INVENTORY MANAGMENT SYSTEM FOR RETAILERS

Team ID	PTN2022TMID47696
Project Name	Project-Inventory Managment System For Retailers

PROJECT DESCRIPTION

Retail inventory management is the process of ensuring you carry merchandise that shoppers want, with neither too little nor too much on hand. By managing inventory, retailers meet customer demand without running out of stock or carrying excess supply.

In practice, effective retail inventory management results in lower costs and a better understanding of sales patterns. Retail inventory management tools and methods give retailers more information on which to run their businesses. 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.

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.

CONTENT

2. LITERATURE SURVEY

Dave Piasecki .[1] (2001) He focused on various model of inventory to calculating optimum purchase quantity which used the EOQ method. He points out that many companies are not using EOQ model because of poor results resulted from inaccurate data input. He says that EOQ is an accounting formula which determines point at which combination of ordering costs and stock inventory costs are the least. He highlights that EOQ method would not conflict with the JIT approach. He further elaborates the EOQ model formula that includes parameters like yearly usage on unit, order cost and carrying cost. Finally, he proposes several steps to follow in implementing the EOQ model. Now this litrature limitation is as it does not elaborate further association among EOQ and JIT. It does not associate stock turns with EOQ so fails for mention profit gain with associated stock is calculated.

Sambasiva Rao. K [2] (2002) According his investigation on Materials Managing in Public Sector Ship Building Industry evaluates. Output of materials managing and identifies some problems faced by materials managing in the heavy engineering industry. This investigation method involves the 68 documentary evidence and survey of expert opinion. He evaluates the existing purchase systems and lead time involved on procurement of stock item and adviced the long lead time shall be reduced. His research points at additional stock in terms on months poduction cost in all the engineering units. He also highlights some of the problems in the area on materials managing such as delay in customer part on supplying own stock item, existence and disposal of surplus and non-moving items, excessive lead times and excessive dependence on imports. He claims that administrative and procurement lead times for organization are on the higher side according to peculiar nature of industry. He suggests liberalized purchase procedures, increased capital powers to the personnel, Opening up of liaison offices

in various countries to reduce the lead time.

Gaur, Fisher and Raman [3] (2005) In their study examined firm-level inventory behavior among retailing companies. They took a sample on 311 public-listed retail firms for years 1987–2000 for investigate relationship on stock turnover about gross margin, capital intensity , sales surprise. All observed that stock aggregate turnover for retailing company was positively related to capital intensity with sales surprise while inversely related gross margins.

S. Singh [4] (2006) Analysed stock control exercises on single fertilizer company named IFFCO. He statistically examined stock level according consumption, sales as well as other variables along growth on these variables with inventory patterns. He concluded increments in components of stocks lead to increment in the proportion on stock in current assets. The special attention was made in stores with spares for calculate excess purchases resulting Pradeep singh (2008) In his study made an attempt to investigate stock with working capital managing Indian Farmers Fertilizer Cooperative Limited (IFFCO) / National Fertilizer Limited (NFL). He concluded that overall position of the working fund of IFFCO / NFL is satisfactory. But there arises need for imrovement in stocking as situation of IFFCO. Although stock were not properly utilized as well as maintained bay IFFCO during investigation period. Also managing organization of NFL surely try to properly utilize stock with try to care stock according to requirements. So that liquidity will not interrupt.

Capkun, Hameri and Weiss [5] (2009) Statistically analysed the association among stock levels with fund situation in manufacturing companies using capital information on large sample on USbased production units over a 26-year period, during, 1980 to 2005. According to them a significant relationship existed between inventory performance

along with the performance of its components and profitability.

Gaur and Bhattacharya [6] (2011) Attempted to study the linkage between the performance of the components of inventory such as raw material, work in progress and finished goods and financial performance of Indian manufacturing firms. The study revealed that finished goods inventory as inversely associated with business performance while raw material inventory and work in progress did not have much effect on same. They emphasised that instead of focusing on total inventory, an attempt should be made to concentrate on individual components of inventory so as to adequately manage the same. They concluded that managers not paying heed to inventory performance may become weak in combating competitors.

Eneje et al [7] (2012) He researched the changes of raw stock inventory management system with margin of beer company in Nigeria during data from 1989 to 2008 which had gathered for analysis from the annual reports of the sampled brewery firms. Measures of profitability were examined and related to proxies for raw materials inventory management by brewers. The Ordinary Least Squares (OLS) stated in the form of a multiple regression model was applied in the analysis. Research analysed that local variable raw stock inventory managing system design such a way to capturing changes of efficient management of raw stock inventory on behalf of company in terms of their margin is significantly strong and positive and influences the profitability of the brewery firms in Nigeria. They concluded that efficient management of raw material inventory is a major factor to be contained with by Nigerian brewers in enhancing or boosting their profitability.

Nyabwanga and Ojera[8] (2012) Their research concentrate

relationship among inventory management with business performance of smallscale enterprises (SSEs), in Kisii Municipality, Kisii County,Kenya. They used a cross-sectional survey study based on a small sample size of 79 SSEs. The study inferred that inventory comprised the maximum portion of working capital, and improper management of working capital was one of the major reasons of SSE failures. The empirical results disclosed that a positive significant relationship existed between business performance and inventory management practices with inventory budgeting having the maximum influence on business performance ensued by shelf-space management. The study suggested that by following effective inventory management practices business performance can be enhanced.n loss of profit.

Sahari, Tinggi and Kadri [9](2012) They focused on association among the inventory management system and company performance corresponding to fund capability. Therefore according to that reason they looked 82 sample construction company in Malaysia during period of 2006– 2010. Using the regression and correlation analysis methods, they deduced that inventory management is positively correlated with firm performance. In addition, the results indicate that there is a positive link between inventory management and capital intensity.

Soni [10] (2012) Made an in depth study of practices followed in regard to inventory management in the engineering goods industry in Punjab. The analysis used a sample of 11 companies for a period five years, that is, 2004–2009 and was done using panel data set. The adequate and timely flow of inventory determines the success of an industry. She concluded that size of inventory enhanced marginally over the period as compared to a hike in current assets and net working capital. Inventories constituted half of the working capital which was due to overstocking of inventory as a result of low inventory turnover

especially for finished goods and raw materials. Rise in sales and favourable market conditions lead to a rise in inventory levels. It was also inferred that sales increased more as compared to inventory.

Lwiki et al[11] (2013) A survey conducted on all the eight (8) sugar manufacturing firms in Kenya established that there is generally positive correlation between each of inventory management practices.Specific performance indicators were proved to depend on the level of inventory management practices. They established that Return on Equity had a strong correlation with lean inventory system and strategic supplier partnerships. As such, they concluded that the performance of sugar firms could therefore be stated as being a function of their inventory management practices.

Panigrahi [12] (2013) According to his analysis inventory management practices used by Indian cement firms and their effects must be on working fund efficiency. The study also investigated the relationship between profitability and inventory conversion days. The study, using a sample of the top five cement companies of India over a period of 10 years from 2001 to 2010, concluded there must be exist inverse relationship among conversion period of inventory and profit margin.

Madishetti and Kibona [13] (2013) Found that a well designed and executed inventory management contributes positively to a small or medium-sized enterprises (SMEs) profitability. They studied the association between inventory conversion period and profitability and the impact of inventory management on SMEs profitability. They took a sample of 26 Tanzanian SMEs, and used the data from financial statements for the period 2006–2011. Regression analysis was adopted to determine the impact of inventory conversion period over gross operating profit. The results cleared out that significant negative linear

relationship occurred between inventory conversion period and profitability.

Srinivas Rao Kasisomayajula [14] (2014) His research title based on the" Inventory

Management in Commercial Vehicle Industry In India". There were five sample firms had preffered for study. The study concluded that all the units in the commercial vehicle industry have significant relationship between Inventory and Sales. Proper management of inventory is important to maintain and improve the health of an organization. Efficient management of inventories will improve the profitability of the organization.

Edwin Sitienei and Florence Memba [15] (2015) Conducted a study on Effect of Inventory Management on profitability of Cement Manufacturing Companies in Kenya. The study concluded that Gross profit margin is negatively correlated with the inventory conversion period, Increase in sales, which denotes the firm size enriches the firm's inventory levels, which pushes profits upwards due to optimal inventory levels. It is also noted that firms inventory systems must maintain an appropriate inventory levels to enhance profitability and reduce the inventory costs associated with holding excessive stock in warehouses.

REFERENCES

[1] Sambasiva Rao K., Singh, Sukhdev. (2006). Inventory control practices in IFFCO.The Management Accountant.

1. Pradeep Singh(2008)," Inventory and Working Capital Management- An Empirical Analysis", The ICFAI Journal of Accounting and Research.

2. Capkun, Vedran, Hameri, Ari-Pekka & Weiss, Lawrence A.

(2009). On the relationship between inventory and financial performance in manufacturing. International Journal of Operations & Production Management.

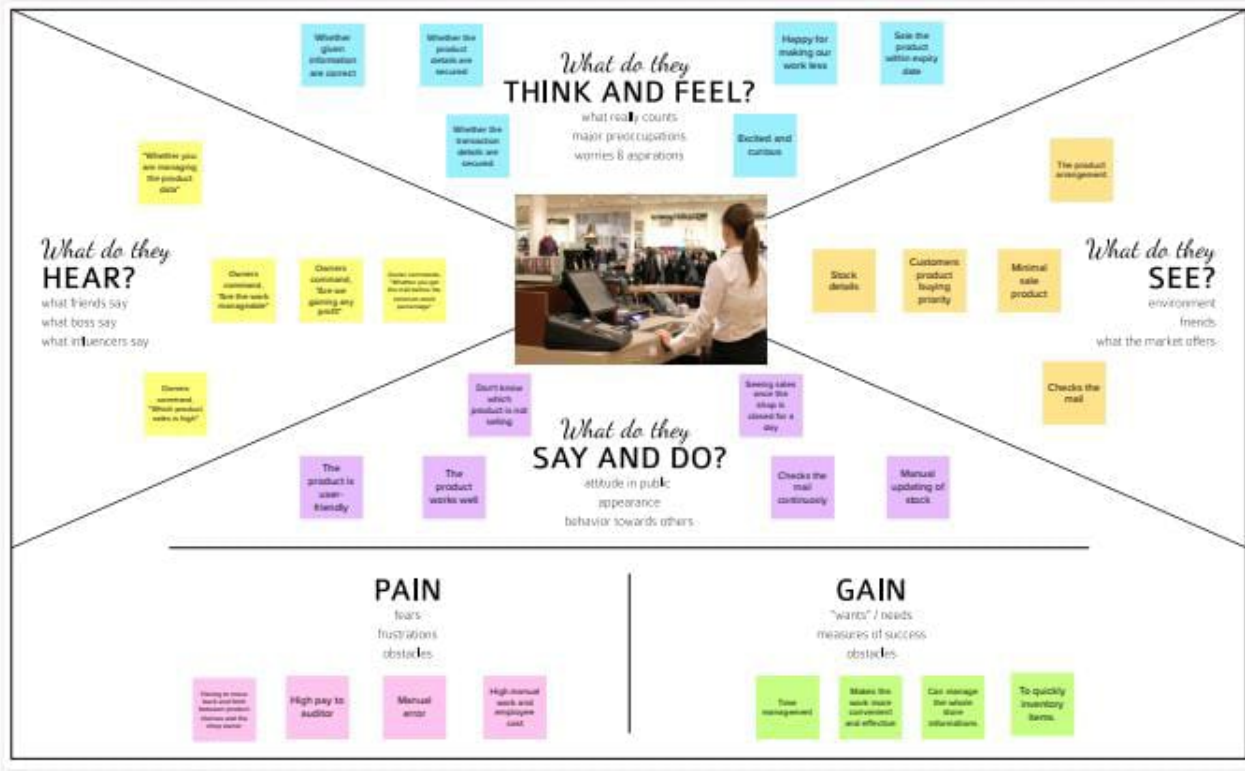
3. Gaur, Jighyasu & Bhattacharya, Sourabh. (2011). The relationship of financial and inventory performance of manufacturing firms in Indian context. California Journal of Operations Management.

4. Krishnankutty, Raveesh. (2011). Panel data analysis on retail inventory productivity.The Economic Research Guardian.

2.3 DEFINE THE PROBLEM STATEMENT

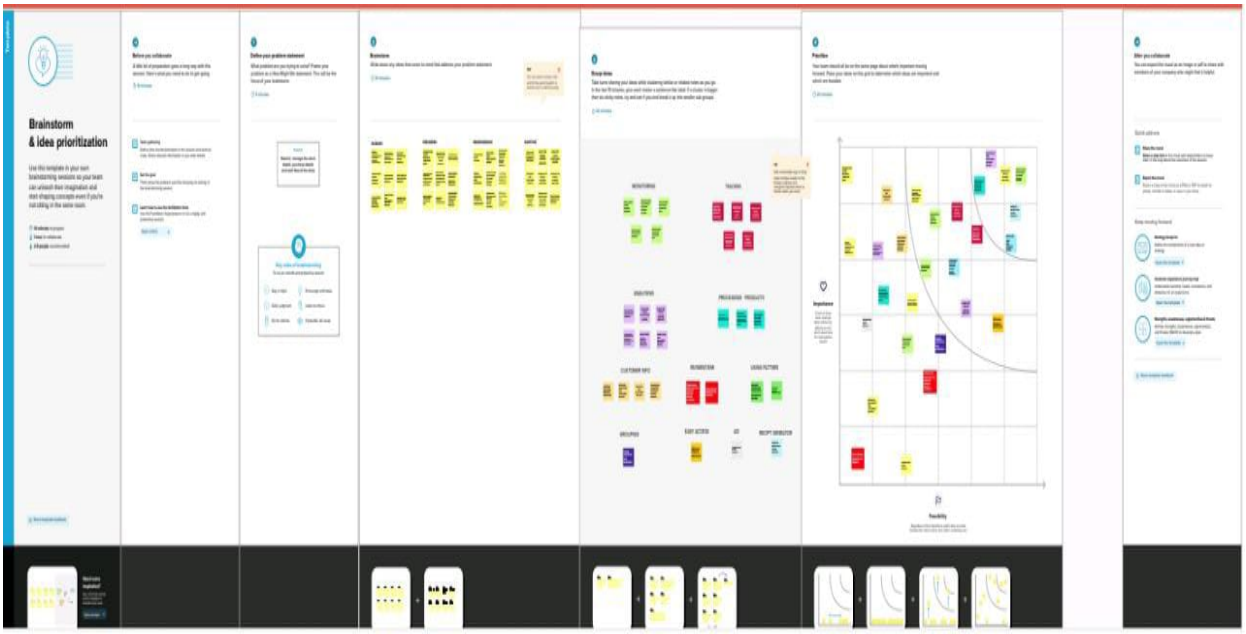
The retailers needs a way to manage the stock details,purchase details and cash flow so that he can maintain stock details without any default.

3. IDEATION PHASE- EMPATHIZE & DISCOVER



3.2 IDEATION

PHASE-BRAINSTORM & IDEA PRIORITIZATION



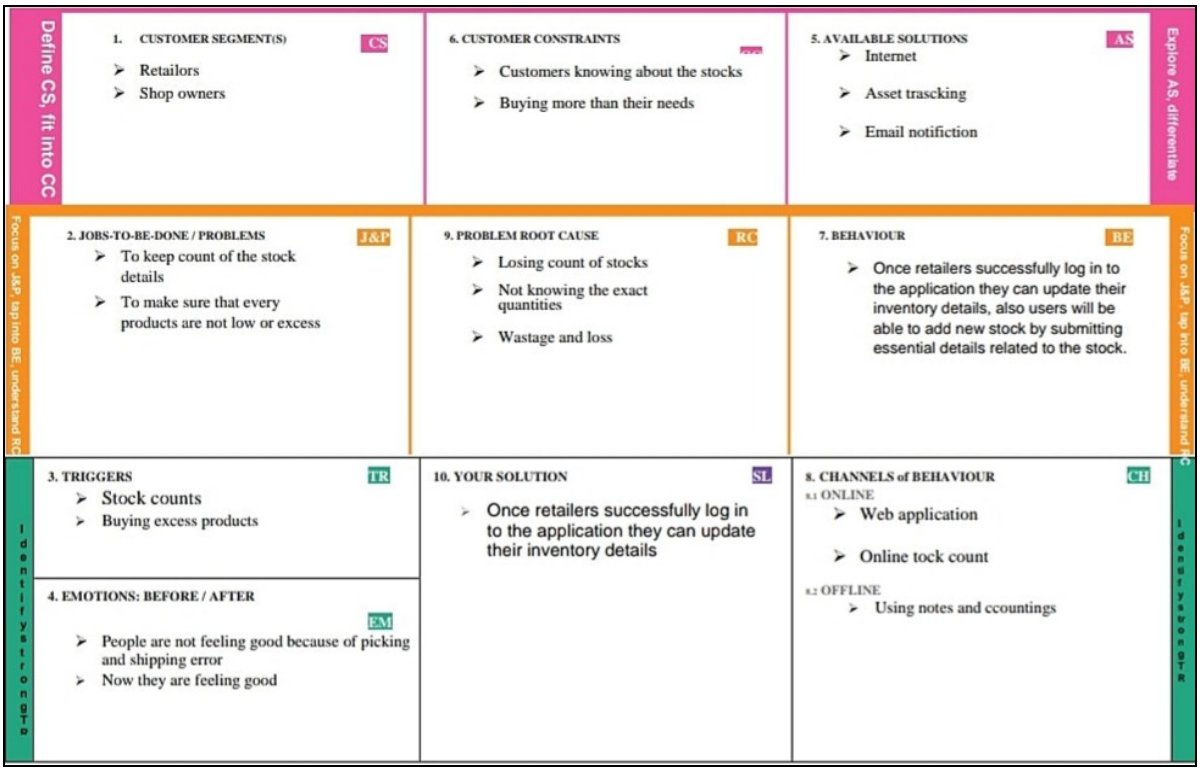
3.3 PROPOSED SOLUTION

S.NO	PARAMETER	DESCRIPTION
1	Problem Statements (problem to be solved)	The retail industry is in a state of constant transformation and there is an increasing urgency to reduce costs and to increase efficiency in operations. As customers become more demanding, there is also extra pressure to exceed their expectations with regards to the

		quality of the product, service and overall experience.
2	Idea / Solution description	Effective retail inventory management results in lower costs and a better understanding of sales patterns. Retail inventory management tools and methods give retailers more information on which to run their businesses. Applications have been developed to help retailers track and manage stocks related to their own products
3	Novelty / uniqueness	The novelty of the work is that the system automatically helps also users will be able to add new stock by submitting essential details related to the stock. They can view details of the current inventoryTh.e 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
4	Social impact / Customer Satisfaction	Customer satisfaction depends on the product's perceived performance relative to a buyer's expectations. If the product's performance falls short of expectations, the customer is

		dissatisfied. If performance matches expectations, the customer is satisfied.Acquiring new customers can cost 5 to 10 times more than the costs involved in satisfying and retaining current customers. • Loyal customers tend to spend more and cost less to serve • Satisfied customers are likely to recommend your products and services
5	Business model (Revenue model)	● Easy to use ● low cost ● If there is no stock available ,this application helps retailers to know ● increase business
6	Scalability of the solution	This application ensures the safety and accuracy about the results of stock retailers need not to be worried about their business to be fall down

3.4 PROJECT DESIGN PHASE I-PROBLEM SOLUTION FIT



4.SOLUTION REQUIREMENTS (FUNCTIONAL & NON FUNCTIONAL)

4.1 Functional Requirements:

FR NO	Functional Requirement (Epic)	Sub Requirement (story)
FR-1	Application building	➢ Build HTML page for login, Registration, Prediction, Log out. ➢ YOLOV3 detector is real time object detection algorithm specify the objects in image. ➢ Computer vision can gain high understanding of images.
FR-2	User registration	➢ Registration through Gmail. ➢ Registration using phone, laptop, computer.
FR-3	User confirmation	➢ Confirmation via Email. ➢ Confirmation via OTP.
FR-4	User interface	➢ User login form. ➢ Admin login form.
FR-5	Database	➢ It collects at least 50 images of each type of skin disease placed them in folder. ➢ Using a chrome extension such as batch downloader where you can search and download images from chrome.
FR-6	Data server	➢ It connects a data from chrome and the application to the cloud. ➢ Data server has been installed to run as a service and is deployed in IBM cloud instance.

4.2Non-functional Requirements:

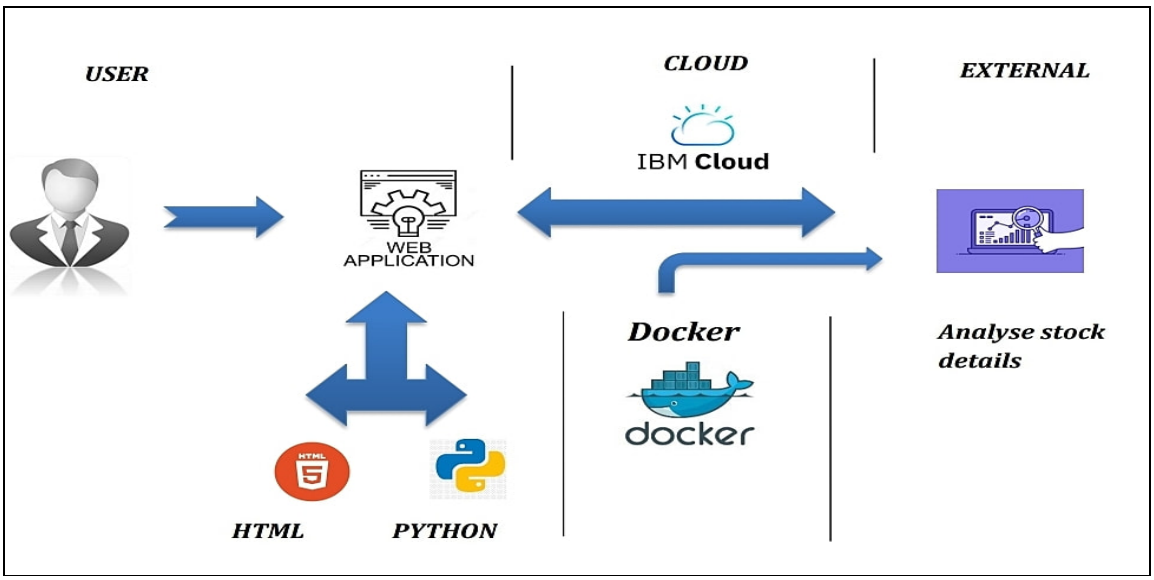
FR NO	Non functional requirement	Description
NFR-1	Usability	➢ YOLO trainer model can help the dermatologist to detect whether the patient have skin disease or not. ➢ Visual object tagging tool (VOTT) can annotate images for understanding.
NFR-2	Security	➢ It ensure about patient safety during process.
		➢ Careful examine about choosing an image for detecting or uploading images of your damaged skin.
NFR-3	Reliability	➢ Easy to use with good network connection. ➢ Accuracy ➢ Less time consumption ➢ Low cost.
NFR-4	Performance	➢ Creating a model with an application can be very helpful to the people who are affected by skin disease. ➢ The trained model can predict an accurate result and took less time when compare to reality.

NFR-5	Availability	➢ Easy to detect even when there is many images of skin which accurate results. ➢ Helps to get correct treatment at a correct time, which helps patients to heal earlier. ➢ Make use the application at anytime with proper guidelines.
NFR-6	Scalability	➢ This method is ensured accurate information about patients skin disease. ➢ patient need not to be worried about their condition.

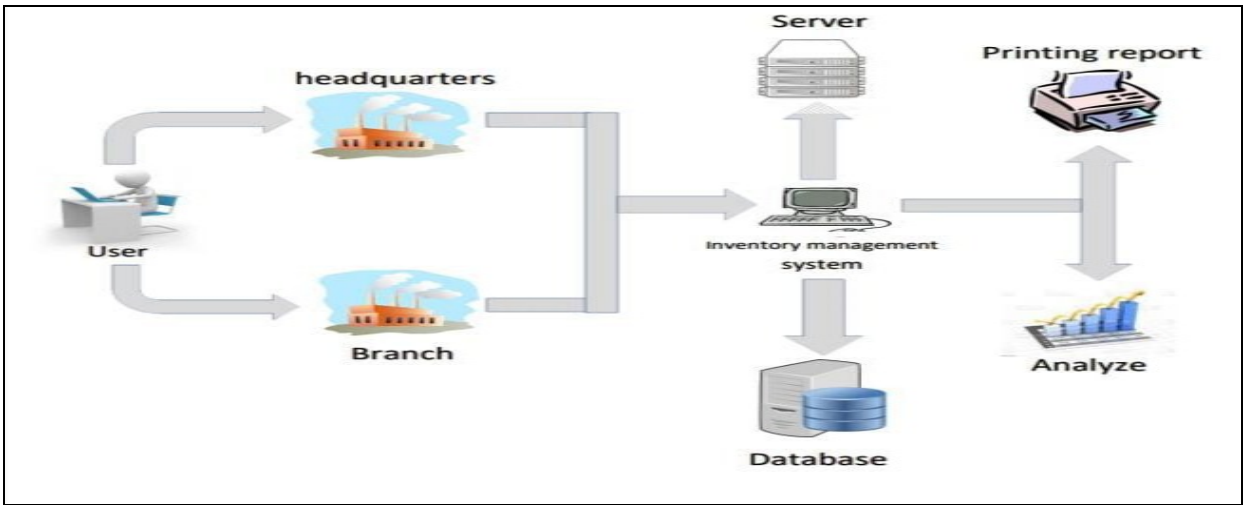
5.PROJECT PHASE II-DATA FLOW DIAGRAMS & USER STORIES

5.1Data flow diagrams:

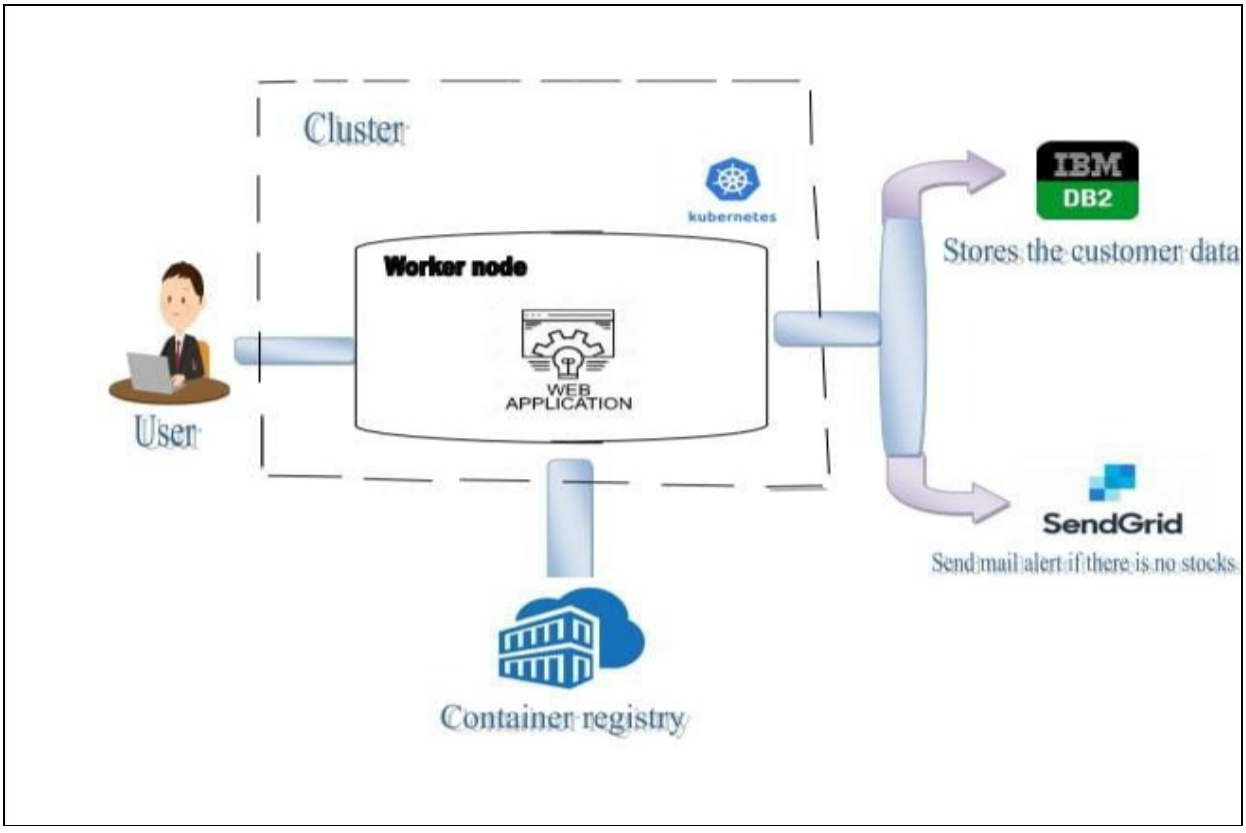
A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2 SOLUTION ARCHITECTURE:



5.2.1 TECHNICAL ARCHITECTURE:



6.PROJECT PLANNING & SCHEDULING

6.1 sprint planning & estimation

ProductBacklog, Sprint Schedule, and Estimation

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 using my email & password and confirming my login credentials.	3	High	K.Rishi, P.Deva Manikandan, M.Hariharan, M.Panish kanth
sprint-1		USN-2	As a user, I can login through my E-mail.	3	Medium	K.Rishi, P.Deva Manikandan, M.Hariharan, M.Panish kanth
sprint-1	Confirmation	USN-3	As a user, I can receive my confirmation email once I have	2	High	K.Rishi, P.Deva Manikandan, M.Hariharan, M.Panish kanth

			registered for the application.			
sprint-1	Login	USN-4	As a user, I can log in to the authorized account by entering the registered email and password.	3	Medium	K.Rishi, P.Deva Manikandan, M.Hariharan, M.Panish kanth
sprint-2	Dashboard	USN-5	As a user, I can view the products that are available currently.	4	High	K.Rishi, P.Deva Manikandan, M.Hariharan, M.Panish kanth
sprint-2	Stocks update	USN-6	As a user, I can add products which are not available in the inventory and restock the products.	3	Medium	K.Rishi, P.Deva Manikandan, M.Hariharan, M.Panish kanth
sprint-3	Sales prediction	USN-7	As a user, I can get access to sales prediction tool which can help me to	6	Medium	K.Rishi, P.Deva Manikandan, M.Hariharan, M.Panish kanth

			predict better restock management of product.			
sprint-4	Request for customer care	USN-8	As a user, I am able to request customer care to get in touch with the administrato rs and enquire the doubts and problems.	4	Medium	K.Rishi P.Deva Manikandan, M.Hariharan, M.Panish kanth
sprint-4	Giving feedback	USN-9	As a user, I am able to send feedback forms reporting any ideas for improving or resolving any issues I am facing to get it resolved.	3	Medium	K.Rishi, P.Deva Manikandan, M.Hariharan, M.Panish kanth

6.2 Project Tracker, Velocity & Burndown Chart

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	11	6 Days	24 Oct2022	29 Oct 2022	11	29 Oct 2022
Sprint-2	**7**	6 Days	31Oct2022	05 Nov2022	7	05 Nov 2022
Sprint-3	**6**	6 Days	07Nov2022	12 Nov2022	6	12 Nov 2022
Sprint-4	**7**	6 Days	14 Nov 2022	19 Nov 2022	7	19 Nov 2022

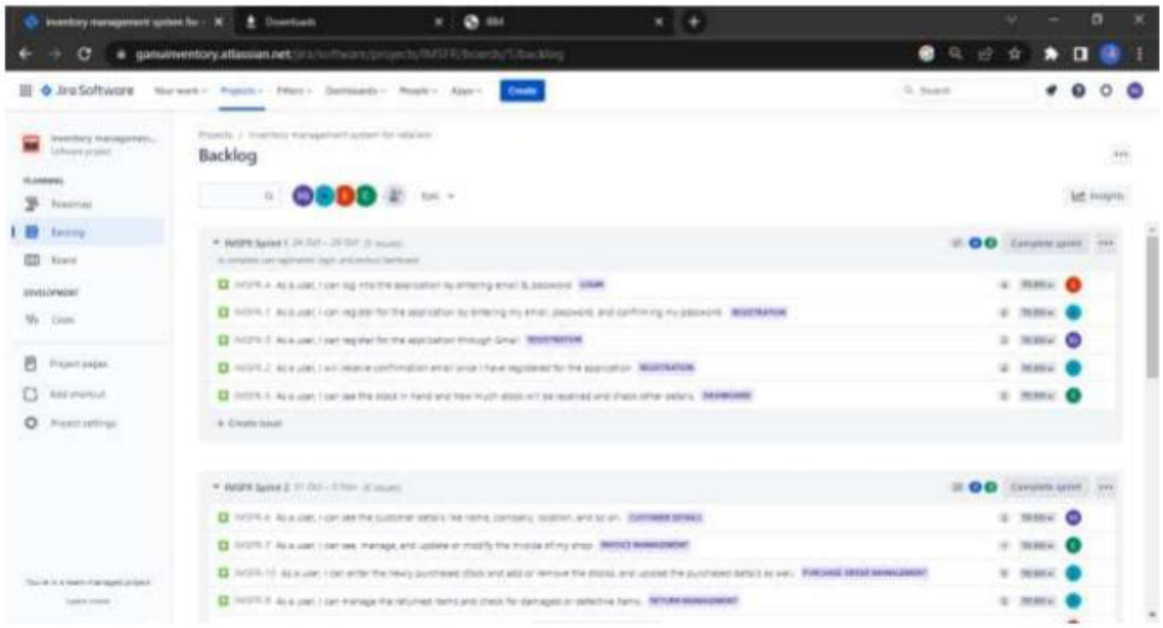
Velocity:

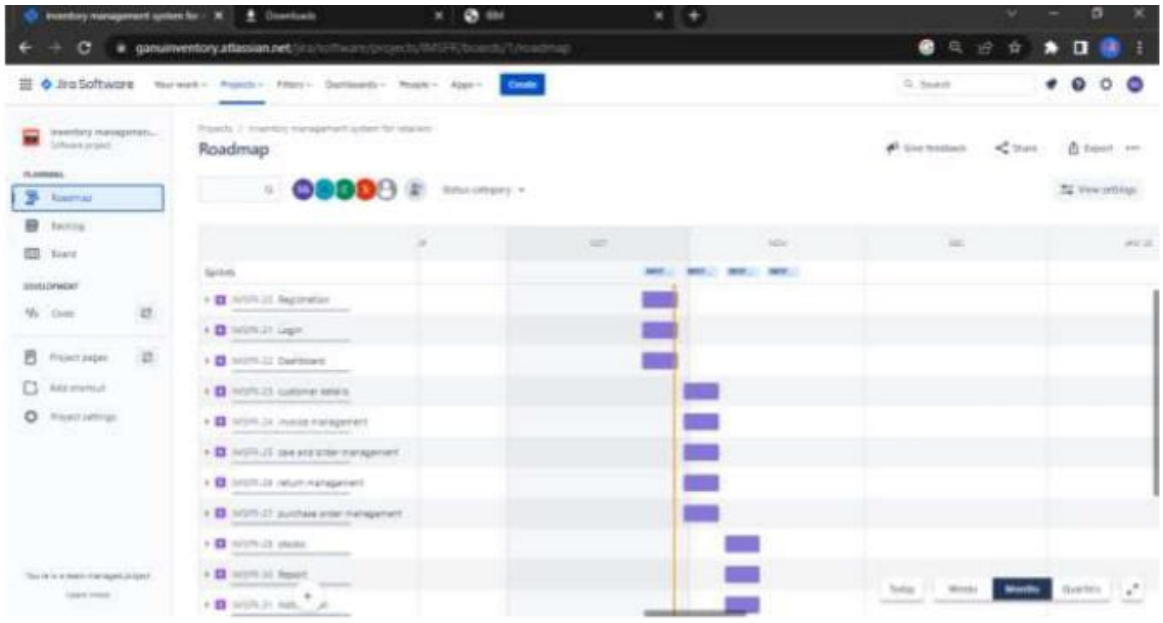
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

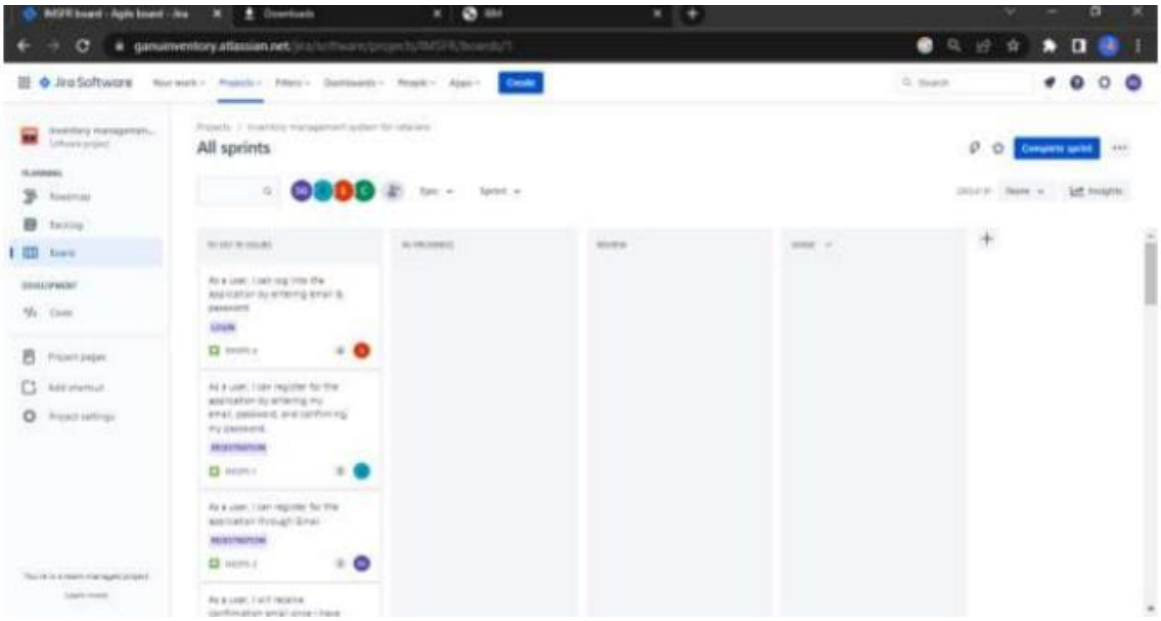
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

6.3Report from jira:

Jira Roadmap

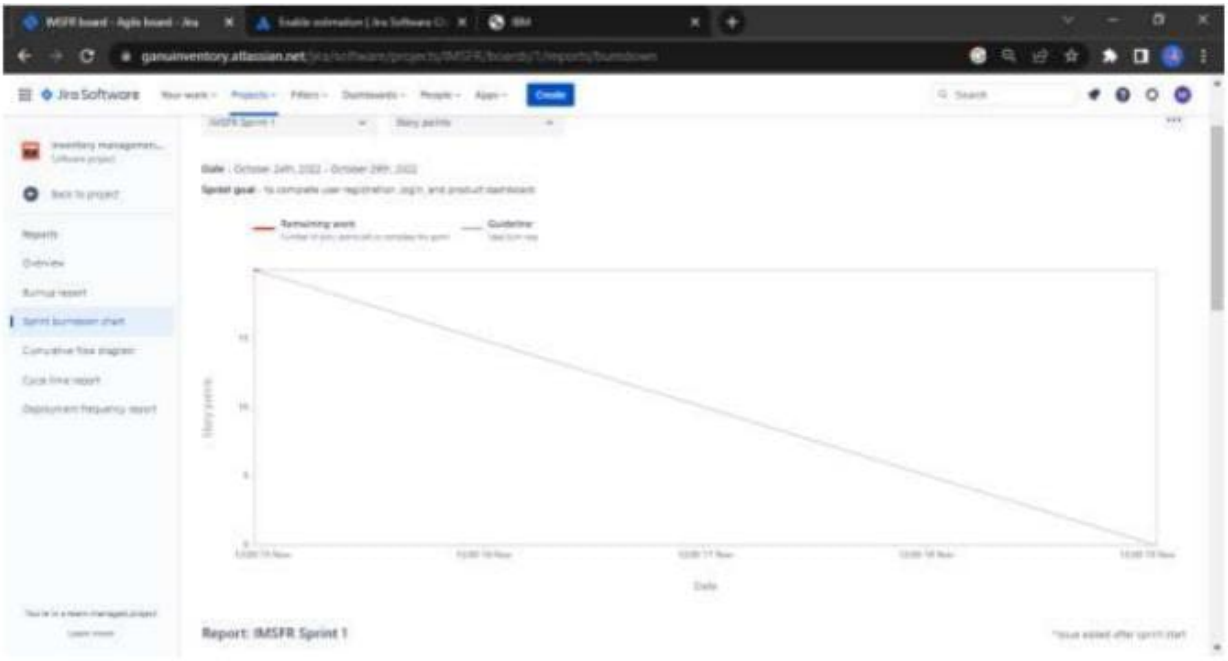






Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.



7.CODING AND SOLUTION

Feautures

Feauture 1: Add Product

Feauture 2: Update product

Feauture 3: Delete product

Feauture 4:Set limit

Feauture 5:Send alert emails to user

8.TESTING

Testing:

- ➤ Login page(Functional)
- ➤ Login page(UI)
- ➤ Upload image page(Functional)
- ➤ Logout page(Functional)

8.1 Test cases

				Project Name	Project - Inventory Managment System For Retailers						
				Maximum Marks	4 marks						
Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_001	Functional	Login page	Verify user is able to log into website with Valid credentials	Login first	1.Go to login page 2.Enter email ID and password 3.click to register	devamanidm578@gmail.com ibm1234	successfully log in to the website	Working as expected	Pass	YES	NIL	Rishi k
homepage_TC_002	Functional	home page	verify the product available in the website and able to know the quantity & update the product	Home page	1.Login to home page 2.click an add product 3.enter name,price,quantity	update quantity of the product	Successfully updated the product	Working as expected	pass	YES	NIL	Deva manikandan p
pythoncode_TC_003	code	python3.11	verify python code run without error	software	1.download the python version 3.11 2.type the program and save it 3.verify its run continuously	type python code to create backend	successfully crested to the website	working as expected	pass	YES	NIL	Hariharan M
webUI_TC_004	Functional	Python flask	To create a web UI to interact with user	python IDE	1.Go to dashboard 2.open a web link 3.display the result	devamanidm578@gmail.com ibm1234	website should show the accurate quantity of the product	Working as expected	pass	YES	NIL	panish kanth M
IBMcloud_TC_005	Functional	IBM Cloud service	verify login to the cloud service	IBM cloud service	1.log in to IBM.cloud.com 2.create your own account	devamanidm578@gmail.com BNTIBMBu32	successfully created an account	Working as expected	Pass	YES	NIL	Rishi k Deva manikandan p
IBM DB2_TC_006	Functional	Dataset	Verify the database is created in the IBM cloud and get the service crendentials	IBM cloud service	1.Go to the catalog 2.to create the database , go to the cloudant 3.launch dashboard	create a database with click create button and store the quantity of the product	successfully created a database in DB2	Working as expected	Pass	YES	NIL	Hariharan M panish kanth M
Sendgrid_TC_007	Functional	E-mail	Verify user is able to receive the mail	software	1.To send mails from the application 2.we need to integrate the sendgrid serive	send alert mail to the user	successfully get the alert mail	Working as expected	pass	YES	NIL	Rishi k

8.2USER ACCEPTANCE TESTING

1.Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of [product name]project time of the release to User Acceptance Testing(UAT).

2.Defect Analysis

This report shows the number of resolved or closed bugs at each severity level,and how they are resolved.

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Sub total
By design	**5**	**3**	**2**	**0**	**10**
Duplicate	**0**	**0**	**0**	**1**	**1**
Fixed	**2**	**0**	**0**	**1**	**3**
External	**6**	**2**	**0**	**0**	**8**
Not reproduced	**0**	**1**	**1**	**0**	**2**
Skipped	**0**	**0**	**0**	**0**	**0**
Won't Fix	**0**	**0**	**0**	**0**	**0**
Total	**13**	**6**	**3**	**2**	**24**

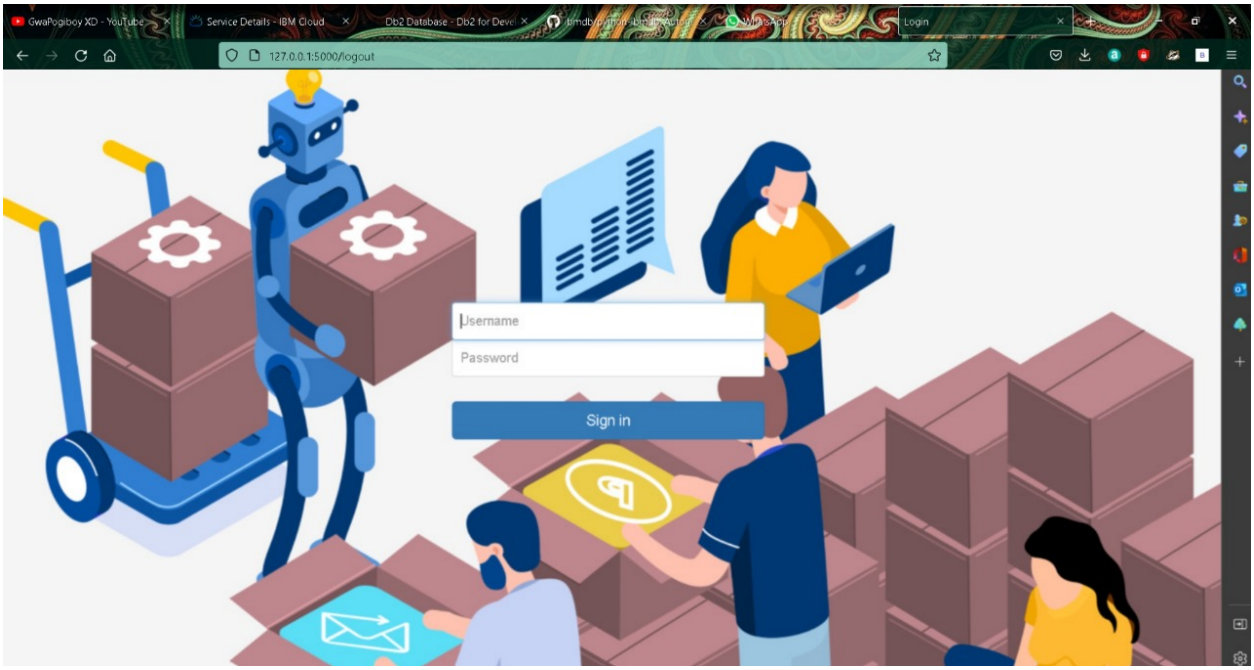
3.Test case Analysis

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

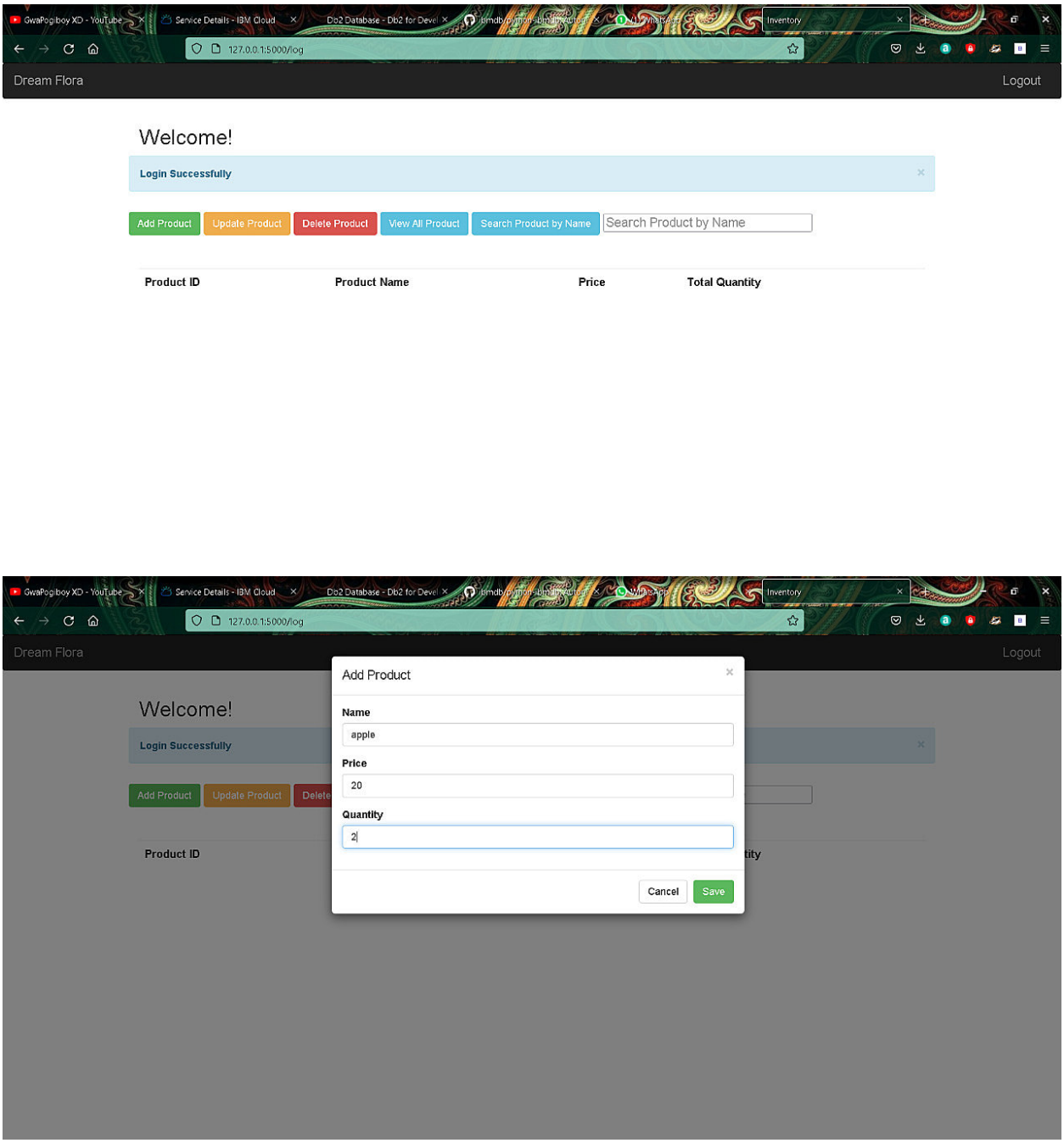
Section	Total cases	Not tested	Pass	Fail
Interface	1	0	0	1
Login	2	0	0	2
Logout	1	0	0	1
Limit	2	0	0	2

RESULTS

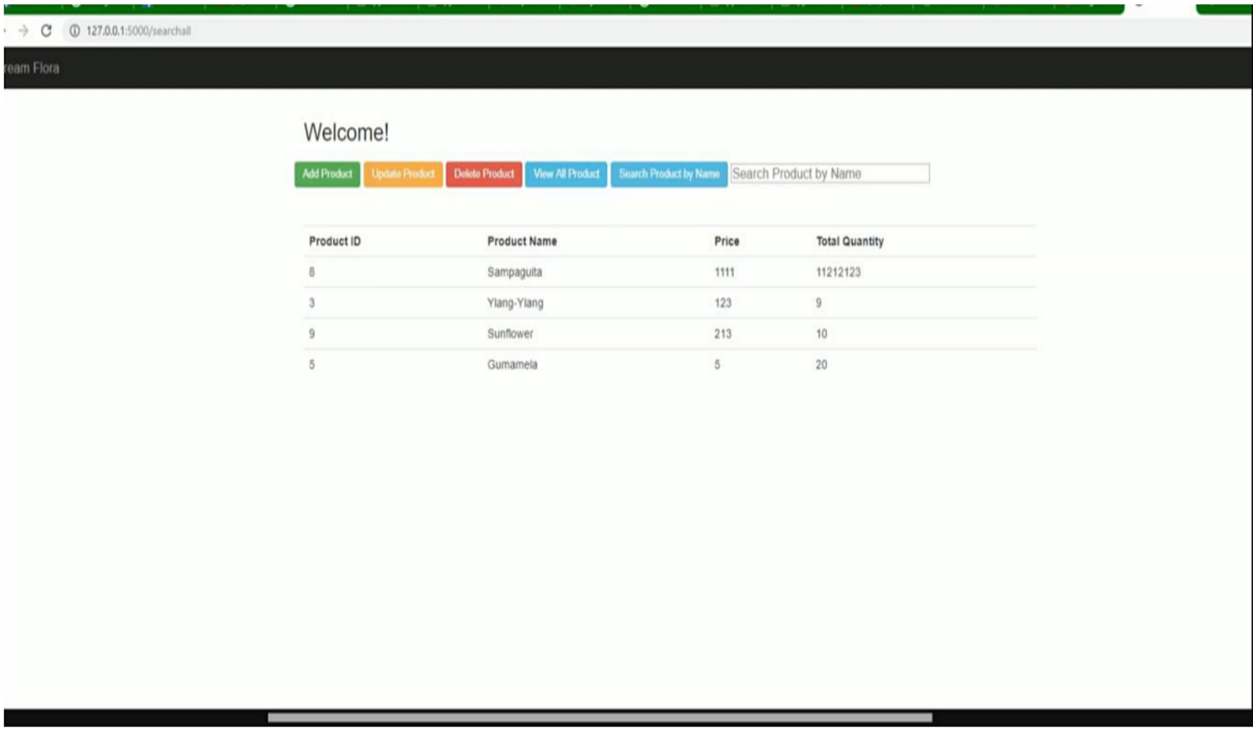
Signup page



Login page


Inventory
127.0.0.1:5000/log
Dream Flora
Logout
Welcome!
Login Successfully
Add Product
Update Product
Delete Product
View All Product
Search Product by Name
Search Product by Name
Product ID
Product Name
Price
Total Quantity
Add Product
Name
apple
Price
20
Quantity
2
Cancel
Save

Output page



10.ADVANTAGES

- ➤ Provides security
- ➤ Can manage high demand
- ➤ Satisfy customers with dependability
- ➤ Avoid shortages
- ➤ Can helpful for planning and control

DISADVANTAGES

- ➤ It is involving working capital
- ➤ Value depreciation of inventory
- ➤ Inventory uses the space
- ➤ Consuming time
- ➤ It incurs storage cost

11.CONCLUSION

In conclusion, it has examined that effective inventory management is a crucial aspect management of operations.It enables the company to hold and store the raw materials and points of consumption. The use of information technology ensures the cost-effectiveness of supply chain management and improves inventory management efficiency. Thus, information positively management influences that competitive advantage technology inventory leads

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.

PREDICTION

It can help businesses optimize their working capital by accurately predicting stock-outs and suggesting appropriate safety threshold levels

13. APPENDIX

Source Code: https://github.com/IBM-EPBL/IBM-Project-20134-1659712981/tree/main/project%20developement%20phase/source%20code

GitHub LinK:https://github.com/IBM-EPBL/IBM-Project-20134-1659712981

Demo Link:https://drive.google.com/file/d/1NGl6C52EiUehZiDql_0jsaBpJHMZa_xu/view?usp=drivesdk