

# PHARMACY MANAGEMENT SYSTEM



DBMS Course Project

S5 CS04

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# Problem Statement

To develop and implement a robust Pharmacy Management System that optimizes operations, ensures efficiency, accuracy and compliance while enhancing customer satisfaction.

The following problems are to be tackled in the implementation of the PMS:

- Separate Admin and Employee access.
- Sales Catalogue of Medicines.
- Catalogue of Different Companies.
- Security of Operations.
- Easy-to-operate User Interface.

# Introduction



The **Pharmacy Management System** is a comprehensive database application designed to improve **efficiency**, **accuracy**, and **safety** of pharmacy operations.

This system manages **inventory**, **sales**, **supplier records**, and **employee accounts** in a pharmaceutical store.

Ensures secure accesses through **separate login accesses** for admins.

Users can generate reports and manage records related to supplies.

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# Motivation

The pharmacy at NIT Calicut's Health Centre currently relies on manual methods to dispense medicines and record transactions, which involves writing in a register. This method is prone to errors, time-consuming, and inefficient. To address these issues, the development of a Pharmacy Management System (PMS) is proposed. A PMS aims to streamline pharmacy operations, enhance accuracy, and improve overall efficiency.



Fig(0): The state of the Pharmacy

# Literature Review

**John C. Lincoln Hospital, Phoenix, Arizona:** This hospital implemented one of the earliest pharmacy management systems, standardizing manual procedures and improving efficiency through automation.

**Efficiency:** A local pharmacy uses a PMS to automate tasks like ordering medicines and tracking inventory.

- **Inventory Management:** Tracks medicine stock levels, expiry dates, and reorder thresholds to prevent stockouts or overstocking.
- **Customer Transactions:** The system provides accurate information on medicine availability, prices, and alternatives, and tracks purchase history for better service.
- **Supplier Integration:** Pharmacies connect their PMS with suppliers to automate orders, get price updates, and restock quickly without manual effort.

Our implementation of PMS already supports (or will support in near future) all the above mentioned practices, and also allows the customer to choose the company which they intend to buy the medicine from, based on availability.

# Methodology



## Identify Goals and Requirements:

- **Goals:** Defining the primary objectives of the system (e.g., improving efficiency, reducing errors, enhancing customer service).
- **Requirements:** Gathering detailed requirements from stakeholders (pharmacists, technicians, customers, etc.).

## System Design

- Designing the system architecture to reflect the workflows of a pharmacy. This includes modules for inventory management, Employee management, Sale catalogue, Sale history, etc.
- **User Interface:** Designing an intuitive and user-friendly interface for different user roles.

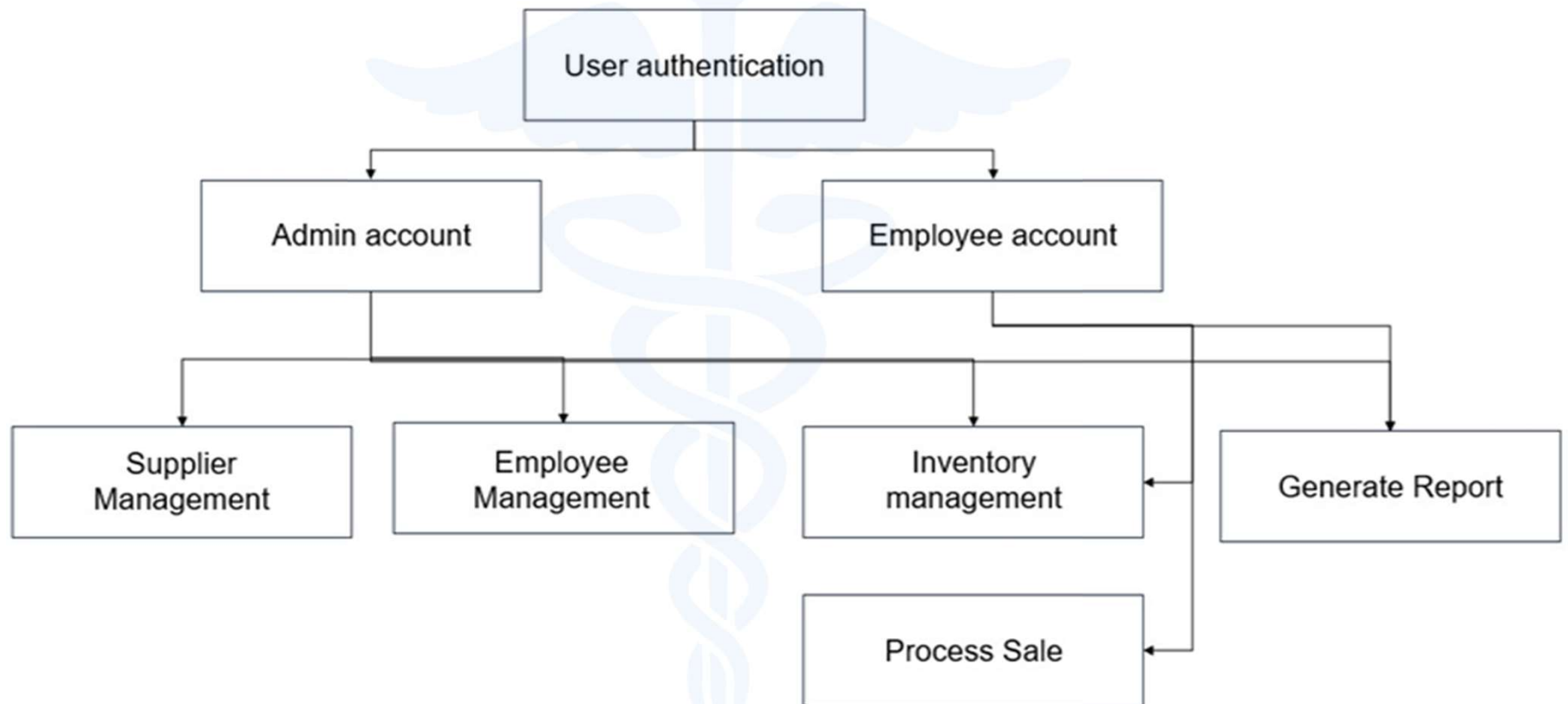
## Coding

- Developing the system using appropriate programming languages and frameworks.
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# PMS OVERVIEW

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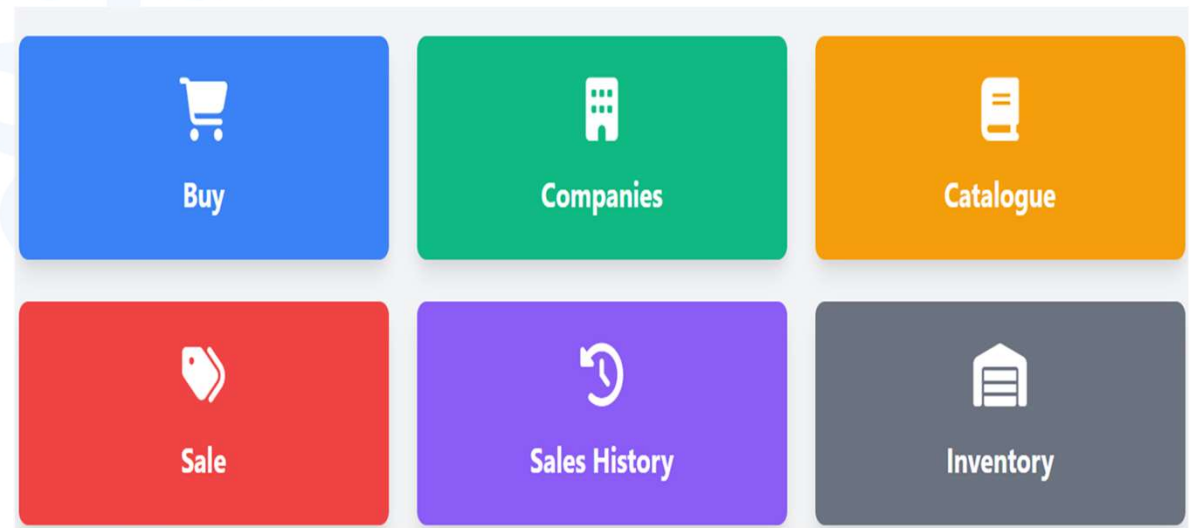


Fig(1): Overview of PMS



# Product Functionalities

- User Authentication
- Inventory Management
- Sales Management
- Purchase Management
- Supplier Management



Fig(2): Dashboard of Implemented PMS

# Technologies Used



## Specific Technologies, Tools, and Databases:

- Database management- MS SQL.
- Backend development - Python and Flask.
- Frontend - HTML, CSS, and JavaScript.



## Communications Protocols:

- The system will use HTTPS for secure communication over the internet.
- Internal communication between modules will use RESTful APIs.

# MS SQL

- **Reliability and Stability**

Reliable performance in handling transaction-heavy applications.

- **Scalability**

Supports scaling both vertically (by adding more powerful hardware) and horizontally (through sharding and replication).

- **Performance Optimization**

Tools for query optimization, indexing, and caching, which are essential for high-speed data retrieval.



# Design and Implementation Constraints

## Parallel Operations:

- Should support concurrent access by multiple users without performance degradation.
- Proper synchronization mechanisms must be implemented.

## Language Requirements:

- The primary language for development will be Python.
- All documentation and user interfaces must be in English.

## Security Considerations:

- User authentication and authorization to ensure data security.
- Encryption of sensitive data.
- Regular security audits to identify and mitigate vulnerabilities.

# **SPECIFIC REQUIREMENTS**

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# User Interfaces

## Dashboard:

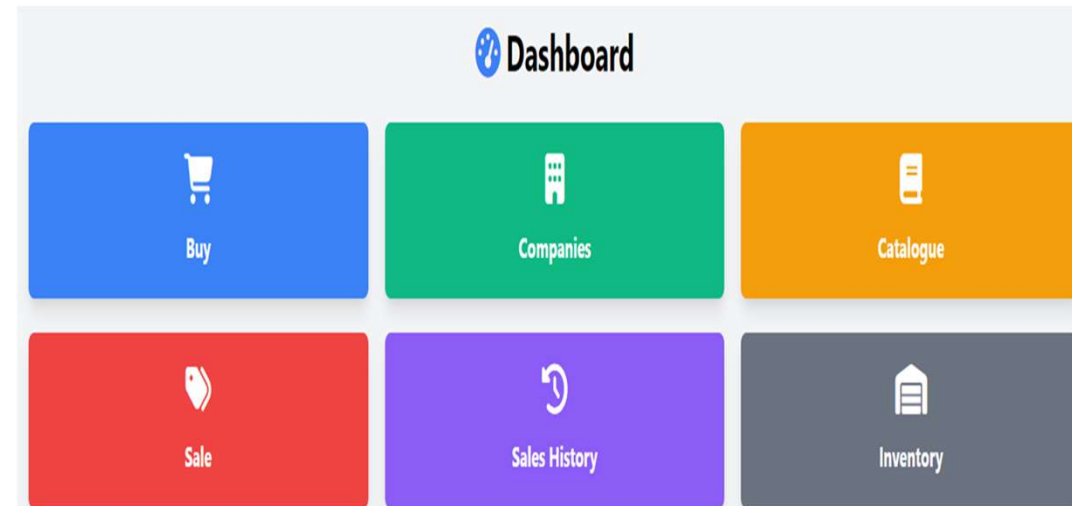
- Menus
- Click Navigation

## Inventory Management:

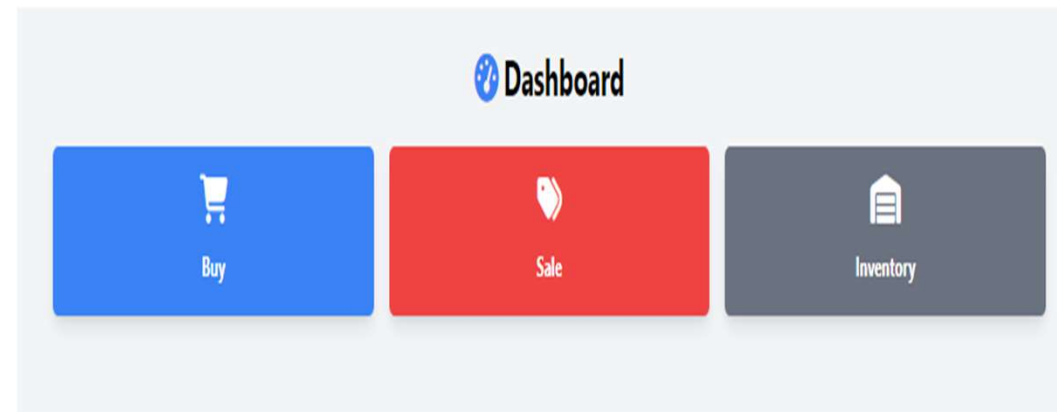
- List View
- Buttons

## Sales and Purchase Management:




- Catalog Access
- Sales Interface
- History log









Fig(3): Picture of Dashboard from admin login









Fig(4): Picture of Dashboard from Employee login

Sales History				
Sale Date	Quantity	Selling Price	Drug Name	Image
2024-11-09	25	Rs 22.57	Digene Acidity & Gas Relief Tablets	
2024-11-09	22	Rs 1,007.16	Accu-Chek Active Glucose Monitor	
2024-11-09	10	Rs 1,792.80	Omron Automatic Blood Pressure Monitor	




Fig(5): Sales History from PMS site

Catalog			
	Accu-Chek Active Glucose Monitor Rs 1,007.16		AccuSure Pulse Oximeter Rs 1,999.50
	Cofsils Lozenges Rs 26.81		INLIFE Diastan Plus Diabetic Care Powder 300 gm Rs 498.60
	Digene Acidity & Gas Relief Tablets Rs 22.57		Kapiva Wild Amla Juice 1 ltr Rs 249.07

Fig(6): Sales Catalog from PMS site

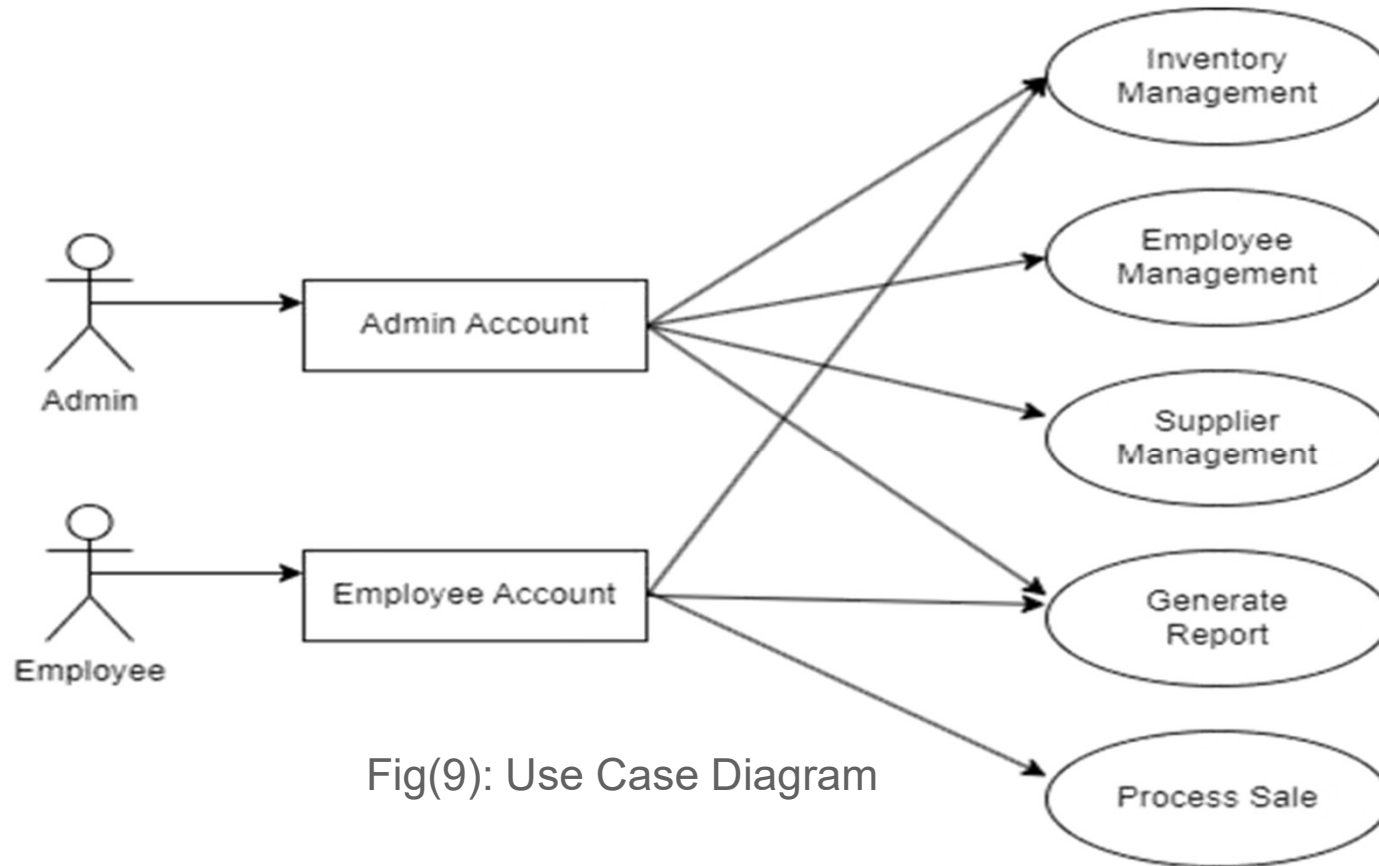
Sale		
 Accu-Chek Active Glucose Monitor 2026-01-01 Rs 1,007.16 51 available City <a href="#">Add</a>	 AccuSure Pulse Oximeter 2025-11-09 Rs 1,999.50 2 available City <a href="#">Add</a>	 Digene Acidity & Gas Relief Tablets 2025-11-09 Rs 22.57 30 available City <a href="#">Add</a>
 INLIFE Iron Folic Acid Tablets 2025-11-09 Rs 329.34 50 available City <a href="#">Add</a>	 Omnigel Gel 30gm 2025-11-09 Rs 117.53 25 available City <a href="#">Add</a>	 Omron Automatic Blood Pressure Monitor 2025-11-09 Rs 1,792.80 35 available City <a href="#">Add</a>

Fig(7): Sales from PMS site

Inventory				
Image	Name	Expiration	Quantity	Price
	Accu-Chek Active Glucose Monitor	2026-01-01	51	Rs 1,007.16
	AccuSure Pulse Oximeter	2025-11-09	2	Rs 1,999.50
	Digene Acidity & Gas Relief Tablets	2025-11-09	30	Rs 22.57

Fig(8): Inventory from PMS site

# Use Case Model



Fig(9): Use Case Diagram



# **PMS DATABASE MANAGEMENT SYSTEM**

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# Constraints



a. **Hardware Limitations**

The system is designed to operate on standard pharmacy hardware, such as desktop computers and barcode scanners.

b. **Data Storage Limitations**

Large data volumes, such as extensive sales histories or inventory records, may affect performance, requiring periodic data archiving or purging to maintain efficiency.

c. **Role-Based Access Control (RBAC)**

Security constraints require that only authorized users can access specific parts of the system based on their roles (Admin vs. Employee).

d. **Network Reliability**

Network interruptions could affect real-time inventory updates and sales processing, necessitating local caching mechanisms.

e. **Backup and Recovery Constraints**

Frequent backups may introduce performance lags or require dedicated resources.

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# Behaviour

## User Authentication and Role-Based Access

- Successful login grants access to the appropriate interface; incorrect login attempts trigger error messages, and multiple failed attempts may result in temporary lockouts.

## Inventory Management

- The inventory is updated immediately following any modification, preventing discrepancies in available stock. Any attempt to access or modify inventory without appropriate permission is denied.



Fig(10): Login page

## Supplier Management

- Updates to supplier records are stored in the database, and changes reflect immediately in inventory modules. Only admins are authorized to make supplier-related modifications.

## Sales Processing

- Completed transactions update the inventory in real-time, and an invoice is issued. In cases where stock is unavailable, the sale cannot proceed, and the user is notified.

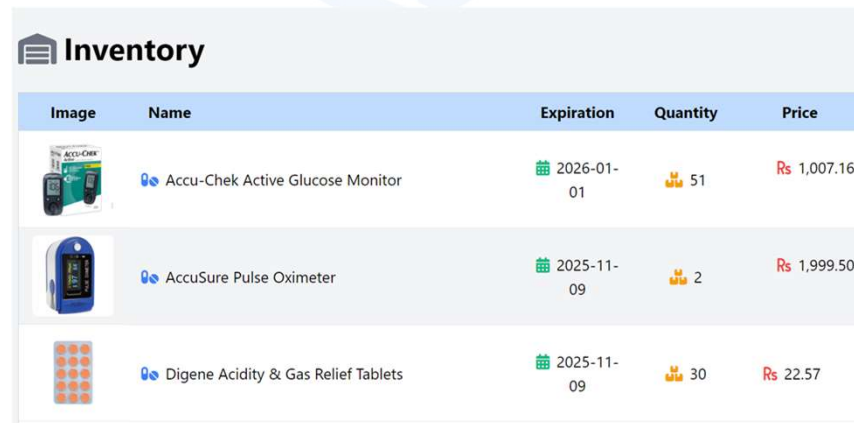



A screenshot of a web application's 'Inventory' page. The page has a light blue header with a house icon and the word 'Inventory'. Below the header is a table with five columns: 'Image', 'Name', 'Expiration', 'Quantity', and 'Price'. The table contains three rows of inventory items. The first row shows 'Accu-Chek Active Glucose Monitor' with an expiration date of '2026-01-01', a quantity of 51, and a price of Rs 1,007.16. The second row shows 'AccuSure Pulse Oximeter' with an expiration date of '2025-11-09', a quantity of 2, and a price of Rs 1,999.50. The third row shows 'Digene Acidity & Gas Relief Tablets' with an expiration date of '2025-11-09', a quantity of 30, and a price of Rs 22.57. Each row includes a small image of the product on the left.

Image	Name	Expiration	Quantity	Price
	Accu-Chek Active Glucose Monitor	2026-01-01	51	Rs 1,007.16
	AccuSure Pulse Oximeter	2025-11-09	2	Rs 1,999.50
	Digene Acidity & Gas Relief Tablets	2025-11-09	30	Rs 22.57

Fig(11): Inventory page

# Security Requirements



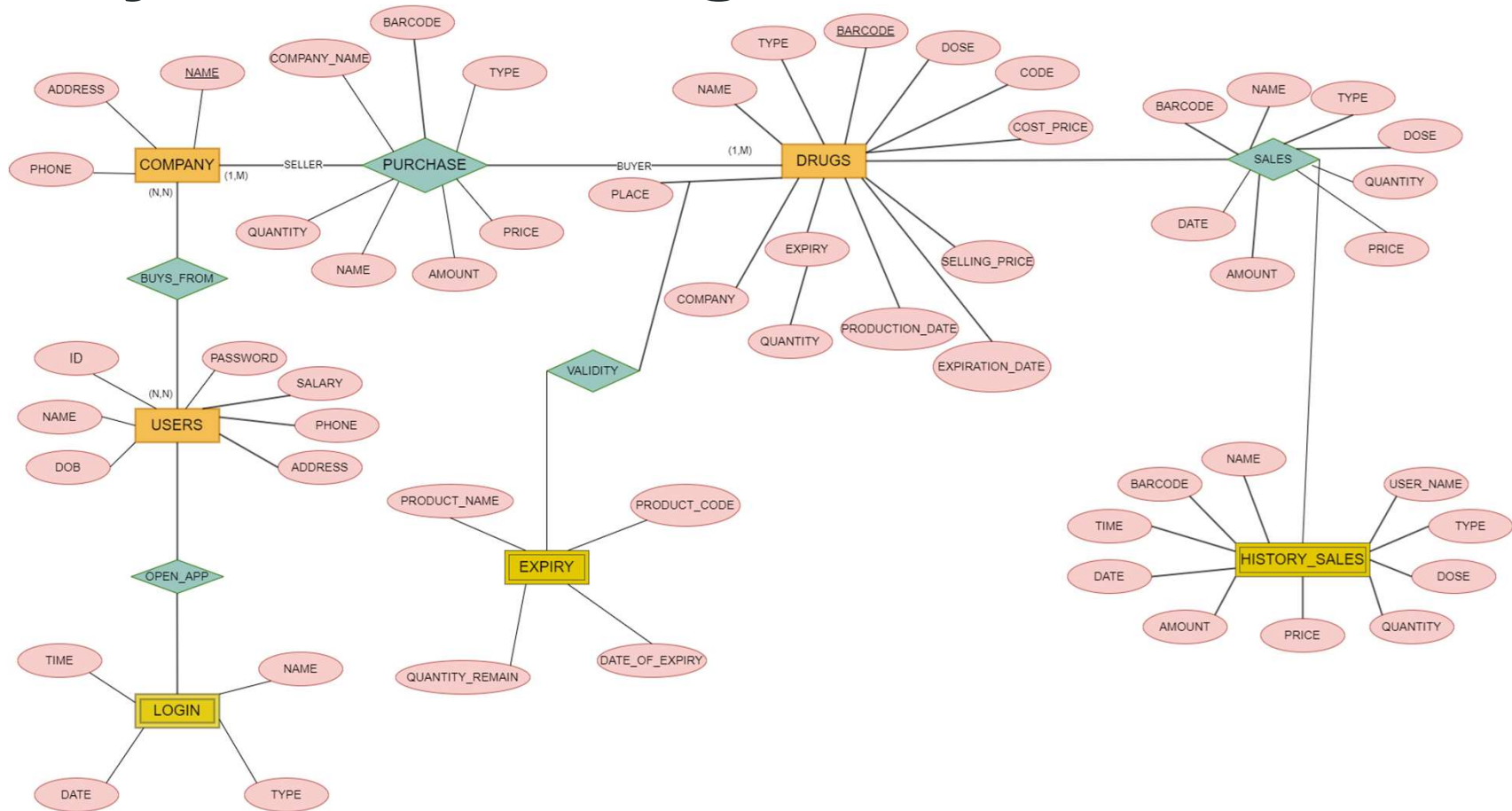
## 1. User Authentication and Authorization

- **Requirement:** All users must log in with a unique username and password. User roles (Admin or Employee) dictate access privileges within the system.

## 2. Role-Based Access Control (RBAC)

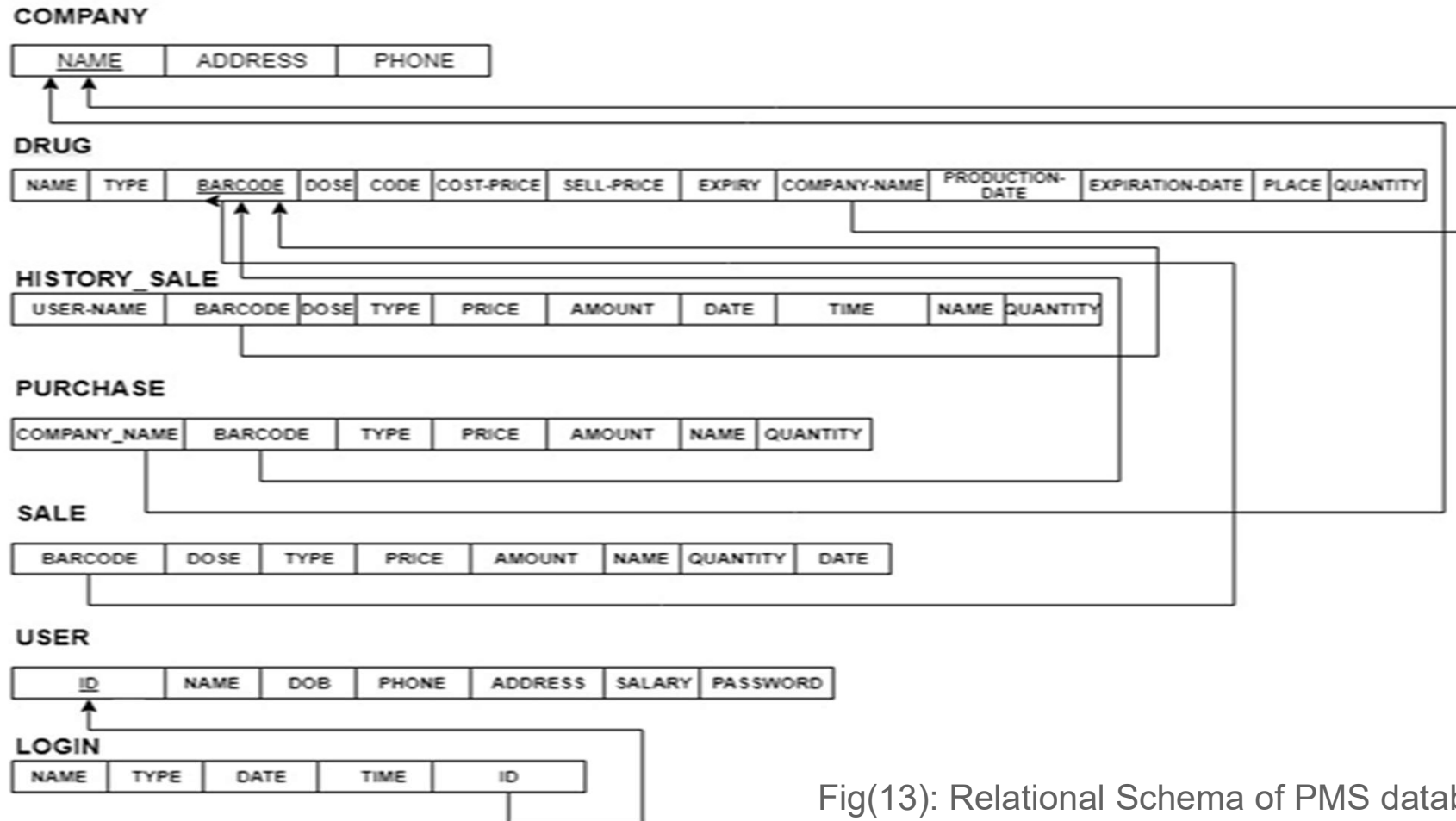
- **Requirement:** Access to database tables and functions must be restricted based on the user's role. Admins have full access, including inventory and employee management, while employees have limited access to sales and inventory viewing.
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# Entity-Relation Diagram



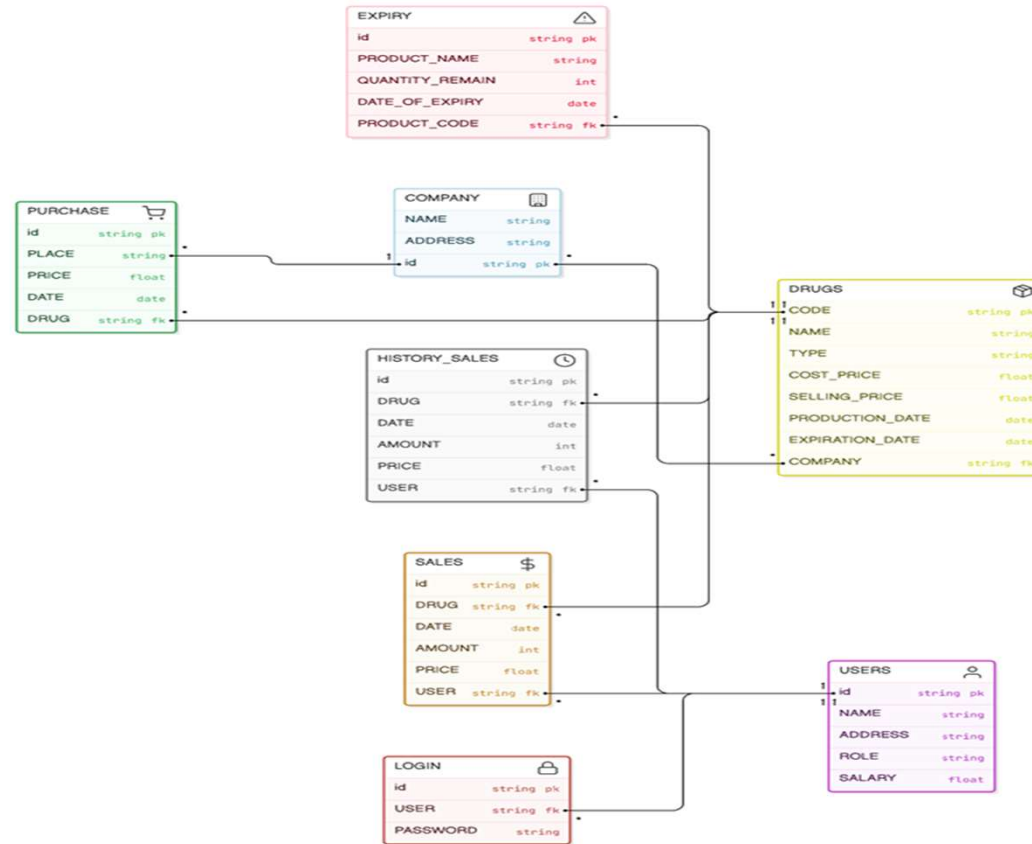
Fig(12): E-R diagram of PMS Database

# Relational Schema



Fig(13): Relational Schema of PMS database

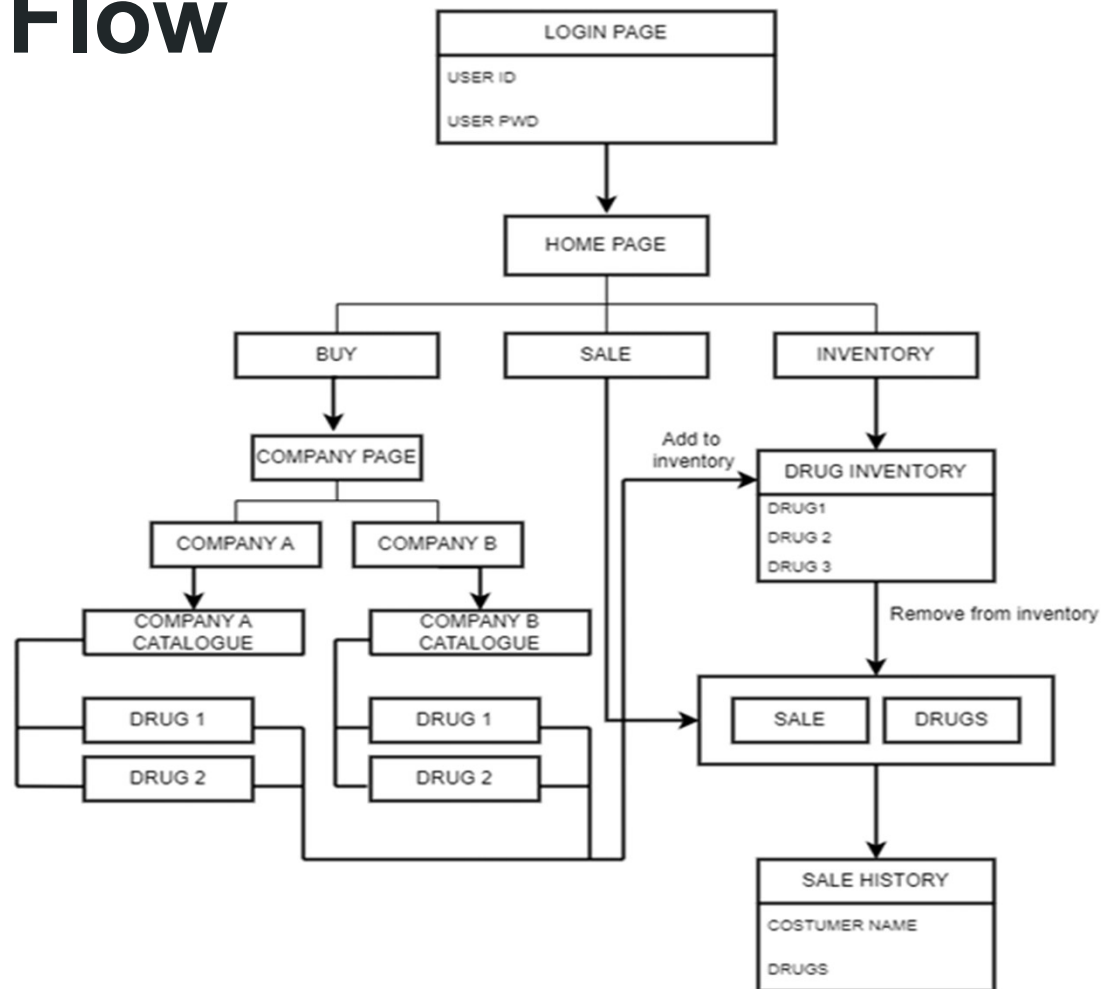
# Schema Description and Data Formats



Fig(14): Schema Description of PMS Database



# Control Flow



Fig(15): Control Flow Diagram of PMS DBMS

# PRODUCT DESIGN



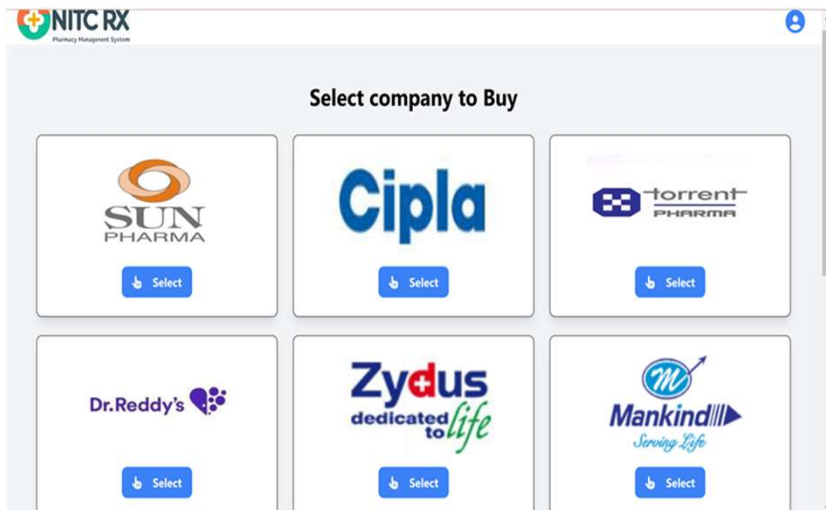
# Login Page



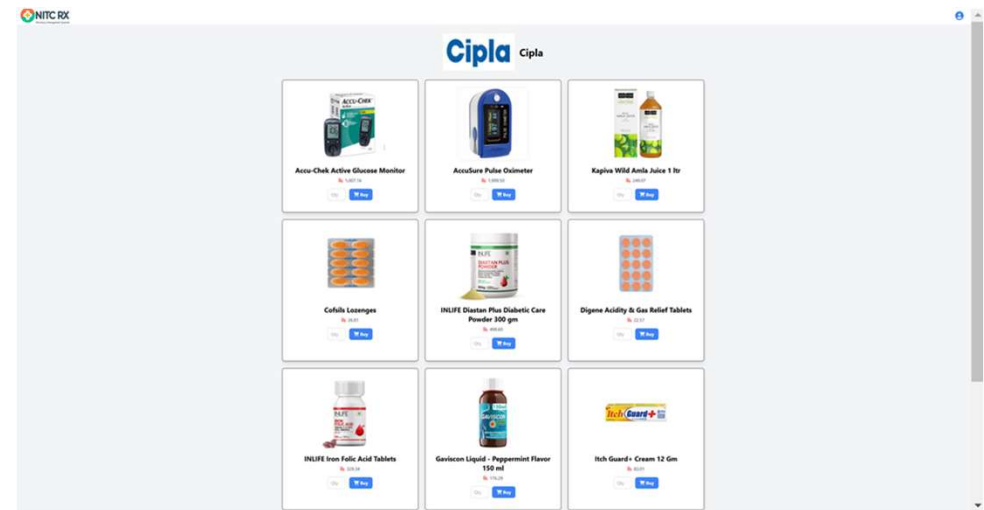
Fig(16): Login Page

# Dashboard Navigations

BUY:



Fig(17): Company selection page



Fig(18): Medicine selection page


After Selecting the desired company, select Medicines to buy.










## COMPANIES:



Fig(19): Companies Page

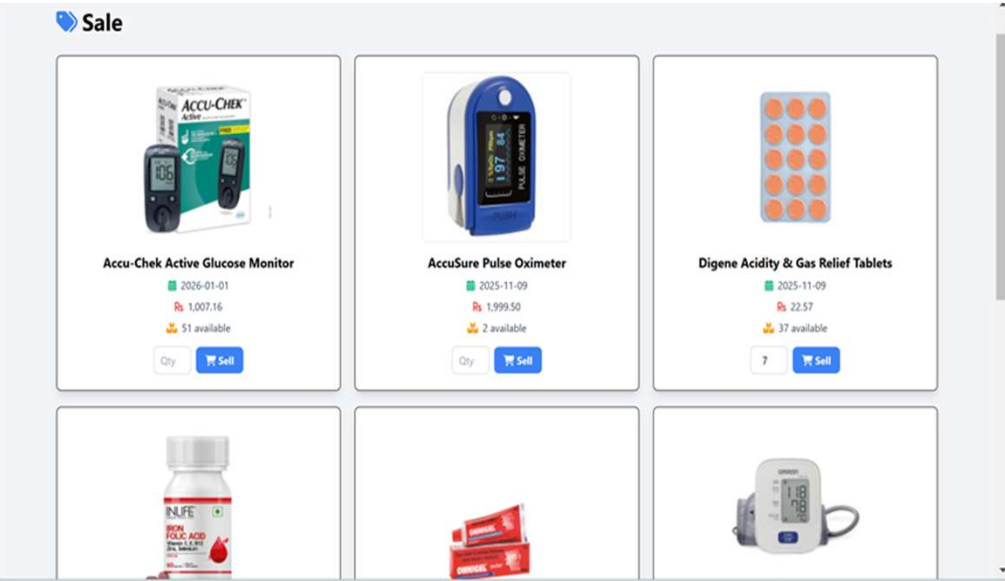
## CATALOGUE:

 **Catalog**

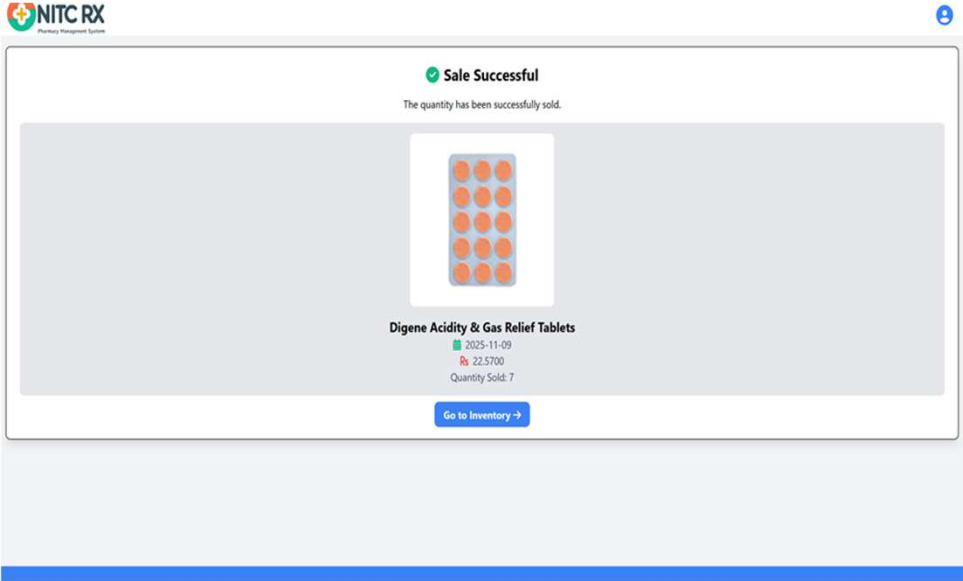
	<b>Accu-Chek Active Glucose Monitor</b> Rs 1,007.16		<b>AccuSure Pulse Oximeter</b> Rs 1,999.50		<b>Kapiva Wild Amla Juice 1 Itr</b> Rs 249.07
	<b>Cofsils Lozenges</b> Rs 26.81		<b>INLIFE Diastan Plus Diabetic Care Powder 300 gm</b> Rs 498.60		<b>Digene Acidity &amp; Gas Relief Tablets</b> Rs 22.57
	<b>INLIFE Iron Folic Acid Tablets</b> Rs 329.34		<b>Gaviscon Liquid - Peppermint Flavor 150 ml</b> Rs 176.28		<b>Itch Guard+ Cream 12 Gm</b> Rs 83.01

Fig(20): Catalogue Page

SALE:





Fig(21): Sales Page




























Fig(22): Successful Sale Report

# SALE HISTORY:




Sales History


Sale Date	Quantity	Selling Price	Drug Name	Image
 2024-11-09	 25	 22.57	 Digene Acidity & Gas Relief Tablets	
 2024-11-09	 22	 1,007.16	 Accu-Chek Active Glucose Monitor	
 2024-11-09	 10	 1,792.80	 Omron Automatic Blood Pressure Monitor	
 2024-11-09	 21	 22.57	 Digene Acidity & Gas Relief Tablets	
 2024-11-09	 2	 1,999.50	 AccuSure Pulse Oximeter	

Fig(23): Sales History Page



# INVENTORY:






























 Inventory

Image	Name	Expiration	Quantity	Price
	 Accu-Chek Active Glucose Monitor	 2026-01-01	 51	Rs 1,007.16
	 AccuSure Pulse Oximeter	 2025-11-09	 2	Rs 1,999.50
	 Digene Acidity & Gas Relief Tablets	 2025-11-09	 30	Rs 22.57
	 INLIFE Iron Folic Acid Tablets	 2025-11-09	 50	Rs 329.34
	 Omnigel Gel 30gm	 2025-11-09	 25	Rs 117.53
	 Omron Automatic Blood Pressure Monitor	 2025-11-09	 35	Rs 1,792.80

Fig(24): Inventory Page

# FUTURE SCOPE

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## What we would add in the future:

- **Report Generation:** Automatically compile and generate detailed reports on various pharmacy operations and metrics.
  - **Employee management:** Oversee and manage employee records, schedules, performance, and payroll within the system.
  - **Availability Updation:** Keep inventory levels updated automated in real-time to reflect the availability of medications and supplies and request for supplies as and when needed.
  - **Admin Features:** Provide administrative tools for system configuration, user management, and access control to maintain security and efficiency.
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## References

- **John C. Lincoln Hospital, Phoenix, Arizona:**

<https://www.honorhealth.com/locations/hospitals/john-c-lincoln-medical-center>

- **Pharmacy Mangement System:**

[https://www.researchgate.net/publication/375380198\\_PHARMACY\\_MANAGEMENT\\_SYSTEM\\_WEB-BASED\\_APPLICATION](https://www.researchgate.net/publication/375380198_PHARMACY_MANAGEMENT_SYSTEM_WEB-BASED_APPLICATION)

- **Others:** <https://www.gartner.com/reviews/market/pharmacy-management-software>



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