COLLEGE OF COMPUTING AND INFORMATICS

UNIVERSITI TENAGA NASIONAL

Inventory Management System App for a Small Enterprise.

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by

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The undersigned certify that the above candidate has fulfilled the condition of the Final Year Project in partial fulfilment for the Bachelor of Computer Science (Software Engineering) (Hons.)

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Date: _____26/06/2025_____

DECLARATION

I hereby declare that this report, submitted to Universiti Tenaga Nasional as a partial fulfilment of the requirements for the Bachelor of Computer Science (Software Engineering) (Hons.) has not been submitted as an exercise for a bachelor at any other university. I also certify that the work described here is entirely my own except for excerpts and summaries whose sources are appropriately cited in the references.

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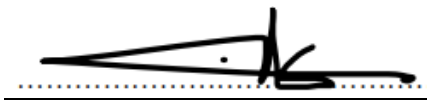

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ABSTRACT

The **Inventory Management System** is designed to streamline inventory processes for small and medium-sized enterprises, offering a reliable and user-friendly platform for efficient inventory management while minimizing errors and enhancing operational decision-making. This project addresses key challenges such as real-time inventory tracking limitations, managing multi-warehouse and multi-location tracking, and reducing manual data entry through enhanced automation. The system employs a robust web-based and mobile-compatible architecture, utilizing modern frameworks like Node.js and React to ensure scalability and responsiveness, while modular coding practices facilitate maintainability and updates. Security is a core focus, incorporating AES-256 encryption and token-based authentication to safeguard data integrity and protect user information. Agile development methodologies guide the iterative design and testing processes, ensuring flexibility and continuous improvement. The system is capable of supporting up to 500 concurrent users, processing inventory updates in under 2 seconds, and generating actionable insights through advanced analytics and reporting tools. Additionally, it integrates seamlessly with external platforms, such as supplier systems and e-commerce platforms, to enhance operational efficiency. By providing a scalable, secure, and maintainable solution, the Inventory Management System empowers businesses to manage inventory effectively, reduce operational bottlenecks, and make data-driven decisions, achieving operational excellence across diverse business environments.

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to everyone who contributed to the successful completion of this project. First and foremost, I extend my heartfelt thanks to my supervisor, MOAMIN A MAHMOUD, TS. DR., for their invaluable guidance, constructive feedback, and constant encouragement throughout this project. Their expertise and support have been instrumental in shaping the outcome of this work.

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LIST OF ABBREVIATIONS/NOTATIONS/GLOSSARY OF TERMS

IMS	Inventory Management System
SDLC	System Development Life Cycle

CHAPTER 1

INTRODUCTION

1.1. Project Background

In today's fast-paced company climate, good inventory management is essential for maintaining operational efficiency and meeting client needs. The major purpose of this project is to create a mobile-only inventory management application that will streamline inventory tracking, monitoring, and administration via a simple and intuitive interface. This mobile application intends to give customers with a comprehensive yet simple solution for managing their inventory operations directly from their mobile devices, reducing the need for sophisticated, desktop-based systems.

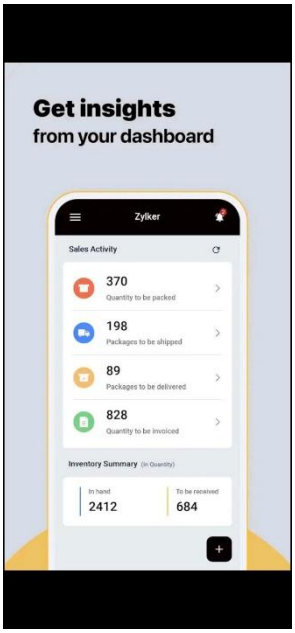

Figure 1: Dashboard of the app

This application is aimed at small and medium-sized enterprises in need of a low-cost, mobile inventory management solution. The mobile-only method enables users to manage their inventory on the go, giving them flexibility and rapid access to critical inventory data. The application provides features like barcode/QR code scanning for quick item entries, real-time stock level tracking, and customisable low-stock notifications to ensure inventory is always optimised.

This application is relevant to firms wishing to streamline inventory tracking, reduce stock shortages, and improve decision-making with easily available data and analytics. This inventory management system also contributes to digital transformation efforts by integrating mobile technology into traditional inventory procedures. Unlike larger, more

sophisticated systems, this app is designed for ease of use, accessibility, and mobility, enabling corporate operations in a quickly digitising world.

The sections that follow focus on the application's technical characteristics, such as system architecture, main functionalities, and implementation details. This will provide you a thorough grasp of how the app achieves its goals and the technological considerations that underpin its development.

1.2. Problem Statements

Although QuickBooks Desktop is a widely adopted tool for inventory management among small to medium-sized businesses, users face challenges in tracking real-time inventory, managing multiple warehouses, and customizing reports to meet specific operational needs. Its limited support for multi-location inventory and lack of real-time integration with other sales and supply chain systems can result in inaccurate stock levels, inefficiencies in order fulfillment, and increased risk of stockouts or overstocking. These issues hinder effective inventory management and may affect overall business performance. These are the challenges that users can face:

- **Real-Time Inventory Tracking Limitations**: QuickBooks Desktop lacks real-time tracking capabilities, which means inventory data is not automatically updated as new orders are placed or stock levels change.

- **Multi-Warehouse and Multi-Location Tracking**: Many traditional inventory management tools, including QuickBooks Desktop, struggle with managing inventory across multiple locations or warehouses.

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- **Manual Data Entry and Limited Automation:** Traditional apps like QuickBooks Desktop often require significant manual input, particularly in updating stock levels and processing new inventory entries.

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Users of QuickBooks Desktop for inventory management face various challenges rooted in its limitations in real-time tracking, multi-location management, customization, and adaptability to modern eCommerce and supply chain demands. These issues can negatively affect business operations, efficiency, and growth potential, often requiring users to invest in workarounds or supplementary tools. Consequently, businesses may need to reassess their inventory management needs as they scale, weighing the benefits of transitioning to more adaptable, cloud-based inventory management solutions.

1.3. Project Objectives

- To identify a feature that automatically monitors inventory levels and sends real-time notifications when stock falls below a customizable threshold.

- To design an intuitive, mobile-optimized interface that includes barcode/QR code scanning functionalities. This will create a user-friendly, mobile-first experience that allows users to manage inventory efficiently on smaller screens, ensuring ease of use even for users with minimal technical experience.

- To evaluate the functionality of the system by testing the app's performance, efficiency, and usability, gathering feedback from users to assess its effectiveness and identify areas for improvement.

1.4. Project Scopes

User	Description

Admin	- Admin has full control over app, including user management, inventory settings, and permissions. - Admin can add, edit, or remove users and define roles. - Admin can access to all reports, analytics, and customization settings within the app.
Warehouse Staff	- Warehouse Staff can primarily checks stock in and out using barcode/QR code scanning. - Warehouse Staff can updates item quantities and views product details. - Warehouse Staff has limited permissions to alter main settings or access reports.
Sales Staff	- Sales Staff can view stock levels and item details to assist with customer inquiries or orders. -Sales Staff may log sales-related stock deductions but cannot modify inventory settings or item data.

CHAPTER 2

LITERATURE REVIEW

RELATED WORKS

2.1 Review on Existing Systems

Regarding the mobile-only inventory management system project, this chapter describes the systems and resources that are currently in use. It includes a thorough analysis of real-world applications that are similar to the mobile-only inventory management system. The purpose of this investigation is to learn more about the operation of inventory tracking, stock level monitoring, and data entry processes, as well as the best methods for real-time notifications and efficient data synchronization.

2.1.1. Zoho App

Zoho Inventory app is a powerful tool that will help to increase your sales and keep track of every unit in your inventory. It is an all-in-one inventory management solution that helps businesses streamline their operations, optimize their stock levels, and boost their bottom line. This app is best for small- to medium-sized e-commerce businesses.

Advantages of Zoho Inventory app:

- User-Friendly Interface
- Real-Time Inventory Tracking
- Barcode and QR Code Support
- Comprehensive Reporting and Analytics

Disadvantages of Zoho Inventory app:

- Complexity with Advanced Features
- Limited Warehouse Management Functions
- Limited Customization Options
- Scalability Concerns for Larger Operations

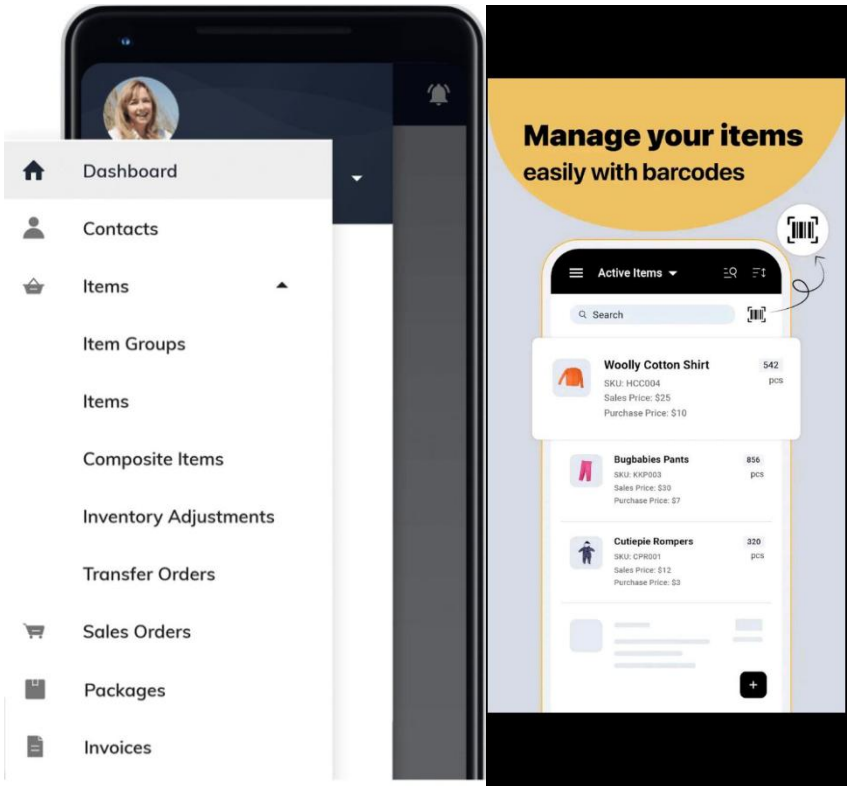


Figure 2.1: Screen shot of app interface.

Figures 2.1,: Depicts the app's dashboard, featuring the main screen that provides users with their profile photo of the inventory and their contacts and tracking item details, Sales Orders, Packages, Invoices.

It also depicts how the admin can manage the items easily with barcodes that showed at the top right of the page.

TradeGecko (QuickBooks Commerce)

Formerly TradeGecko, QuickBooks Commerce is a cloud-based inventory management software that streamlines operations, from purchasing and manufacturing to fulfillment and sales. It helps companies manage every aspect of their business in one place. QuickBooks Commerce provides insights and resources to simplify operations, from product and supplier management to inventory control and order fulfillment.

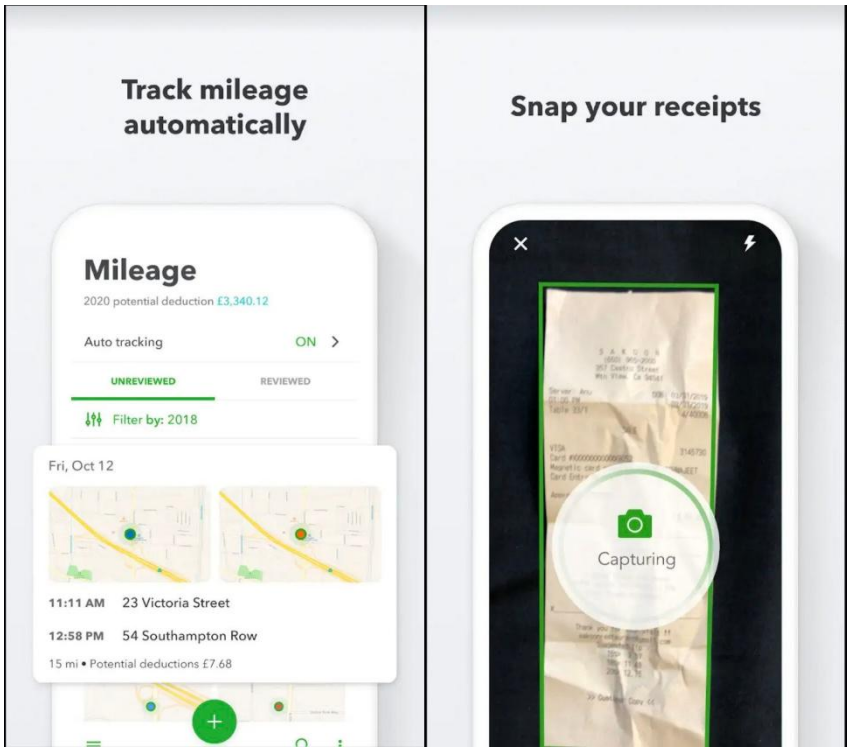


Figure 2.2: The screenshots of the app interface with its features.

Figure 2.2 It shows two of the features app which is user can track the mileage automatically and easily by monitoring within the map live and also he can snap his receipts by capturing using the camera.

Odoo Inventory

Odoo enables users to select which applications they need with their system. It eliminates the need to integrate external applications, unlike the previous inventory management options. This is the perfect option for businesses that want to pick which apps to include with the inventory management app to create an all-in-one system that addresses specific business needs.

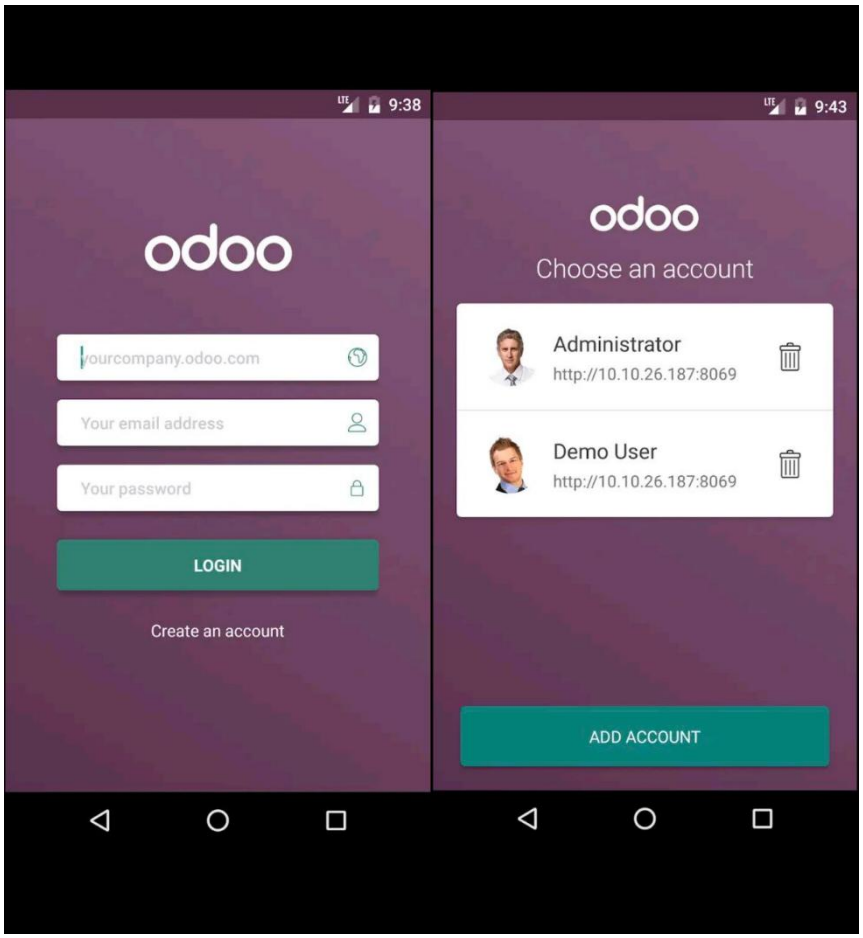


Figure 2.3: screenshots of login page and choosing an account of user type.

Figure 2.3 shows the interface of login page, when user login to the account he can choose an account to login either as an administrator or a demo user.

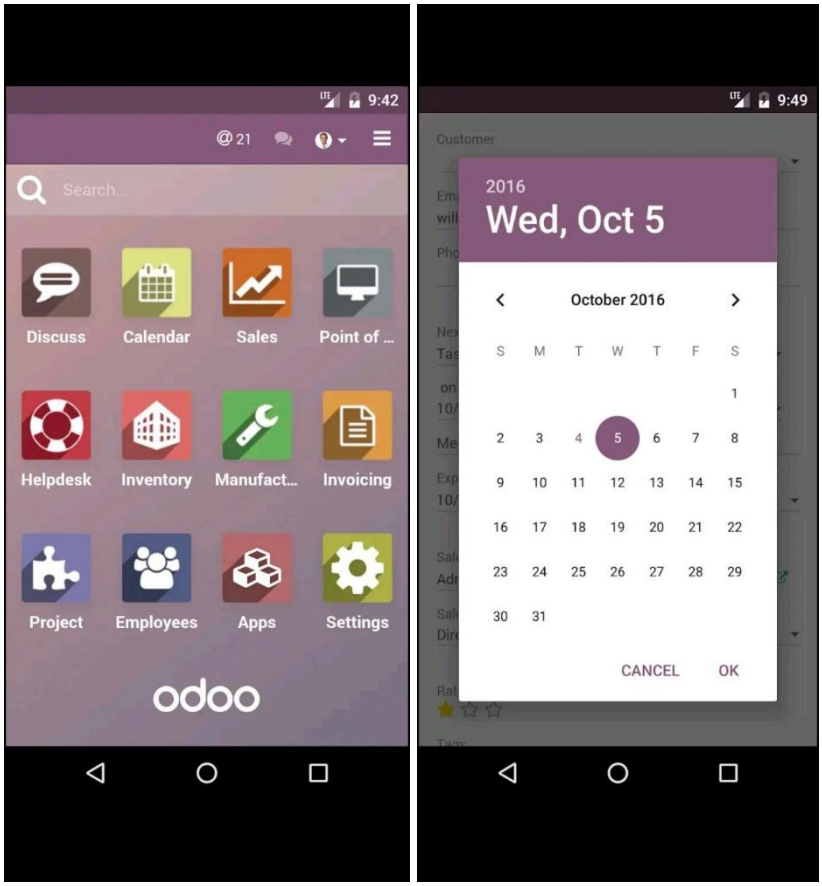


Figure 2.4:Screenshot of Home Page and Calendar Page

Figure 2.4 shows the home page and contains many elements such as Discuss, Calendar, Sales, Helpdesk, Inventory, Invoicing and the other page is calendar page which user can easily select a date from the calendar view, no need to enter date manually.

2.2 Finding and Analysis

Comparison of existing applications techniques and functionalities that are related to project that presented in a form of table.

Table Comparison between three existing system .1 Sample

Name of Application	Advantages	Disadvantages
Zoho App	- Intuitive interface that requires minimal training, ideal for small business owners with limited technical skills. - Real-time stock updates and low stock alerts help prevent overstocking or stockouts. - Supports barcode scanning, reducing manual input errors and simplifying item tracking.	- Integration challenges with third-party tools - Suitable for small businesses, but limited scalability if business complexity increases significantly. - Customer support may be inconsistent. .
TradeGecko (QuickBooks Commerce)	- User-friendly for businesses in e-commerce and B2B sectors,	- Limited customization options - Can be expensive for smaller businesses.

	streamlined for online sellers. - Strong inventory management - Seamless integration with QuickBooks for accounting, which is helpful for financial management. - Fully cloud-based, offering flexibility for remote access and real-time updates across locations.	- Inconsistent customer support.
Odoo App	- Highly customizable, open-source nature allows tailored functionality to meet specific needs. - Modular, integrates with other Odoo ERP modules (e.g., accounting, CRM) for comprehensive	- Complex implementation for multiple modules. - Technical Knowledge Required - No Automation Capabilities there is no automation features can make certain processes more labor-intensive and time-consuming

	management. - Real-time inventory adjustments with options for batch and serial tracking, suitable for complex warehouses.	- Manual Data Entry it relies on manual data entry can lead to errors and wasted time

2.3 Summary of the findings

In summary, each of the analyzed systems—Zoho App, TradeGecko, and Odoo—has its distinct features that cater to different business needs. Zoho App is ideal for businesses seeking a versatile, all-in-one solution. TradeGecko excels in inventory and order management, particularly for eCommerce-focused operations, while Odoo App provides expansive customization and integration options suitable for businesses looking for tailored solutions. When selecting a business management system, organizations should evaluate their specific operational requirements, budget constraints, and desired features to determine the best fit for growth and efficiency.

Feature	Zoho App	TradeGecko (QuickBooks Commerce)	Odoo App
Intuitive interface, easy for beginners	✓	✓	✗
Real-time stock updates and low stock alerts	✓	✓	✓
Supports barcode scanning	✓	✗	✓
Fully cloud-based	✗	✓	✓

CHAPTER 3

REQUIREMENT ANALYSIS

3.1 Requirements Elicitation

A comprehensive study focused on the user discovery process was conducted to identify the system requirements for this chapter. Requirements elicitation is a critical step in the system development process to ensure that the mobile inventory management app accurately reflects the needs and preferences of its users. By gathering detailed insights from stakeholders through techniques like interviews, surveys, and observations, this process helps define clear, actionable requirements, forming a solid foundation for designing a user-centered and effective system.

3.2 Elicitation Technique(s)

Survey:

Questionnaires are efficient tools for collecting large amounts of data from multiple individuals. Project teams can gather requirements from users or participants via the internet. The design of the questionnaire is critical as it can significantly influence respondents' reactions. A survey comprising 14 project-related questions was distributed

to a random sample of students at Universiti Tenaga Nasional Malaysia, and their responses were recorded.

Technique X

Explain how it was conducted.

3.3 Results and Discussion

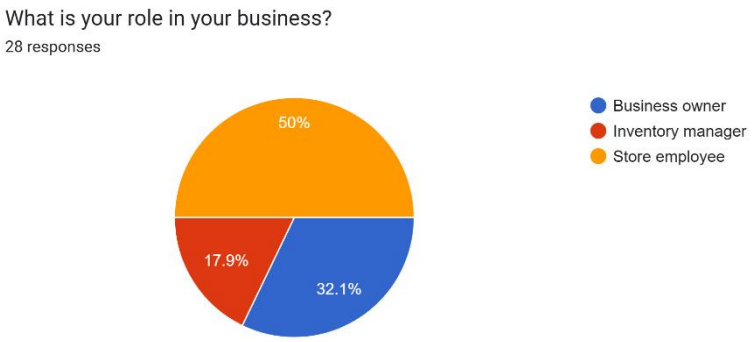


Figure 3.1 What is your role in your business?

Question 1: What is your role in your business?

The pie chart displays the distribution of roles among 28 respondents in a business setting. The analysis of the results is as follows:

1. **Store Employee (50%)**: Half of the respondents (14 out of 28) identify as store employees. This indicates that the majority of users interacting with the inventory system might be front-line staff responsible for day-to-day inventory tasks. Ensuring the app is user-friendly and straightforward for this group is crucial.
2. **Business Owner (32.1%)**: Approximately one-third of the respondents (9 out of 28) are business owners. This group is likely interested in higher-level features, such as analytics, reporting, and overall inventory oversight, to make informed business decisions.
3. **Inventory Manager (17.9%)**: A smaller percentage of respondents (5 out of 28) are inventory managers. This group likely focuses on specific inventory

management tasks, such as stock tracking, adjustments, and order coordination, necessitating features for precision and control.

Q2: How many employees are involved in inventory management in your business?

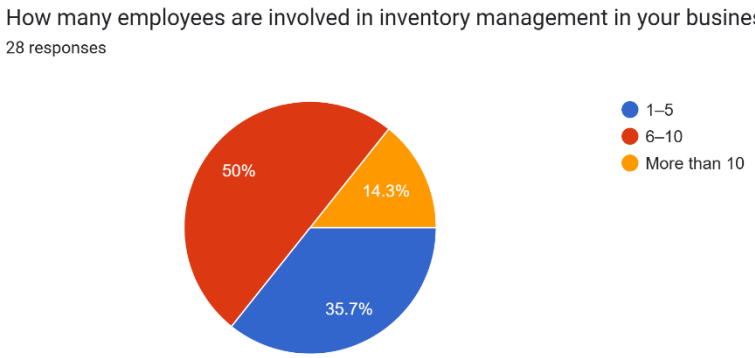


Figure 3.2 How many employees are involved in inventory management in your business?

1. **6–10 Employees (50%)**: Half of the respondents (14 out of 28) have between 6 to 10 employees involved in inventory management. This suggests that a significant number of businesses operate at a medium scale, requiring inventory solutions that support coordination among multiple users.
2. **1–5 Employees (35.7%)**: About one-third of respondents (10 out of 28) have small teams managing inventory. These businesses likely prioritize simplicity, ease of use, and cost-effectiveness in their inventory management systems.
3. **More than 10 Employees (14.3%)**: A smaller proportion of businesses (4 out of 28) involve more than 10 employees in inventory management. These larger teams may need advanced features such as multi-user access, role-based permissions, and collaborative tools to streamline operations.

Q3. How often do you or your team manage inventory?

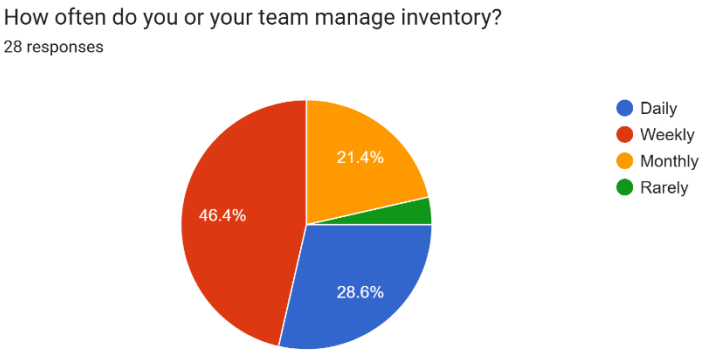


Figure 3.3 How often do you or your team manage inventory?

1. **Weekly (46.4%)**: Nearly half of the respondents (13 out of 28) manage their inventory on a weekly basis. This indicates that most businesses prefer periodic updates to track inventory, which may be sufficient for their operational needs.
2. **Daily (28.6%)**: A significant portion of respondents (8 out of 28) manage inventory daily. These businesses likely operate in fast-paced environments where real-time inventory updates are critical, such as retail or food services.
3. **Monthly (21.4%)**: A smaller group of respondents (6 out of 28) manage inventory monthly. These businesses might deal with slower inventory turnover or operate in industries with less frequent stock changes.
4. **Rarely (3.6%)**: Only one respondent (1 out of 28) manages inventory rarely. This could suggest either a highly stable inventory process or minimal inventory-related operations.

Q4. What method do you currently use for managing inventory?

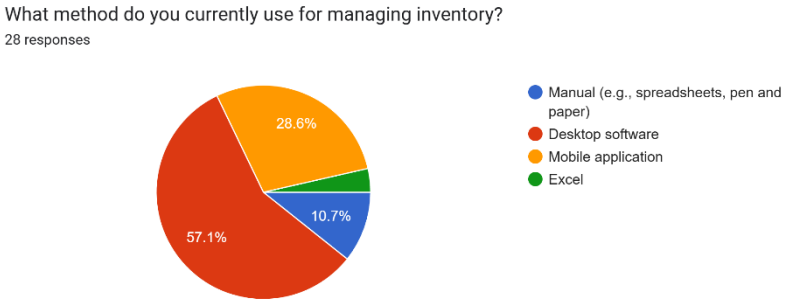


Figure 3.4 What method do you currently use for managing inventory?

1. Manual (e.g., spreadsheets, pen and paper): 57.1%

The majority of respondents (57.1%) are using manual methods for inventory management. This indicates that a significant portion of respondents still rely on traditional tools, which might be less efficient or prone to human error compared to automated methods.

2. Desktop software: 28.6%

About 28.6% of respondents use desktop software for inventory management. This group likely benefits from more organized systems with better tracking capabilities compared to manual methods.

3. Mobile application: 10.7%

A small portion of respondents (10.7%) uses mobile applications for inventory management. This suggests that mobile tools for managing inventory are still relatively underutilized but may offer convenience and accessibility for those on the move.

4. Excel: 3.6%

A very small number of respondents (3.6%) use Excel specifically for inventory management. While Excel is a powerful tool for data organization, it may lack the more specialized features and automation of dedicated inventory management systems.

Q5. Do you track inventory in real-time?

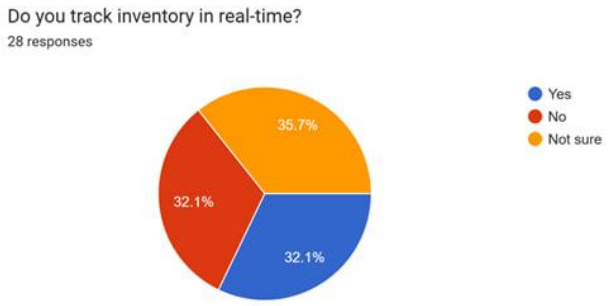


Figure 3.5 Do you track inventory in real-time?

1. Only 35.7% of respondents track their inventory in real-time. This indicates that a minority of the participants have automated systems or processes in place that allow them to continuously monitor inventory as it changes, providing them with up-to-date data on stock levels.
2. A slightly smaller percentage (32.1%) does not track inventory in real-time. This suggests that many respondents still use periodic methods or manual checks for inventory management, which may not offer as much accuracy or speed as real-time tracking.
3. The remaining 32.1% are unsure whether they track inventory in real-time. This could indicate a lack of clarity or awareness about the tools and processes being used, possibly suggesting a need for better communication or understanding within these organizations regarding their inventory management systems.

Q6: How would you rate the effectiveness of your current inventory management system?

Figure 3.6 How would you rate the effectiveness of your current inventory management system?

The chart represents the responses to the question "How would you rate the effectiveness of your current inventory management system?" with a total of 28 responses. The ratings are on a scale from 1 to 5, with 1 being the least effective and 5 being the most effective. Here's the breakdown of the responses:

1. Rating 1 (Least Effective): 2 responses (7.1%)

   A small percentage of respondents (7.1%) rate their system as ineffective, which suggests that a few individuals are dissatisfied with their current inventory management system.

2. Rating 2: 4 responses (14.3%)

   A slightly higher percentage (14.3%) rated the system as a 2, indicating that some users feel their system is somewhat ineffective but not completely inadequate.

3. Rating 3 (Neutral): 15 responses (53.6%)

   The majority (53.6%) rate their system a 3, suggesting that most respondents feel that their inventory management system is average or neutral in effectiveness. This could mean that while the system works, it may not fully meet the users'

needs or expectations.

4. Rating 4: 5 responses (17.9%)

   A smaller group (17.9%) rate the system as a 4, indicating that these users find the system to be somewhat effective but feel there may still be room for improvement.

5. Rating 5 (Most Effective): 2 responses (7.1%)

   Only 7.1% of respondents rate their system as the most effective, which suggests that very few people are fully satisfied with their current inventory management system.

Q7. Which of the following features would you find most valuable in an inventory management app?

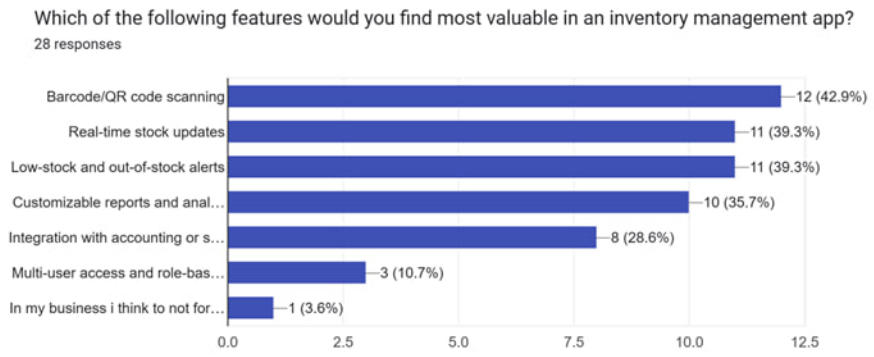


Figure 3.7 Which of the following features would you find most valuable in an inventory management app?

The chart presents responses to the question, "Which of the following features would you find most valuable in an inventory management app?" with a total of 28 responses. The features are ranked based on how many respondents considered them most valuable. Here is the breakdown:

1. Barcode/QR code scanning: 12 responses (42.9%)

The most valued feature by far is barcode/QR code scanning, with 42.9% of respondents indicating this as the most important feature. This suggests that users prioritize ease and speed of data entry for managing their inventory, which barcode and QR code scanning can efficiently provide.

2. Real-time stock updates: 11 responses (39.3%)

   Close behind is real-time stock updates, which 39.3% of respondents find highly valuable. This feature would allow for up-to-date tracking of inventory, helping businesses maintain accuracy and streamline operations.

3. Low-stock and out-of-stock alerts: 11 responses (39.3%)

   Another feature that 39.3% of respondents value is the ability to receive low-stock and out-of-stock alerts. This suggests that many respondents are focused on avoiding stockouts and ensuring they have enough inventory to meet demand.

4. Customizable reports and analytics: 10 responses (35.7%)

   Customizable reports and analytics are also highly valued by 35.7% of respondents. This feature helps businesses analyze inventory trends, make informed decisions, and optimize stock management.

5. Integration with accounting or sales software: 8 responses (28.6%)

   Integration with accounting or sales software is important for 28.6% of respondents. This feature would allow businesses to synchronize their inventory data with financial or sales systems, streamlining workflows and reducing errors.

6. Multi-user access and role-based permissions: 3 responses (10.7%)

   Multi-user access and role-based permissions are considered important by 10.7% of respondents. This feature enables businesses to grant different levels of access to users based on their roles, ensuring proper control over the system.

7. In my business, I think I will not require an inventory management app: 1 response (3.6%)

   Only 3.6% of respondents feel that they do not need an inventory management app, indicating that most see value in adopting such a system.

Q8. How important is it for the app to send notifications for critical inventory updates (e.g., low stock, overdue orders)?

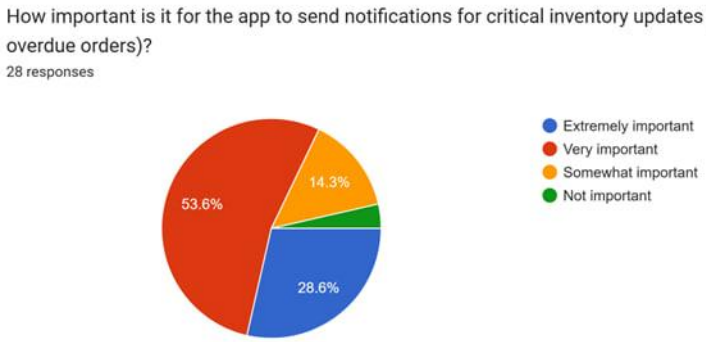


Figure 3.8 How important is it for the app to send notifications for critical inventory updates?

1. Extremely important: 15 responses (53.6%)

   The majority of respondents (53.6%) consider it extremely important for the app to send notifications for critical inventory updates. This indicates that real-time alerts are seen as a crucial feature to prevent issues such as stockouts or missed orders, helping businesses stay proactive in managing their inventory.

2. Very important: 8 responses (28.6%)

   A significant portion of respondents (28.6%) view this feature as very important. While not as critical as those who consider it "extremely important," they still recognize its value in ensuring smooth operations and timely responses to inventory needs.

3. Somewhat important: 4 responses (14.3%)

   A smaller group (14.3%) sees notifications as somewhat important. These users may not prioritize real-time updates as much as others but still appreciate the added convenience for inventory management.

4. Not important: 1 response (3.6%)

   Only 3.6% of respondents do not see the value in receiving notifications for critical inventory updates, suggesting that a minimal portion of users are less concerned with this feature, possibly because they have alternative ways of tracking inventory.

Q9. Would you prefer an app that offers customizable features to fit your business needs?

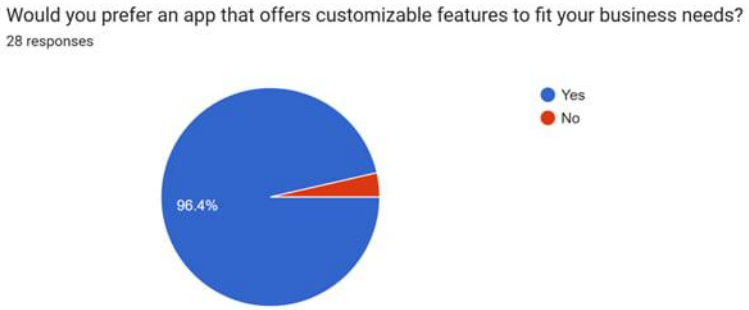


Figure 3.9 Would you prefer an app that offers customizable features to fit your business needs?

1. Yes: 27 responses (96.4%)

   A very overwhelming majority (96.4%) of respondents would prefer an app with customizable features tailored to their business needs. This strongly indicates that businesses value flexibility and the ability to adjust the app to their specific operations and requirements.

2. No: 1 response (3.6%)

   Only a small fraction (3.6%) of respondents does not want an app with customizable features. This suggests that for this particular group, either the current standard features are sufficient or they prefer simplicity over customization.

Q10. How useful would a dashboard displaying key metrics (e.g., stock levels, sales, recent activity) be for you?

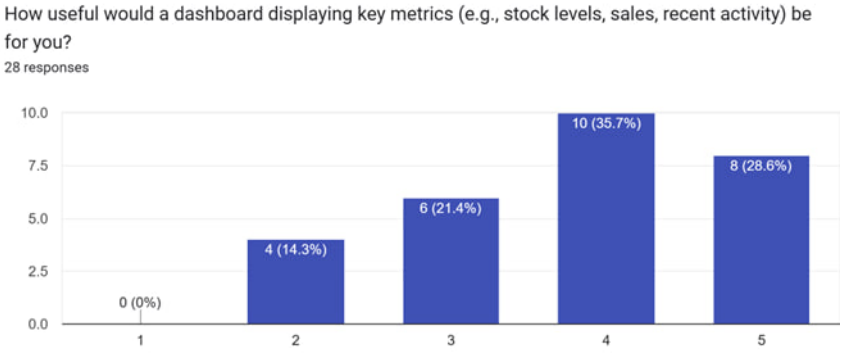


Figure 3.10 How useful would a dashboard displaying key metrics (e.g., stock levels, sales, recent activity) be for you?

1. Rating 1 (Not useful): 0 responses (0%)

   No respondents consider the dashboard completely useless, indicating that there is a general consensus that dashboards with key metrics are valuable to some extent.

2. Rating 2: 4 responses (14.3%)

   A small percentage (14.3%) find the dashboard only somewhat useful. These respondents may not feel the need for such a tool or believe they can manage without it.

3. Rating 3: 6 responses (21.4%)

   A larger group (21.4%) rates the dashboard as somewhat useful, indicating a more moderate interest in having access to key metrics.

4. Rating 4: 10 responses (35.7%)

   The largest group (35.7%) finds the dashboard quite useful. These respondents likely see value in having a visual representation of key metrics to help with

decision-making and operational oversight.

5. Rating 5 (Extremely useful): 8 responses (28.6%)

   A significant portion (28.6%) rates the dashboard as extremely useful. This group clearly values having key metrics displayed in real time, which can be very beneficial for tracking performance and inventory management.

Q11. What level of technical expertise do you have?

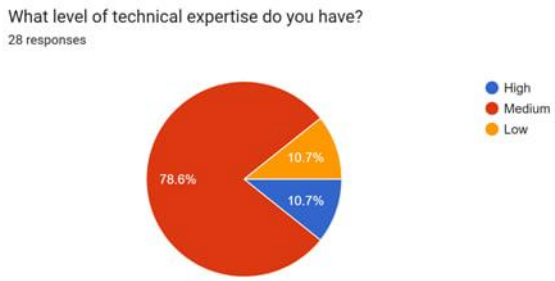


Figure 3.11 What level of technical expertise do you have?

1. High technical expertise: 3 responses (10.7%)

   A small percentage (10.7%) of respondents consider themselves to have high technical expertise. This indicates that a relatively small portion of the group feels confident in their advanced technical skills.

2. Medium technical expertise: 3 responses (10.7%)

   Similarly, 10.7% of respondents rate their technical expertise as medium, suggesting that they possess a moderate understanding of technical concepts or systems.

3. Low technical expertise: 22 responses (78.6%)

The vast majority (78.6%) of respondents describe their technical expertise as low. This indicates that most of the respondents may not be highly familiar with advanced technical systems, possibly preferring simpler, more user-friendly interfaces and solutions.

3.3 Requirement Specifications

The purpose of this Software Requirements Specification (SRS) document is to define the functional and non-functional requirements for the mobile-only inventory management system. The system is designed to provide small-to-medium-sized businesses (SMBs) with an efficient and user-friendly solution to track, manage, and monitor inventory via a mobile application.

Use-Case Diagram:

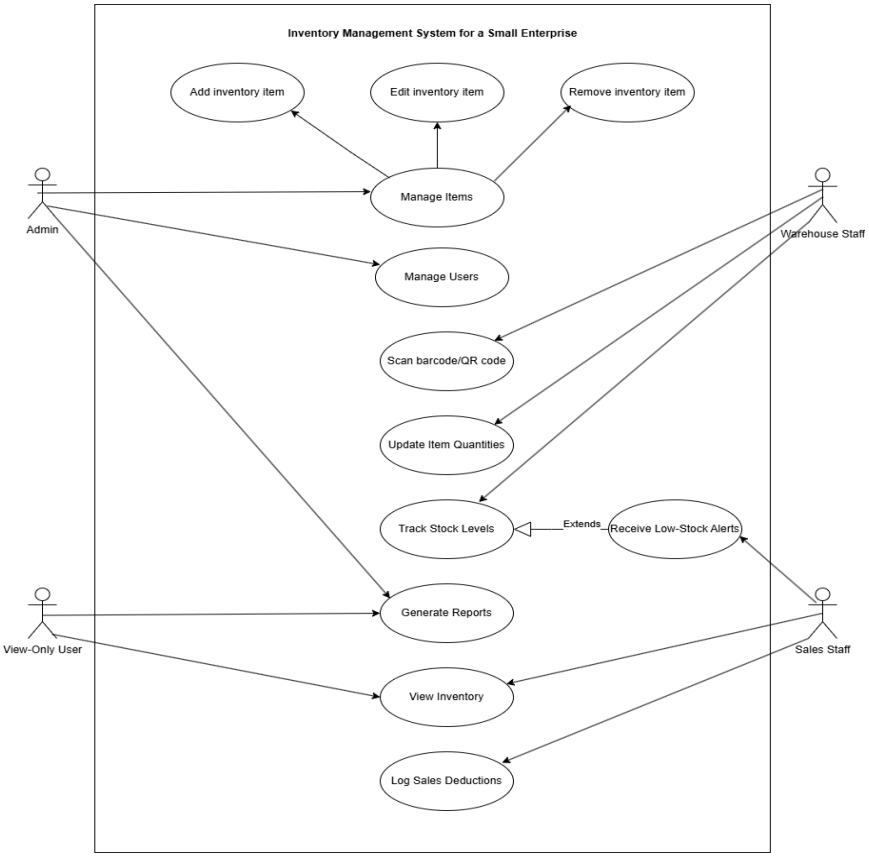


Figure 4 Use Case Diagram

CHAPTER 4

SYSTEM DESIGN

4.1 System Design

The aim of this chapter is to document the specific details and requirements of the system. The system design is divided into three main components: system architecture, interface design, and database design.

4.2 System architecture

System architecture can be represented through models that outline the overall structure of the system and illustrate the connections between its different components. These models offer a detailed representation of the system's functionality, user interactions, data storage, and other essential system characteristics.

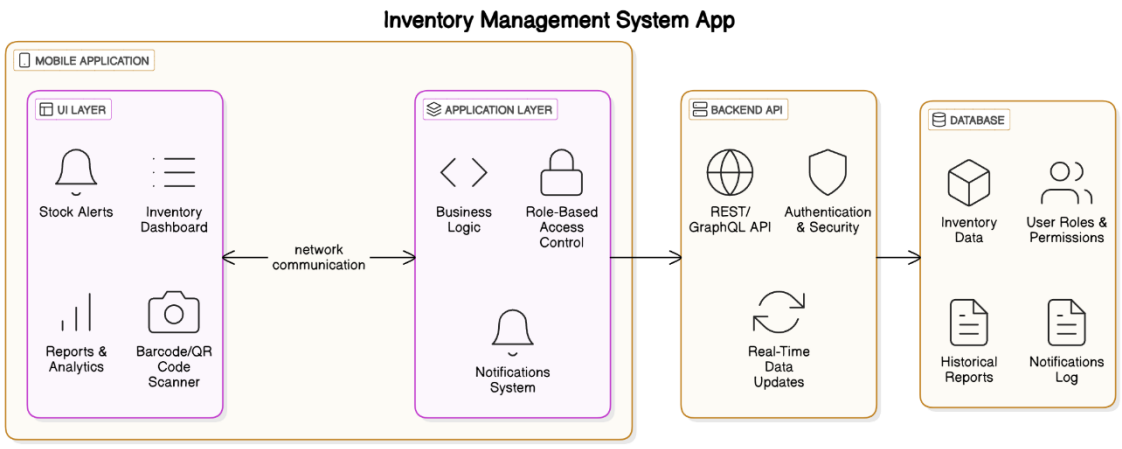


Figure 4.1 System Architecture

4.3 Interface Design

Figure 4.2: Home Page Interface

This landing page represents the homepage of an application called **InventoryPro**, a digital solution designed to streamline inventory management processes. The page features a modern, responsive layout with a strong visual and functional focus. Below is a breakdown of its core components and design elements:

- The landing page provides immediate access to:
    - **User Login** – for existing users to access their inventory dashboards.
    - **User Registration** – for new users to onboard and start using the service.
- Emphasis is placed on encouraging new users to register via both the top navigation and a large, central call-to-action button.

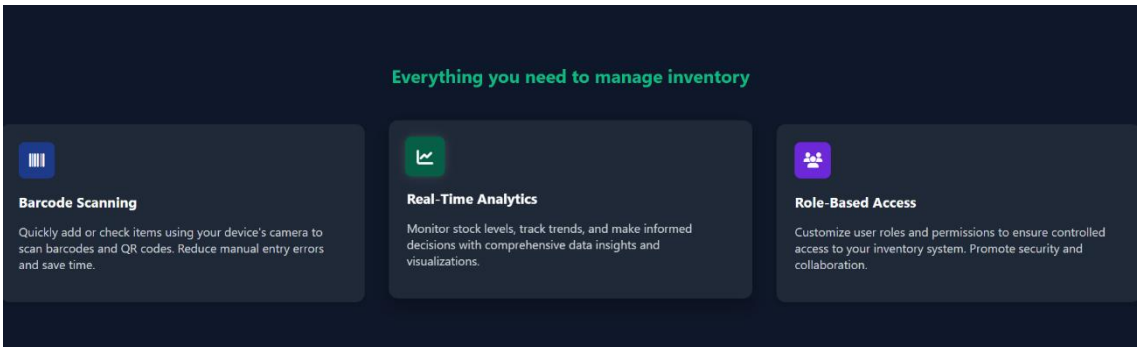


Figure 4.3 The features of the system app

This section of the InventoryPro landing page highlights the **core features** of the inventory management system, presented in a clean, responsive three-column layout. The content is centered under the heading:

"Everything you need to manage inventory"

(Styled in bold green text for visual emphasis)

Each feature is enclosed in a rectangular card with a dark navy-blue background, rounded corners, and an icon header. The visual design is consistent with the overall brand theme, emphasizing usability, clarity, and modern aesthetics.

- **Barcode Scanning**, which allows users to quickly add or check items using a device's camera to scan barcodes and QR codes, reducing manual entry errors.
- **Real-Time Analytics**, enabling users to monitor stock levels, track trends, and make informed decisions with comprehensive data insights.
- **Role-Based Access**, which ensures controlled access by allowing customizable user roles and permissions, promoting security and collaboration.

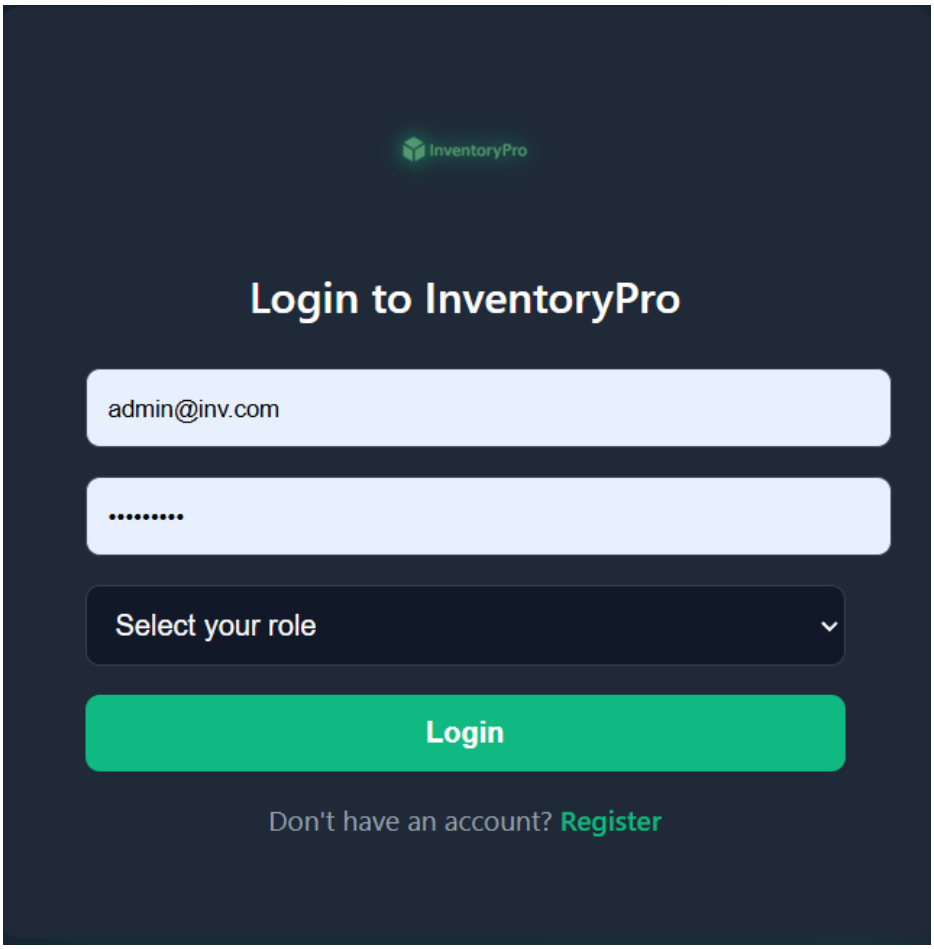


Figure 4.4 Login Page for the user

The login page of the InventoryPro Inventory Management System provides a secure and user-friendly interface for users to access their accounts. At the top of the page, the InventoryPro logo is prominently displayed with a glowing green cube icon and brand name, reinforcing the platform's visual identity. Centered beneath the logo is the main heading, "Login to InventoryPro," which clearly communicates the purpose of the page. The login form includes two primary input fields: one for the user's email address, with a placeholder example shown as "admin@inv.com", and another for the password, which is masked to ensure privacy and data protection. In addition to these, a role selection dropdown menu labeled "Select your role" allows users to specify their designated system role—such as admin, manager, or staff—ensuring that role-based authentication is enforced at the point of entry. This adds an extra layer of security and personalized access control. Below the form, a large green button labeled "Login" acts as the call-to-action,

initiating the authentication process upon submission. For new users who do not yet have an account, a prompt beneath the login button reads, “Don’t have an account? Register,” with the word “Register” highlighted in green and linked to the sign-up page, thereby supporting easy onboarding and user inclusion.

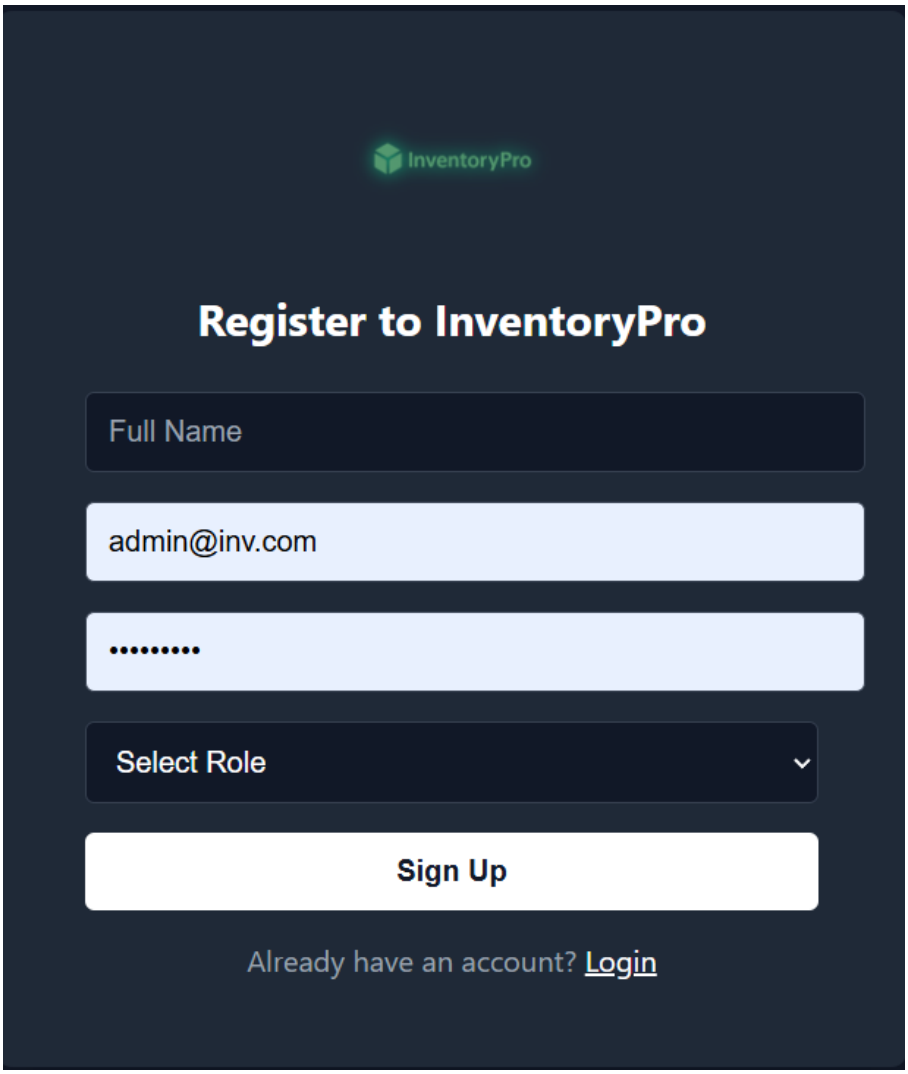


Figure 4.5 Registration page of the new user

The registration page of the InventoryPro Inventory Management System is designed to facilitate a smooth and secure onboarding experience for new users. At the top center of the interface, the InventoryPro logo is prominently displayed, featuring a glowing green cube icon accompanied by the brand name. Beneath the logo, the heading "Register to InventoryPro" is clearly presented in bold white text, signaling the page’s purpose. The

form includes four key input components that are visually stacked for ease of use and accessibility. The first field prompts the user to enter their **full name**, followed by a second field for the **email address**, shown with a placeholder example ("admin@inv.com"). A third input field is dedicated to **password entry**, which is masked to ensure user privacy and data protection. To support access control, a dropdown menu labeled **"Select Role"** allows users to specify their role within the system, such as admin, warehouse staff, or sales staff. This enables the platform to implement appropriate permissions and features tailored to the user's responsibilities. Directly beneath the form, a wide white **"Sign Up"** button serves as the main call-to-action, encouraging users to complete their registration. For users who may already have an account, a subtle message at the bottom of the form reads, "Already have an account? Login," with "Login" highlighted as a clickable hyperlink, providing a seamless transition to the login page.

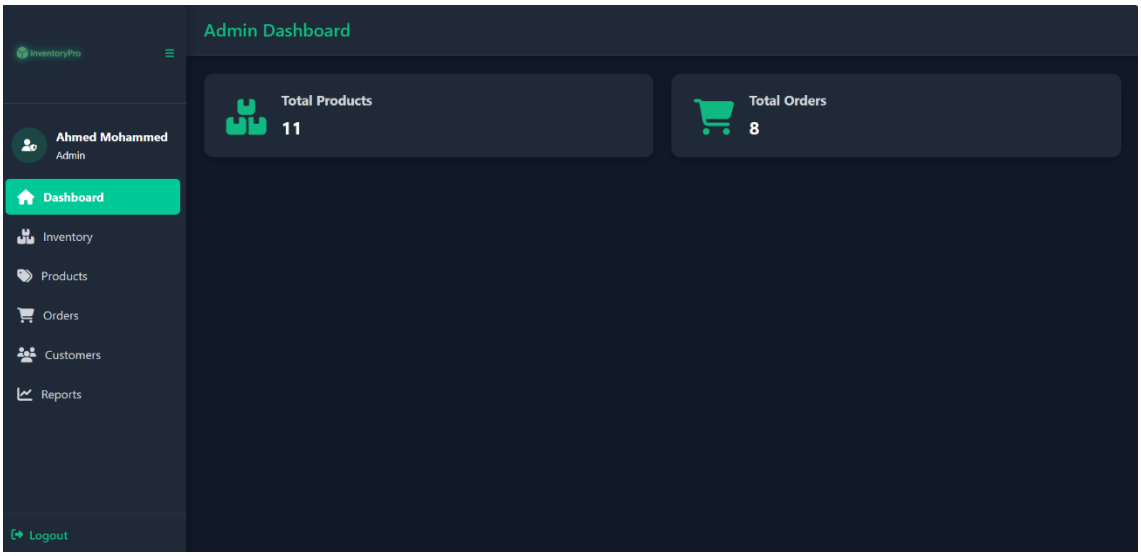


Figure 4.6 Dashboard Page

The Admin Dashboard of the InventoryPro Inventory Management System serves as the central control panel for administrative users, providing a streamlined overview of core inventory metrics and navigation. Positioned on the left-hand side is a fixed sidebar containing user information and system navigation links. At the top of this sidebar, the user's name, "Ahmed Mohammed," is displayed alongside their role, "Admin,"

reinforcing personalized access. Below this, a vertically aligned navigation menu includes buttons for Dashboard, Inventory, Products, Orders, Customers, and Reports, each with intuitive icons and hover effects. The currently active section, “Dashboard,” is highlighted in green to indicate the user's location within the interface. A "Logout" button is located at the bottom of the sidebar, providing secure session termination.

The dashboard prominently displays two key statistics: "Total Products" and "Total Orders." Each statistic is encapsulated in its own dark card container with a minimalistic icon—boxes for products and a shopping cart for orders—alongside numerical values. In this instance, the system reports **11 total products** and **8 total orders**, giving the admin a quick snapshot of current inventory activity.

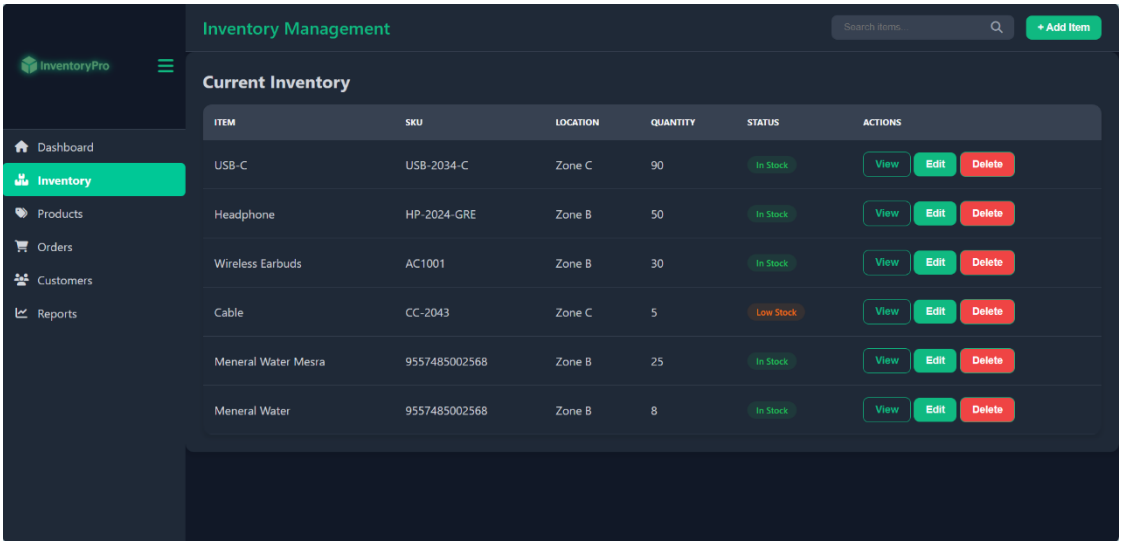


Figure 4.7 Inventory Table

The main content area is titled “Current Inventory” and displays a well-structured table listing all inventory items. The table includes columns for **Item Name**, **SKU**, **Location**, **Quantity**, **Status**, and **Actions**. Each row represents a unique item, such as USB-C cables, headphones, wireless earbuds, and mineral water, along with their corresponding stock-keeping unit (SKU), storage zone (e.g., Zone B or Zone C), and available quantity. The **Status** column uses color-coded labels to indicate whether an item is “In Stock” (green) or “Low Stock” (orange), offering a quick visual assessment of stock levels. For

example, the cable item is marked as “Low Stock” with only five units remaining, whereas other items like USB-C and headphones are sufficiently stocked.

To the right of each row, a set of action buttons allows users to manage individual items. The **“View”** button opens item details, the **“Edit”** button enables modifications, and the **“Delete”** button facilitates item removal from the inventory—each color-coded respectively in blue, green, and red to aid user recognition. At the top right of the interface, a bright green **“+ Add Item”** button, allowing users to input new inventory entries efficiently.

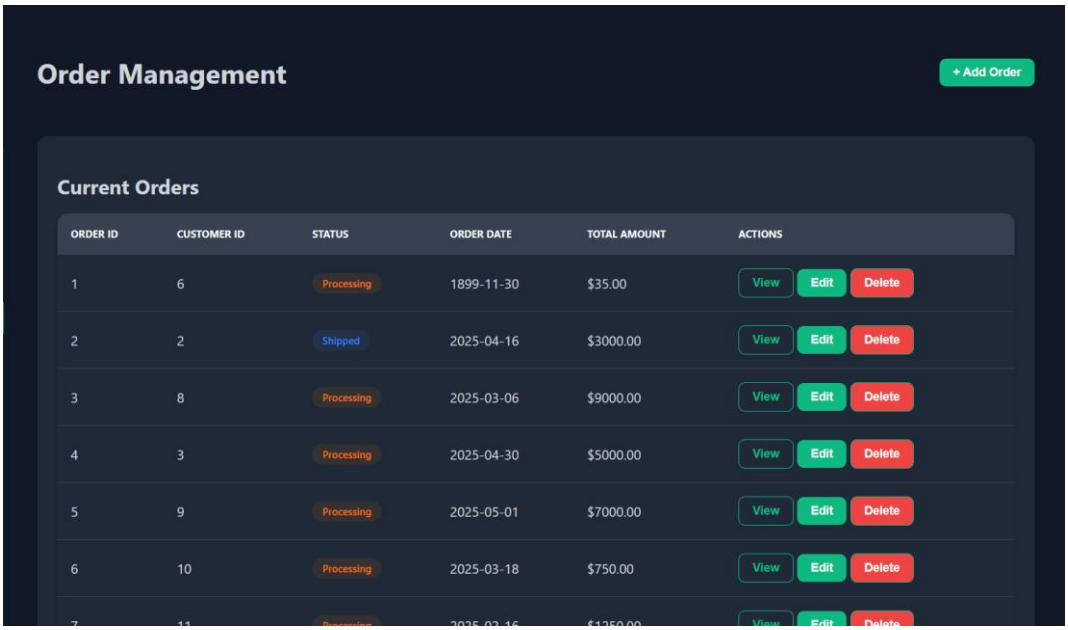


Figure 4.8 Orders Page

The Order Management page in the InventoryPro Inventory System provides a centralized interface for monitoring, managing, and updating customer orders. The top of the page features a bold heading labeled “Order Management,” clearly indicating the current module. Below this heading is the section titled “Current Orders,” where all recent and active orders are displayed in a structured data table. The table includes key columns: **Order ID**, **Customer ID**, **Status**, **Order Date**, **Total Amount**, and **Actions**. Each row corresponds to an individual order, offering detailed tracking of transaction data such as the customer associated with the order, the current status of the order (e.g., *Shipped* or

Processing), the date the order was placed, and the total monetary value.

Color-coded status labels enhance clarity—orders marked as **"Shipped"** appear in blue, while those labeled **"Processing"** are highlighted in orange, providing a quick visual reference for fulfillment progress. For example, Order ID 1 with Customer ID 6 has been shipped with a total amount of $35.00, while Order ID 3 is still in processing and has a value of $9,000.00. To the right of each row, three action buttons—**View**, **Edit**, and **Delete**—allow for full management of each order. These buttons are color-coded as well: View in dark teal, Edit in green, and Delete in red, promoting intuitive interaction and error prevention.

On the top-right corner of the page, a green **"+ Add Order"** button enables users to input new order data, supporting continuous system updates.

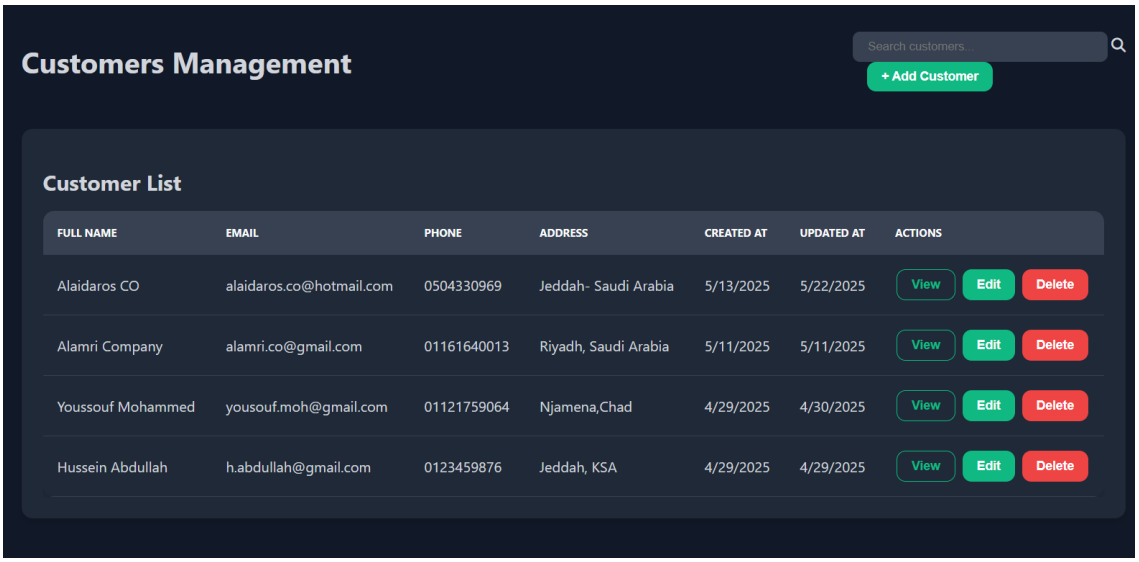


Figure 4.9 Customers Page and its data.

- The Customers Management page in the InventoryPro system provides a structured and intuitive interface for overseeing customer records. At the top of the page, the title "Customers Management" is prominently displayed in bold white text, signaling the current administrative module. The interface is divided

into two main functional areas. On the right side of the top bar, there is a green "+ Add Customer" button, which enables administrators to add new customer profiles seamlessly.

- The central feature of the page is the **Customer List** table, which displays all existing customer entries in a clear tabular format. The columns include **Full Name**, **Email**, **Phone**, **Address**, **Created At**, **Updated At**, and **Actions**. Each row contains detailed customer information such as name, contact details, and address—examples include companies and individuals based in Jeddah, Riyadh, and even international locations like Njamena, Chad. The table also shows timestamps for when each customer record was created and last updated, enabling tracking of changes over time.
- To the far right of each customer entry, the **Actions** column offers three buttons for managing customer data. The **"View"** button allows users to see full details, the **"Edit"** button provides access for modifying customer information, and the **"Delete"** button enables safe removal of records. These actions are color-coded—blue for View, green for Edit, and red for Delete—to enhance usability and prevent accidental operations. The design of the page follows InventoryPro's overall theme, featuring a dark background, green highlights, and white text for optimal contrast and readability. This layout ensures that administrators can efficiently manage customer data with full visibility, quick searchability, and real-time update capabilities.

Figure 4.10 Report analysis overview

The Reports Overview page of the InventoryPro system offers a visual summary of key operational metrics, providing stakeholders with clear insights into sales performance and inventory status. At the top of the page, the heading "Reports Overview" is displayed in bold white text, followed by the section title "Sales by Category." This section features a horizontal bar chart labeled **"Total Sales by Category,"** which visually represents sales figures across various product categories. The chart indicates that **Phones** significantly outperformed other categories, with sales reaching over 200,000 units, followed by **Furniture**, **Electronics**, and **Accessories**, which recorded substantially lower figures. This data visualization helps administrators identify which product segments are driving revenue and informs future inventory planning and procurement decisions.

Below the sales chart is the "Inventory Distribution" section, which includes a **pie chart** labeled **"Inventory Stock Distribution."** This chart uses two color codes—green for "In Stock" and yellow for "Low Stock"—to represent the overall condition of the inventory. The visual suggests that the majority of inventory items are adequately stocked, while a

smaller proportion is categorized as low in stock, indicating areas where restocking may soon be required. The clear and vibrant pie chart provides a quick snapshot of inventory health, helping managers maintain operational continuity and avoid stockouts.

4.4 Database Design

Column Name	Data Type	Description
`user_id`	int (PK)	Unique identifier for the user.
`name`	varchar(255)	Full name of the user.
`email`	varchar(255)	User email address.
`password`	varchar(255)	Hashed password for security.
`role`	ENUM('Admin', 'Warehouse Staff', 'Sales Staff', 'View-Only User')	User role.

Table 1 Users Table

Column Name	Data Type	Description
product_id	int (PK)	Unique identifier for the product.
product_code	varchar(255)	Unique code representing the product (barcode, QR code, etc.).
name	varchar(255)	Name of the product.

description	varchar(255)	Description of the product.
price	decimal(10,2)	Price of the product.
stock_quantity	int	Current stock level.
category	varchar(255)	Product category (e.g., Electronics).
created_at	datetime	Timestamp of when the product was added.
updated_at	datetime	Timestamp of the last update.

Table 2 Product Table

Column Name	**Data Type**	**Description**
order_id	int (PK)	Unique identifier for the order.
customer_id	int (FK)	References customer_id in the Customers table.
order_status	ENUM('Processing', 'Shipped', 'Delivered', 'Cancelled')	Current status of the order.
order_date	datetime	Date and time the order was placed.
total_amount	decimal(10,2)	Total cost of the order.

Table 3 Orders Table

Column Name	**Data Type**	**Description**
order_item_id	int (PK)	Unique identifier for the order item.
order_id	int (FK)	References order_id in the Orders table.
product_id	int (FK)	References product_id in the Products table.
quantity	int	Quantity of the product in the order.
price	decimal(10,2)	Price of the product at the time of the order.

Table 4 Order_Items Table

customer_id	int (PK)	Unique identifier for the customer.
name	varchar(255)	Full name of the customer.

Column Name	Data Type	Description
email	varchar(255)	Email address of the customer.
phone	varchar(20)	Contact phone number.
address	varchar(255)	Physical address of the customer.
created_at	datetime	Timestamp of when the customer was added.

Table 5 Customers Table

Column Name	Data Type	Description
`log_id`	int (PK)	Unique identifier for the log entry.
`product_id`	int (FK)	References `product_id` in the Products table.
`change_type`	ENUM('Added', 'Removed', 'Adjusted')	Type of inventory change.
`quantity_changed`	int	Quantity added or removed.
`timestamp`	datetime	Date and time of the inventory change.
`user_id`	int (FK)	References `user_id` in the Users table.

Table 6 Inventory_Log Table

Column Name	Data Type	Description
notification_id	int (PK)	Unique identifier for the notification.

Column Name	**Data Type**	**Description**
user_id	int (FK)	References user_id in the Users table.
message	varchar(255)	Notification message content.
read_status	boolean	Indicates if the notification has been read.
created_at	datetime	Timestamp of when the notification was created.

Table 7 Notification Table

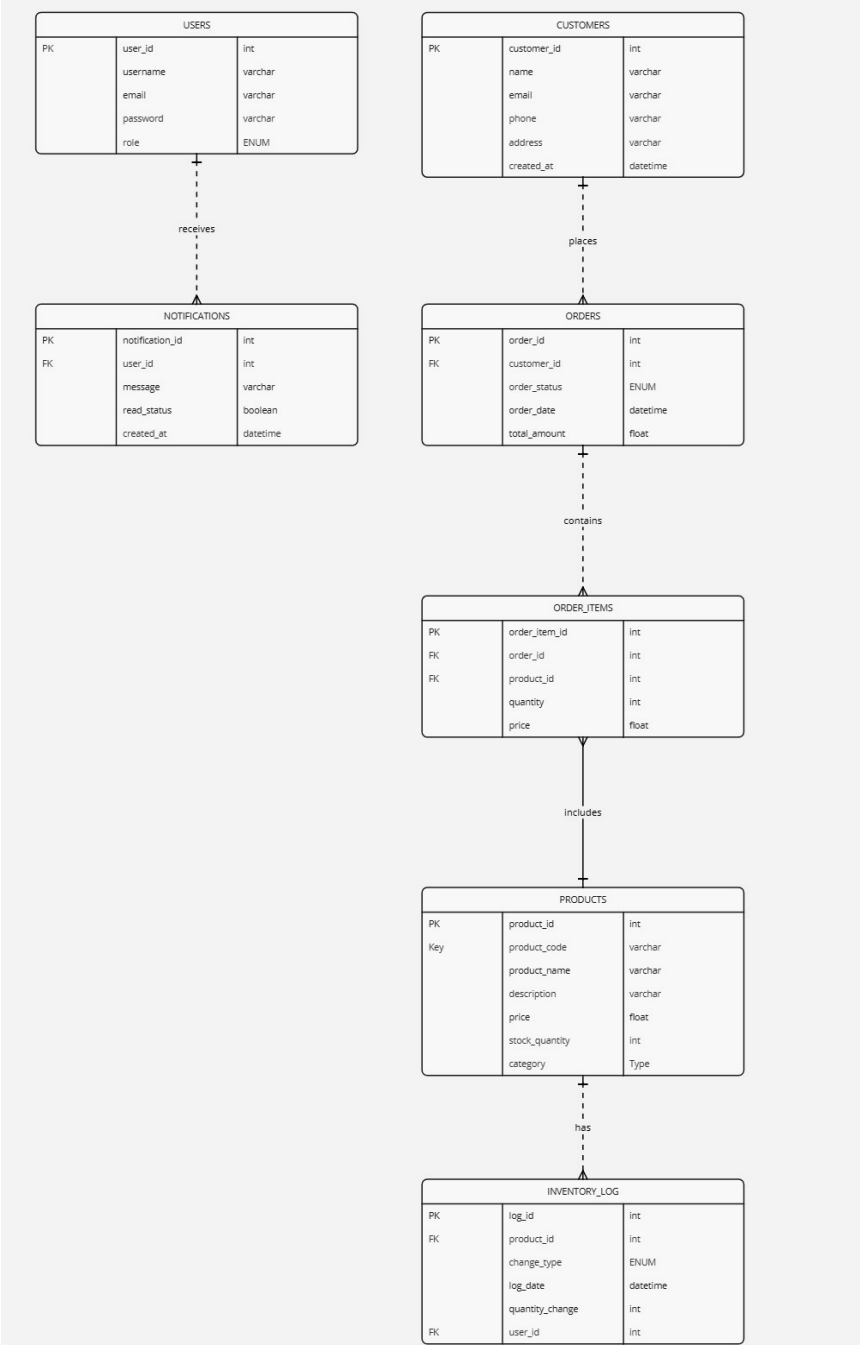
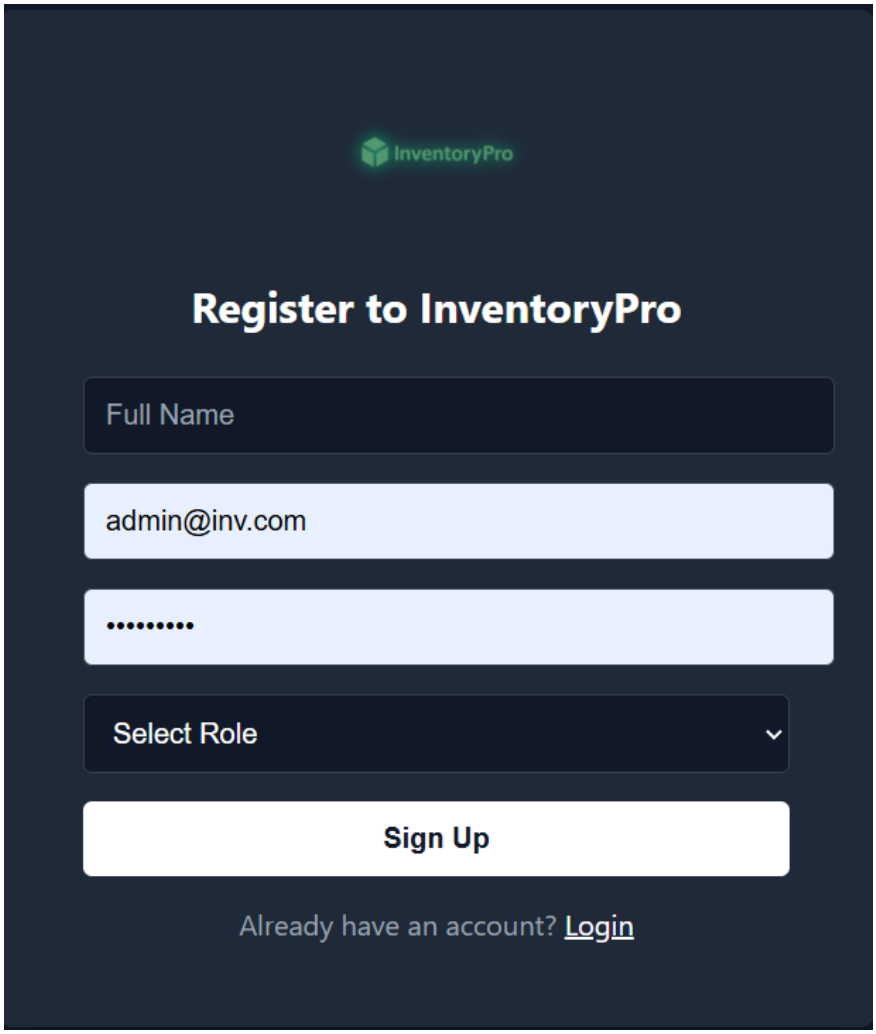
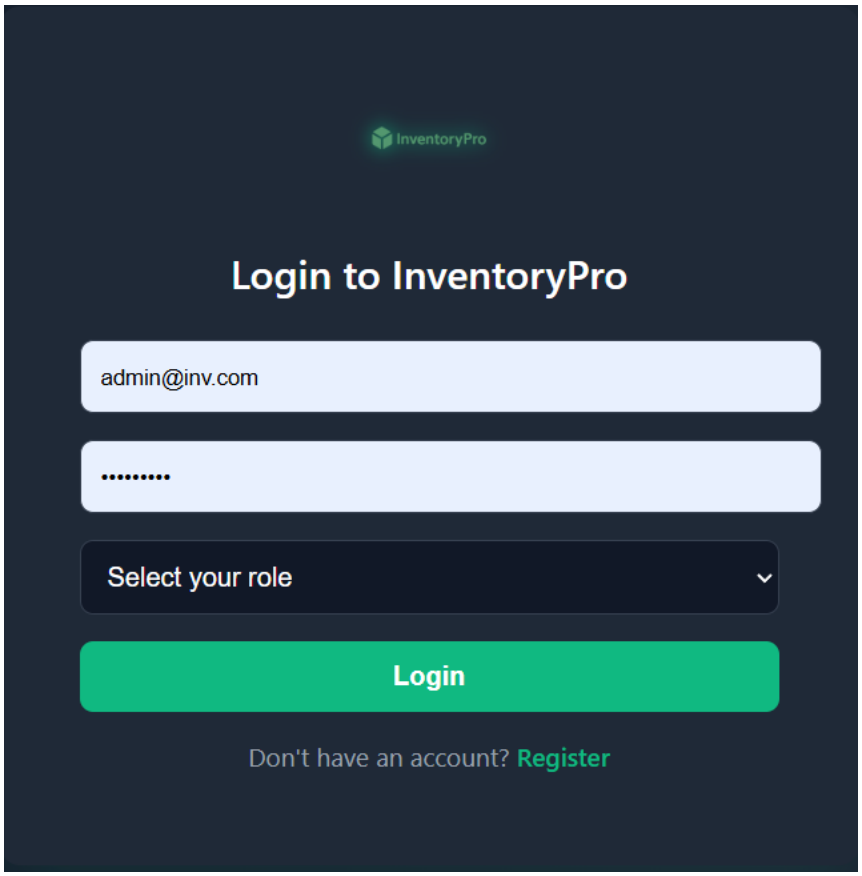


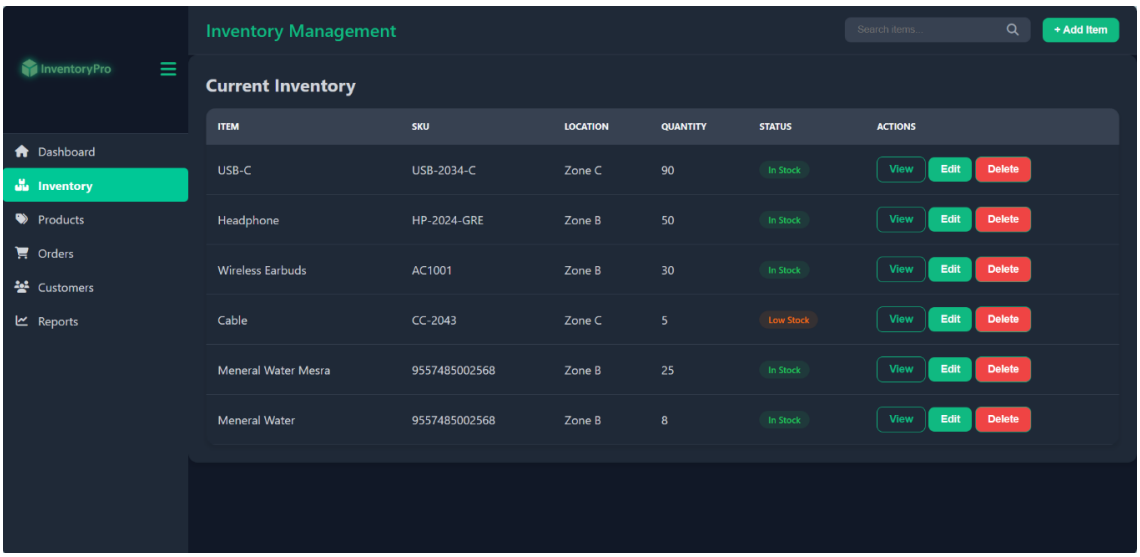
Figure 4.11 ER Diagram

CHAPTER 5

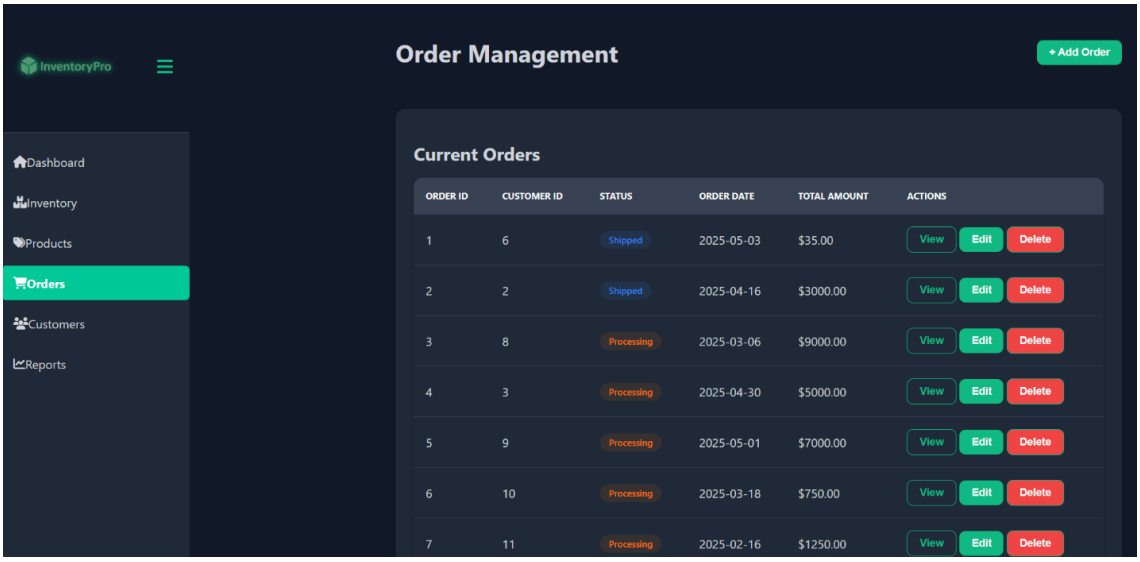
Development

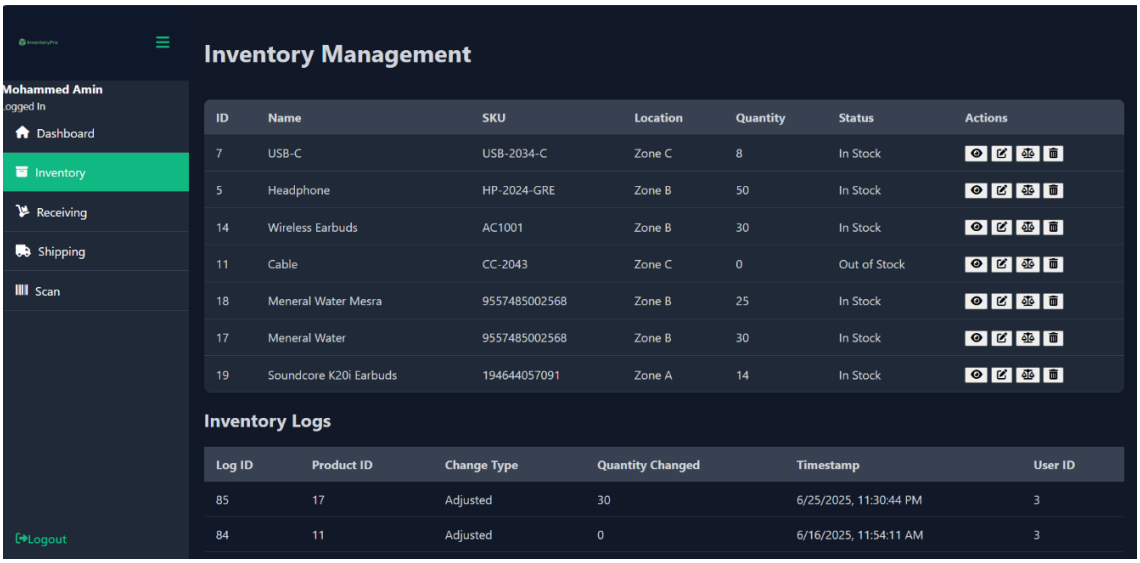


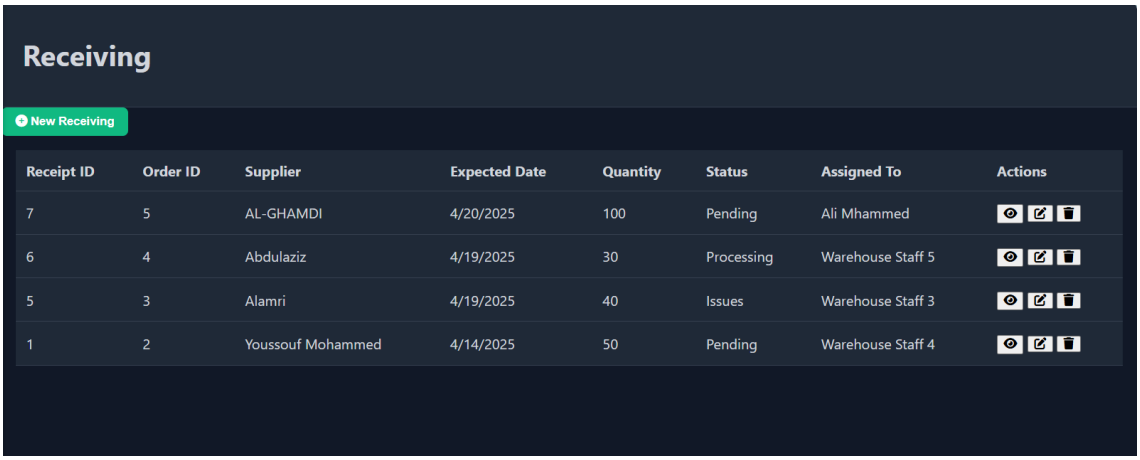

InventoryPro
Login to InventoryPro
admin@inv.com
Select your role
Login
Don't have an account? Register

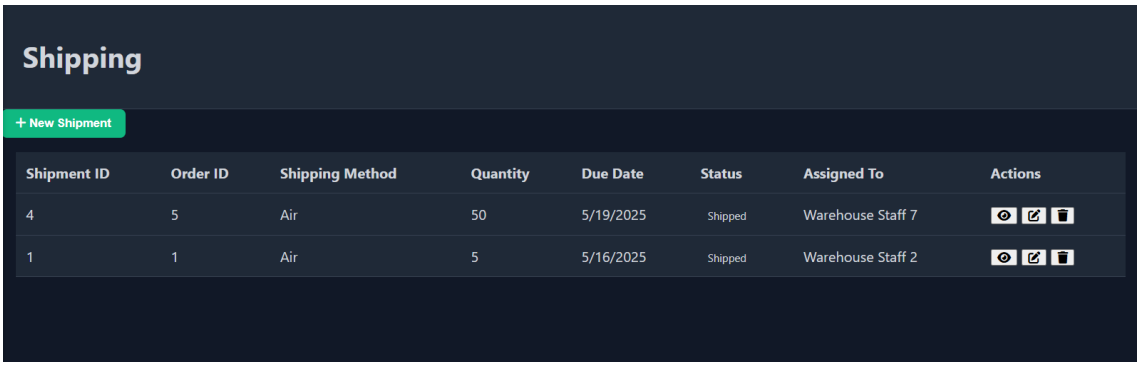

InventoryPro
Dashboard
Inventory
Products
Orders
Customers
Reports
Inventory Management
Search items...
+ Add Item
Current Inventory
ITEM
SKU
LOCATION
QUANTITY
STATUS
ACTIONS
USB-C
USB-2034-C
Zone C
90
In Stock
Headphone
HP-2024-GRE
Zone B
50
In Stock
Wireless Earbuds
AC1001
Zone B
30
In Stock
Cable
CC-2043
Zone C
5
Low Stock
Meneral Water Mesra
9557485002568
Zone B
25
In Stock
Meneral Water
9557485002568
Zone B
8
In Stock
View
Edit
Delete

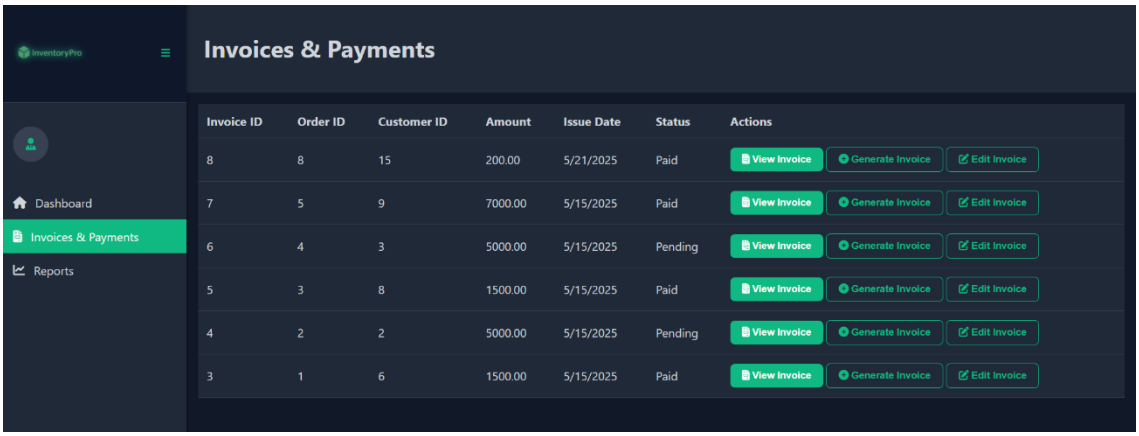

Reports Overview
Sales by Category
Total Sales by Category
300,000
200,000
100,000
0
Phones
Accessories
Furniture
Electronics
Inventory Distribution
Inventory Stock Distribution
In Stock
Low Stock


InventoryPro
Order Management
+ Add Order
Dashboard
Inventory
Products
Orders
Customers
Reports
Current Orders
ORDER ID
CUSTOMER ID
STATUS
ORDER DATE
TOTAL AMOUNT
ACTIONS
1 6 Shipped 2025-05-03 $35.00 View Edit Delete
2 2 Shipped 2025-04-16 $3000.00 View Edit Delete
3 8 Processing 2025-03-06 $9000.00 View Edit Delete
4 3 Processing 2025-04-30 $5000.00 View Edit Delete
5 9 Processing 2025-05-01 $7000.00 View Edit Delete
6 10 Processing 2025-03-18 $750.00 View Edit Delete
7 11 Processing 2025-02-16 $1250.00 View Edit Delete


Mohammed Amin
Logged In
Dashboard
Inventory
Receiving
Shipping
Scan
Logout
Inventory Management
ID Name SKU Location Quantity Status Actions
7 USB-C USB-2034-C Zone C 8 In Stock
5 Headphone HP-2024-GRE Zone B 50 In Stock
14 Wireless Earbuds AC1001 Zone B 30 In Stock
11 Cable CC-2043 Zone C 0 Out of Stock
18 Meneral Water Mesra 9557485002568 Zone B 25 In Stock
17 Meneral Water 9557485002568 Zone B 30 In Stock
19 Soundcore K20i Earbuds 194644057091 Zone A 14 In Stock
Inventory Logs
Log ID Product ID Change Type Quantity Changed Timestamp User ID
85 17 Adjusted 30 6/25/2025, 11:30:44 PM 3
84 11 Adjusted 0 6/16/2025, 11:54:11 AM 3


Receiving
New Receiving
Receipt ID Order ID Supplier Expected Date Quantity Status Assigned To Actions
7 5 AL-GHAMDI 4/20/2025 100 Pending Ali Mhammed
6 4 Abdulaziz 4/19/2025 30 Processing Warehouse Staff 5
5 3 Alamri 4/19/2025 40 Issues Warehouse Staff 3
1 2 Youssouf Mohammed 4/14/2025 50 Pending Warehouse Staff 4


Shipping
+ New Shipment
Shipment ID Order ID Shipping Method Quantity Due Date Status Assigned To Actions
4 5 Air 50 5/19/2025 Shipped Warehouse Staff 7
1 1 Air 5 5/16/2025 Shipped Warehouse Staff 2



CHAPTER 6

TESTING

This test plan outlines the test strategy for the Inventory Management System (InventoryPro). The objective is to ensure all system modules—such as user login, inventory control, shipment handling, reporting, and invoicing—are tested in accordance with the functional specifications. This test documentation will guide developers and QA personnel throughout the testing lifecycle.

Test Case 001

Test Case ID	001
Objective	Users (admin, warehouse, sales) can register and log in successfully
Test Input Data	User fills the registration form and logs in using valid credentials
Expected Result	User is registered and logged in with appropriate role-based access

Test Case 002

Test Case ID	002
Objective	Admin can add/edit/delete products and manage inventory
Test Input Data	Admin navigates to inventory, adds a product, edits details, deletes another
Expected Result	Product is successfully added, updated, or removed

Test Case 003

Test Case ID	003
Objective	Warehouse staff can update stock and log inventory changes
Test Input Data	Staff adjusts quantity, and changes are recorded in logs

Expected Result	Stock updates successfully, log reflects change with timestamp

Test Case 004

Test Case ID	004
Objective	Warehouse staff can manage incoming shipments
Test Input Data	Create, edit, and assign a receiving record
Expected Result	Shipment is recorded and updated properly in the receiving table

Test Case 005

Test Case ID	005
Objective	Warehouse staff can manage outgoing shipments
Test Input Data	Create and update a shipping entry
Expected Result	Shipment details updated; status set to 'Shipped' if completed

Test Case 006

Test Case ID	006
Objective	Sales staff can generate, view, and update

	invoices
Test Input Data	View invoice, generate invoice, update amount/status
Expected Result	Invoices are rendered correctly and updated in system

Test Case 007

Test Case ID	007
Objective	Users can view reports and export them as CSV
Test Input Data	Open Reports > Sales Reports > Click 'Download CSV'
Expected Result	Report downloads successfully as a CSV file

Test Case 008

Test Case ID	008
Objective	Warehouse or sales staff can scan a product barcode and retrieve the correct item record
Test Input Data	Scan barcode 194644057091
Expected Result	Product 'Soundcore K20i Earbuds' with correct details is displayed

Test Procedure 001

Test Procedure ID	001
Objective	Registration and login function
Test Cases To Be Executed	TC-001
Set Up	Register and login with different roles
Wrap Up	Working as intended — roles redirect to correct dashboard

Test Procedure 002

Test Procedure ID	002
Objective	Admin inventory management
Test Cases To Be Executed	TC-002
Set Up	Add, edit, delete items
Wrap Up	Working as expected — no errors during CRUD operations

Test Procedure 003

Test Procedure ID	003
Objective	Warehouse user inventory adjustment
Test Cases To Be Executed	TC-003
Set Up	Update quantity of an item and check inventory log

Wrap Up	Working — changes reflect in logs correctly

Test Procedure 004

Test Procedure ID	004
Objective	Receiving shipments
Test Cases To Be Executed	TC-004
Set Up	Add new receiving entry and assign staff
Wrap Up	Working — entries show with correct status

Test Procedure 005

Test Procedure ID	005
Objective	Shipping handling
Test Cases To Be Executed	TC-005
Set Up	Create and update shipment
Wrap Up	Working — status changes to Shipped successfully

Test Procedure 006

Test Procedure ID	006
Objective	Invoice management for sales staff
Test Cases To Be Executed	TC-006

Set Up	View and generate invoice, update status
Wrap Up	Working — invoices reflect updated state properly

Test Procedure 007

Test Procedure ID	007
Objective	Report viewing and export
Test Cases To Be Executed	TC-007
Set Up	View report and click 'Download CSV'
Wrap Up	CSV downloads without error — file format correct

Test Procedure 008

Test Procedure ID	008
Objective	Confirm Scan module correctly recognizes barcodes and fetches inventory records
Test Cases To Be Executed	TC-008
Set Up	Ensure item exists and scan barcode
Wrap Up	Product displayed with details and green check-mark

CHAPTER 7

CONCLUSION

The Inventory Management System is a comprehensive, mobile-first solution developed to meet the issues organizations experience when managing their inventory efficiently. The system simplifies inventory operations and improves operational accuracy by including features like real-time inventory tracking, barcode scanning, role-based access, and extensive analytics.

The system provides an intuitive interface for a variety of user roles, including

administrators, warehouse staff, sales staff, and view-only users, ensuring that each role has access to the resources they require. Its capacity to generate reports, send low-stock alerts, and document inventory changes makes it an effective tool for stock management and business operations.

The system's robust database structure and seamless functioning provide expansion and adaptability, catering to the evolving demands of small and medium-sized businesses. This technology reduces human errors while also improving decision-making by giving actionable insights. Overall, the Inventory Management System enables organizations to optimize their inventory management procedures, save time, and improve efficiency, resulting in increased growth and success.

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