping	3	0	0	3
Exception Reporting	9	0	0	9
Version control	2	0	0	2
Final Report Output	4	0	0	4

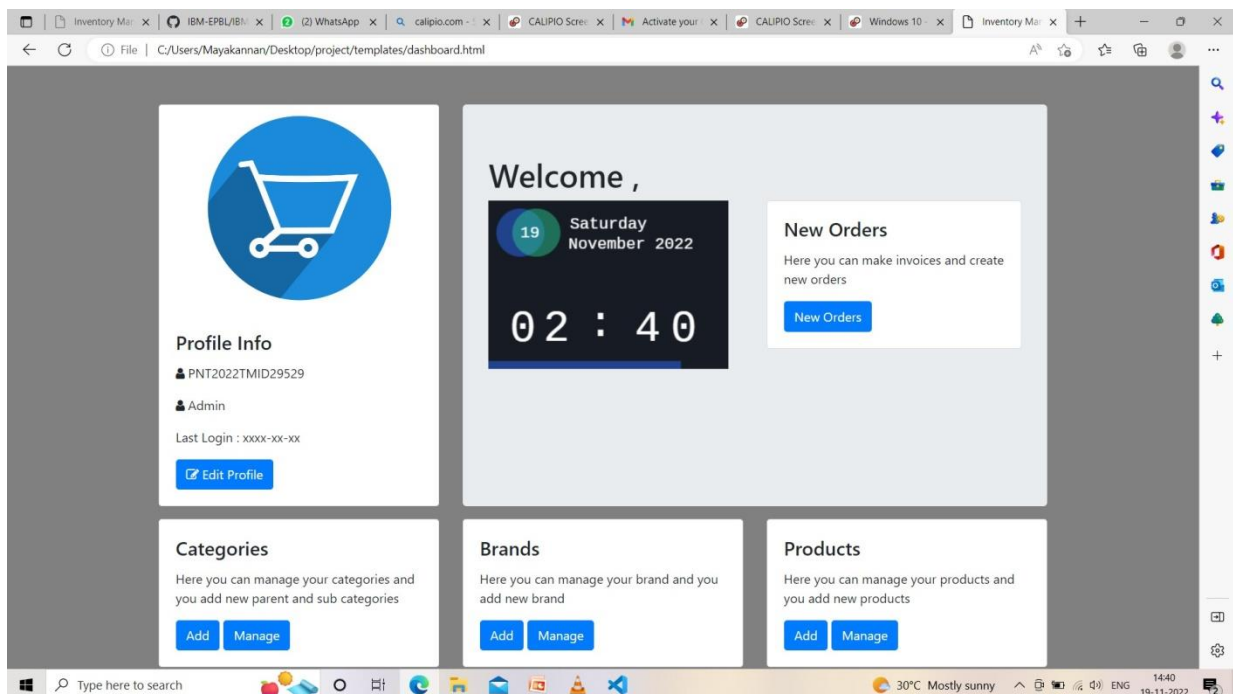
9. RESULT

1.PERFORMANCE MATRICES

LOGIN PAGE



DASHBOARD PAGE



ADD STOCK

The screenshot shows a web browser window with the title 'ADD STOCK'. The browser's address bar displays the file path 'C:/Users/Mayakannan/Desktop/project/templates/add_stock.html'. On the left, a blue sidebar contains a menu with the following items: 'Add stock', 'Update stock details', 'View stock', 'Delete stock', and 'Log out'. The main content area features a form titled 'ADD STOCK' with a dark header. The form includes three input fields: 'Product name:', 'Item quantity:', and 'Warehouse location:' (which has a dropdown menu currently showing 'Chennai'). Below these fields is a blue 'SUBMIT' button. The Windows taskbar at the bottom shows the search bar, task view button, and several application icons, along with a system tray displaying '30°C Mostly sunny' and the date '19-11-2022'.

DELETE STOCK

The screenshot shows a web browser window with the title 'Delete stock'. The browser's address bar displays the file path 'C:/Users/Mayakannan/Desktop/project/templates/delete_stock.html'. On the left, a blue sidebar contains a menu with the following items: 'Add stock', 'Update stock details', 'View stock', 'DELETE', and 'Log out'. The main content area features a form titled 'Delete stock' with a dark header. The form includes a single input field labeled 'Product name:' and a blue 'DELETE' button. The Windows taskbar at the bottom is identical to the one in the previous screenshot, showing the search bar, task view button, application icons, and system tray with '30°C Mostly sunny' and the date '19-11-2022'.

Thus the project has been successfully implemented and executed.

10. ADVANTAGES

- It helps to maintain right amount of stocks
- It leads to more organised warehouse
- It saves time and money
- Improves efficiency and productivity
- Schedule maintenance

DISADVANTAGES

- Increased space is need to hold the inventory
- Complexity
- High implementation costs
- Malicious Hacks.
- Works for only a single company.

11. CONCLUSION

From the analysis it is clear that there is high accumulation of inventory in BOSCH LTD. The company has installed all the type of machines to carry the production as well as systematic examining of goods but the only thing the company needs to maintain sound inventory management and use of appropriate techniques to make sure greater ease in the production. There must be periodic review by the management mainly material planning and control department is must to see that the level of inventories are fixed depending upon circumstances and avoid unnecessary building up of stocks which result in locking up of scarce funds. To improve improved inventory management system the company should be open to enhance continuous production for which company has to invest time and effort.

12. FUTURE SCOPE

The scope of an inventory system can cover many needs, including valuing the inventory, measuring the change in inventory and planning for future inventory levels. The value of the inventory at the end of each period provides a basis for financial reporting on the balance sheet. Measuring the change in inventory allows the company to determine the cost of inventory sold during the period. This allows the company to plan for future inventory needs.

13. APPENDIX

Source Code:<https://github.com/IBM-EPBL/IBM-Project-52421-1661003156.git>

GitHub:<https://github.com/IBM-EPBL/IBM-Project-52421-1661003156.git>

Demo Link:<https://youtube.com/watch?v=Cb183fmwt1M&feature=share>