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MEDICAL DRUG INVENTORY MANAGEMENT SYSTEM

CSI1007 – Software Engineering Principles Laboratory

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MEDICAL DRUG INVENTORY MANAGEMENT SYSTEM

Description of the Project:

The Medical Drug Inventory System is a web-based tool for efficiently managing drug storage, tracking stock levels, monitoring expiry dates, and generating reports in healthcare facilities. Key features include role-based user authentication, a real-time inventory dashboard, low-stock and expiry alerts, reporting tools, and an interactive interface for search and validation.

Scope of the Project:

Aim: To develop a web-based Medical Drug Inventory System to efficiently manage, track, and monitor drug inventory in healthcare facilities.

Objectives:

1. Simplify inventory management with features to add, update, and delete drugs.
2. Provide real-time alerts for low-stock and nearing expiry drugs.
3. Generate accurate reports on inventory trends and expiry status.
4. Offer an interactive interface with search and validation tools.

Impact of the developing Project

1. Economic Impact:

- Saves costs by reducing drug wastage and minimizing stock issues.
- Improves efficiency, cutting manual errors and operational costs.

2. Social Impact:

- Ensures timely drug availability, enhancing patient care.
- Reduces staff workload and builds trust in healthcare services.

3. Technological Impact:

- Replaces manual systems with a secure, scalable digital solution.
- Enables real-time alerts, automated reporting, and data-driven decisions.

4. Environmental Impact:

- Reduces drug wastage and improper disposal.
- Cuts paper usage, promoting sustainable healthcare practices.

Work Breakdown Structure

Process-Based WBS

Break down the project into major process phases:

1. Initiation
- o 1.1 Define project objectives
- o 1.2 Identify stakeholders
- o 1.3 Approve project plan

2. Planning
- o 2.1 Requirement gathering
- o 2.2 Technical feasibility analysis
- o 2.3 Resource allocation

3. Execution
- o 3.1 Design UI/UX mock-ups
- o 3.2 Develop server-side scripts
- o 3.3 Implement database schemas

4. Testing
- o 4.1 Functional testing
- o 4.2 Integration testing
- o 4.3 User acceptance testing

5. Deployment
- o 5.1 Set up production environment
- o 5.2 Deploy application
- o 5.3 Monitor system performance

Work Breakdown Structure

Product-Based WBS

Break down based on product features or deliverables:

1. User Module
- o 1.1 User authentication and role-based access
- o 1.2 User management (add/update/delete users)

2. Inventory Module
- o 2.1 Add new drug details
- o 2.2 Update existing drug details
- o 2.3 Delete expired drugs
- o 2.4 Generate low-stock and expiry alerts

3. Reporting Module
- o 3.1 Generate inventory reports
- o 3.2 Stock trend analysis
- o 3.3 Expiry status reports

4. Interactive Features
- o 4.1 Search functionality
- o 4.2 Dynamic tables (sorting/filtering)
- o 4.3 Form validation

SRS Document

Functional Requirements

1.User Authentication:
- Secure login for admins and staff.

2.Order Management:
- Add, update, and delete drug records.

3.Inventory Management:
- Track stock levels and update inventory details.

4.Alerts & Notifications:
- Send alerts for low stock or near-expiry drugs.

5.Role-Based Access:
- Admins can manage inventory and generate reports.
- Staff can update inventory details and track stock.

6.Report Generation:
- Generate inventory and transaction reports.

7.Data Security & Encryption:
- Secure authentication and protection of sensitive data.

SRS Document

Non-Functional Requirements

1.Performance Requirements:
- Handle up to 500 simultaneous inventory operations.

2.Safety Requirements:
- Prevent expired drugs from being sold or added.

3.Security Requirements:
- Use secure authentication and encryption.

4.Software Quality Attributes:
- **Usability**: Simple and intuitive user interface.
- **Scalability**: Handle increased drug records in the future.

5.Operating Environment:
- Web-based system running on modern browsers.

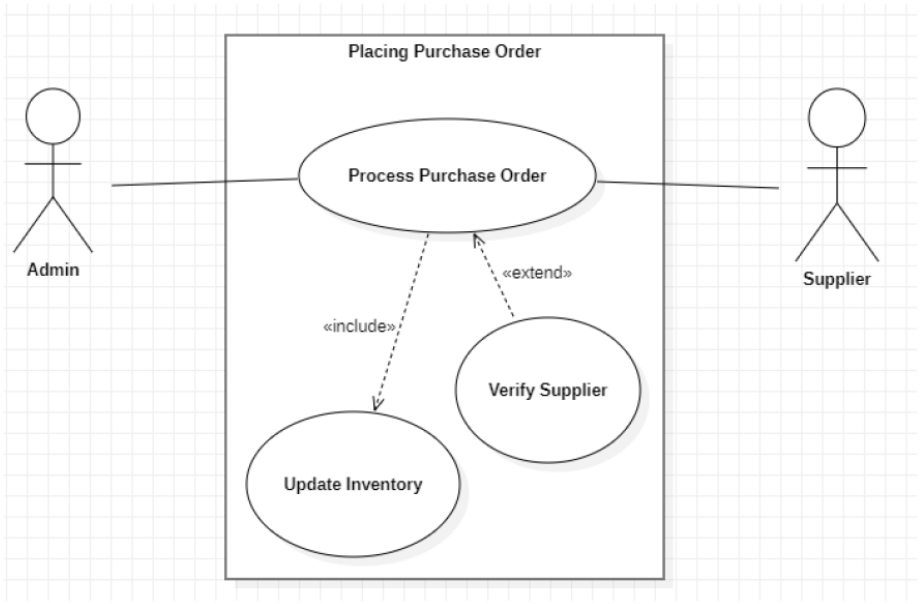
6.Design Constraints:
- Runs in a local XAMPP environment with SQL Server.

7.Future Enhancements:
- Integration with barcode scanners.
- Cloud deployment for multi-location access.

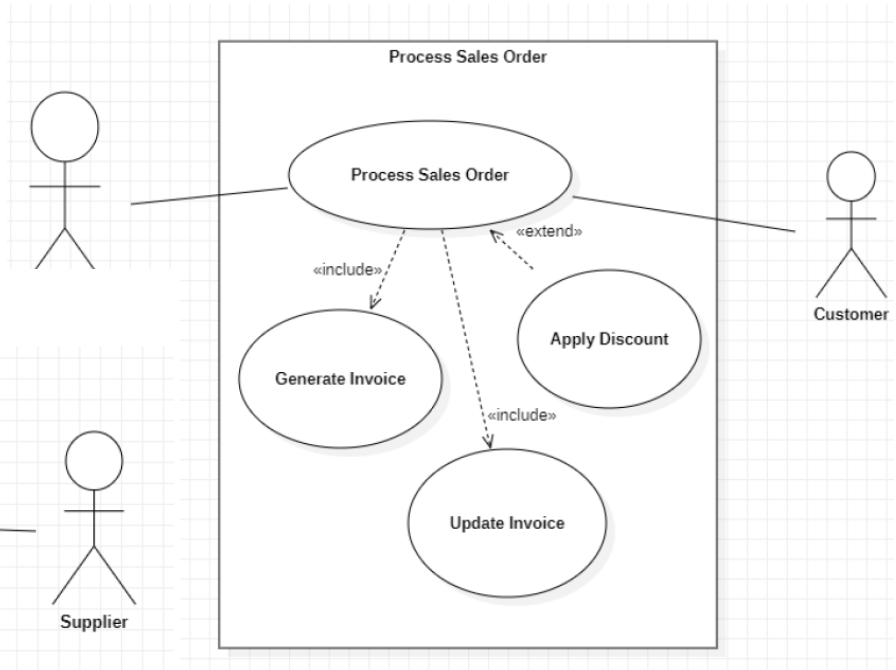
UML Diagrams

Use Case Diagram

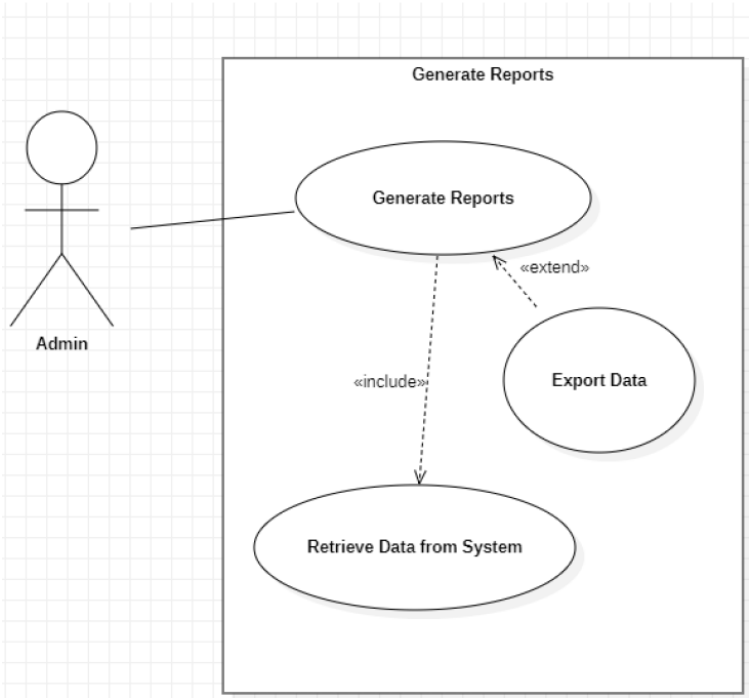
1. Placing Purchase Order



2. Process Sales Order

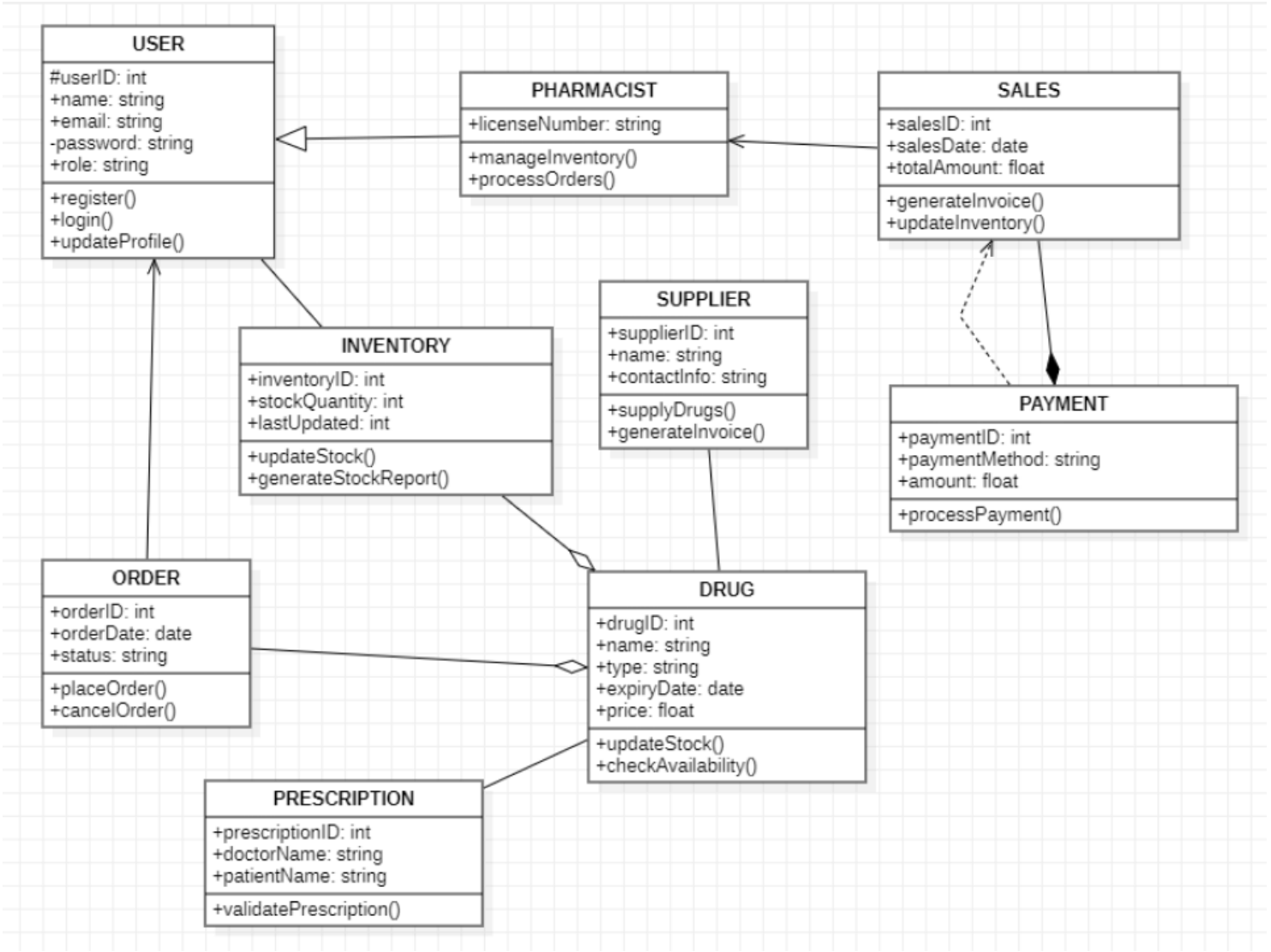


3. Generate Reports



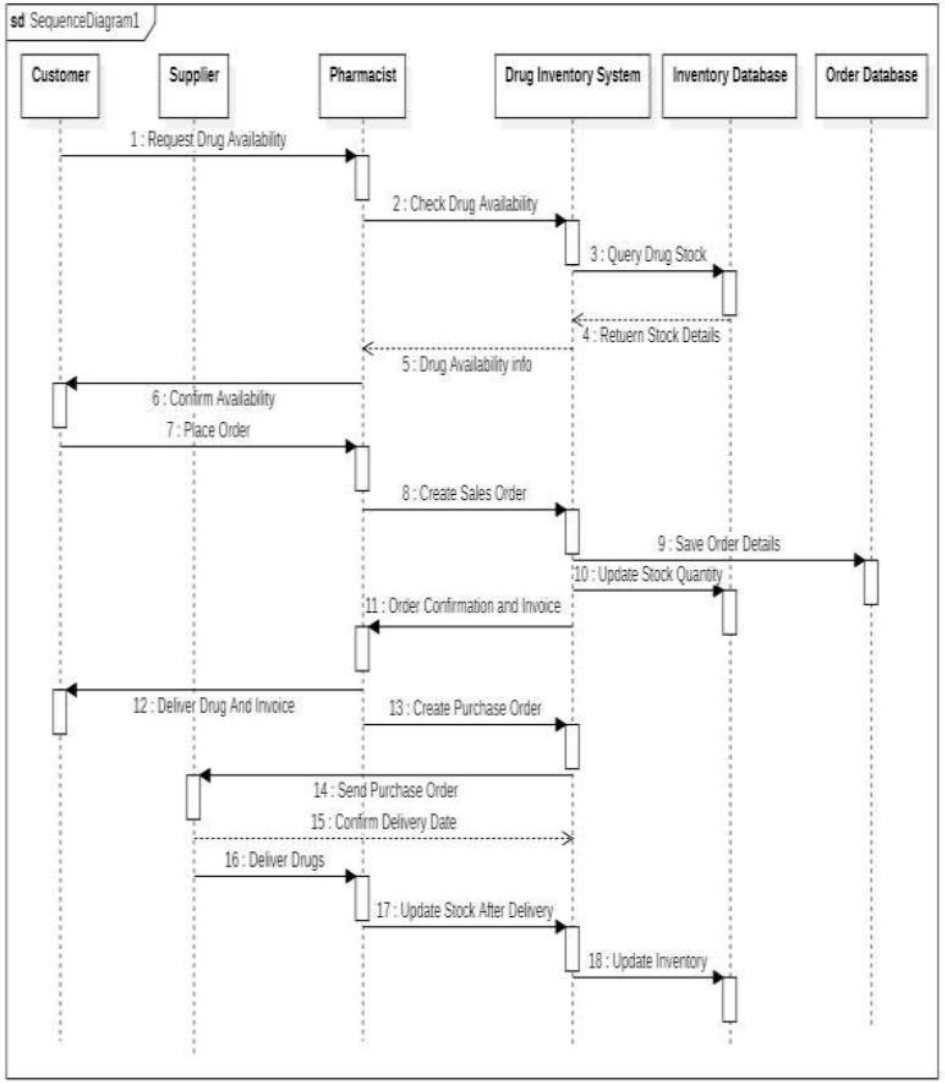
UML Diagrams

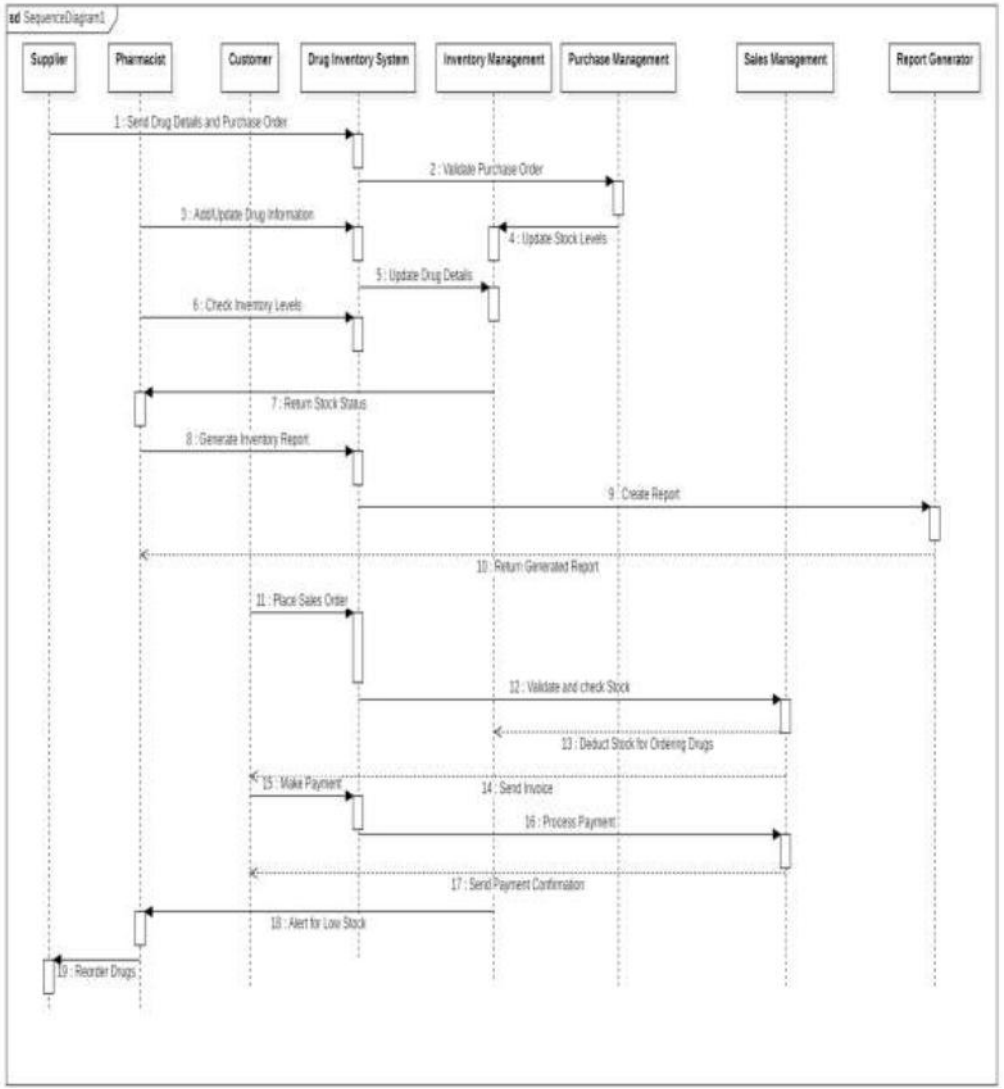
Class Diagram



UML Diagrams

Sequence Diagram





Testing

Scenario 1: User Authentication Testing

Objective: Verify that only authorized users (admin/staff) can log in and access the system securely.

Test Case ID	Test Scenario	Test Steps	Expected Result	Status
UA-01	Successful Admin Login	1. Open the login page. 2. Enter valid admin credentials. 3. Click "Login".	Admin is redirected to the dashboard.	Pass/Fail
UA-02	Successful Staff Login	1. Open the login page. 2. Enter valid staff credentials. 3. Click "Login".	Staff is redirected to the inventory page.	Pass/Fail
UA-03	Invalid Login Attempt	1. Enter incorrect credentials. 2. Click "Login".	"Invalid username or password" message is displayed.	Pass/Fail
UA-04	Session Timeout	1. Login successfully. 2. Stay inactive for a set duration. 3. Try performing an action.	User is logged out and asked to re-authenticate.	Pass/Fail
UA-05	Password Encryption	1. Check password storage in the database.	Passwords should be encrypted, not stored in plain text.	Pass/Fail

Testing

Scenario 2: Low Stock Alerting

Objective: Ensure that the system correctly generates alerts when drug stock falls below the threshold.

Test Case ID	Test Scenario	Test Steps	Expected Result	Status
LSA-01	Add a drug with low stock	1. Login as admin. 2. Add a drug with stock below the threshold. 3. Save the changes.	A low-stock alert is generated.	Pass/Fail
LSA-02	Update stock to below threshold	1. Login as staff. 2. Update stock of a drug to a value below the threshold. 3. Save the changes.	A low-stock alert is generated.	Pass/Fail
LSA-03	Stock replenishment	1. Login as admin. 2. Increase stock above the threshold. 3. Save the changes.	The low-stock alert should disappear.	Pass/Fail
LSA-04	Email Notification	1. Reduce stock below threshold. 2. Check if an email alert is sent to the admin.	Admin receives a low-stock email.	Pass/Fail
LSA-05	Alert Display on Dashboard	1. Login as admin. 2. Navigate to the dashboard.	Low-stock drugs appear in the alert section.	Pass/Fail

XAMPP Control Panel v3.3.0 [Compiled: Apr 6th 2021]

XAMPP Control Panel v3.3.0

Modules

Service	Module	PID(s)	Port(s)	Actions			
✖	Apache	3296 18952	80, 443	Stop	Admin	Config	Logs
✖	MySQL	19920	3307	Stop	Admin	Config	Logs
✖	FileZilla			Start	Admin	Config	Logs
	Mercury			Start	Admin	Config	Logs
✖	Tomcat			Start	Admin	Config	Logs

Config
Netstat
Shell
Explorer
Services
Help
Quit

```
11:49:33 [main]   Initializing Control Panel
11:49:33 [main]   Windows Version:  Home  64-bit
11:49:33 [main]   XAMPP Version: 8.2.12
11:49:33 [main]   Control Panel Version: 3.3.0  [ Compiled: Apr 6th 2021 ]
11:49:33 [main]   Running with Administrator rights - good!
11:49:33 [main]   XAMPP Installation Directory: "c:\xampp\"
11:49:33 [main]   Checking for prerequisites
11:49:34 [main]   All prerequisites found
11:49:34 [main]   Initializing Modules
11:49:34 [Apache] XAMPP Apache is already running on port 80
11:49:34 [Apache] XAMPP Apache is already running on port 443
11:49:34 [main]   Starting Check-Timer
11:49:34 [main]   Control Panel Ready
11:49:44 [mysql]  Attempting to stop MySQL app...
11:49:44 [mysql]  Status change detected: stopped
11:49:45 [Apache] Attempting to stop Apache (PID: 18948)
11:49:45 [Apache] Attempting to stop Apache (PID: 7624)
11:49:45 [Apache] Status change detected: stopped
11:49:46 [mysql]  Attempting to start MySQL app...
11:49:46 [mysql]  Status change detected: running
11:49:47 [Apache] Attempting to start Apache app...
11:49:47 [Apache] Status change detected: running
```

Server: 127.0.0.1 » Database: pharma_flow

Structure | SQL | Search | Query | Export | Import | Operations | Privileges | Routines | Events | Triggers | Designer

Filters

Containing the word:

	Table	Action	Rows	Type	Collation	Size	Overhead
☐	inventory	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
☐	low_stock_alert	Browse Structure Search Insert Edit Drop	~0	View	---	-	-
☐	orders	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
☐	place_order	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
☐	users	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
	5 tables	**Sum**	**~0**	**InnoDB**	**utf8mb4_general_ci**	**112.0 KiB**	**0 B**

Check all With selected:

Print Data dictionary

Create new table

Table name Number of columns

4 Create

Welcome to Pharma Flow

Admin

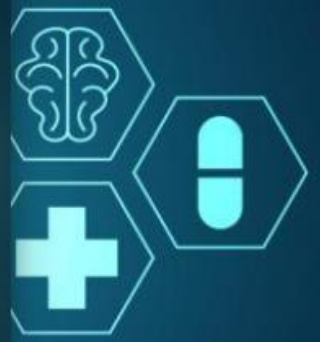
Staff

Login

Username admin

Password ••••••••••

Login



DASHBOARD

Manage Inventory

Manage Orders

Low Stock Alerts

Logout

Manage Inventory

Morphine

9

02-11-2025

Add Drug

Inventory List

DRUG NAME	QUANTITY	EXPIRY DATE	ACTION
Aspirin	100	2026-05-20	Edit Delete
Paracetamol	150	2025-11-15	Edit Delete
Metformin	200	2027-02-10	Edit Delete
Amoxicillin	50	2024-08-30	Edit Delete
Insulin	8	2025-06-26	Edit Delete
Morphine	9	2025-11-02	Edit Delete

Order Placement

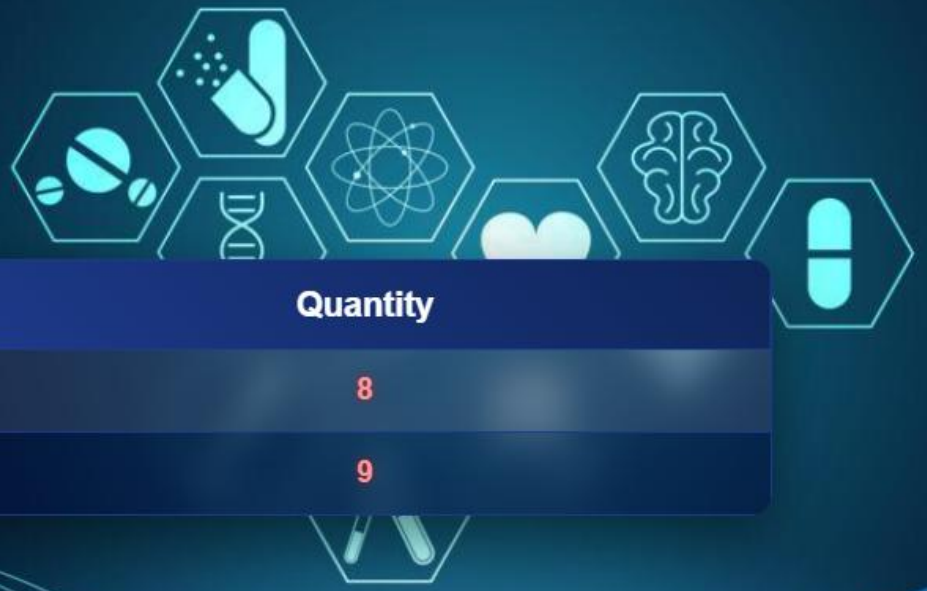
Drug Name

Quantity

Add Order

Order ID	Drug Name	Quantity	Status	Action
1743491382546	Metformin	500	Received	Edit Undo Delete
1743491771807	Insulin	300	Pending	Order Received Edit Delete

Low Stock Alert



Drug Name	Quantity
Insulin	8
Morphine	9

Order Management

Sakhanaa

Metformin

10

Add Order

Order ID	Customer Name	Product	Quantity	Status	Action
1	Varshini	Paracetamol	4	Completed	Undo Delete
2	Sakhanaa	Metformin	10	Pending	Mark Completed Delete

Order Management

Shyam

Cough Syrup

10

Add Order

Drug not available in inventory

Order ID	Customer Name	Product	Quantity	Status	Action
1	Varshini	Paracetamol	4	Pending	Mark Completed Delete
2	Sakhanaa	Metformin	10	Pending	Mark Completed Delete

Order Management

Harshini

Insulin

100

Add Order

Drug quantity not available in the inventory

Order ID	Customer Name	Product	Quantity	Status	Action
1	Varshini	Paracetamol	4	Completed	Undo Delete
2	Sakhanaa	Metformin	10	Pending	Mark Completed Delete

Welcome to Pharma Flow

Admin

Staff

FUTURE ENHANCEMENTS

- **Smart Drug Restocking:** AI predicts future stock needs and suggests how much to restock.
- **Prescription Scanning:** AI scans prescriptions and adds medicines to the system automatically.
- **Auto Order Placement:** When stock is low, the system creates purchase orders automatically.
- **Cloud Storage:** Data is stored online, so all pharmacy locations can access inventory in real time.
- **Mobile App:** Users can check stock, place orders, and get alerts from their phones.
- **Dark Mode & Themes:** Users can change the app’s look for a better experience.
- **Voice Commands:** Users can speak to search for medicines or place orders hands-free.