

IBM Experiential Learning
Inventory Management System for Retailers

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CHAPTER-1

1. INTRODUCTION

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.

1.1 Project Overview

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.

CHAPTER-2

2. LITERATURE SURVEY

S.No	Paper	Author	Year	Method and Algorithm
1	A Study of Inventory Management System Case Study	Tariq Hussain Sheikh	2018	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 steel manufacturing industry (Small Scale Industry) on inventory management. The relationship between the inventory management and company performance was determined based on inventory days and return on asset (ROA) analysis. The research found that company X had a few inventory problems such as unorganized inventory arrangement, large amount of inventory days / no cycle counting and no accurate records balance due to unskilled workers. The study also proved that there was a significant relationship between return on asset (ROA) and inventory days. This paper also provides recommendation to the company and for further research.
2	Research paper on Inventory management system	Punam Khobragade	2018	Inventory Management System is software which is helpful for the businesses operate hardware stores, where store owner keeps the records of sales and purchase. Mismanaged inventory means disappointed customers, too much cash tied up in warehouses and slower sales. This project eliminates the paper work, human faults, manual delay and

				<p>speed up process. Inventory Management System will have the ability to track sales and available inventory, tells a store owner when it's time to reorder and how much to purchase. Inventory Management System is a windows application developed for Windows operating systems which focused in the area of Inventory control and generates the various required reports.</p>
3	Inventory management efficiency analysis	S S Islam,A Rochim, A H Pulungan	2018	<p>The research aims to examine factors that affect inventory mismanagement in a Small Medium Enterprises (SME), which is a market leader in the Heavy Equipment Spare part Industry. Despite its status as market leader, the company deals with various inventory problems, for examples slow-moving stocks, delivery delays to customers, and so forth. Those problems, at the end, may reduce company's profit. In order to determine the main factors, this study applies quantitative and qualitative methods. Quantitative methods, specifically Pareto diagram and Inventory Turnover Ratio (ITR), are mainly used to evaluate sales and inventory management. ITR is affected by spare part quantity, warehouse area used, and the material amount. The top five ITR ratings are examined further through observation, interview, and questionnaire techniques. Meanwhile, the qualitative method is applied to evaluate the company's inventory information systems, procedures and coordinations among departments, and human</p>

				resources. Our findings suggest that the unintegrated company's information system and lack of qualified human resources are the main factors affect inefficient inventory management. The research benefits to industry by suggesting the importance of information systems and human resources to inventory management. As for academics, this research enriches inventory management literature.
4	A Study on Inventory Management towards Organizational Performance	Fararishah Abdul Khalid and Samantha Reina Lim	2018	Inventory exists in almost every organization, it is crucial for an organization to have good understanding and strategy about inventory management. Inventory management has significance for an enterprise in an inventory intensive manufacturing industry (Rajeev, 2008). In this research, the researcher aimed to know the relationship between inventory management and organizational performance of manufacturing company in Melaka. Thus, the researchers identified three inventory management strategies, Vendor Managed Inventory (VMI), Material Requirement Planning (MRP), and Just-In-Time (JIT), as the independent variables to investigate the research questions. In order to collect the data and information needed, the researcher used qualitative method as the research methodology. The interviewee is aimed to be the inventory management manager of the target company. The data analysis will be using a deductive approach where all interview questions will be constructed based on the research questions, research objectives and conceptual framework. After the interview is conducted, the researcher will transcribe the script

				and start analysing based on the answer given by the interviewee.
5	A STUDY ON INVENTORY MANAGEMENT AND CONTROL	PRATAP CHANDR AKUMA R. R GOMATHI SHANK AR	2017	Abstract The aim of the study is to examine the inventory management process. The significance of this research is based on the benefits that can be obtained by identifying the issues of inventory control. The methodology used are unstructured interviews, on-site study, and annual report analysis. Inventory management is an important area of manufacturing industry. If company fails to manage inventory, they will face failure. It is a challenge for the company to maintain fair inventory. There are various inventory management techniques available for maintaining fair inventory level in the company. The basic objective of this paper is to study about inventory management techniques used in Linamar India Pvt. Ltd. and find out some measures for improvement on inventory management process of the concerned company. The present system of inventory management of the company is good. For improvement of the present inventory management system, company should adopt other inventory management techniques

2.1 Existing problem

The existing problem are Inconsistent Tracking, Problem Stock, Insufficient Order Management and Inaccurate Data.

2.2 References

1. Afentakis, P., Gavish, B., Karmarkar, U.: Computationally efficient optimal solutions to the lot-sizing problem in multistage assembly systems. Management Science 30, 222–239 (1984)
2. Aggarwal, A., Park, J.: Improved algorithms for economic lot-size problems. Operations Research 41, 549–571 (1993)

3. Aggarwal, P.K., Moinzadeh, K.: Order expedition in multi-echelon production/distribution systems. IIE Transactions 26(2), 86–96 (1994)
4. Aggarwal, S.: A review of current inventory theory and its applications. International Journal of Production Research 12, 443–472 (1974)
5. Agrawal, V., Cohen, M.A., Zheng, Y.S.: Service parts logistics: A benchmark analysis. IIE Transactions, Special Issue on Supply Chain Co-ordination and Integration 29(8), 627–639 (1997)

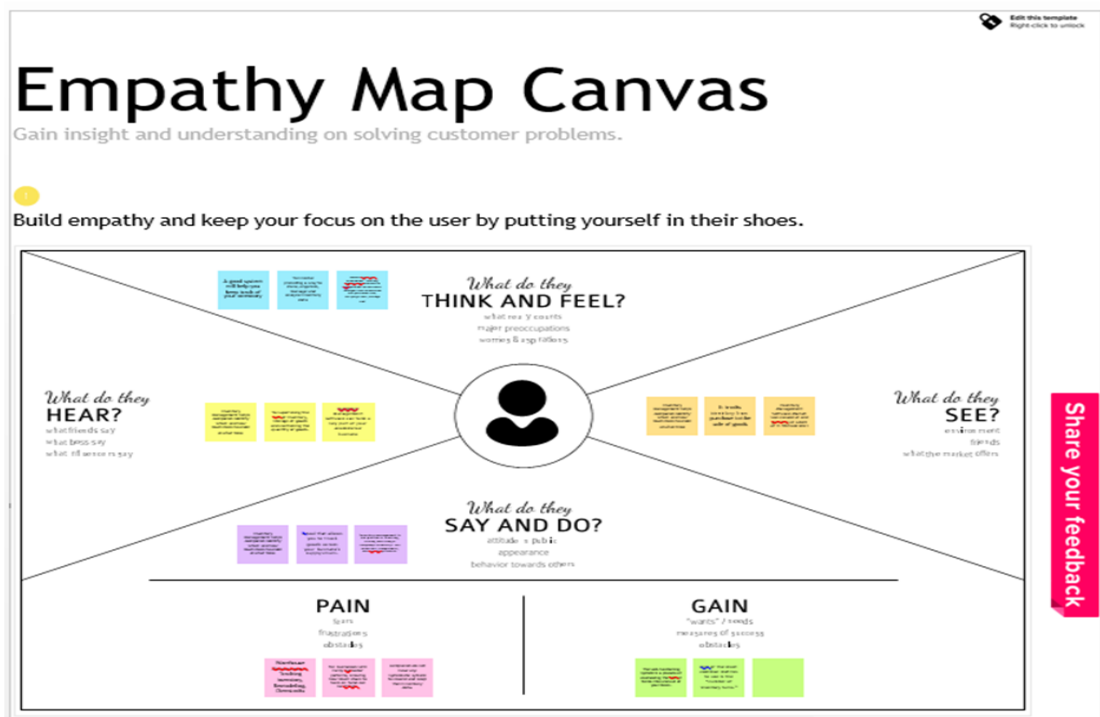
2.3 Problem Statement Definition

Inventory management is a challenging problem in supply chain management. The problem faced by the company is that they do not have any system to keep track of inventory data. It is difficult for the retailer to record the inventory data. Every inventory stock manager's main problem is keeping track of how much stock is purchased and how much stock is spent. A tool or system to aid the inventory management would be a beneficial tool in this area. Inventory management refers to managing the quantity, quality, location and transportation of various products utilized in manufacturing by various industrial organizations or in sales by various retailers. Usually, Inventory Management systems are limited and fixed to a selected range of items and cannot be modified and extended based on the customer's needs. The Inventory Management System focuses on making it expandable and usable easily by the end user and with constant customer support to alter the use. Unlike other software that provides similar functionalities.

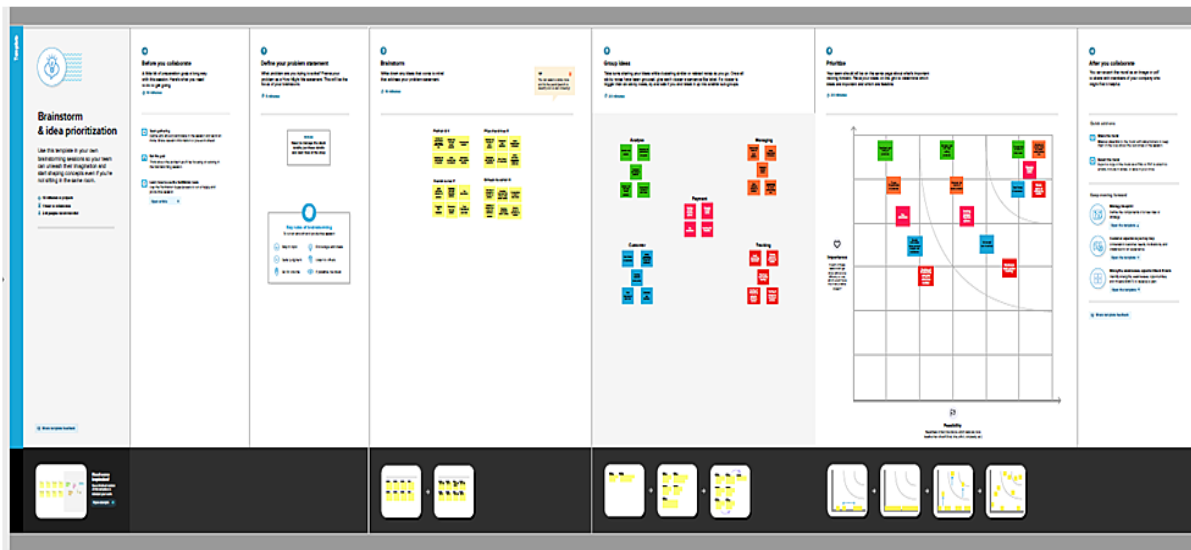
CHAPTER-3

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



3.3 Proposed Solution

S.No.	Parameter	Description
1	Problem Statement (Problem to be solved)	<ul style="list-style-type: none"> The retailers generally facing issues in recording the stocks and its threshold limit available. The customers are not satisfied with the retailers store since it doesn't have enough supplements and the deliveries were not made on time.
2	Idea / Solution description	<ul style="list-style-type: none"> This proposed system will have a daily update system whenever a product is sold or it is renewed more. The product availability is tracked daily and an alert system is again kept on to indicate those products which falls below the threshold limit. All the customers can register their accounts after which they will be given a login credentials which they can use whenever they feel like buying the stocks. The application allows the customers to know all the present time available

		stocks and also when the new stock will be available on the store for them to buy.
3	Novelty / Uniqueness	<ul style="list-style-type: none"> • Certain machine learning algorithms are used to predict the seasonal high selling products which can be made available during that time. • Prediction of the best selling brand of all certain products based on their popularity, price and customer trust and satisfaction will be implemented. • Notifications will be sent to the retailers if any product that the customers have been looking for is not available so that the product can be stocked up soon.
4	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> • The customers will be highly satisfied since the wasting of time while searching for an unavailable product is reduced. • The work load of the retailers will be minimized if the system is automated every day and during every purchase. • The customer satisfaction will be improved for getting appropriate response from the retailers and that too immediately.

5	Business Model (Revenue Model)	<ul style="list-style-type: none"> ● Hereby we can provide a robust and most reliable inventory management system by using: <ul style="list-style-type: none"> ○ ML algorithms for all the prediction purposes using all the past dataset since datasets are undoubtedly available in huge amounts. ○ Can deploy the most appropriate business advertising models. ○ To establish a loss preventing strategy. ○ And to ensure the all time, any where availability of products system.
6	Scalability of the Solution	<ul style="list-style-type: none"> ● Implementation of anyone and anywhere using system can be helpful for even a commoner to buy the products. ● Daily and Each time purchase updation of the stock for preventing inventory shrinkage.

3.4 Problem Solution fit

Problem-Solution fit canvas 2.0 Purpose / Vision : To help the retailers in managing their stocks

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS Our proposed model targets the distributors, wholesalers, manufacturers and retailers to track their stocks.	6. CUSTOMER CONSTRAINTS CC Too much stock on hand can be just as hazardous as not enough. Overstock negatively affects a company's cash flow and causes issues with storage and loss of inventory. Also doesn't come to know about the stocks which is to be short.	5. AVAILABLE SOLUTIONS AS It is laborious and unsafe to manage inventory with paperwork and manual procedures. Additionally, scaling across several warehouses with a lot of goods is difficult. Provide workers with the appropriate inventory tools for the job. Software is required to replace manual inventory tracking, and purchase orders and invoices must be processed without the use of paper.	Explore AS, differentiate
	2. JOBS-TO-BE-DONE / PROBLEMS J&P The problem faced by them is that it is difficult to manage the large amount of inventory data. They have maintain the hardcopy of the inventory, it is difficult to organize properly. Pen and paper work is too tedious.	9. PROBLEM ROOT CAUSE RC Difficulty in managing the large amount of stocks using pen and paper and struggles in managing the stocks date without centralized data storage.	7. BEHAVIOUR BE It is time-consuming, redundant, and prone to errors to use manual inventory tracking techniques across various programmes and spreadsheets. An integrated central inventory management system with accounting capabilities might be helpful for even small retailers.	
Focus on J&P, fit into	3. TRIGGERS TR This inventory management method will inspire distributors, retailers who own markets or wholesale enterprises by making them to handle the data easily.	10. YOUR SOLUTION SL Our aim is to design the inventory management system to increase the scalability of the retailers business with the help of automated inventory management system and also aim to save the time. The customer can able to track the sold stocks and availability of stocks. They get notified when the stock is about to end.	8. CHANNELS of BEHAVIOUR CH 8.1 ONLINE Collecting information from various websites and utilise it efficiently. 8.2 OFFLINE Collecting feedbacks to improve the efficiency of the system.	Extract online & offline CH of BE
	4. EMOTIONS: BEFORE / AFTER EM Before: Depressed, Worn out of managing stocks. After : Stress less, Enthusiastic in works			

Problem-Solution fit canvas is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 License
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AMALTAMA

4. REQUIREMENT ANALYSIS

4.1 Functional requirements

- Inventory Management
- Inventory Tracking
- Transfer Management
- Purchasing
- Shipping
- Reporting & Analytics
- Deployment

4.2 Non-Functional requirements

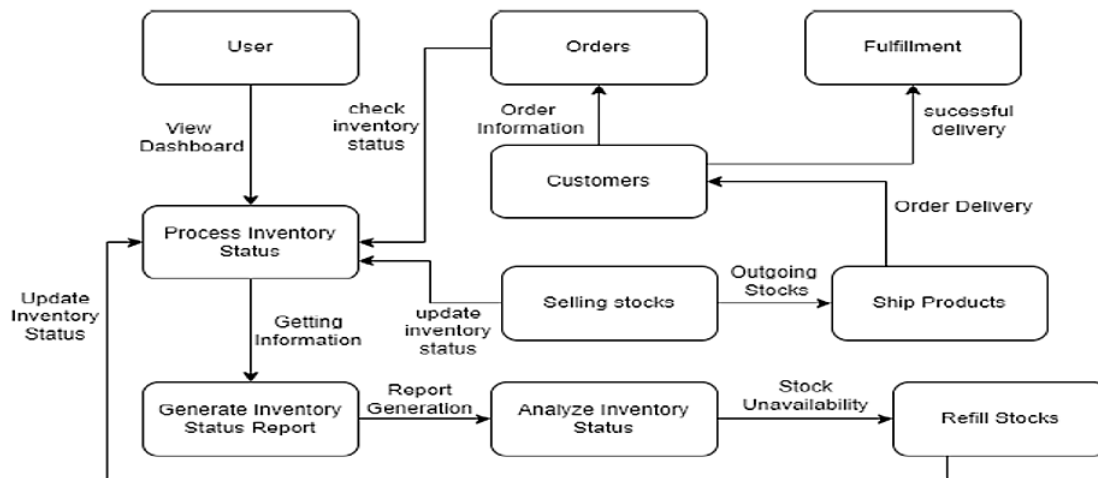
- Performance
- Scalability
- Portability
- Compatibility
- Reliability
- Availability
- Maintainability
- Security
- Localization
- Usability

CHAPTER-5

5. PROJECT DESIGN

5.1 Data flow diagrams

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



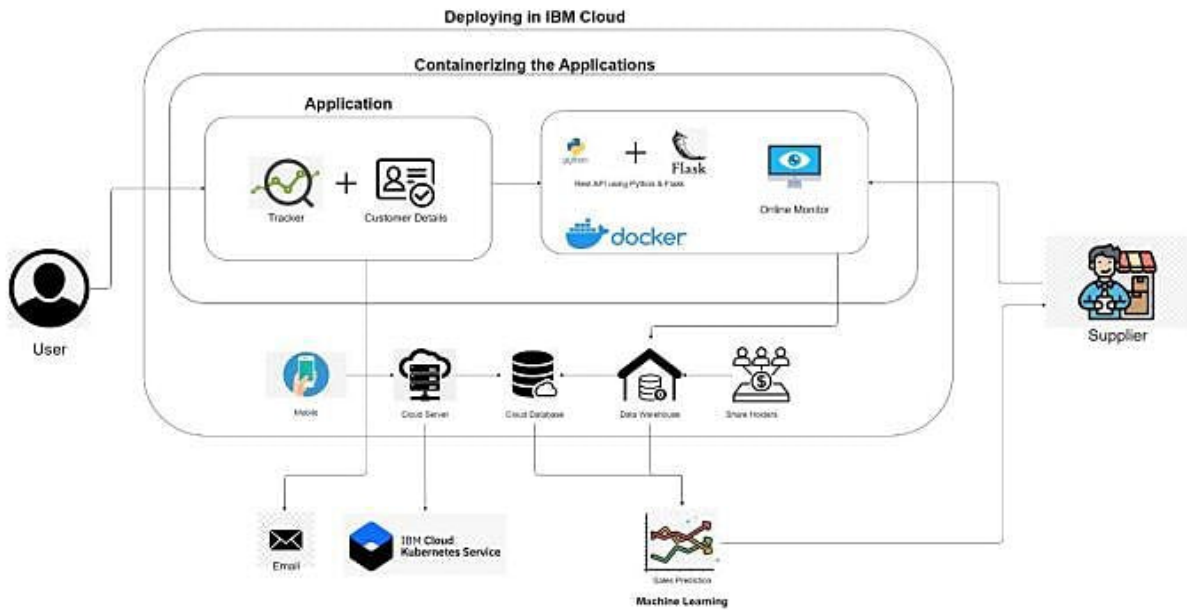
5.2 Solution & Technical architecture

Solution architecture

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

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

Solution Architecture Diagram:



Technical architecture

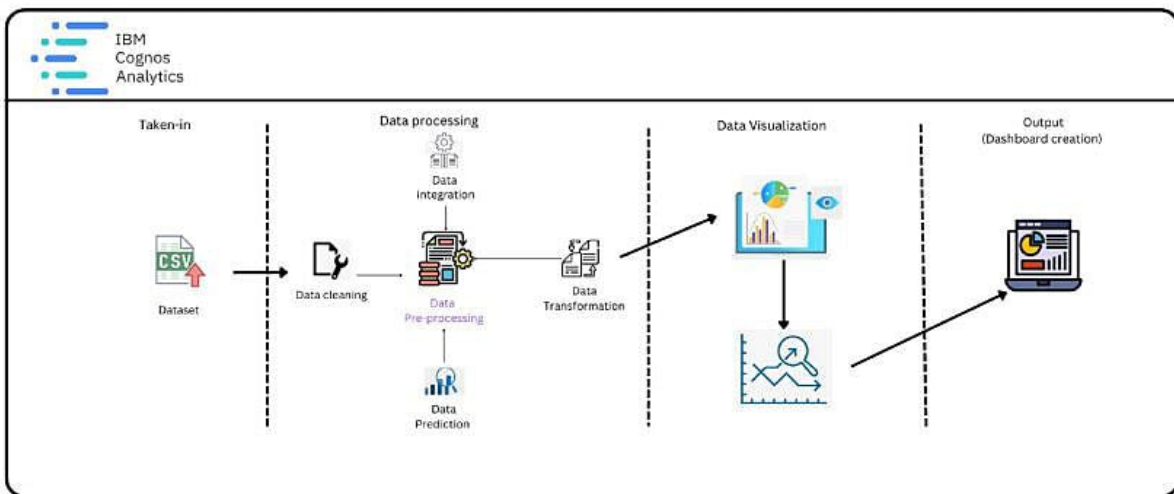


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The user interacts with application using Web UI	HTML,CSS,JavaScript
2.	DataProcessing	The data from the Data set is pre-processed	IBM Cognos Analytics
3.	CloudDatabase	The clean data set is stored on IBM Cloud	IBM Cloud
4.	Data visualization	The data is visualized into different forms	IBM Cognos Analytics, Python
5.	Prediction	These Algorithm techniques are used to predict the proper way to make the stock in store.	ML algorithms-Logistic Regression, Linear Regression, Random Forest, ABC Techniques.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Open-source frame works used	IBM Cognos Analytics, Python
2.	Security Implementations	Request authentication using Encryptions	Encryptions
3.	Scalable Architecture	Scalability consists of 3-tiers	Web Server-HTML, CSS, Javascript Application Server-Python Database Server-IBM Cloud
4.	Availability	The application is available for cloud users	IBM Cloud Hosting
5.	Performance	The user can know how to maintain the inventory to increase profits.	ML algorithms

5.3 User stories

User Type	Functional Requirements (Epic)	User Story Number	User Story	Priority	Release
Retailer (Web User)	Registration	USN-1	As a user, I can register for the application by using my email & password and confirming my login credentials.	High	Sprint-1
		USN-2	As a user, I can login through my E-mail.	Medium	Sprint-1
	Confirmation	USN-3	As a user, I can receive my confirmation email once I have registered for the application.	High	Sprint-1
	Login	USN-4	As a user, I can log in to the authorized account by entering the registered email and password.	Medium	Sprint-1
	Dashboard	USN-5	As a user, I can view the products that are available currently	High	Sprint-2

	Stocks Update	USN-6	As a user, I can add products which are not available in the inventory and restock the products	Medium	Sprint-2
	Sales prediction	USN-7	As a user, I can get access to sales prediction tool which can help me to predict better restock management of product.	Medium	Sprint-3
	Request for customer care	USN-8	As a user, I am able to request customer care to get in touch with the administrators and enquire the doubts and problems.	Medium	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.	Medium	Sprint-4

CHAPTER-6

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

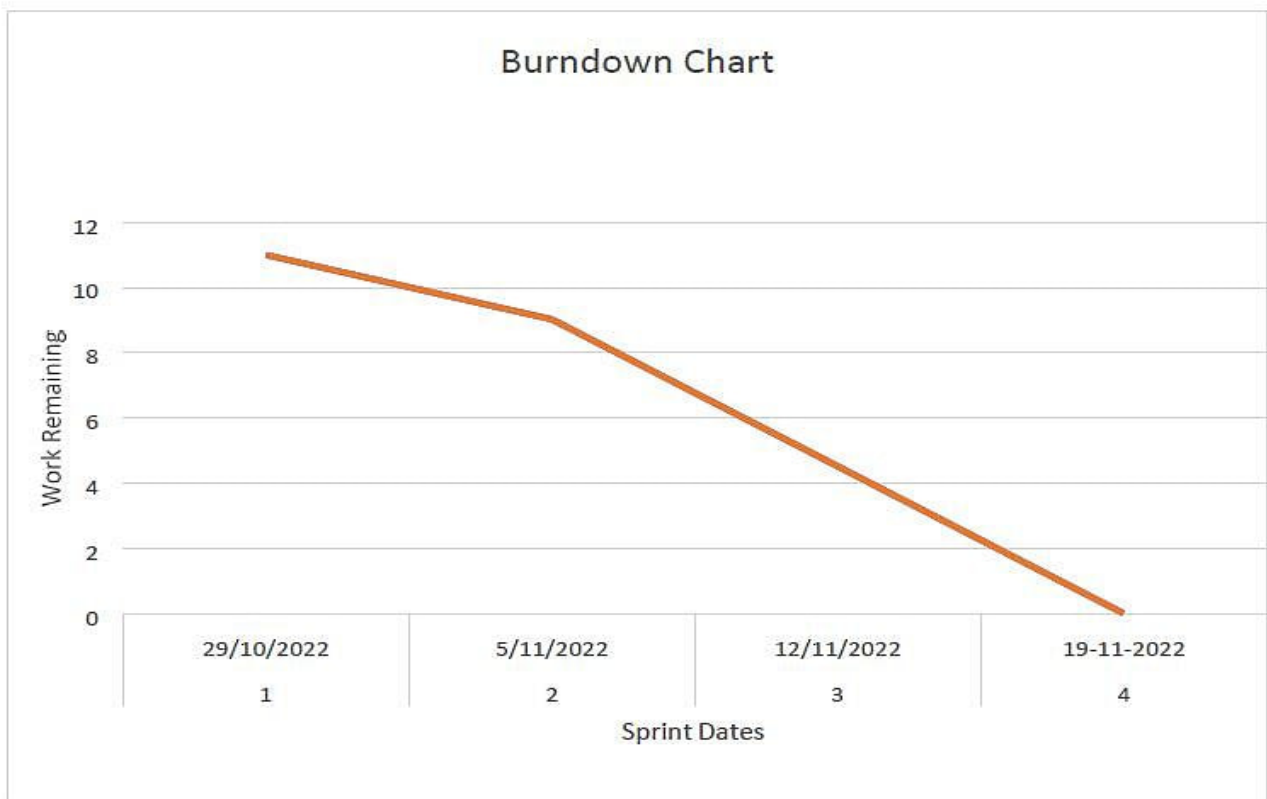
Sprint	Functional Rquirements (Epic)	User Story Number	User Story	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by using my email & password and confirming my login credentials.	3	High	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N
Sprint-1		USN-2	As a user, I can login through my E-mail.	3	Medium	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N
Sprint-1	Confirmation	USN-3	As a user, I can receive my confirmation email once I have registered for the application.	2	High	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N
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	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N

Sprint-2	Dashboard	USN-5	As a user, I can view the products that are available currently.	4	High	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N
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	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N
Sprint-3	Sales prediction	USN-7	As a user, I can get access to sales prediction tool which can help me to predict better restock management of product.	6	Medium	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N
Sprint-4	Request for customer care	USN-8	As a user, I am able to request customer care to get in touch with the administrators and enquire the doubts and problems.	4	Medium	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N
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	Prathish B V, Priyadharshinee R, Thanish Kumar P, ShihaabHuvairish N

6.2 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	11	6 Days	24 Oct 2022	29 Oct 2022	11	29 Oct 2022
Sprint-2	7	6 Days	31 Oct 2022	05 Nov 2022	7	05 Nov 2022
Sprint-3	6	6 Days	07 Nov 2022	12 Nov 2022	6	12 Nov 2022
Sprint-4	7	6 Days	14 Nov 2022	19 Nov 2022	7	19 Nov 2022

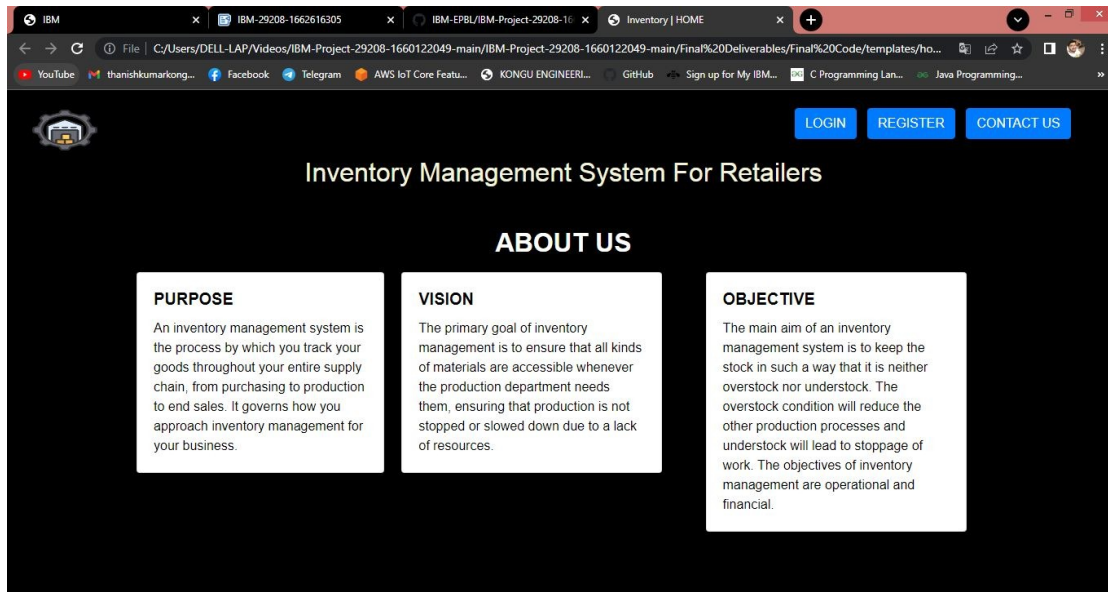
6.3 Reports from JIRA



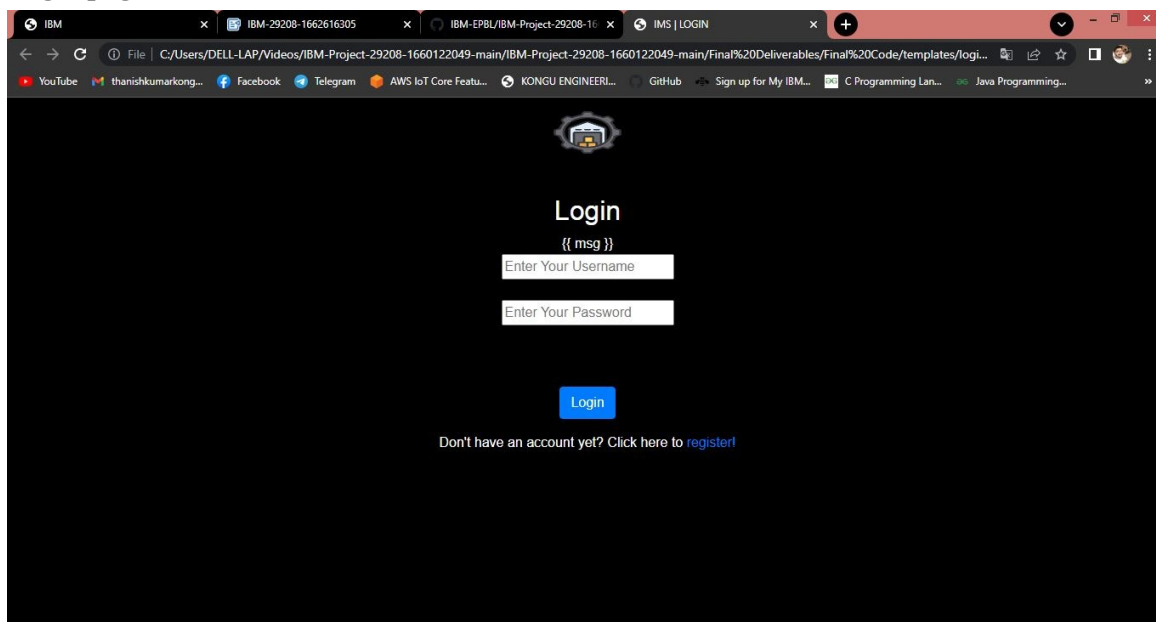
7. CODING & SOLUTIONING (Explain the features added in the project along with code)

7.1 Feature 1

Home page:



Login page:



Register page:

Register Form

{{ msg }}

Enter Your Username

Enter Your Email ID

Enter Your Password

Register

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

Dashboard page:

Add stock

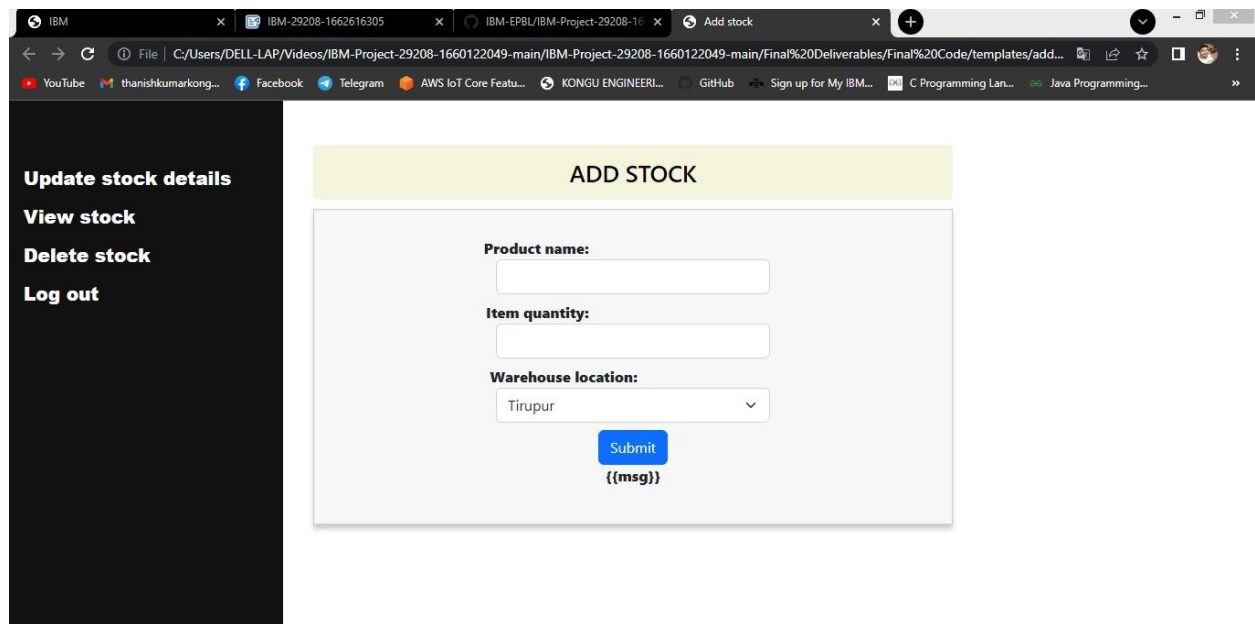
Update stock details

View stock

Delete stock

Log out

Add stock page:



IBM-29208-1662616305 IBM-EPBL/IBM-Project-29208-1660122049-main Add stock

File | C:/Users/DELL-LAP/Videos/IBM-Project-29208-1660122049-main/IBM-Project-29208-1660122049-main/Final%20Deliverables/Final%20Code/templates/add...

YouTube thanishkumarkong... Facebook Telegram AWS IoT Core Featu... KONGU ENGINEERI... GitHub Sign up for My IBM... C Programming Lan... Java Programming...

Update stock details
View stock
Delete stock
Log out

ADD STOCK

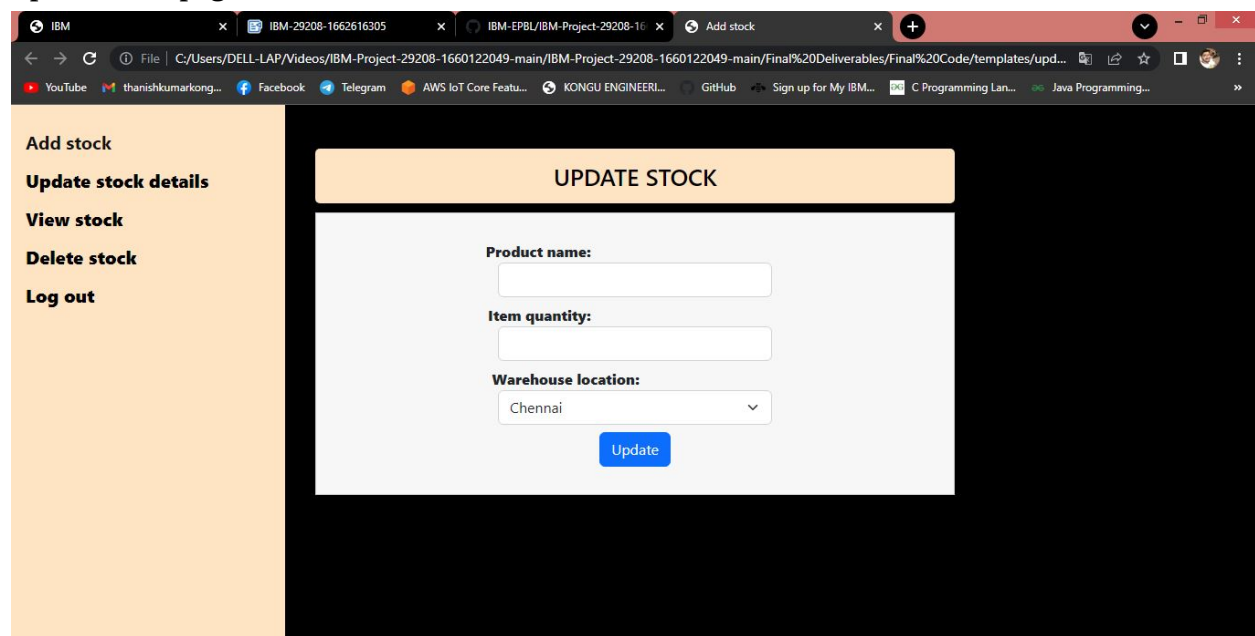
Product name:

Item quantity:

Warehouse location:

Submit
{{msg}}

Update stock page:



IBM-29208-1662616305 IBM-EPBL/IBM-Project-29208-1660122049-main Add stock

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YouTube thanishkumarkong... Facebook Telegram AWS IoT Core Featu... KONGU ENGINEERI... GitHub Sign up for My IBM... C Programming Lan... Java Programming...

Add stock
Update stock details
View stock
Delete stock
Log out

UPDATE STOCK

Product name:

Item quantity:

Warehouse location:

Update

Delete stock page:

Add stock

Update stock details

View stock

Delete stock

Log out

Delete stock

Product name:

Delete

7.2 Feature 2

Backend IBM DB2:

Data objects | Saved objects

Filter objects

LHY73704

Untitled - 1 | *Untitled - 2 | *Untitled

SQL

1 select * from users

History | Results

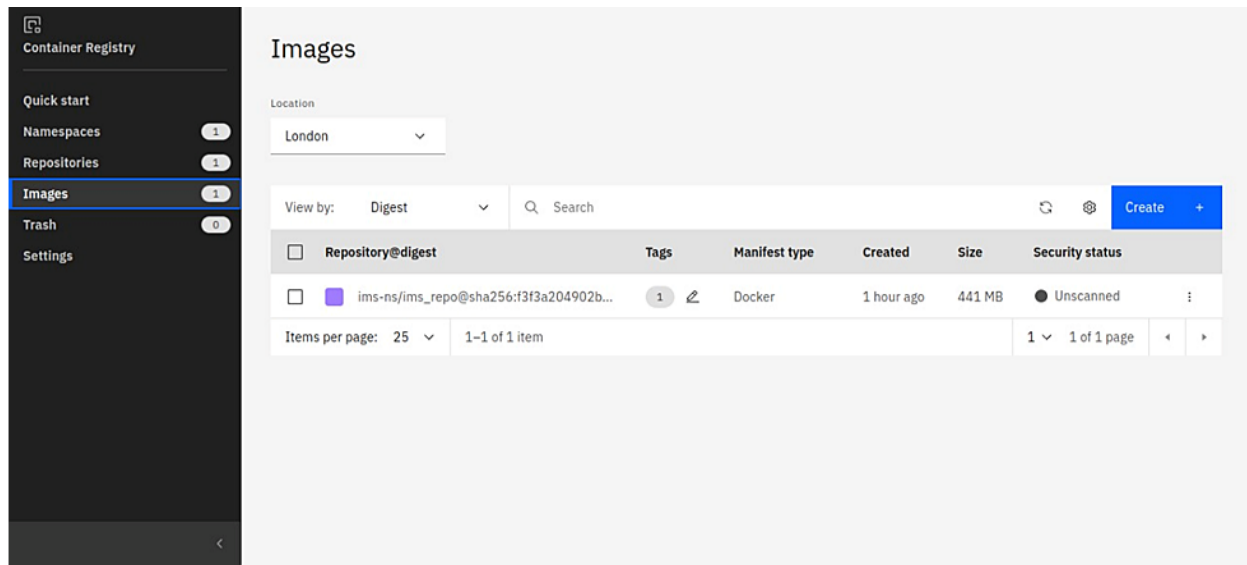
Result set 1

Filter table

Total: 2

USERNAME	EMAIL	PASSWORD
sankar	sankarannamalai01@gmail.com	sankar
somu	sankarannamalai01@gmail.com	sankar

Backend IBM Cloud:



8. TESTING

8.1 Test Cases

Login

- Verify user is able to see login page
- Verify user is able to log into application or not?
- Verify login page elements

Register

- Verify if user is able to enter all the details and register
- Verify if user is redirected to login page once registered.

Add products

- Verify user is able to add products in add product page
- Verify whether added products are correctly added in the table

View products

- Verify whether products can be viewed in view page
- Verify whether products can be retrieved correctly from database

Update Products

- Verify user is able to update products in update page
- Verify whether updated product details are correctly updated in the table
- Verify if the product quantity is less than 5
- Verify if an alert email has been sent to retailer if the product quantity is less

Delete Products

- Verify user is able to delete product movements
- Verify whether deleted product gets deleted from the table

8.2 User Acceptance Testing

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data
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	Inventorymanagement localhost
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	Inventorymanagement localhost
LoginPage_TC_003	Functional	Home page	Verify user is able to log into application with Valid credentials		1.Enter URL 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: abishekr66@gmail.com password: abi123
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter URL and click go 2.Click on My Account dropdown button 3.Enter Invalid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: abishekr66@gmail.com password: abi123
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter URL 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: abishekr66@gmail.com password: abi1233ha82
LoginPage_TC_005	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter URL 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: abishekr password: abi1233ha82

Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Signup popup displayed or not	Inventorymanagement localhost	Login/Signup popup should display	Working as expected	Pass				
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	Inventorymanagement localhost	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		BUG-1234	Abishek L R
1.Enter URL 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: abishekr66@gmail.com password: abi123	User should navigate to user account homepage	Working as expected	pass				
1.Enter URL and click go 2.Click on My Account dropdown button 3.Enter Invalid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: abishekr66@gmail.com password: abi123	Application should show 'incorrect email or password' validation message.	Working as expected	Fail	need to verify		bug-1235	Yaswanth M
1.Enter URL 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: abishekr66@gmail.com password: abi1233ha82	Application should show 'incorrect email or password' validation message.	Working as expected	pass				
1.Enter URL 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: abishekr password: abi1233ha82	Application should show 'incorrect email or password' validation message.						

9. RESULTS

This is the inventory management system for retailers to login to their account, Add the stock, Update stock details, View the stock, Delete the stock and Log out from their account.

10. ADVANTAGES & DISADVANTAGES

10.1 ADVANTAGES:

- It helps to maintain the right amount of stocks:

Contrary to popular assumption, inventory management tries to maintain a balance where your inventory is operating at optimal efficiency and you do not need to have too many or too few inventories on hand at any given time. This helps you keep the proper quantity of stock on hand.

- It leads to a more organized warehouse

It results in a more organised warehouse since you can easily organise your warehouse with the help of an effective inventory management system. It will be quite challenging to maintain your inventory if your warehouse is disorganised

- It saves money and time:

A successful inventory management system can result in time and money savings for the company. You can avoid the inconveniences of having to do an inventory recount in order to verify the accuracy of your records by keeping track of the merchandise you already have on hand.

- Increases productivity and efficiency:

Inventory management tools like bar code scanners and inventory management software can significantly boost a company's productivity and efficiency.

10.2 DISADVANTAGES:

- Lack of a human touch:

This is another drawback of inventory management. The availability of products across the globe is facilitated by large supply chain management systems, and the majority of them offer customer service support in the event of a problem, but the increase in infrastructure can frequently mean a loss of the personal touch that makes a company stand out from the competition.

- Increased room is required to hold the inventory:

Unless the products you trade in are extremely small in size, a warehouse will be required to store your inventory. In addition, you will require workers, forklifts to transport the stock, and shelves and racks to store your products.

- Complexity:

Some inventory management techniques and strategies might be challenging for personnel to comprehend and relatively sophisticated. Employee training may be required as a result so they can understand how the system operates.

- High implementation costs:

Because the business must install specialised systems and software in order to use them, some inventory management systems can be expensive to implement.

11. CONCLUSION

Thus, the projected using IBM CLOUD is tested, verified and executed successfully.

12. FUTURE SCOPE

In future, we planned using implemented this project in large scale which will be helpful and used by all the people.

13. APPENDIX

13.1 Source Code

HOME.HTML

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css" rel="stylesheet"
```

```
integrity="sha384- Zenh87qX5JnK2Jl0vWa8Ck2rdkQ2Bzep5IDxbcnCeuOxjzrPF/et3URy9Bv1WTRi"
crossorigin="anonymous">
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js"
integrity="sha384- OERcA2EqJJCMA+/3y+gxIOqMEjwtxJY7qPCqsdltbNJuaOe923+mo//f6V8Qbsw3"
crossorigin="anonymous"></script>
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>IMS | HOME</title>
<meta charset="UTF-8">
<!-- favicon-->
<!-- <link rel="shortcut icon" href="/assets/img/favicon.ico" type="image/x-icon"> -->
<!-- <link rel="icon" href="/assets/img/favicon.ico" type="image/x-icon"> -->
<link rel="icon" type="image/png" sizes="16x16" href="#">
<!-- bootstrap css cdn -->
<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.c
ss"integrity="sha384-
JcKb8q3iqJ61gNV9KGb8thSsNjpSL0n8PARn9HuZOnIxN0hoP+VmmDGMN5t9UJ0Z"
crossorigin="anonymous">
<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/@fortawesome/fontawesome-free@4.7.0/css/fontawesome.css">
<!-- css stylesheet -->
<link rel="stylesheet" href="static/css/style.css">
<!-- font styles cdn -->
<link rel="preconnect" href="https://fonts.gstatic.com">
<link href="https://fonts.googleapis.com/css2?family=Alegreya&display=swap" rel="stylesheet">
<link href="https://fonts.googleapis.com/css2?family=Alegreya:wght@600&display=swap"
rel="stylesheet">
</head>
<body>
<!-- bootstrap navbar -->
<nav class="navbar sticky-top navbar-expand-lg navbar-dark">
<div class="container-fluid">
<a class="main-logo-img mt-3" href="#">
<!-- <a class="navbar-brand" href="index.html">JobPortal</a>
-->
</a>

<div class="row donate-sponsor">
<a type="button" class="btn btn-success mr-1" id="donate" href="login">LOGIN</a>
<a type="button" class="btn btn-warning mr-1" id="sponsor" href="register">REGISTER</a>
<a type="button" class="btn btn-primary mr-1" id="sponsor" href="contact.html">CONTACT US</a>
</div>
</div>
</nav>
```

```
<!-- navbarends -->  
<!-- what wefocus on -->  
<section class="our-focus">  
  <div class="container">  
    <h2 class="text-center mt-3">ABOUT US</h2>  
    <div class="row ml-3 mt-3">  
      <div class="col-lg-3 mr-5" id="focus-first">  
        <div class="card" style="width: 19rem;">  
  
          <!--   
          <div class="card-body">  
            <h5 class="card-title">PURPOSE</h5>  
            <p class="card-text">An inventory management system is the process by which you track your goods throughout your entire supplychain, from purchasing to production to end sales. It governs how you approachinventory management for your business.</p>  
          </div>  
        </div>  
      </div>  
      <div class="col-lg-3 mr-5" id="focus-second">  
        <div class="card" style="width: 20rem;">  
          <!--   
          <div class="card-body">  
            <h5 class="card-title">VISION</h5>  
            <p class="card-text">The primary goal of inventory management is to ensure that all kinds of materials are accessible whenever the production department needs them, ensuring that production is not stopped or slowed down due to a lack of resources.</div>  
          </div>  
        </div>  
      </div>  
      <div class="col-lg-3 ml-5" id="focus-third">  
        <div class="card" style="width: 20rem;">  
          <!--   
          <div class="card-body">  
            <h5 class="card-title">OBJECTIVE</h5>  
            <p class="card-text"> The main aim of an inventory management system is to keep the stock in such a way that it is neither overstock nor understock. The overstock condition will reduce the other production processes and understock will lead to stoppage of work. Theobjectives of inventorymanagement are operational and financial.</p>  
          </div>  
        </div>  
      </div>  
    </div>  
  </section>  
<!-- focus sectionends -->  
<!-- footer starts-->
```

```

<!-- Site footer-->
<footer class="footer">

<div class="container mt-5">
<div class="row">
<h3>INVENTORY MANAGEMENT SYSTEM FOR RETAILERS</h3>
<p class="text-justify">Inventory Management System is a process of ordering, storing, and using
inventories. This stock management includes generating the lead on raw materials, components, and
finished products, along-side warehousing, and processing of such items in your company. The available
stock of inventories must be physically counted before it is put on the balancesheet.</p>
</div></div><hr> </div></div></footer> </body></html>

```

Register.html

```

<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css" rel="stylesheet"
integrity="sha384- Zenh87qX5JnK2Jl0vWa8Ck2rdkQ2Bzep5IDxbcnCeuOxjzrPF/et3URy9Bv1WTRi"
crossorigin="anonymous">

<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js"
integrity="sha384- OERcA2EqjJCMA+/3y+gxIOqMEjwtxJY7qPCqsdltbNjuaOe923+mo//f6V8Qbsw3"
crossorigin="anonymous"></script>
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>IMS | LOGIN</title>
<!-- favicon-->
<!-- <link rel="shortcut icon" href="/assets/img/favicon.ico" type="image/x-icon"> -->
<!-- <link rel="icon" href="/assets/img/favicon.ico" type="image/x-icon"> -->
<link rel="icon" type="image/png" sizes="16x16" href="/assets/img/favicon-32x32.png">
<!-- bootstrap css cdn -->
<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css"
integrity="sha384-
JcKb8q3iqJ61gNV9KGb8thSsNjpSL0n8PARn9HuZOnIxN0hoP+VmmDGMN5t9UJ0Z"
crossorigin="anonymous">
<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/font-awesome@4.7.0/css/font-
awesome.css">
<!-- css stylesheet -->
<link rel="stylesheet" href="static/css/style.css">
<!-- font styles cdn -->
<link rel="preconnect" href="https://fonts.gstatic.com">
<link href="https://fonts.googleapis.com/css2?family=Alegreya&display=swap" rel="stylesheet">
<link href="https://fonts.googleapis.com/css2?family=Alegreya:wght@600&display=swa
p"rel="stylesheet">

```

```

</head>
<body>
<!-- bootstrap navbar -->
<div class="logo mt-3 text-center">
<a class="main-logo-img mt-5" href="#">
<!-- <a class="navbar-brand" href="index.html">JobPortal</a> -->
</a>
</div>
<!-- navbarends -->
<!-- Login form -->
<div class="login text-center mt-5">
<h2> RegisterForm </h2>
<form action="/register" method="post">
<div class="msg">{{ msg }}</div>
<!-- <input type="text" placeholder="fullname" id="fullname">
</br></br> -->
<input type="text" name="username" placeholder="Enter Your Username" id="username"
required></br></br>
<input type="email" name="email" placeholder="Enter Your Email ID" id="email" required></br></br>
<input type="password" name="password" placeholder="Enter Your Password" id="password"
required></br></br>
</br></br>
<button type="submit" id="button" class="btn btn-primary"> Register
</button>
</form>
</div>

<div class="note mt-3 text-center"> <!--Register form -->
<p> alreadyhave an account ? pleaselogin <a href="/login">login! </a>
</p>
</div>
</body>
</html>

```

Login.HTML

```

<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.cs s" rel="stylesheet"
integrity="sha384- Zenh87qX5JnK2Jl0vWa8Ck2rdkQ2Bzep5IDxbcnCeuOxjzrPF/et3URy9Bv1WTRi"
crossorigin="anonymous">
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.m in.js"
integrity="sha384- OERcA2EqjJCMA+/3y+gxIOqMEjwtxJY7qPCqsdltbNJuaOe923+mo//f6V8Qbsw3"

```

```

crossorigin="anonymous"></script>
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>IMS | LOGIN</title>
<!-- favicon-->
<!-- <link rel="shortcut icon" href="/assets/img/favicon.ico" type="image/x-icon"> -->
<!-- <link rel="icon" href="/assets/img/favicon.ico" type="image/x- icon"> -->
<link rel="icon" type="image/png" sizes="16x16" href="/assets/img/favicon-32x32.png">
<!-- bootstrap css cdn -->
<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.c ss"
integrity="sha384-
JcKb8q3iqJ61gNV9KGb8thSsNjpSL0n8PARn9HuZOnIxN0hoP+VmmDGMN5t9UJ0Z"
crossorigin="anonymous">
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/font-
awesome.css">
<!-- css stylesheet -->
<link rel="stylesheet" href="static/css/style.css">
<!-- font styles cdn -->
<link rel="preconnect" href="https://fonts.gstatic.com">
<link href="https://fonts.googleapis.com/css2?family=Alegreya&display=swap" rel="stylesheet">
<link href="https://fonts.googleapis.com/css2?family=Alegreya:wght@600&display=swa
p"rel="stylesheet">
</head>
<body>
<!-- bootstrap navbar -->
<div class="logo mt-3 text-center">
<a class="main-logo-img mt-5" href="#">
<!-- <a class="navbar-brand" href="index.html">JobPortal</a -->
</a>
</div>
<!-- navbarends -->
<!-- Login form -->
<div class="login text-center mt-5">
<h2> Login Form </h2>
<form action="/login" method="post">
<div class="msg">{{ msg }}</div>
<input type="text" name="username" placeholder="Enter Your Username" id="username"
required></br></br>

<input type="password" name="password" placeholder="Enter Your Password" id="password"
required></br></br>
</br>
</br>
<button type="submit" id="button" class="btn btn-primary"> Login

```

```
</button>
</form>
</div>
<div class="note mt-3 text-center"> <!--Register form -->
<p> Don't have an account yet? Click here to <a href="register">register! </a> </p>
</div>
</body>
</html>
```

GitHub Link: <https://github.com/IBM-EPBL/IBM-Project-29208-1660122049>

Project Link: <http://159.122.187.90:30006/>

Project Demo Link: https://drive.google.com/file/d/1JjvtVzr35qi-He_9qUFsVu5mcSMUCdV7/view?usp=sharing