MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE

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NAAC Accredited with A++ Grad

Project Report

On

Development Of Inventory Management System

A project report submitted in partial fulfilment of the requirement for the degree of

MASTER IN COMPUTER APPLICATION

in

COMPUTER SCIENCE AND ENGINEERING

Submitted By

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(0901CA221038)

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Professor & Faculty Coordinator MCA, Department of Computer Science and Engineering

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE
GWALIOR - 474005 (MP) Estd. 1957
JAN-JUNE 2024

JK TYRE & INDUSTRIES LTD.

JKTIL/HRD/SIP/24-25/04

Date: 16-April-2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Mohit Lakhera** S/o **Mr. Prakash Lakhera** a student of Masters of Computer Science from **MITS. Gwalior** has undergone Vocational Training in Information Technology Department of our organization from 01-Jan-2024 to 16-April-2024

During the training he has shown interest in learning **"Inventory Management System at Jk Tyres"** at Banmore Tyre Plant.

We wish him all Success in his future endeavours.

Yours Sincerely,

For JK Tyre & Industries Limited

(Banmore Tyre Plant)

HR -Department

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VIKRANT

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CERTIFICATE

This is certified that **Mohit Lakhera (0901CA221038)** has submitted the project report titled **Development of Inventory Management System** under the mentorship of **Mr. Gaurav Kushwaha** (Project Manager, JK Tyre & Industries Ltd, Banmore) in partial fulfilment of the requirement for the award of degree of **Master in Computer Application** of Computer Science and Engineering from **Madhav Institute of Technology and Science, Gwalior.**

Dr. Anshu Chaturvedi
Professor & Faculty Coordinater
,Computer Science and Engineering

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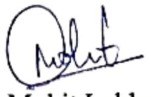
DECLARATION

I hereby declare that the work being presented in this project report, for the partial fulfilment of requirement for the award of the degree of Master in Computer Application in Computer Science and Engineering at **Madhav Institute of Technology & Science, Gwalior** is an authenticated and original-record of my work under the mentorship of **Mr. Gaurav Kushwaha, Project Manager (JK Tyre & Industries Ltd, Banmore)**

I declare that I have not submitted the matter embodied in this report for the award of any degree or diploma anywhere else.



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ACKNOWLEDGEMENT

The full semester project has proved to be pivotal to my career. I am thankful to my institute, **Madhav Institute of Technology and Science** to allow me to continue my disciplinary project. I extend my gratitude to the Director of the institute, **Dr. R. K. Pandit** and Dean Academics, **Dr. Manjaree Pandit** for this.

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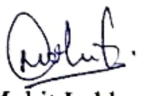
I am sincerely thankful to my faculty coordinator. I am grateful to the guidance of **Dr. Anshu Chaturvedi ,Faculty Coordinator, Professor,Computer Science and Engineering** for her continued support and guidance throughout the project. I am also very thankful to the faculty and staff of the department.



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ABSTRACT

An Inventory Management System (IMS) serves as a critical tool for an organisation to efficiently oversee and manage their inventory. This system integrates advanced technologies, such as real-time tracking, automation, and data analytics, to optimize the entire inventory lifecycle. The key features include accurate demand forecasting, centralized communication channels, and modern technology integration to eliminate manual errors.

Challenges addressed by an IMS range from inaccurate forecasting leading to overstock or stockouts, to communication gaps causing delays and errors in inventory coordination. Moreover, obsolete technology and manual processes are mitigated through the adoption of IMS ensuring accuracy and reducing operational inefficiencies.

The IMS offers real-time visibility into inventory levels and movements, empowering whole organization to make timely and informed decisions. Security concerns are addressed through access controls and regular security audits, safeguarding against theft and unauthorized access.

Supply chain disruptions are managed through contingency planning and diversified supplier networks, while relationships with suppliers are strengthened by implementing vendor-managed inventory systems and utilizing performance metrics. Employee training programs ensure that staff effectively utilize the system, reducing errors and improving overall efficiency.

In essence, an IMS optimizes inventory levels, mitigates risks, and enhances operational efficiency, leading to reduced costs and increased organisation satisfaction. By embracing technology and best practices, can achieve a seamless and responsive inventory management process, positioning themselves for sustained growth and success.

सार

एक इन्वेंटरी प्रबंधन प्रणाली (IMS) संगठन के लिए एक महत्वपूर्ण उपकरण के रूप में कार्य करती है ताकि वह अपनी इन्वेंटरी को प्रभावी ढंग से पर्यवेक्षित और प्रबंधित कर सके। यह प्रणाली वास्तविक समय में ट्रैकिंग, स्वचालन, और डेटा विश्लेषण जैसी उन्नत तकनीकों को एकीकृत करती है, जिससे पूरी इन्वेंटरी जीवनचक्र को अनुकूलित किया जा सकता है। मुख्य विशेषताएं में शामिल हैं सटीक मांग का पूर्वानुमान, केंद्रीय संवाद चैनल, और मॉडर्न तकनीक का समृद्धि से समृद्धि तक इंटीग्रेशन में से लाभ उठाने के लिए मैन्युअल त्रुटियों को खत्म करने के लिए।

एक IMS द्वारा पता किए जाने वाले चुनौतियों में से एक है, जिसमें गलत मांग के कारण अधिशेष या शॉर्ट आइटम्स होने की स्थिति से लेकर, संवाद की कमी से शीघ्रता और इन्वेंटरी समन्वय में त्रुटियों की स्थिति तक है। इसके अलावा, अपातकालीन प्रौद्योगिकी और मैन्युअल प्रक्रियाओं को IMS के अभ्यास के माध्यम से समाप्त किया जा रहा है, जिससे सटीकता में सुधार हो रहा है और कार्यान्वयन की अक्षमता कम हो रही है।

IMS इन्वेंटरी स्तर और चलन में वास्तविक समय की दृष्टि प्रदान करती है, पूरे संगठन को समयप्रबंधन और सूचित निर्णय लेने की शक्ति प्रदान करती है। सुरक्षा संबंधित चिंताओं का समाधान पहुंचाई जाती है एक्सेस कंट्रोल्स और नियमित सुरक्षा निरीक्षण के माध्यम से, चोरी और अनधिकृत पहुंच से बचाव करते हुए।

आपूर्ति श्रृंगी विघटन का प्रबंधन आपात योजना और विभिन्न आपूर्ति स्रोतों की विविधता के माध्यम से होता है, जबकि आपूर्ति स्रोतों के साथ संबंधों को बढ़ावा देने के लिए विकेन्द्र प्रबंधन प्रणाली और प्रदर्शन मैट्रिक्स का उपयोग करके साथी के साथ संबंधों को मजबूती प्रदान की जाती है। कर्मचारी प्रशिक्षण कार्यक्रम सुनिश्चित करते हैं कि कर्मचारी प्रणाली को सही से उपयोग करते हैं, त्रुटियों को कम करते हैं और कुल में कार्यक्षमता में सुधार करते हैं।

संक्षेप में, IMS इन्वेंटरी स्तर को समृद्धि करती है, जोखिमों को कम करती है, और कार्यान्वयन की दक्षता में सुधार करती है, जिससे लागतें कम होती हैं और संगठन संतुष्टि में वृद्धि होती है। तकनीक और सर्वोत्तम प्रथाओं को अपनाकर, संगठन सुगम और प्रतिस्पर्धी इन्वेंटरी प्रबंधन प्रक्रिया प्राप्त कर सकता है, जिससे वह स्थिर विकास और सफलता की दिशा में स्थान प्राप्त कर सकता है।

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In present time of dynamic businesses , The inventory management plays a very important role in the success of organizations across various industries. An Inventory Management System (IMS) is sophisticated solution which will optimize the processes involved in monitoring, controlling, and managing a company's inventory. This system goes beyond traditional manual methods, offering businesses a comprehensive and automated approach to handle their stock, ensuring efficiency, accuracy, and cost-effectiveness.

The primary objective of an Inventory Management System is to strike a delicate balance between maintaining good stock levels to meet customers requirements while minimizing costs and preventing stockouts or overstock situations. By leveraging cutting-edge technology, these systems works on synchronous static increment of newly purchased items & stock movements, empowering businesses to make informed decisions that enhance overall operational efficiency.

Key Features of an Inventory Management System:

1. **Real-time Tracking:** Instant visibility into inventory levels, enabling businesses to monitor stock movements and make timely decisions.
2. **Order Management:** Seamless processing of purchase orders, sales orders, and returns, facilitating a smoother supply chain.
3. **Forecasting and Demand Planning:** Utilizing historical data and predictive analytics to forecast future demand, aiding in strategic decision-making.
4. **Multi-location Management:** Ability to manage inventory across multiple locations or warehouses, ensuring centralized control and coordination.
5. **Supplier Collaboration:** Efficient communication with suppliers to manage orders, deliveries, and maintain healthy supplier relationships.
6. **Reporting and Analytics:** Robust reporting tools providing insights into inventory turnover, carrying costs, and other key performance indicators.

In essence, an Inventory Management System is a fundamental asset for businesses aiming to enhance supply chains ,costs & provide an unparalleled customer experience. As businesses evolve, the adoption of advanced inventory management solutions becomes imperative to stay competitive in the rapidly changing market landscape.

1.1 Problem Identification: -

- The current system for managing inventory is inefficient and can't leverage stages , reports for better understanding of products and planning effective correctional activities for the organisation. Manual processes, making it difficult to track the status of items or products and the overall operation of the inventory. This has led to increased disruptions in the supply chain, and other security concerns. There is a need for a Inventory management system that can store the product details and display an interactive dashboard that can provide real-time insights into the status of items .
- An Inventory Management System (IMS) significantly improves accuracy and minimizes discrepancies between recorded and actual inventory levels associated with manual data entry. Manual order processing is time-taking , IMS automates this process, streamlining fulfillment, reducing lead times, and enhancing overall operational efficiency.
- Traditional manual systems often lack analytical tools for accurate demand forecasting. In contrast, IMS leverages advanced algorithms and analytics, enabling org. to make accurate decisions about inventory levels depends on historical data & market trends.
- Manual systems operate in silos, leading to disjointed information and communication gaps. IMS addresses this by integrating with other enterprise systems ensuring a unified and coordinated approach to business processes.
- Manual communication with suppliers may result in delays and misunderstandings. IMS facilitates real-time communication with suppliers, allowing for accurate and timely exchange of information, reducing the risk of disruptions in the supply chain.
- Manual systems may lack robust security measures, putting sensitive inventory data at risk. IMS incorporates securities which includes encryption, access controls, and audits, enhancing the overall security of inventory data.
- In summary, An Inventory Management System addresses limitations associated with manual systems by automating processes, improving accuracy, providing real-time visibility, and promoting integration with other business functions. This leads to increased efficiency, better decision-making, and a more responsive and agile supply chain.

1.2 About Parent Organization: -

- JK Tyre & Industries Ltd, the flagship company of JK Organisation, stands as one of India's leading tire manufacturers and ranks among the top 25 globally. Over the past four decades, JK Tyre has consistently spearheaded innovation and excellence within the tire industry. Through the introduction of groundbreaking technologies and products tailored to various segments of the automobile industry, the company has maintained its forefront position.
- An early adopter of radial technology, JK Tyre pioneered the production of the first radial tire in 1977, subsequently emerging as the market leader in the Truck Bus Radial segment. Notably, in 2019, the company secured a place in the prestigious Limca Book of Records with its production of the nation's largest off-the-road tire, the VEM 045. Offering comprehensive solutions across passenger vehicles, commercial vehicles, farming, Off-the-Road, and two & three-wheelers, JK Tyre's commitment to innovation is evident through its advanced global research and technology center, the Raghupati Singhania Centre of Excellence in Mysore.
- This center houses cutting-edge technologies and techniques, contributing to the company's efforts to bolster India's presence on the global innovation stage. Moreover, initiatives like the Hari Shankar Singhania Elastomer and Tyre Research Institute (HASETRI) and the JK Tyre Tech Centre further reinforce JK Tyre's pursuit of globally competitive technologies for tires and polymers, as well as new product development to address evolving customer needs.
- In a significant move, JK Tyre introduced India's first 'Smart Tyre' technology, featuring Tyre Pressure Monitoring Systems (TPMS) with TREEL Sensors to monitor vital tire statistics such as pressure and temperature. With a global footprint spanning 105 countries and supported by over 180 global distributors, JK Tyre operates 12 sustainable manufacturing facilities, nine in India and three in Mexico, collectively producing approximately 35 million tires annually.
- Furthermore, JK Tyre boasts a robust network of over 4000 dealers and more than 500 dedicated Brand shops known as Steel Wheels and Xpress Wheels. The company's dedication to motorsport in India is also noteworthy, with over three decades of efforts to establish the country as the motorsport hub of Asia, fostering infrastructure development for the sport and nurturing young talent.
- In recognition of its excellence, JK Tyre stands as the only Indian tire manufacturer featured in the Superbrands India list for seven consecutive years since 2019. Additionally, the company was honored among India's Best Companies to Work For in 2019 by Great Place to Work® and received the prestigious Sword of Honour for Safety across its plants from the British Safety Council, UK.

1.3 Hardware And Software Specification: -

1.3.1 Hardware specification : -

Hardware Component	Minimum Requirement
Processor	Intel Core i3 or equivalent
RAM	4 GB
Hard Disk	250 GB
Display	15-inch monitor with a resolution of 1366x768 pixels
Input Devices	Keyboard and Mouse
Internet Connectivity	Broadband or Wi-Fi connection
Operating System	Windows 7 or later ,MacOs X 10.11 or later Ubuntu linux 18.04 or later
Browser	Google Chrome (Updated version), Mozilla Firefox (Updated version)
Other Requirements	Node.js (Updated Version), MongoDB (Updated version)

1.3.2 Software Specification: -

Window 11 Operating System: The decision to utilize Windows 11 as the operating system stems from its advanced features, enhanced security measures, and improves user interfaces, with its modern design and optimized performance, it provides a stable and secure environment for software development.

Visual Studio Code: As the primary coding environment, VS Code offers a plethora of features tailored for modern development workflows, its support for various programming languages, extensive libraries of extensions, and integrated version control systems streamline the coding process, fostering productivity and collaboration among team members.

Mongoose (Mongo dB): Opting for Mongoose for database management guarantees efficient data handling throughout the development lifecycle. Its user-friendly interface simplifies tasks such as schema design, data modelling, and administration, empowering developers to create and optimize databases effortlessly. Additionally, Mongoose's seamless integration with Node.js environments ensures smooth compatibility, facilitating streamlined development processes and enhancing productivity.

Postman: Postman emerges as a critical tool for API testing and validation, crucial components in today's interconnected software ecosystem. Its intuitive interface allows developers to design, test. And

debug APIs effortlessly, ensuring the reliability and scalability of software. It increases efficiency of testing. With features such as automated testing, real-time monitoring, and collaboration capabilities.

Farebase: Farebase offers a straightforward solution for user authentication with its farebase email login feature. By utilizing email addresses as login credentials, Farebase simplifies the authentication process, making it easy for users to access platforms securely. Its intuitive interface ensures a seamless experience for both developers and end-users. With automated processes and real-time monitoring capabilities, Farebase enhances the reliability and scalability of authentication systems, providing a dependable solution for login procedures.

By leveraging the capabilities of Windows 11, VS Code, Mongoose, farebase and Postman, the software development process is poised for scalability and optimal performance. Whether it's handling large volumes of data, testing complex APIs, or deploying software across diverse environments, this robust software stack provides the necessary tools and resources to meet the demands of modern software development. In conclusion, the combined utilization of Windows 11, Workbench, VS Code, and Postman forms a cohesive and powerful software development environment, equipped to tackle the challenges of today's dynamic and interconnected digital landscape.

Please note that these are the minimum Hardware and software specifications required for the system to function properly. Higher software specifications may be required for optimal performance, depending on the number of users and the volume of data being processed.

1.3.3 Technology Used:-

The complaint tracking system for Jiwaji University students is designed and developed using the MERN stack. MERN stack is a popular technology stack that includes MongoDB, Express.js,React.js, and Node.js. The system uses these technologies to provide a scalable, efficient, and userfriendly platform for students to submit and track complaints related to various issues such as missing or lost migration or degree certificates, errors or misprints in academic records, and other related issues.

Frontend: HTML, CSS, MUI, Reactjs a Javascript Library for making frontend applications

Backend: NodeJS Javascript runtime environment and ExpressJS a nodejs web application framework

Database: MongoDB a document database

CHAPTER 2: SYSTEM ANALYSIS

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2.1 Problem Analysis: -

The need for an Inventory Management System (IMS) in Organisation arose from the challenges faced by management staff in registering and tracking product related to their issued items. Prior to the implementation of the IMS, employees had to add their items manually and were unable to track the status of their products. This resulted in a lack of transparency, delayed response times, and supply chain disruptions.

The IMS was developed to address these issues and provide a platform for organisation to easily register product, track the status of their items, and receive updates on their items. The system also streamlines the query resolution process by delivering response to the appropriate department systems and allowing department to verify the stage and update the status accordingly.

By providing a centralized and transparent system for managing Inventory, the IMS improves the supply chain and increases the collaboration and communication within the organisation.

2.2 Feasibility Study: -

A feasibility study was conducted to determine the viability of developing the Inventory Management System (IMS) . The study focused on three main areas: technical feasibility ,economic feasibility & Operational feasibility

2.2.1 Technical Feasibility:

The technical feasibility of the IMS project has been assessed. The MERN stack is selected as a technology for the project, & all the required tools and resources were available.The system's database design was optimized for efficient data retrieval and storage.The system's security measures were implemented to ensure the protection of sensitive organisation data. The required hardware and software have been evaluated, and it has been determined that the project is technically feasible.

2.2.2 Economic Feasibility:

The economic Feasibility of the IMS project has been evaluated. This shows the estimated cost for developing the system. The initial costs of the project include the development of the digital platform, the purchase and installation of equipment, and the training of staff. The ongoing costs of the project include maintenance and upgrades to the hardware and software, as well as ongoing staffing costs. The project's benefits include improved efficiency and security, reduced costs associated with manual

processes, and reduced risk of security breaches. Based on the analysis of the costs and benefits, it has been determined that the project is financially sustainable over the long term.

2.2.3 Operational Feasibility:

Operational feasibility is crucial for the successful implementation and adoption of the Inventory Management System (IMS). The following factors contribute to the operational feasibility of the IMS :

Integration with Current Processes: The inventory management system seamlessly integrated with the company's current processes for manufacturing, warehousing, and distribution of items or products. It should complement existing workflows without causing disruptions.

Training and Adaptation: Employees at various levels, from warehouse staff to managers, will use the inventory management system. Operational feasibility requires ensuring that the system is user-friendly and intuitive, and that comprehensive training programs are provided to facilitate its adoption.

Data Accuracy and Reliability: The system provide accurate and reliable information about inventory levels, including real-time updates on stock availability, incoming shipments, and outgoing orders. Data integrity is crucial for making informed decisions and preventing stockouts or overstock situations.

2.2.4 Behavioural Feasibility:

The IMS is designed with a focus on maximizing user acceptance and minimizing resistance to change by implementing the following measures:

User-Friendly Interface: The IMS features an intuitive and user-friendly interface that simplifies audit management tasks for employees across different roles. With its intuitive design and familiar navigation patterns, users can easily adapt to the system, reducing the learning curve and enhancing usability.

Continuous Improvement: Current phase mechanisms is integrated into the IMS to give employees the detail about product continuously in each phase . By actively monitoring to employee feedback and incorporating enhancements based on their needs, the IMS aims to continuously improve the experience and enhance user satisfaction.

2.2.5 Legal Feasibility:

The legal requirements for the storage and handling of data were reviewed, and the system was designed to comply with all relevant laws and regulations.The system's security measures were designed to protect the confidentiality and privacy of organisation data.The terms of service and privacy policy were drafted to ensure that the software was legally compliant. The necessary permissions and approvals were obtained from the authorities before starting the development process.

2.3 Data Flow Diagram (DFD): -

2.3.1 Level 0 DFD: -

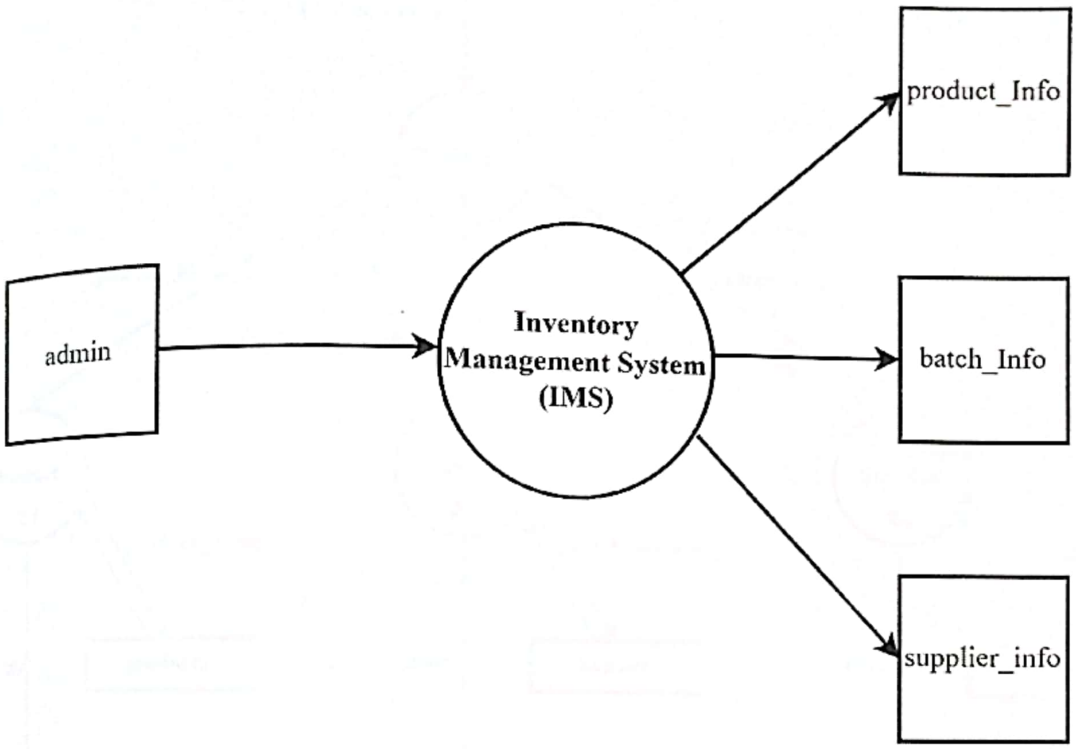

Figure 2.1 Level 0 DFD

2.3.2 Level 1 DFD for Admin: -

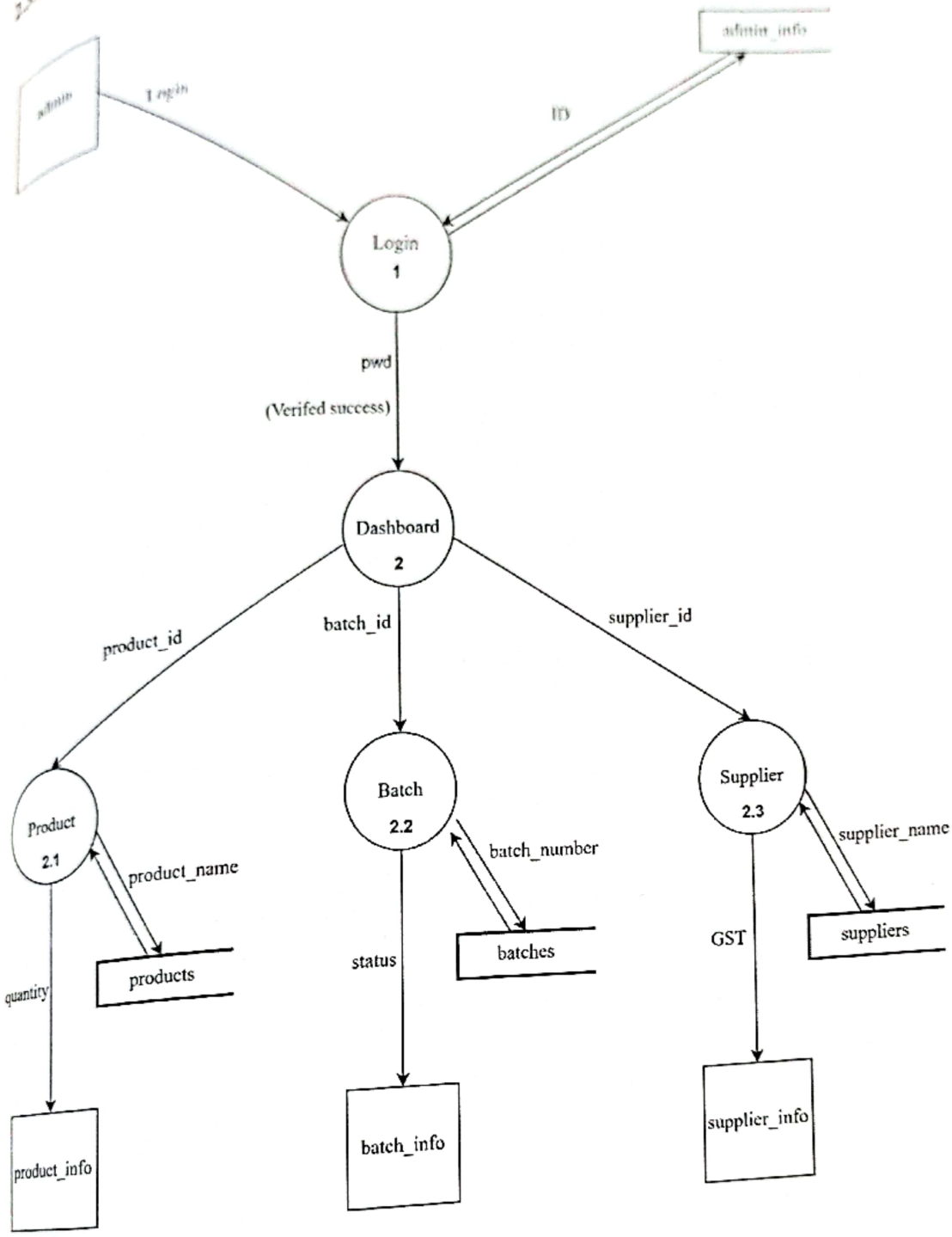

Figure 2.2 Level 1 DFD for Admin

CHAPTER 3:
SYSTEM DESIGN

CHAPTER 3: SYSTEM DESIGN

3.1 Use Case Diagram: -

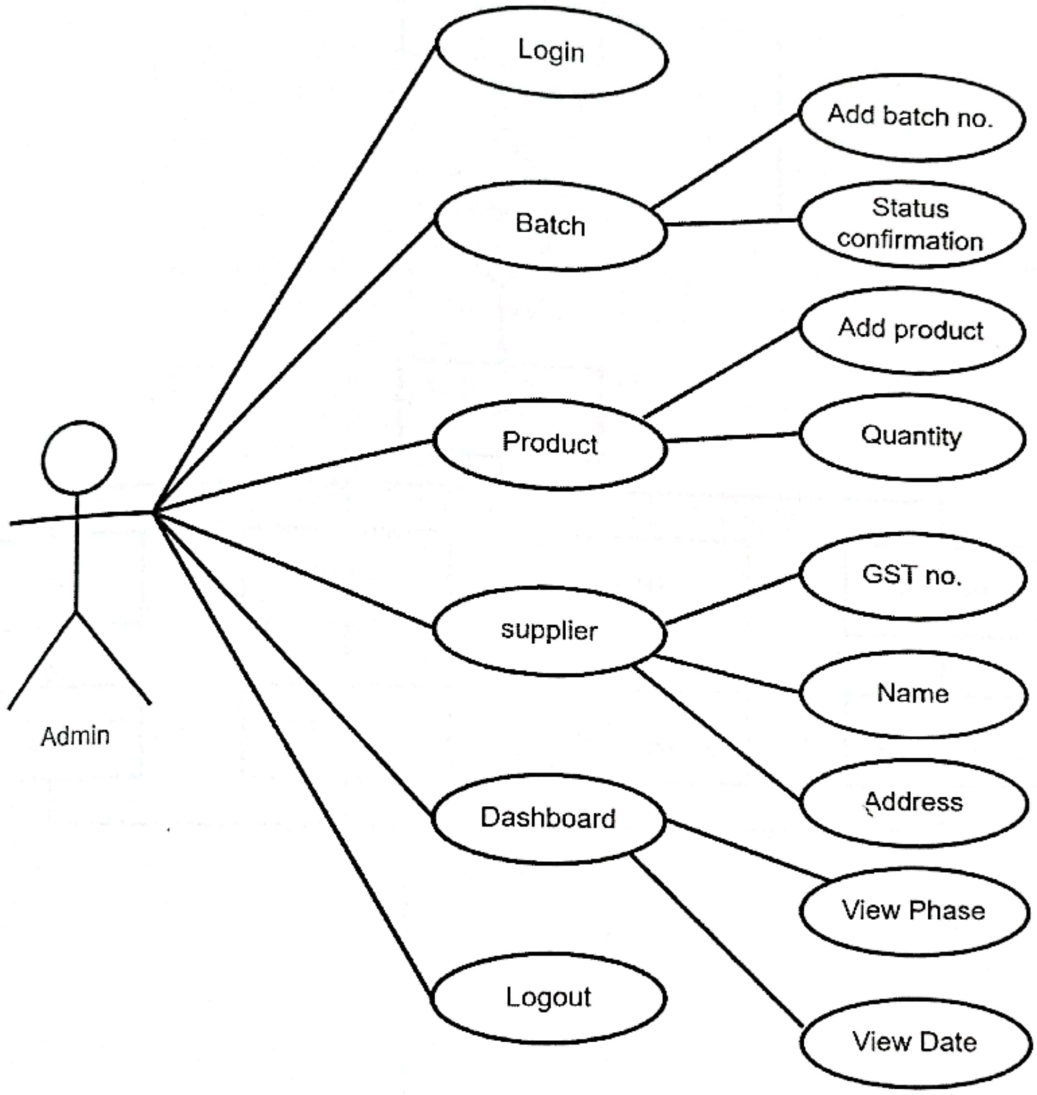

Figure 3.1 Use Case Diagram

3.2 System Flow Chart: -

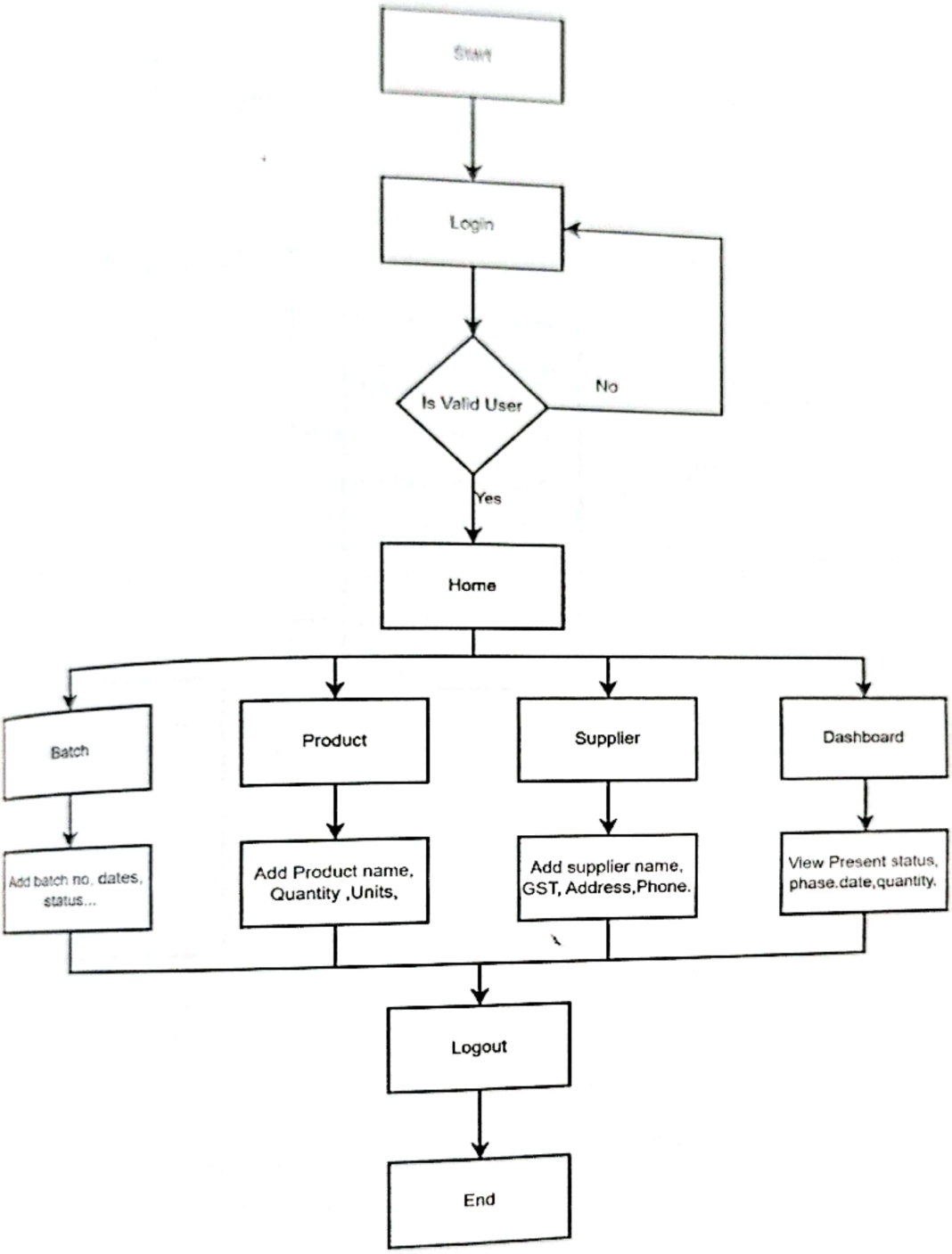

Figure 3.2 System Flow Chart

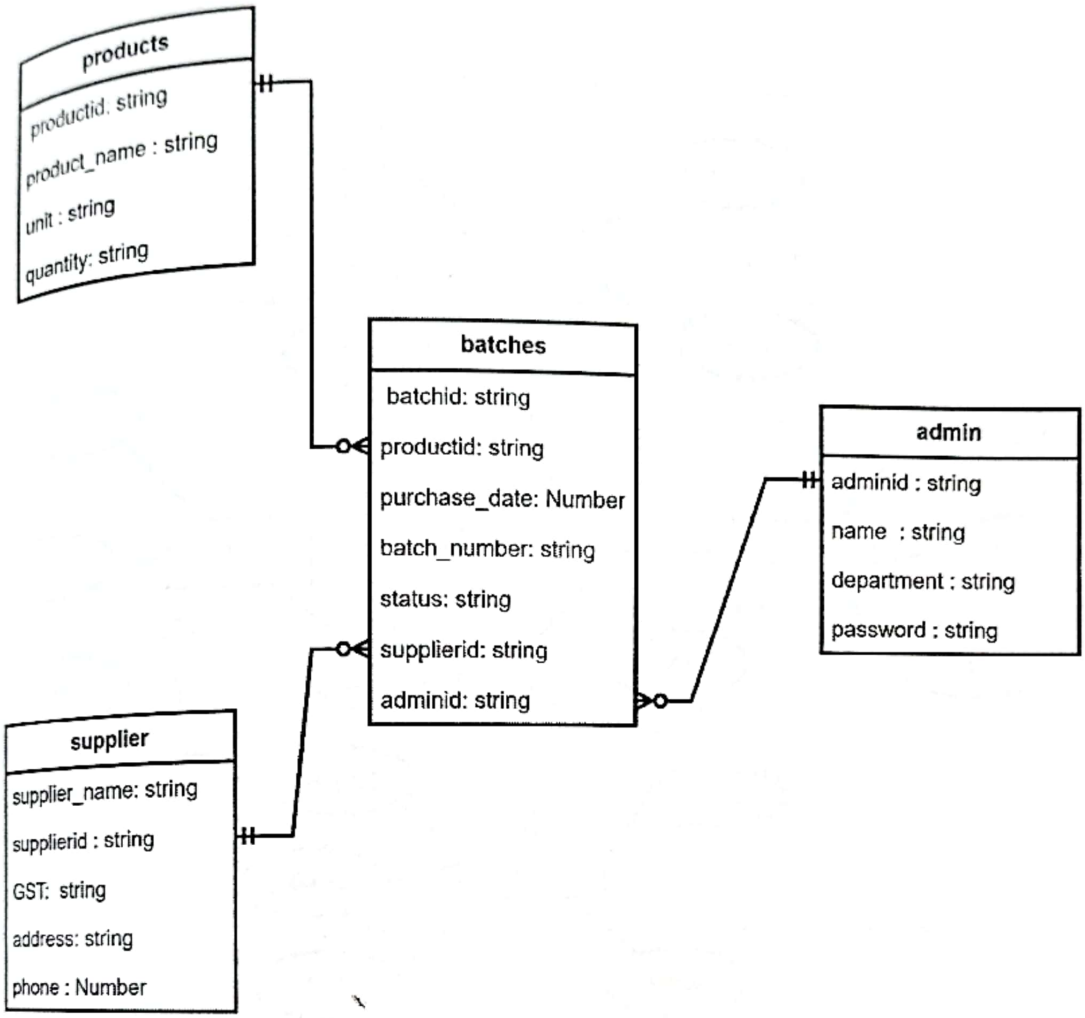

Figure 3.3 Structure Chart

3.4 ER Diagram

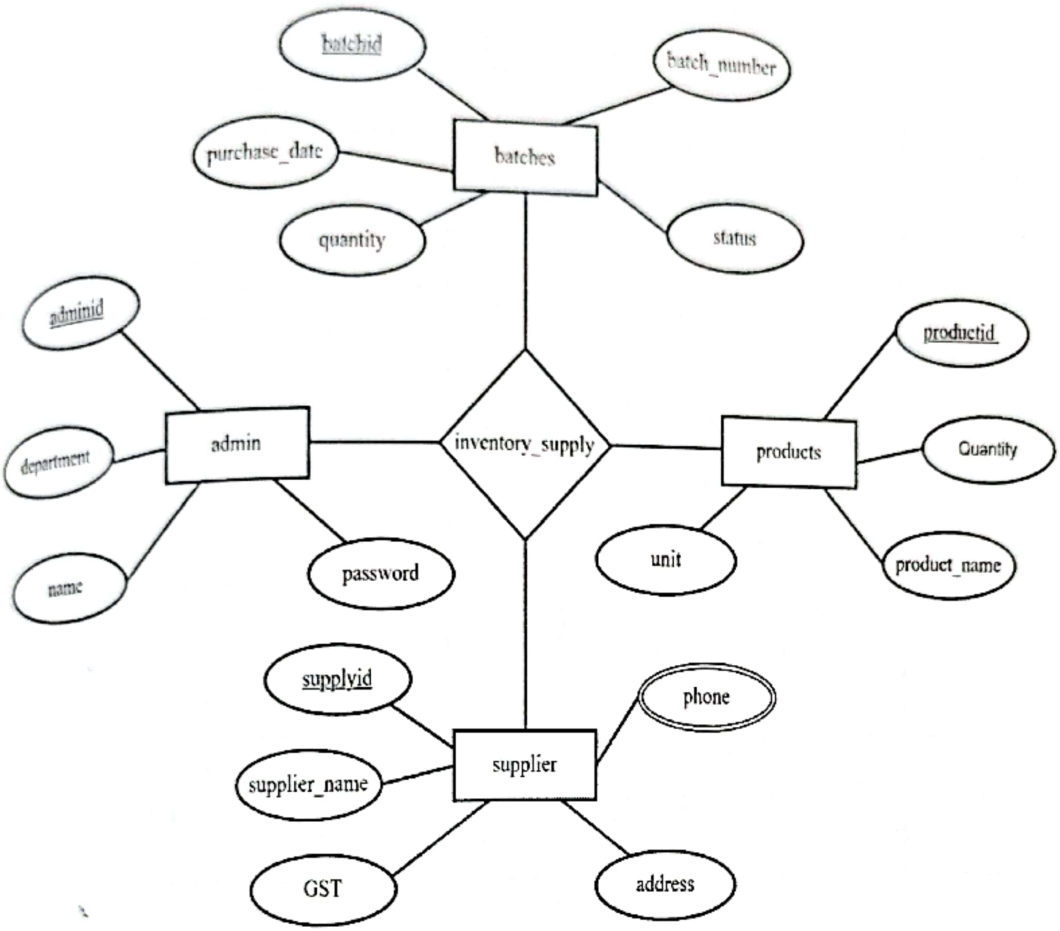

Figure 3.4 ER diagram

3.5 Gantt Chart : -

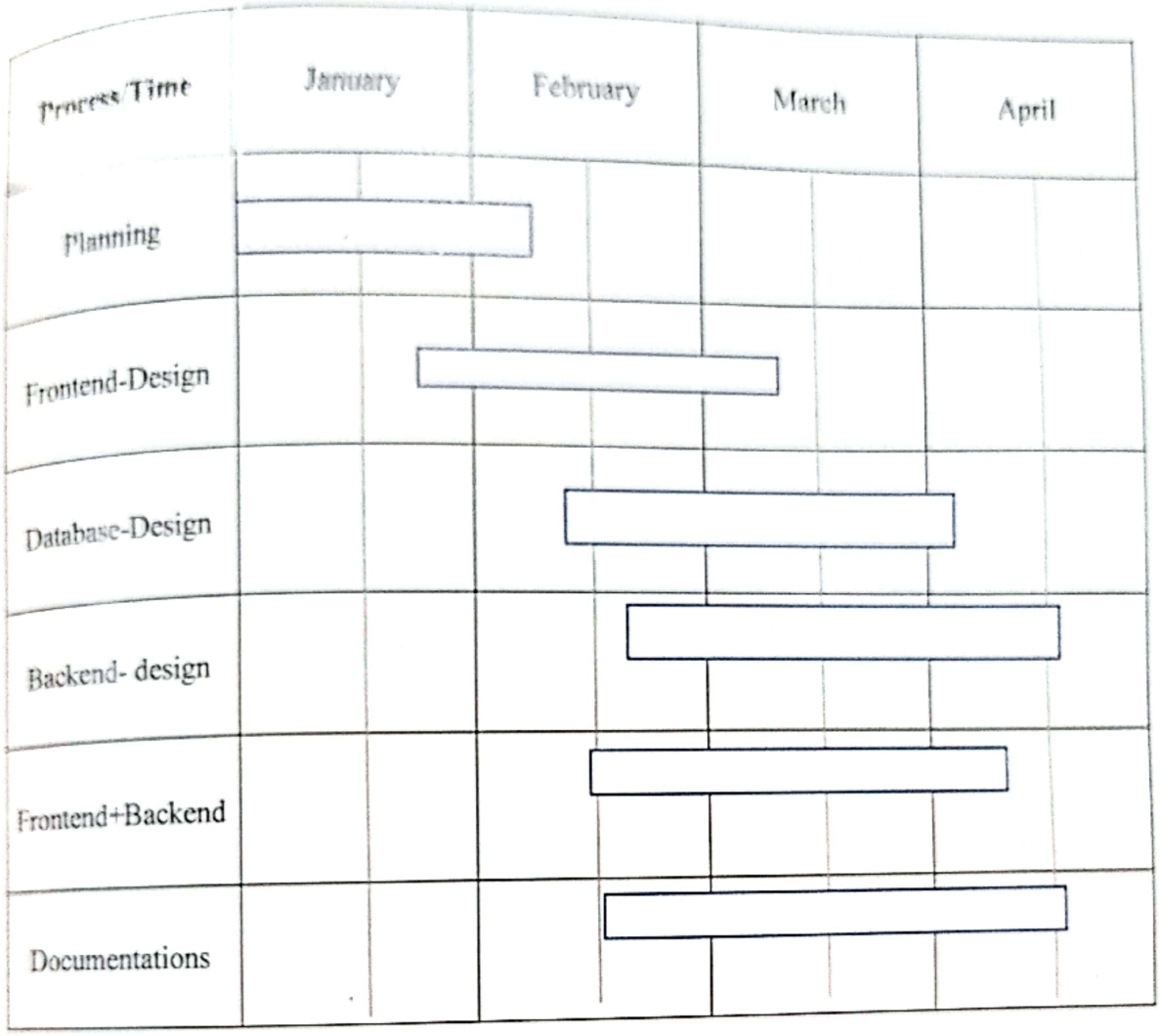

Figure 3.5 Gantt Chart

CHAPTER 4: TESTING

CHAPTER 4: TESTING

4.1 Unit Testing

We are doing the unit testing on every small unit of the website individually to verify the proper working We do every type of inputs to check their outputs, and its functioning We performed these tests on user login.

Test Cases

Test Case ID	Element Name	Element Type	Input	Expected Result	Actual Result	Test Result
1	User id	Username	No input	Displays an error by pop-up	error displayed	Passed
2	User id	Username	lakhera*****	No error	No error	Passed
3	Password	password	No input	Displays an error by pop-up	Error displayed	Passed
4	Password	password	mohit***	Login successfully if details are valid	Passed (Successfully login)	Passed

The login button on the Login Page is disabled by default until the admin enters both it's valid username and it's password in input fields. This measure ensures that the admin has provided the required information before attempting to log in. Once both fields are filled, the admin is able to logged in & can access the dashboard, but only if the entered data is valid and correct. Logging in will navigate to the dashboard, and will allow to add product , suppliers, batches and access the available features on the Inventory management system.

4.2 System testing

It is a type of testing which evaluates the whole system including all its components. Tests how the different component of the application navigate to another component. Verify that only Admin can able to access the module. Verify that dashboard has all the required option to manage all types of data.

Test Case ID	Description
Test Case 1	Only authorized user can login
Test Case 2	Verify that user dashboard has all the required option to manage all the types of data

Test Cases

Test case	Element Name	Element Type	Input	Expected Result	Actual Result	Test Result
1	User Credentials	Textbox	Wrong/invalid username and password	Displays error	Error displayed	Passed
2	User Credentials	Textbox	lakhera*** ********	Login successfully	Logged in successfully	Passed
3	User Dashboard	User	Add Products, Batches & suppliers to view in the dashboard	All the operations working properly	As expected	Passed

4.3 Compatibility Testing

Compatibility testing refers to the process of testing its compatibility across different platforms, devices, browsers, operating system, and network environments. The objective is to ensure that the website functions work properly and consistently for users.

Test Cases

Test Scenario	Element Name	Element Type	Input	Expected Result	Actual Result	Test Result
1	Device Compatibility	Responsiveness on different devices	Checking Responsiveness on devices for e.g., Laptops, computers.	IMS will adapt different screen sizes on different devices without any disbalancing	As expected, the website is rworking perfectly	Passed
2	Operating System Compatibility	Checking website behavior on different operating system	Working on different Operating Systems e.g., Android systems, macOS, iOS, Windows, etc.	There shouldn't be any changes in website Designing, Working, Accessibility and Performance speed, while switching the Operating System	As Expected, The Website is working all same even on different Operating System except Linux operating system	Partially Passed
3	End-user Security	Data Security	Testing security measures of users	The logged in user will be able to see his/her own details related information only or correct user-profile is opened for user while logging in	As Expected, Details of login username is shown, no details of other user are visible. Hence Secured	Passed

CHAPTER 5: IMPLEMENTATION

CHAPTER 5: IMPLEMENTATION

Firstly, we need to install some IDE software for implementing our project which are as follows:

i. **Visual Studio Code –**

- Go to the official Visual Studio website https://visualstudio.microsoft.com/downloads/.
- Click on the "Download" button for the version of Visual Studio you want to install.
- Choose the components you want to install, such as languages, frameworks, and tools.
- Click on the "Install" button to start the installation process.
- Follow the installation wizard and select the options that suit your needs.
-

ii. **MongoDB –**

- Go to official MongoDB website: https://www.mongodb.com/try/download/community.
- Select the appropriate version of MongoDB community edition, your system architecture and the package type.
- Click on the "Download" button to start the download.
- Once the download is complete, run the installer. Choose the "Complete" installation type a typical installation with default settings.
- Make sure to select the option to install MongoDB Compass and MongoDB as a Windows service so that it starts automatically.

iii. **NodeJS –**

- Go to the official Node.js website: https://nodejs.org/en/download/.
- Select the appropriate version of Node.js for your operating system (e.g., Windows, macOS, or Linux).
- Click on the "Download" button to start the download.
- Once the download is complete, run the installer. Follow the installation wizard and select the options that suit your needs.
- Once the installation is complete, you can open a terminal or command prompt and type
- node -v to check if Node.js is installed correctly. This should display the version of Node.js that you just installed.

Below are the steps of implementation after installing all the essential software required for the development:

1. **Create GitHub Account.**

2. **Set up the project:**

- Clone the GitHub repository of the project.
- Navigate to the project directory in the terminal or command prompt.
- Run the command pnpm install to install the project dependencies such as React, Next, Express, Nodemon, Mongoose etc.
- This will install all the required packages mentioned in the project's package.json file.

3. **Configure Environment Variables:**

- Create a .env file in the root directory of the project.
- Add necessary environment variables such as database connection URL, API keys, Firebase Keys and email configuration details.
- Refer to the project documentation or configuration files to determine the required environment variables.

4. **Set up the database:**

- Select the cluster where you want to create the new database or create a new cluster if needed.
- In MongoDB Atlas, we need to whitelist the IP address from which we will be accessing the database.
- Update the .env file with the appropriate database connection URL or connection string.
- Verify that MongoDB Compass is running.

5. **Start the Frontend:**

- In the terminal or command prompt, navigate to the project's frontend directory.
- Run the command pnpm install to install frontend dependencies.
- Execute the command pnpm run dev to run the frontend server.

6. **Start the Server or backend:**

- In the terminal or command prompt, navigate to the project's backend directory.
- Run the command pnpm install to install backend dependencies.
- Run the command pnpm run dev to start the server.
- If you want automatic server restart on file changes during development, you can use nodemon in pnpm script.

7. **Access the application:**

- Open a web browser.
- Enter http://localhost:3000 (or the specified port if different) in the address bar.
- The JK IMS application should load in the browser, and you can now interact with it

CHAPTER 6:
SAMPLE FORMS AND REPORTS

CHAPTER 6: SAMPLE FORMS & REPORTS

6.1 Login Page

Fig 6.1: login page

6.2 Dashboard Page :

Fig 6.2: Dashboard

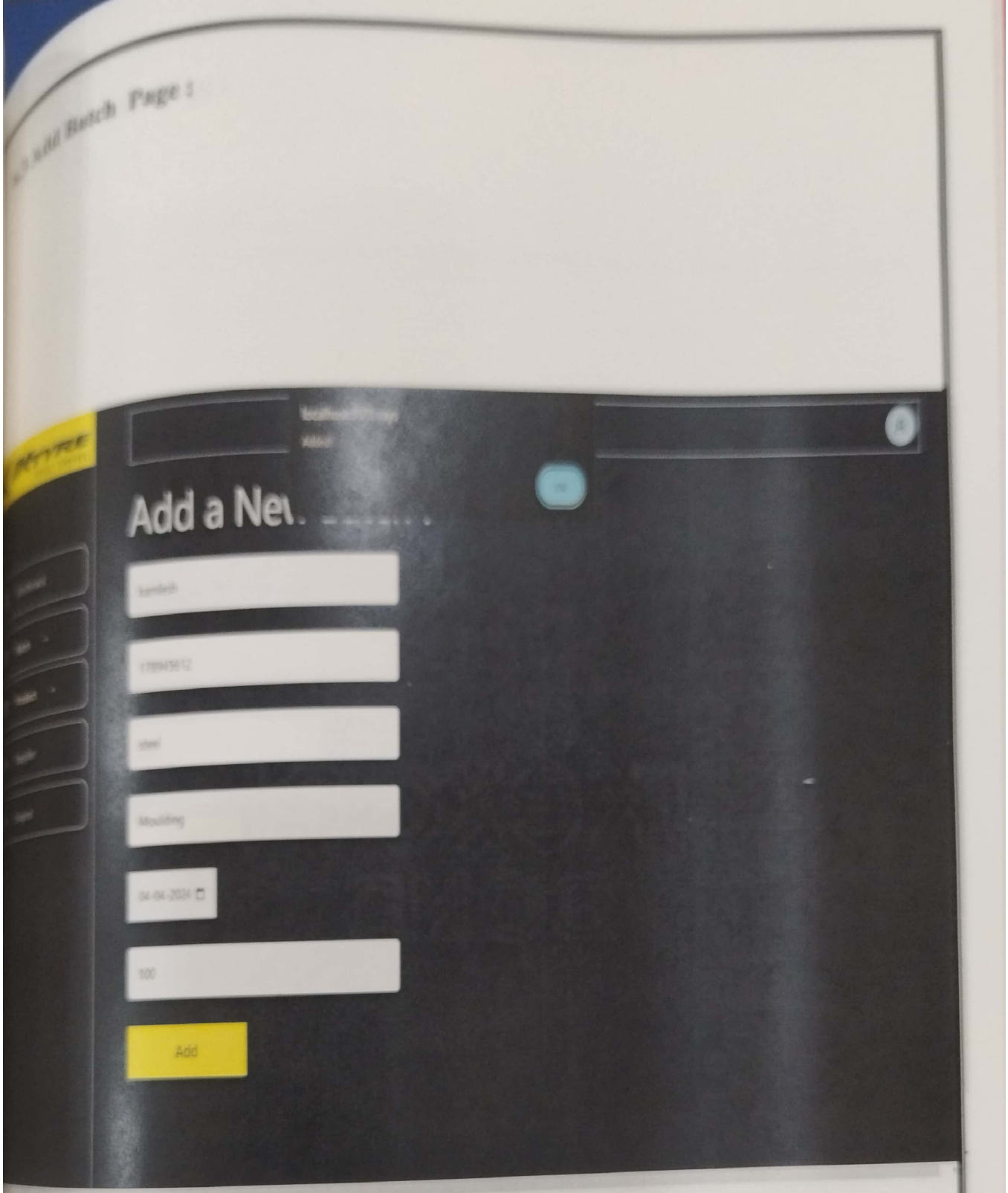

Fig 6.3: Add Batch Page

6.4 Add Product Page :

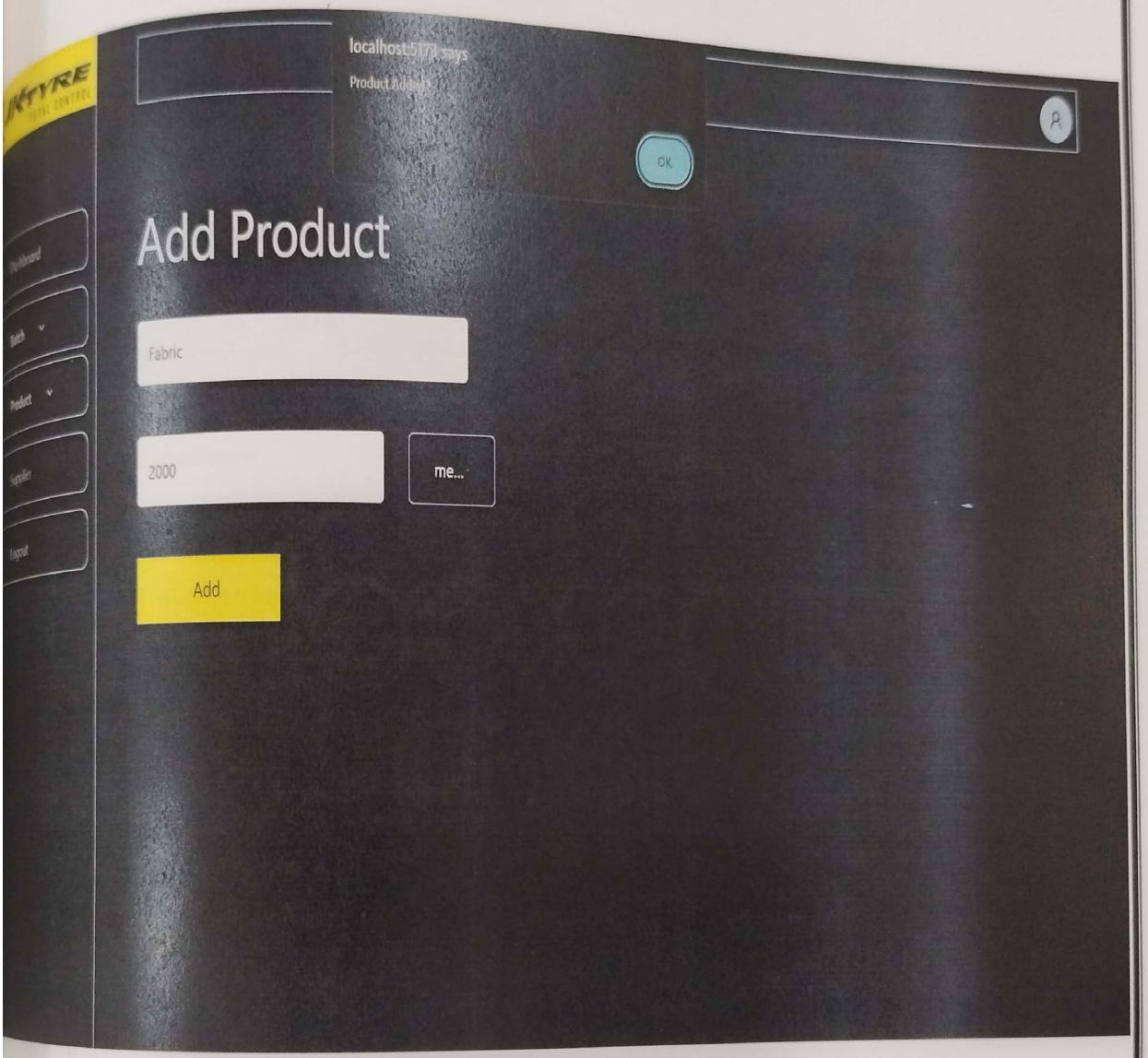

Fig 6.4: Add Product Page

Add Supplier Page :

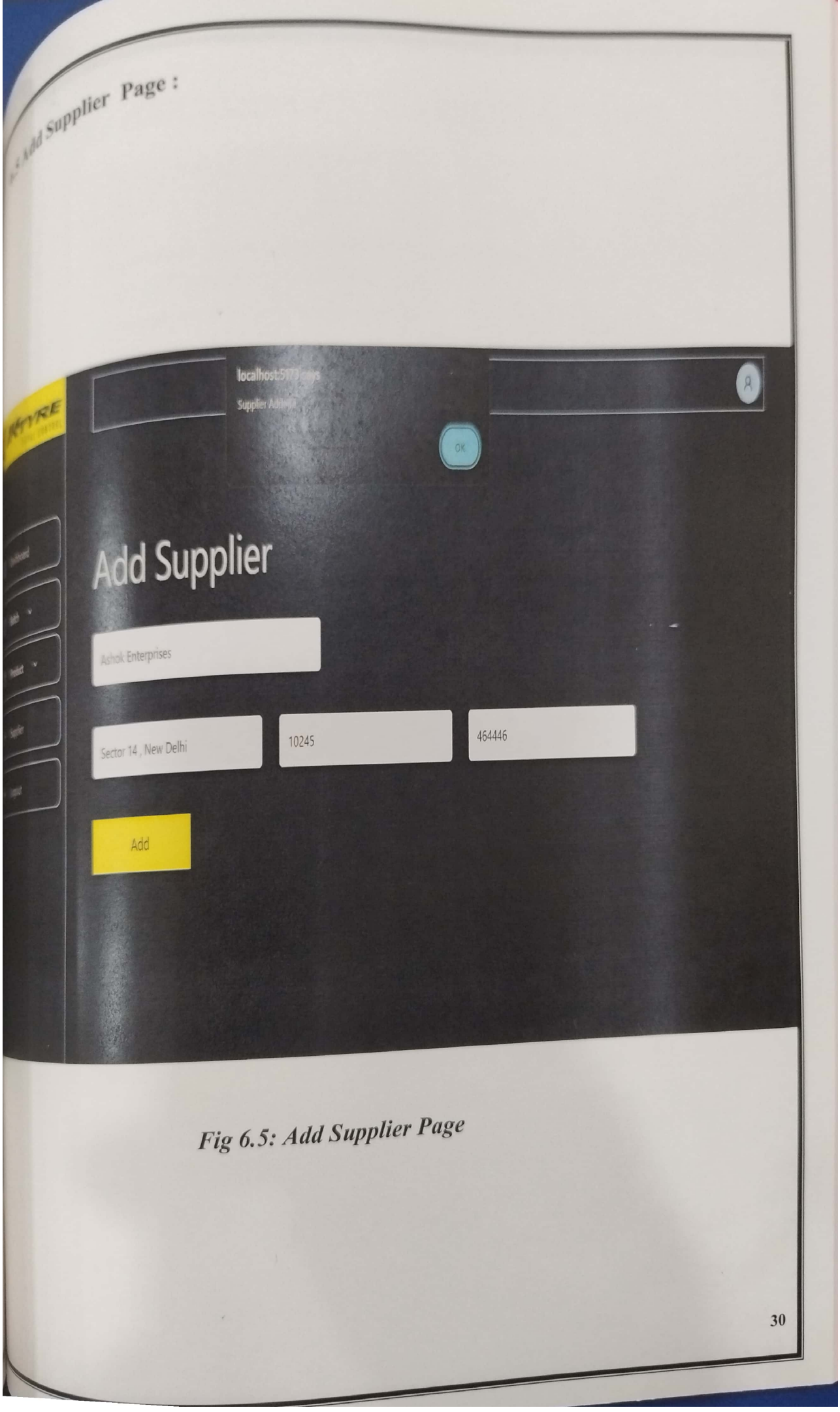

Fig 6.5: Add Supplier Page

CHAPTER 7: CONCLUSION

CHAPTER 7: CONCLUSION AND FUTURE WORK

7.1 Conclusion: -

The project was effectively planned, and its correctness and quality are evaluated. I have met the organization's needs and achieved all project objectives within this time. The created project will be used to manage the organization's inventory of products and other objects. Future modifications to the project can be simply made because to its design. The project's development has led to the following conclusions:

1. The efficiency of the entire inventory system is increased through management.
2. Depending on their permissions, it grants authorised individuals the necessary access.
3. It successfully gets over the communication lag.
4. The standout characteristics are dependability, data security, and system security.

This software is developed with the help of different kinds of tools such as React JS, Nodejs, MongoDB, MUI, HTML, CSS and ShadCN. The developed software is user friendly.

In conclusion, the Inventory Management System (IMS) developed for the Organization is an efficient and effective tool to manage inventory related to various products of organisation . The IMS provides a easy to use interface & secure login to ensure the privacy and confidentiality of the users.

The feasibility study for the IMS project showed that it is technically feasible, economically feasible, and behaviourally feasible. The implementation of the IMS involved several phases including planning, analysis, design, development and implementation of various component such as batches , products ,suppliers which were carried out systematically.

However, there is still room for future work and improvements in the IMS. One potential improvement is to integrate a feature to add a mechanism where the employees of particular department can add their requirements by their own which will help to automate the overall process.

Overall, the IMS has the potential to enhance the Inventory management process for the organisation and improve their overall experience with the the system.

7.2 Future Work: -

The future of Inventory Management Systems (IMS) holds promising advancements and enhancements aimed at making inventory management even more efficient and effective. Some potential areas for future work in IMS include:

1. **Artificial Intelligence (AI) and Machine Learning (ML) Integration::** Implementing AI and ML algorithms can enable IMS to analyze historical data, predict demand patterns, optimize reorder points, and automate decision-making processes. This can lead to more accurate forecasting and proactive inventory management strategies.

2. **Internet of Things (IoT) Integration**: Real-time visibility into inventory levels, location tracking, and environmental conditions can be obtained by connecting IMS with IOT devices like RFID tags, sensors, and smart shelves. Better stock movement tracking is made possible as a result, lowering the possibility of stockouts or overstocking.

3. **Blockchain Technology :** Leveraging blockchain technology can enhance transparency, traceability, and security in inventory management processes. It enables immutable records of transactions, ensuring the authenticity of inventory data, supply chain visibility, and preventing issues like counterfeit products.

4. **Mobile and Cloud-Based Solutions**: Businesses may manage inventory from anywhere at any time by creating mobile applications and cloud-based IMS platforms that provide remote access to inventory data. This encourages adaptability, scalability, and cooperation between interested parties.

5: **Advanced Analytical Skills and Visualisation of Data** By combining data visualisation methods with advanced analytics tools, one can gain a deeper understanding of performance indicators, inventory trends, and optimisation opportunities. This gives companies the ability to make data-driven decisions and keep refining their inventory management plans over time.

We can say that , the future work in Inventory Management Systems is expected to revolve around harnessing emerging technologies, enhancing automation, improving decision support capabilities, and addressing evolving business needs to drive greater efficiency, agility, and sustainability in inventory management processes.

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3. https://www.w3schools.com/js/js_es6.asp
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5. https://mui.com/
6. https://ui.shadcn.com/

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Fortnightly Progress Report

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Name of student	MOHIT LAKHERA		Department	MCA	
Industry/Organization	JK-TYRE Industries		Date/Duration	1-1/2/24-15-4/24	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	Allotment of project, further discussion of project, Instruction for developing Front-end. ✓				
OVERALL GRADE (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT				
Name of Industry Mentor	Gaurav Kushwaha				
Signature of Industry Mentor					

JK Industries Limited

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Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work				✓	
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	- Understanding Project requirement. - learned CSS & Javascript.				
OVERALL GRADE (Any one)	**POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT**				
Name of Industry Mentor	Mr. Gaurav Kushwaha				
Signature of Industry Mentor	Gkushwaha				

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Industry/Organization	JK TYRE Industry		Date/Duration	1/2/24 - 15/2/24	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation				✓	
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	→ Learned Connectivity with Database & its Operations.				
OVERALL GRADE (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT				
Name of Industry Mentor	Mr. Gaurav Kushwaha				
Signature of Industry Mentor	Kushwaha				

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Industry/Organization	JK-TYRE INDUSTRY		Date/Duration	16/2/24 - 29/2/24	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work				✓	
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	→ started working on ~~Admin~~ Module → Completed login Pages				
OVERALL GRADE (Any one)	**POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT**				
Name of Industry Mentor	MR. Gaurav Kushwaha				
Signature of Industry Mentor					

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Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work				✓	
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	→ Integrated APIs for communication b/w front end & Backend. → Design & Maintain database using queries & explore data replication.				
OVERALL GRADE (Any one)	**POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT**				
Name of Industry Mentor	MR. Gaurav Kushwaha				
Signature of Industry Mentor	Gkushwaha				

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Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work				✓	
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	→ UML Diagrams → figma Designs				
OVERALL GRADE (Any one)	**POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT** ✓				
Name of Industry Mentor	MR. Gaurav Kushwaha				
Signature of Industry Mentor	Kushwaha				

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Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓

Comment on nature of work done/Area/Topic	Completed Project Report Doumentation ✓
OVERALL GRADE (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT
Name of Industry Mentor	MR. Gaurav Kushwaha
Signature of Industry Mentor	Gkushwaha

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