

## Database Management System Lab

### Pharmacy Supply Chain Management

# ASSUMPTIONS

- Initially, our model has 6 relations: Supplier, Pharmacy, Customer, Order, Product and Transaction.
- The relations **Supplier**, **Customer** and **Pharmacy** each contain the details of the participating entities in the pharmacy supply chain- namely a unique identifier for each, their name, phone number, pincode, area. Clearly, each pincode is associated with a unique area.
- The **Product** relation contains details about each product/item (medicines/other essentials) being sold or supplied- namely a unique identifier for each product, its name, dosage/specification of the medicine (mL/drops/other specs), category of the product (pill/capsule/other), manufacturing and expiry dates of the product, unit price, and most importantly, the supplier\_id of the supplier who is supplying the product to the pharmacy, and the pharmacy\_id of the pharmacy who is selling the product to the customer. Since multiple suppliers could supply the same product, and multiple pharmacies could also sell the same product, hence supplier\_id and pharmacy\_id are multivalued attributes. This relation also includes the qty\_supplied by each supplier, and the qty\_available to be sold in each pharmacy.

Note that `product_name` and `dosage` have been considered as unique. Consider an example as follows: the “Pan” tablet has multiple different types with specifications, all manufactured by Alkem labs. When we consider the `product_name` alone, it is not unique. However, if we consider the `product_name` along with the `dosage`, this is unique (eg. Pan 40mg, Pan 80mg).

- The **Order** relation contains details about the order placed by customers/pharmacies. Obviously, either a customer can place an order to a pharmacy, or a pharmacy can place an order to a supplier. This relation namely contains a unique identifier for each order, a list of all the `product_ids` of all the products which the order entails (multivalued attributes), the `qty_ordered` in each order, the `order_date` and `delivery_date`, the total price of the order, and the `client_type`. Client type specifies who is placing the order:
  - ❖ `Client_type = 'C'`: This means that a customer is placing an order to a pharmacy, who sells the product. In this case, the `customer_id` and `pharmacy_id` fields will be filled with the identifiers of the corresponding customer and pharmacy involved in the order, whereas the `supplier_id` field will be left NULL. (As no supplier is involved in this order.)
  - ❖ `Client_type = 'P'`: This means that a pharmacy is placing an order to a supplier, who supplies the product. In this case, the `pharmacy_id` and `supplier_id` fields will be filled with the identifiers of the corresponding pharmacy and supplier involved in the order, whereas the `customer_id` field will be left NULL. (As no customer is involved in this order.)

Note that at any given point in time, one of these 3 fields (`supplier_id`, `pharmacy_id`, `customer_id`) will be left NULL depending on whether the order is being placed by a customer to a pharmacy, or by a pharmacy to a supplier.

- The **Transaction** relation contains details about the transaction which has occurred between the participating entities for a particular order- namely a

unique identifier for each transaction, the order\_id of the order for which the transaction has occurred, the type of transaction (card/cash/UPI/other methods), the date of the transaction, and the status of the transaction:

- ❖ Completed: The transaction has been completely paid off successfully.
- ❖ In Progress: If the transaction is being paid in installments, then for each installment in the transaction, the state of the transaction will be marked “in progress”.
- ❖ Pending: The transaction has not begun yet.

Note that for a particular order, there could be multiple transactions taking place, since the client could choose to complete the payment for the order in installments instead of altogether. In this case, there will be multiple transaction\_ids linked with each order\_id.

# **NOVELTY**

## **1. Multi-User Role Integration:**

- **Supplier:** Manages supplier inventory, Manages received orders from pharmacies, Manages pending orders.
- **Pharmacy:** Manages pharmacy inventory, Manages received orders from customers, Places orders to suppliers, Allows to view orders both placed and received, Manages transactions between users and pharmacy.
- **Customer:** Places orders to pharmacies, views past orders and completes pending transactions.

## **2. User Authentication and Role Selection:**

- Centralized login system with user role selection (Supplier, Customer, Pharmacy) to ensure the correct interface and functionalities are presented to the user.
- Authentication is done based on the user\_id and the phone number.

## **3. Comprehensive Order and Inventory Management:**

- Orders can be tracked by suppliers and pharmacies, with detailed views showing order status and included products.
- Inventory can be added and managed by both suppliers and pharmacies, with visibility into current stock levels and order histories.

## **4. Transaction Management:**

- Customers can manage their transactions, view pending transactions, and complete payments, ensuring clear financial management.
- Each Transaction has its type and status which lets the user know about the status of their transactions.

## **5. Dynamic Interface Elements:**

- Utilization of tables, table listeners, dropdowns, and other interactive elements to enhance the user experience and provide real-time data interaction.

## **Future Aspects and Enhancements:**

### **1. Real-Time Order Tracking and Notifications:**

- Implement automated notifications via email/SMS for key events (OTP generation, order placement, dispatch, delivery, payment reminders).

### **2. Advanced Inventory Management:**

- Implement batch tracking and expiration date management.
- Introduce automated reorder levels and alerts for low stock.

### **3. Enhanced Analytics and Reporting:**

- Develop a dashboard with visual analytics (graphs, charts) for tracking sales, inventory turnover, and order trends.
- Provide customizable reports for users to analyze their data based on specific criteria.

### **4. Mobile Application:**

- Develop a mobile app version to allow users to access the system on-the-go, place orders, manage inventory, and view order details.

### **5. User Experience Improvements:**

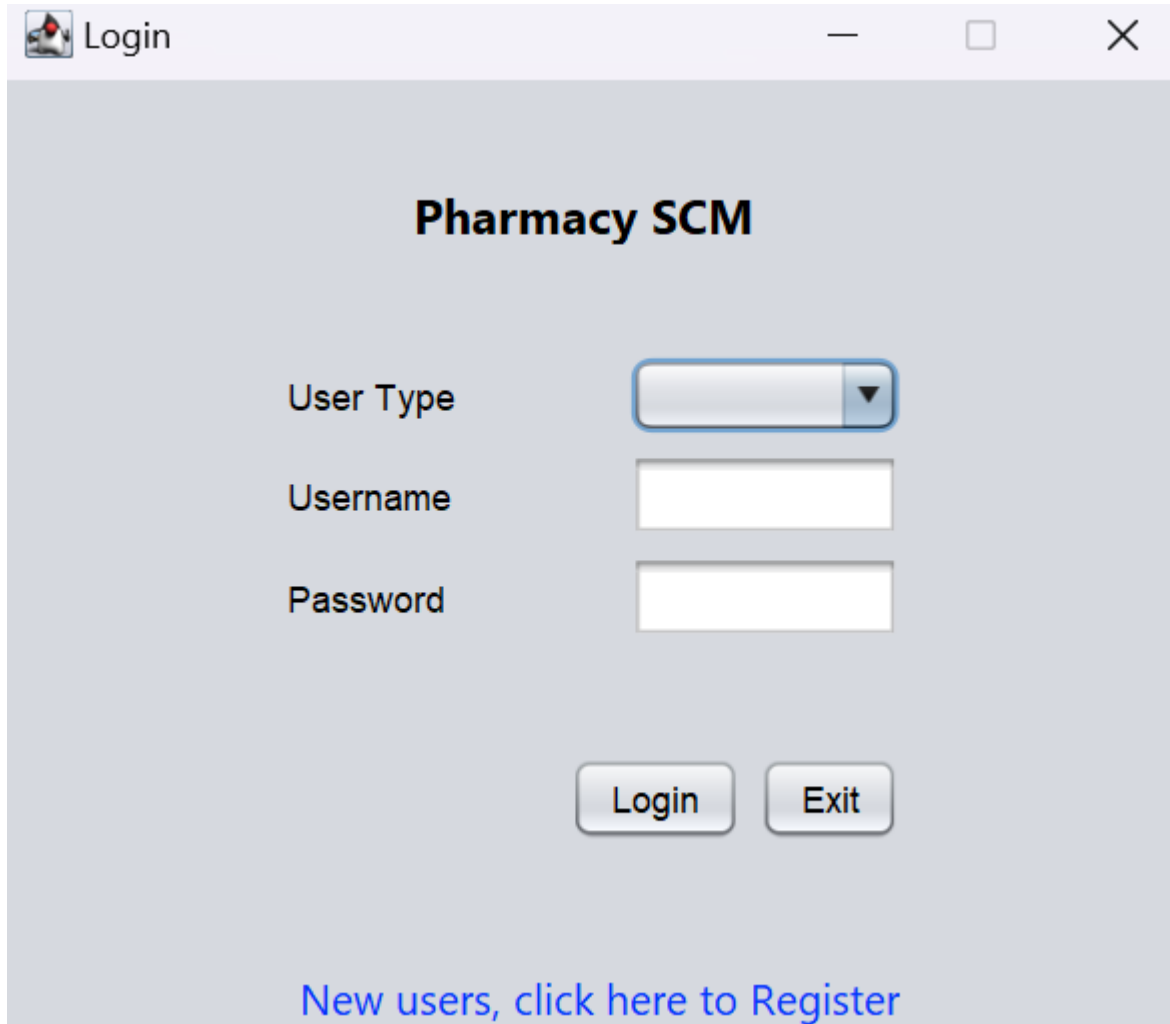
- Enhance the user interface with more interactive elements and a more intuitive design.

## **6. Advanced Delivery & Payment Options:**

- Integrate with other delivery partners to expand the network of the pharmacy.
- Integrate with third party payment platforms.
- Develop APIs for integration with external systems such as accounting software, CRM, or ERP systems to enable seamless data exchange and automation.

## OUTPUT SCREENSHOTS

**SUPPLIER:**



The screenshot shows a web application window titled "Login" with a small icon on the left and standard window controls (minimize, maximize, close) on the right. The main content area has a light gray background and is titled "Pharmacy SCM" in bold black text. Below the title, there are three input fields: "User Type" (a dropdown menu), "Username" (a text box), and "Password" (a text box). Below these fields are two buttons: "Login" and "Exit". At the bottom of the window, there is a blue hyperlink that reads "New users, click here to Register".

**Pharmacy SCM**

User Type

Username

Password

[New users, click here to Register](#)

Login

Pharmacy SCM

User Type

Supplier

Username

S001

Password

9840431265

Login

Exit

[New users, click here to Register](#)

Message

i

Login Successful!

OK

Supplier Home

Supplier Home Page

Manage Pending Orders

Track Past Orders

Manage Inventory

Logout



Supplier - Pending Orders

Order ID	Pharmacy Name	Order Date	Total Amount	
O004	Preethi Medicals	2024-06-04	400.0	<button>Deliver</button>
O007	Preethi Medicals	2024-06-07	270.0	<button>Deliver</button>
O008	Apollo Pharmacy	2024-06-08	490.0	<button>Deliver</button>
O00	Preethi Medicals	2024-06-09	180.0	<button>Deliver</button>
O069	Preethi Medicals	2024-06-13	400.0	<button>Deliver</button>
O058	Preethi Medicals	2024-06-13	420.0	<button>Deliver</button>
O050	Preethi Medicals	2024-06-13	150.0	<button>Deliver</button>

Back

Supplier - Pending Orders

Order ID	Pharmacy Name	Order Date	Total Amount	
O004	Preethi Medicals	2024-06-04	400.0	<button>Deliver</button>
O007	Preethi Medicals	2024-06-07	270.0	<button>Deliver</button>
O008	Apollo Pharmacy	2024-06-08	490.0	<button>Deliver</button>
O00	Preethi Medicals	2024-06-09	180.0	<button>Deliver</button>
O069	Preethi Medicals	2024-06-13	400.0	<button>Deliver</button>
O058	Preethi Medicals	2024-06-13	420.0	<button>Deliver</button>
O050	Preethi Medicals	2024-06-13	150.0	<button>Deliver</button>

i

Order ID O00 delivered!


OK

Back

```
Order ID O002
transaction_status = 'In Progress' WHERE transaction_id = 'T076';
transaction_amount = 100 where transaction_id = 'T076';
```

Supplier - Pending Orders				
Order ID	Pharmacy Name	Order Date	Total Amount	
O004	Preethi Medicals	2024-06-04	400.0	Deliver
O007	Preethi Medicals	2024-06-07	270.0	Deliver
O008	Apollo Pharmacy	2024-06-08	490.0	Deliver
O00	Preethi Medicals	2024-06-09	180.0	Delivered
O069	Preethi Medicals	2024-06-13	400.0	Deliver
O058	Preethi Medicals	2024-06-13	420.0	Deliver
O050	Preethi Medicals	2024-06-13	150.0	Deliver
Back				

Supplier - Order History				
ORDER HISTORY				
Order_ID	Pharmacy Name	Order_Date	Total_Amount	
O001	Preethi Medicals	2024-06-01	540.0	
O004	Preethi Medicals	2024-06-04	400.0	
O007	Preethi Medicals	2024-06-07	270.0	
O008	Apollo Pharmacy	2024-06-08	490.0	
O009	Apollo Pharmacy	2024-06-09	300.0	
O010	Preethi Medicals	2024-06-09	100.0	
O00	Preethi Medicals	2024-06-09	180.0	
O069	Preethi Medicals	2024-06-13	400.0	
O058	Preethi Medicals	2024-06-13	420.0	
O050	Preethi Medicals	2024-06-13	150.0	
Back				


 Supplier - View Inventory

Manage Inventory

Product_ID	Product Name	Quantity	Unit Price
P001	Aspirin	111	10.0
P002	Ibuprofen	175	12.0
P003	Paracetamol	201	8.0
P004	Amoxicillin	346	15.0
P005	Cetirizine	320	5.0

Add ...

Back

 Supplier - Add to Inventory

Add Inventory

Product Name

Quantity

▼

Amoxicillin 250mg

Aspirin 500mg

Cetirizine 10mg

Ibuprofen 200mg

Paracetamol 500mg

Supplier - Add to Inventory


### Add Inventory

Product Name

Quantity

Supplier - Add to Inventory

Message

 Inventory added/ updated successfully!

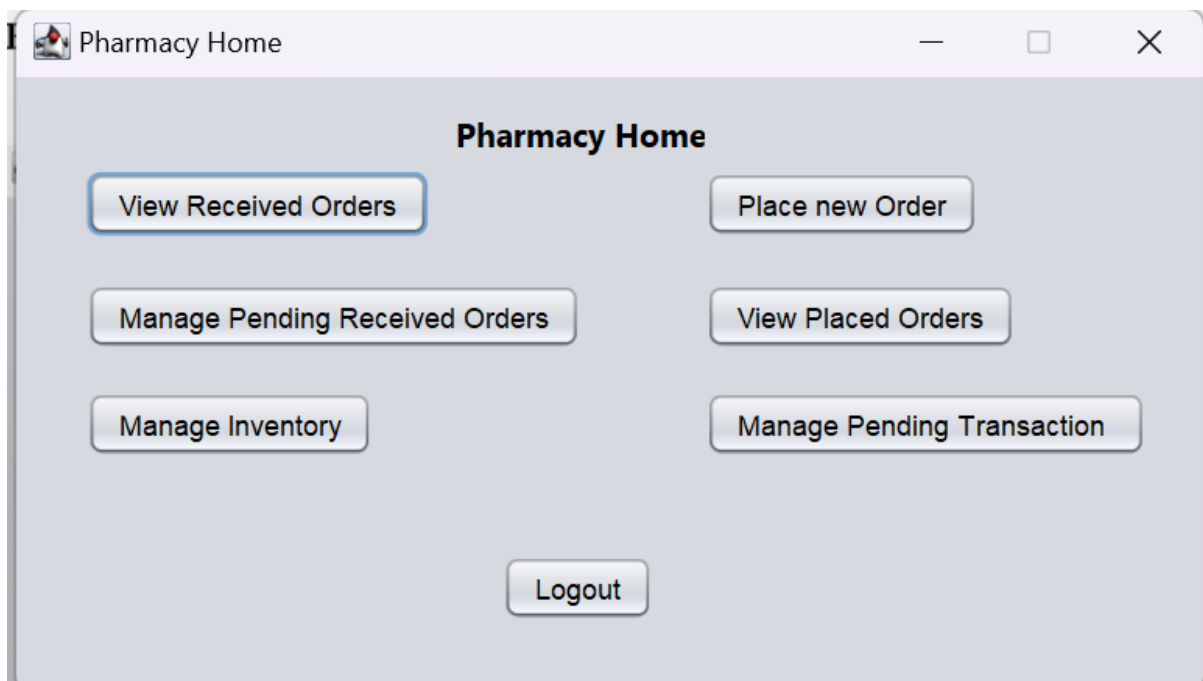
## PHARMACY:



The screenshot shows a 'Login' window for the 'Pharmacy SCM' system. The window has a title bar with a red icon and the text 'Login'. The main content area is light blue and contains the following elements:

- Pharmacy SCM**: Title of the application.
- User Type**: A dropdown menu currently set to 'Pharmacy'.
- Username**: A text input field containing 'Y001'.
- Password**: A text input field containing '1234567890'.
- Login** and **Exit**: Two buttons at the bottom.
- [New users, click here to Register](#): A blue link at the bottom.

Overlaid on the right side of the login window is a 'Message' dialog box. It has a title bar with a close button (X). The message area contains a blue information icon (i) and the text 'Login Successful!'. An 'OK' button is located at the bottom right of the dialog.



The screenshot shows the 'Pharmacy Home' window. It has a title bar with a red icon and the text 'Pharmacy Home'. The main content area is light blue and contains the following elements:

- Pharmacy Home**: Title of the application.
- View Received Orders**: A button.
- Place new Order**: A button.
- Manage Pending Received Orders**: A button.
- View Placed Orders**: A button.
- Manage Inventory**: A button.
- Manage Pending Transaction**: A button.
- Logout**: A button at the bottom center.




## Past Orders

Order_ID	Order_Date	Delivery_...	Total_Amt	Customer...	Transac_...
O056	2024-06-1...		200	C001	Completed
O061	2024-06-1...		150	C001	Completed
O062	2024-06-1...		200	C001	Completed
O062	2024-06-1...		200	C001	Completed
O055	2024-06-1...		100	C001	Completed
O057	2024-06-1...		220	C001	Completed

View Past Orders

View Order Detail

Back

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
**Order Details**

Order ID

Product ID	Qty
P001	15
P002	15
P003	35
P005	10

**View Order Details**

**Close**

— □ ×

**New Order**

Supplier ID

Product Name

Dosage

Quantity Ordered

Confirm Order

Add Product

Clear

Back

Screenshot


REFERENCES MAILINGS REVIE

A Aa A

1 2 3

Message

×

 Order ID: O059

OK

**New Order**

Supplier ID

Product Name

Dosage

Quantity Ordered

Confirm Order

Add Product

Clear

Back

Message

**i** Added to Order\_List!

OK

**Add Transaction Info**

Transaction\_amount 100

Transaction Type Cash

Order ID O059

Add

Close

Message

**i** Successful !

OK



Pharmacy - Pending Orders

Order ID	Customer Name	Order Date	Total Amount	
O056	Diya Seshan	2024-06-14	200.0	<div>Deliver</div>
O077	Diya Seshan	2024-06-13	120.0	<div>Deliver</div>
O061	Diya Seshan	2024-06-14	150.0	<div>Deliver</div>
O062	Diya Seshan	2024-06-13	200.0	<div>Deliver</div>
O055	Diya Seshan	2024-06-14	100.0	<div>Deliver</div>
O057	Diya Seshan	2024-06-14	220.0	<div>Deliver</div>

Back

Pharmacy - Pending Orders

Order ID	Customer Name	Order Date	Total Amount	
O056	Diya Seshan	2024-06-14	200.0	<div>Deliver</div>
O077	Diya Seshan	2024-06-13	120.0	<div>Deliver</div>
O061	Diya Seshan	2024-06-14	150.0	<div>Deliver</div>
O062	Diya Seshan	2024-06-13	200.0	<div>Deliver</div>
O055	Diya Seshan	2024-06-14	100.0	<div>Deliver</div>
O057	Diya Seshan	2024-06-14	220.0	<div>Deliver</div>

Back

Message

i

Order ID O077 delivered!

OK

2024-06-13

120.0

Deliver




## Placed Orders

Order ID	Order Date	Delivery ...	Total Amt	Supplier ID
O001	2024-06-...	2024-06-...	540	S001
O004	2024-06-...		400	S001
O007	2024-06-...		270	S001
O010	2024-06-...	2024-06-...	100	S001
O00	2024-06-...	2024-06-...	180	S001
O076	2024-06-...		100	S004
O069	2024-06-...		400	S001
O058	2024-06-...		420	S001
O050	2024-06-		150	S001

View Past Orders Placed

View Order Detail

Back

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**Order Details**

Order ID

Product ID	Qty
P001	10
P002	20
P003	25

**View Order Details**

Close



Supplier - View Inventory



### Manage Inventory

Product_ID	Product Name	Quantity	Unit Price
P001	Aspirin	187	10.0
P002	Ibuprofen	115	12.0
P004	Amoxicillin	24	15.0
P005	Cetirizine	200	5.0

Add ...

Back



### Add Inventory

Product Name

Cetirizine 10mg

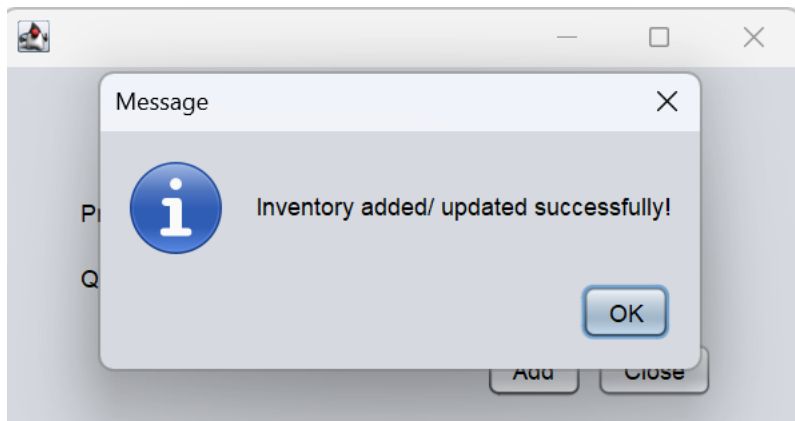


Quantity

20

Add

Close



Pharmacy - Managing Transaction

Order ID	Transaction T...	Transaction D...	Transaction S...	Transaction A...	
O058	UPI	2024-06-13	In Progress	200.0	Complete ...
O058	Card	2024-06-13	In Progress	100.0	Complete ...
O050	UPI	2024-06-13	In Progress	100.0	Complete ...

Back

Pharmacy - Managing Transaction

Order ID	Transaction T...	Transaction D...	Transaction S...	Transaction A...	
O058	UPI	2024-06-13	In Progress	200.0	Complete ...
O058	Card				Complete ...
O050	UPI				Complete ...

Message

Transaction ID O050 done!

OK

Back

## CUSTOMER:



The screenshot shows a 'Login' window for 'Pharmacy SCM'. It has a title bar with a standard icon and window controls. The main area contains three labels: 'User Type', 'Username', and 'Password'. 'User Type' is a dropdown menu set to 'Customer'. 'Username' and 'Password' are text input fields containing 'C001' and '9003096754' respectively. Below these are 'Login' and 'Exit' buttons. At the bottom, there is a link: 'New users, click here to Register'. Overlaid on the right is a 'Message' dialog box with a pink header, an information icon, the text 'Login Successful!', and an 'OK' button.

Pharmacy SCM

User Type: Customer

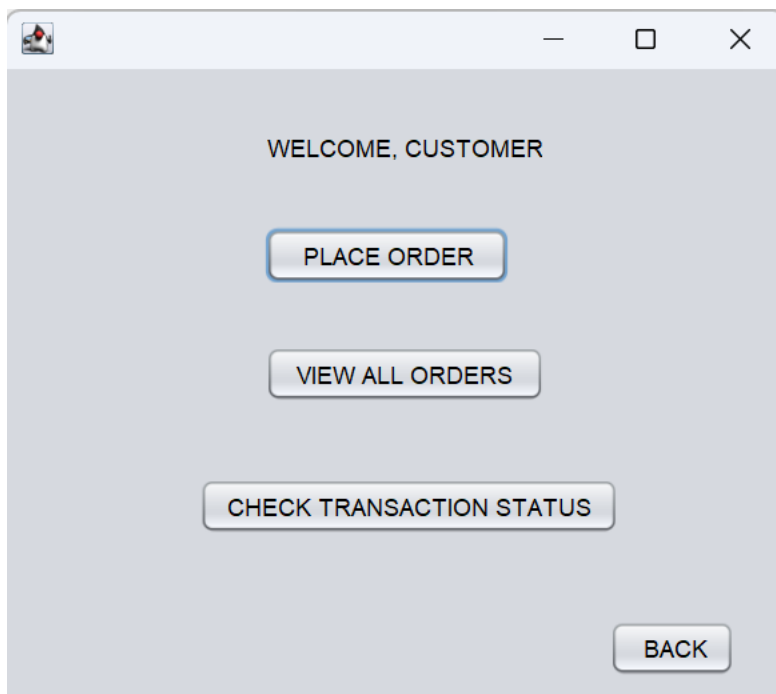
Username: C001

Password: 9003096754

Login Exit

New users, click here to Register

Message: Login Successful! OK



The screenshot shows a 'WELCOME, CUSTOMER' window. It has a title bar with a standard icon and window controls. The main area contains four buttons: 'PLACE ORDER', 'VIEW ALL ORDERS', 'CHECK TRANSACTION STATUS', and 'BACK'.

WELCOME, CUSTOMER

PLACE ORDER

VIEW ALL ORDERS

CHECK TRANSACTION STATUS

BACK

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PRODUCT NAME

DOSAGE

QUANTITY

Pharmacy Name	Area	Select
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CHOOSE PHARMACY

CREATE ORDER

ADD ITEM

CONFIRM ORDER

MAKE TRANSACTION

BACK

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PRODUCT NAME

DOSAGE

QUANTITY

Pharmacy Name	Area	Select
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CHOOSE PHARMACY

CREATE ORDER

ADD ITEM

CONFIRM ORDER

MAKE TRANSACTION

BACK

Message

i

Order ID: O053

OK

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PRODUCT NAME

Aspirin

DOSAGE

500ma

QUANTITY

15

CHOOSE PHARMACY

Pharmacy Name	Area	Select
Preethi Medicals	adyar	<input checked="" type="checkbox"/>
PQRS	adyar	<input type="checkbox"/>
Apollo Pharmacy	adyar	<input type="checkbox"/>

CREATE ORDER

ADD ITEM

CONFIRM ORDER

MAKE TRANSACTION

BACK



PRODUCT NAME

DOSAGE

QUANTITY

Aspirin

500ma

15

CHOOSE PHARM

CREATE ORDER

ADD ITEM

CONFIRM ORDER

MAKE TRANSACTION

BACK

Message

i

Product available in the selected pharmacy. Product ID: P001

OK

PRODUCT NAME

DOSAGE

QUANTITY

Aspirin

500ma

15

CHOOSE PHARMACY

CREATE ORDER

ADD ITEM

CONFIRM ORDER

MAKE TRANSACTION

BACK

Message

i

Item added to order.

OK

Select

☒

☐

☐

PRODUCT NAME

IBUPROFEN

DOSAGE

200ma


QUANTITY

19

CHOOSE PHARMACY

Pharmacy Name	Area	Select
Preethi Medicals	adyar	<input checked="" type="checkbox"/>
PQRS	adyar	<input type="checkbox"/>
Apollo Pharmacy	adyar	<input type="checkbox"/>

Message



Product available in the selected pharmacy. Product ID: P002

OK

TRANSACTION

BACK

TOTAL AMOUNT


378

AMOUNT TO PAY

TRANSACTION TYPE

PAY

BACK TO PLACING ORDER



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×

TOTAL AMOUNT

378

AMOUNT TO PAY

200

TRANSACTION TYPE


Cash

UPI

Card

PAY

BACK TO PLACING ORDER

— □ ×

TOTAL AMOUNT

378


AMOUNT TO PAY

200

TRANSACTION TYPE

Card ▼

Message ×

 Procedure completed. Remaining amount: 178

OK

PRODUCT NAME

DOSAGE

QUANTITY

ibuprofen

200ma

19

CHOOSE PHARMACY

CREATE ORDER

ADD ITEM

CONFIRM ORDER

MAKE TRANSACTION

BACK

Message

i

Order placed successfully.

OK


Select

Preethi Medicals	adyar	<input checked="" type="checkbox"/>
PQRS	adyar	<input type="checkbox"/>
Apollo Pharmacy	adyar	<input type="checkbox"/>

ORDER_ID	ORDER_DATE
O002	2024-06-02
O003	2024-06-03
O005	2024-06-05
O006	2024-06-06
O056	2024-06-14
O077	2024-06-13
O053	2024-06-14
O061	2024-06-14
O062	2024-06-13
O055	2024-06-14
O057	2024-06-14

VIEW ORDER DETAILS

BACK



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ORDER ID

O061

FETCH

PRODUCT NAME	DOSAGE	QUANTITY
Aspirin	500mg	10
Ibuprofen	200mg	5
Paracetamol	500mg	10

BACK



Pharmacy - Managing Transaction

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Order ID	Transaction T...	Transaction D...	Transaction S...	Transaction A...	
O010	UPI	2024-06-12	In Progress	50.0	<div>Complete ...</div>
O069	Cash	2024-06-13	In Progress	250.0	<div>Complete ...</div>
O058	UPI	2024-06-14	In Progress	200.0	<div>Complete ...</div>
O053	Card	2024-06-14	In Progress	200.0	<div>Complete ...</div>


Back

Pharmacy - Managing Transaction

Order ID	Transaction T...	Transaction D...	Transaction S...	Transaction A...	
O010	UPI	2024-06-12	In Progress	50.0	Complete ...
O069	Cash	2024-06-13	In Progress	250.0	Complete ...
O058	UPI	2024-06-14	In Progress	200.0	Complete ...
O053	Card	2024-06-14	In Progress	200.0	Complete ...

Back

Message

 Transaction ID O053 done!

OK

Pharmacy - Managing Transaction

Order ID	Transaction T...	Transaction D...	Transaction S...	Transaction A...	
O010	UPI	2024-06-12	In Progress	50.0	Complete ...
O069	Cash	2024-06-13	In Progress	250.0	Complete ...
O058	UPI	2024-06-14	In Progress	200.0	Complete ...

Back

# **CONCLUSION**

In conclusion, the Pharmacy Supply Chain Management (SCM) system plays a pivotal role in optimizing operations and ensuring efficiency within the pharmaceutical industry. Through a systematic approach encompassing the identification of entities and attributes, establishment of relationships, and development of Entity-Relationship (ER) and schema diagrams, the foundation for effective data management and coordination is established. Additionally, the definition of functional dependencies (FDs) and validation of super keys and primary keys ensure data integrity and relational database efficiency. Moving forward, the implementation and normalization of tables further refines the database structure, enhancing performance and facilitating seamless management of pharmacy supply chains. Overall, the Pharmacy SCM system represents a critical tool for streamlining operations, improving customer service, and driving business success within the pharmaceutical domain.