PHARMACY SUPPLY CHAIN MANAGEMENT SYSTEM

UCS2404 - DATABASE MANAGEMENT SYSTEMS

Report

Submitted By

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Why we chose this topic ?

1. **Industry Demand:** There's a high demand for efficient supply chain management systems in the pharmaceutical industry, making this project highly relevant to current industry needs.

2. **Interdisciplinary Knowledge:** The project provides an opportunity to learn about various aspects of supply chain management, healthcare, and database technologies.

3. **Problem-Solving:** Tackling the challenges in this project will enhance your problem-solving skills and ability to work on complex systems.

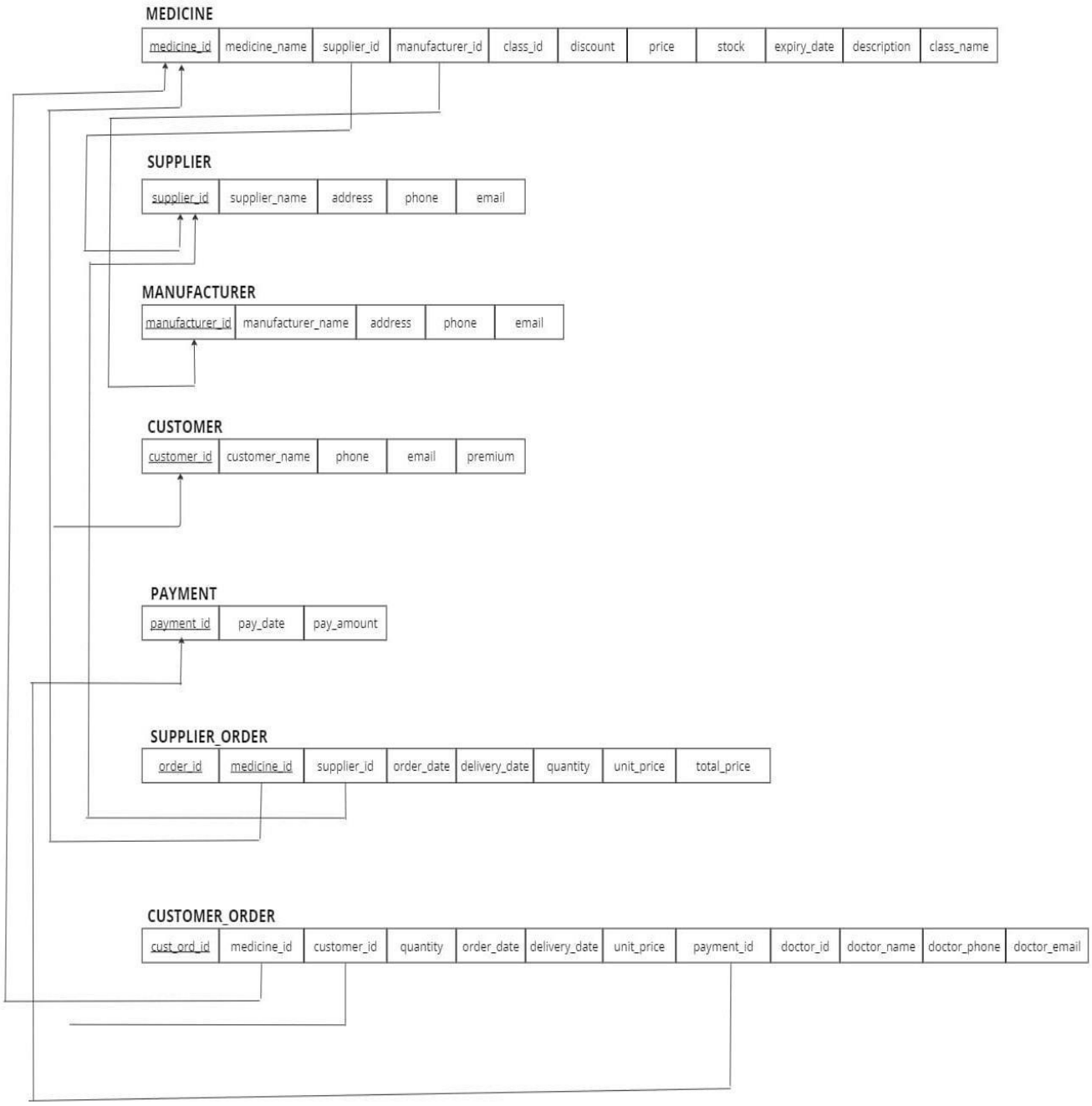
4. **Varied Data Types:** The project involves handling diverse data types, from inventory and order details to customer and supplier information, offering a comprehensive challenge in database management.

UCS2404 - DATABASE MANAGEMENT SYSTEMS
Regulations – R2021

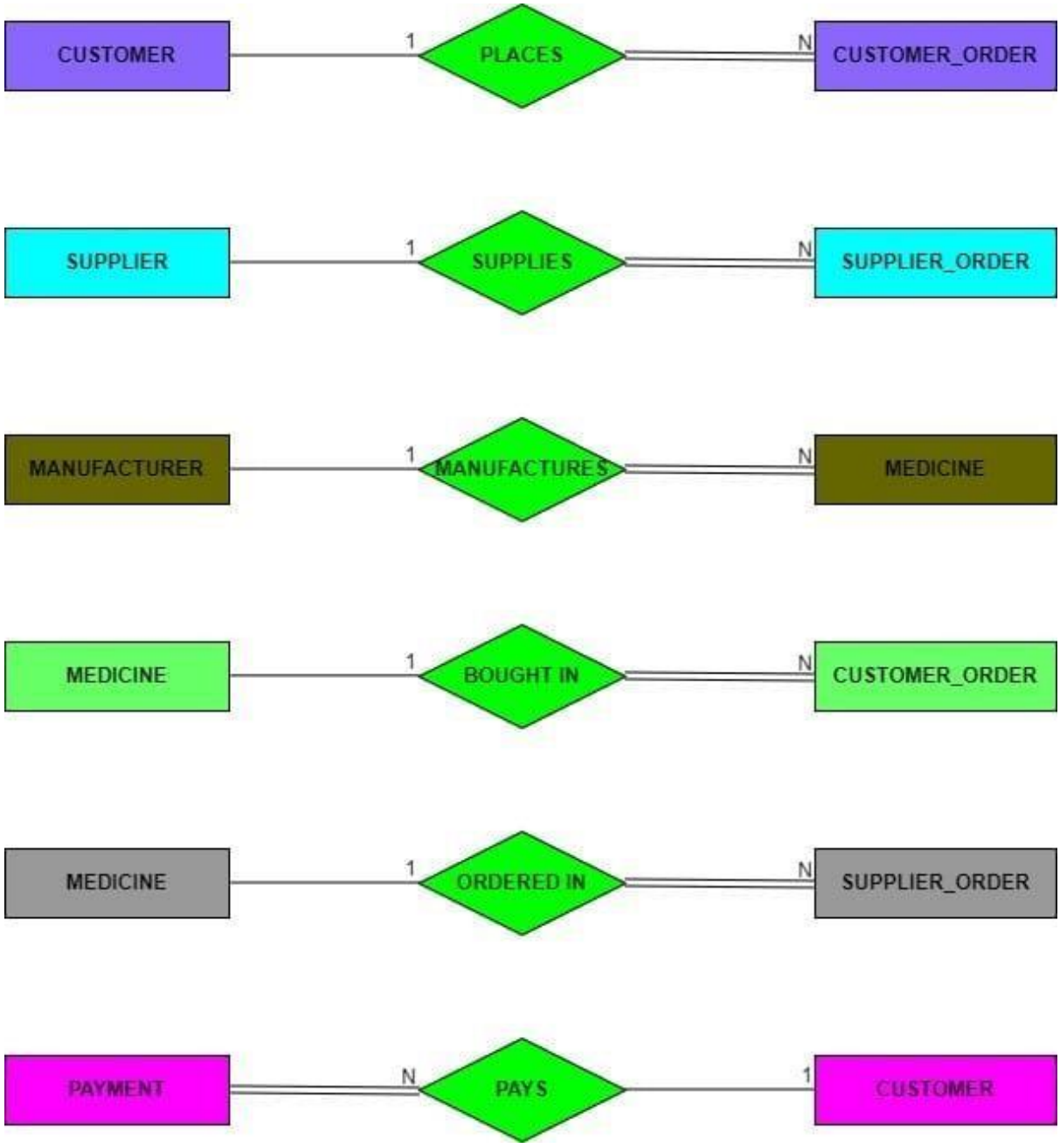
Project Report

Pharmacy supply chain Management system

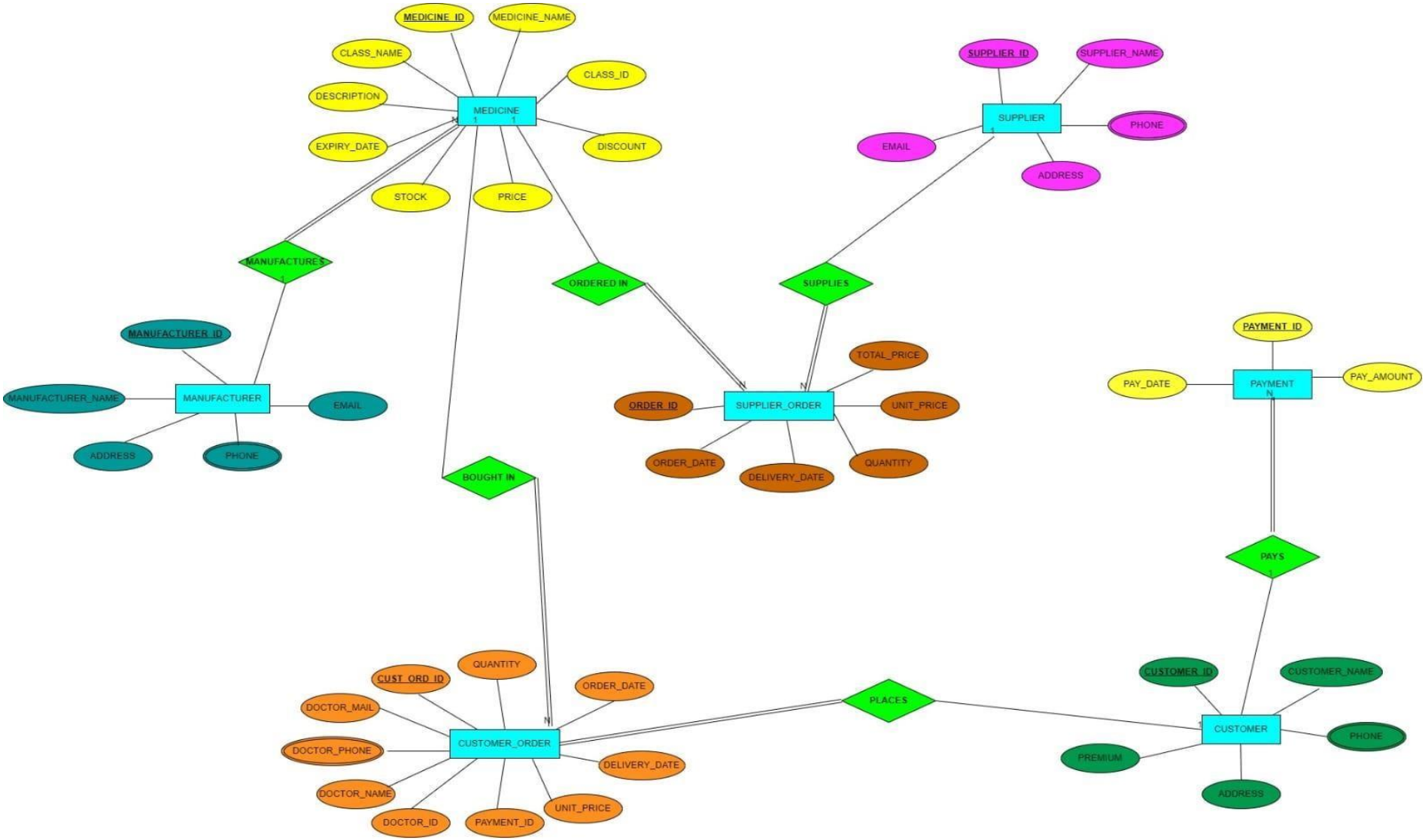
DATABASES:



RELATION:


CUSTOMER
1
PLACES
N
CUSTOMER_ORDER
SUPPLIER
1
SUPPLIES
N
SUPPLIER_ORDER
MANUFACTURER
1
MANUFACTURES
N
MEDICINE
MEDICINE
1
BOUGHT IN
N
CUSTOMER_ORDER
MEDICINE
1
ORDERED IN
N
SUPPLIER_ORDER
PAYMENT
N
PAYS
1
CUSTOMER

ER DIAGRAM:


MEDICINE_ID
MEDICINE_NAME
CLASS_NAME
CLASS_ID
DESCRIPTION
MEDICINE
EXPIRY_DATE
DISCOUNT
STOCK
PRICE
SUPPLIER_ID
SUPPLIER_NAME
SUPPLIER
PHONE
EMAIL
ADDRESS
MANUFACTURES
ORDERED IN
SUPPLIES
MANUFACTURER_ID
MANUFACTURER_NAME
MANUFACTURER
EMAIL
ADDRESS
PHONE
TOTAL_PRICE
ORDER_ID
SUPPLIER_ORDER
UNIT_PRICE
ORDER_DATE
DELIVERY_DATE
QUANTITY
PAYMENT_ID
PAY_DATE
PAYMENT
PAY_AMOUNT
BOUGHT IN
PAYS
QUANTITY
CUST_ORD_ID
ORDER_DATE
DOCTOR_MAIL
PLACES
CUSTOMER_ID
CUSTOMER_NAME
DOCTOR_PHONE
CUSTOMER_ORDER
CUSTOMER
PHONE
DELIVERY_DATE
PREMIUM
DOCTOR_NAME
ADDRESS
DOCTOR_ID
PAYMENT_ID
UNIT_PRICE

Tables :

- Medicine -

1. Medicine_id
2. Medicine_name
3. Supplier_id
4. Manufacturer_id
5. Class_id
6. Stock
7. Expiry_date
8. Discount
9. Price

- Supplier -

1. Supplier_id
2. Supplier_name
3. Email
4. Phone
5. Door_no
6. Street
7. City
8. Pincode

- Customer -

1. Customer_id
2. Customer_name
3. Email
4. Phone
5. Door_no
6. Street
7. City
8. Pincode
9. Premium

❖ Customer Order -

1. Cust_order_id
2. Customer_id
3. Order_date
4. Delivery_date
5. Doctor_id

❖ Doctor -

1. Doctor_id
2. Doctor_name
3. Doctor_phone
4. Doctor_email

❖ Customer Order List -

1. Cust_order_id
2. Medicine_id
3. Quantity
4. Unit_price

❖ Class -

1. Class_id
2. Class_name
3. Description

FUNCTIONAL DEPENDENCIES

Possible FDs :

MEDICINE

Medicine_id → Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock, expiry_date

Class_id → class_name
Supplier_id - > discount,price
Manufactured_id , stock -> expiry_date Class_id,class_name - > description **DECOMPOSE:**

Medicine_id → Medicine_name
Medicine_id → Supplier_id
Medicine_id → Manufacturer_id
Medicine_id → discount
Medicine_id → price
Medicine_id → stock
Medicine_id → expiry_date
Class_id → class_name
Class_id,Class_name - > description
Supplier_id - > discount
Supplier_id - > price
Manufactured_id , stock -> expiry_date **Redundancy:**

1)Medicine_id → Medicine_name
With Medicine_id → Medicine_name
{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock, expiry_date }
Without
{Medicine_id} = { Supplier_id, Manufacturer_id, discount, price, stock, expiry_date }
NOT REDUNDANT

2) Medicine_id → Supplier_id With Medicine_id → Supplier_id
{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock, expiry_date }
Without Medicine_id → Supplier_id
{Medicine_id}$^+$ = { Medicine_name, Manufacturer_id, discount, price, stock, expiry_date }
NOT REDUNDANT

3) Medicine_id → Manufacturer_id
With Medicine_id → Manufacturer_id
{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock, expiry_date }
Without Medicine_id → Manufacturer_id

{Medicine_id}$^+$ = { Medicine_name, Supplier_id,discount, price, stock, expiry_date }

NOT REDUNDANT

4) Medicine_id → discount

With Medicine_id → discount

{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock, expiry_date }

Without Medicine_id → discount

{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount , price, stock, expiry_date }

REDUNDANT

5) Medicine_id → price

With Medicine_id → price

{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock, expiry_date }

Without Medicine_id → price

{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, stock, price,expiry_date }

REDUNDANT

6) Medicine_id → stock

With Medicine_id → stock

{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock, expiry_date }

Without Medicine_id → stock

{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, expiry_date }

7) Medicine_id → expiry_date

With Medicine_id → expiry_date

{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock, expiry_date }

Without Medicine_id → expiry_date

{Medicine_id}$^+$ = { Medicine_name, Supplier_id, Manufacturer_id, discount, price, stock,expiry_date}

REDUNDANT

8)Class_id → class_name

BOTH ARE NOT REDUNDANT

9) Supplier_id - > discount

With, {Supplier_id} = {discount,price}

Without , {Supplier_id} = {price}

NOT REDUNDANT

10)Supplier_id - > price

With, {supplier_id } = {discount,price}

Without , { Supplier_id } = {discount }

NOT REDUNDANT

11)Manufactured_id , stock -> expiry_date

NOT REDUNDANT

12)Class_id,Class_name - > description

NOT REDUNDANT

FDs = {

Medicine_id → Medicine_name, Supplier_id, Manufacturer_id, stock

Class_id → Class_name

Class_id,Class_name - > description

Supplier_id - > discount,price

Manufacturer_id , stock -> expiry_date

}

3) Extraneous Attributes:

1. Class_id,Class_name - > description {Class_id}= {Class_name }

Class_name belongs to {class_id}

Class_name is extraneous

FD = {

Medicine_id → Medicine_name, Supplier_id, Manufacturer_id, stock

Class_id → Class_name

Class_id - > description

Supplier_id - > discount,price

Manufacturer_id , stock -> expiry_date

}

2. Manufacturer_id , stock -> expiry_date

{Manufacturer_id} = {}

Not extraneous

{stock} = {}

Not extraneous

FINAL FDs = {

Medicine_id → Medicine_name, Supplier_id, Manufacturer_id, stock

Class_id → Class_name

Class_id - > description

Supplier_id - > discount,price

Manufacturer_id , stock -> expiry_date

}

R (Medicine_id , Medicine_name , Supplier_id , Manufacturer_id , Stock ,

Class_id , Class_name , Description , Expiry Date)
{Medicine_id , Class_id } is the super Key
PA = {Medicine_id , Class_id }
It is also the Candidate key
It is in 1NF.

CHECK 2NF:

Proper subset {Medicine_id} has partial Dependency PA - > NPA
{Class_id } has partial dependency too PA -> NPA

R1 (Medicine_id , Medicine_name , Supplier_id , Manufacturer_id , Stock , discount , price , expiry_date)

FDs : Medicine_id → Medicine_name, Supplier_id, Manufacturer_id, stock
Supplier_id - > discount,price
Manufacturer_id , stock -> expiry_date

Now it is in 2NF.

R2 (Class_id , Class_name , Description)

FDs: Class_id → Class_name
Class_id - > description

Now it is in 2NF

R3 (Medicine_id , Class_id)

Now it is in 2NF.

CHECK 3NF:

R1 (Medicine_id , Medicine_name , Supplier_id , Manufacturer_id , Stock , discount , price , expiry_date)

FDs : Medicine_id → Medicine_name, Supplier_id, Manufacturer_id, stock
Supplier_id - > discount,price
Manufacturer_id , stock -> expiry_date

Supplier_id - > discount,price

NPA -> NPA
TD

R11 (Supplier_id , Discount , Price)
FD: Supplier_id - > discount,price
LHS is superkey
It is in 3NF and BCNF

Manufacturer_id , stock -> expiry_date

NPA - > NPA
TD

R12 (Manufacturer_id , Stock ,expiry_date)
FD: Manufacturer_id , stock -> expiry_date
LHS is superKey .
It is in 3NF and BCNF.

R13 (Medicine_id , Medicine_name , Supplier_id , Manufacturer_id , Stock)

FD : Medicine_id → Medicine_name, Supplier_id, Manufacturer_id, stock

LHS is SuperKey

It is in 3NF and BCNF.

R2 (Class_id , Class_name , Description)

FDs: Class_id → Class_name

`Class_id - > description`

LHS is Superkey

It is in 3NF and BCNF.

R3 (Medicine_id , Class_id)

It is in 3NF and BCNF.

SUPPLIER:

Possible FDs:

supplier_id → supplier_name,email , phone supplier_id, email →

address

supplier_id, phone → email **Decomposition** supplier_id

→ supplier_name supplier_id → email supplier_id →

phone supplier_id, email → address (redundant) sup-

plier_id, phone → email (extraneous attribute)

Redundancy Check

1.supplier_id → supplier_name

Compute the closure of {supplier_id}:

{supplier_id}+ = {supplier_id, supplier_name}

As supplier_name ∉ {supplier_id}+, it is not redundant.

2.supplier_id → email

Compute the closure of {supplier_id}:

{supplier_id}+ = {supplier_id, email}

As email ∉ {supplier_id}+, it is not redundant.

3.supplier_id → phone

Compute the closure of {supplier_id}:

{supplier_id}+ = {supplier_id, supplier_name, phone}

As phone ∉ {supplier_id}+, it is not redundant.

4.supplier_id, email → address

Compute the closure of {supplier_id}:

{supplier_id}+ = {supplier_id, supplier_name, phone, email}

Since {supplier_id}+ already includes email, let's see if we need email in the FD:

Compute the closure of {supplier_id} without email:

{supplier_id}+ = {supplier_id, supplier_name, phone, address}

(considering supplier_id alone should determine address if email is redundant)
Since address ∉ {supplier_id}+, email is needed.

However, let's assume that we have:

supplier_id → address

So, supplier_id, email → address is redundant because supplier_id alone should be able to determine address.

EXTRANEOUS:

supplier_id, phone → email

Check if phone is extraneous:

Compute the closure of {supplier_id}:

{supplier_id}+ = {supplier_id, supplier_name, phone, address}

Compute the closure of {supplier_id, phone} without phone:

{supplier_id, phone}+ = {supplier_id, supplier_name, phone, email}

Since email ∈ {supplier_id}+, phone is extraneous.

Simplified FDs:

supplier_id → supplier_name

supplier_id → email supplier_id →

phone supplier_id → address

{supplier_id } is the only Candidate key

CUSTOMER:

Given FDs: customer_id → cus-

tomer_name customer_id → email

customer_id → phone customer_id

→ premium customer_id, email →

address customer_id, phone →

email **Decomposition** customer_id

→ customer_name customer_id →

email customer_id → phone cus-

tomer_id → premium customer_id,

email → address customer_id,

phone → email

Redundancy Check

1.customer_id → customer_name

Compute the closure of {customer_id}:

{customer_id}+ = {customer_id, customer_name}

As customer_name ∉ {customer_id}+, it is not redundant.

2.customer_id → email

Compute the closure of {customer_id}:

{customer_id}+ = {customer_name, id}

As email ∉ {customer_id}+, it is not redundant.

3.customer_id → phone

Compute the closure of {customer_id}:

{customer_id}+ = {customer_id, customer_name, phone}

As phone ∉ {customer_id}+, it is not redundant.

4.customer_id → premium

Compute the closure of {customer_id}:

{customer_id}+ = {customer_id, customer_name, phone, premium}

As premium ∉ {customer_id}+, it is not redundant.

5.customer_id, email → address

Compute the closure of {customer_id}:

{customer_id}+ = {customer_id, customer_name, phone, email, address}

Since {customer_id}+ already includes email, let's see if we need email in the FD:

Compute the closure of {customer_id} without email:

{customer_id}+ = {customer_id, customer_name, phone, address} (considering customer_id alone should determine address if email is redundant)

Since address ∉ {customer_id}+, email is needed.

However, let's assume that we have:

customer_id → address

So, customer_id, email → address is redundant because customer_id alone should be able to determine address.

EXTRANEOUS:

1.customer_id, phone → email

Check if phone is extraneous:

Compute the closure of {customer_id}:

{customer_id}+ = {customer_id, customer_name, phone, email, address}

Compute the closure of {customer_id, phone} without phone:

{customer_id, phone}+ = {customer_id, customer_name, phone, email, address}

Since email ∈ {customer_id}+, phone is extraneous.

Simplified FDs:

customer_id → customer_name cus-

tomer_id → email customer_id →

phone customer_id → premium cus-

tomer_id → address

{customer_id } is the only candidate key.

NORMALIZATION: SUPPLIER:

supplier_id → supplier_name supplier_id →

email supplier_id → phone supplier_id → ad-

dress

{supplier_id } is the only Candidate key **1NF:**

As address has Door_no,Street,City and pincode as attributes 1NF is violated. Table will be

Supplier_id	Supplier_name	Email	Phone	Door_no	Street	City	Pincode

2NF:

{supplier_id } is the super key and the only candidate key. No partial dependencies So , 2NF is Satisfied.

3NF:

LHS (supplier_id) is the super key No transitive dependency and so , it satisfies both 3NF and BCNF.

CUSTOMER:

customer_id → customer_name cus-

tomer_id → email customer_id →

phone customer_id → premium cus-

tomer_id → address

{Customer_id } is the only Candidate key **1NF:**

As address has Door_no,Street,City and pincode as attributes 1NF is violated. Table will be

Customer_id	Customer_name	Email	Phone	Door_no	Street	City	Pincode	Premium

2NF:

{Customer_id } is the super key and the only candidate key. No partial dependencies So , 2NF is Satisfied.

3NF:

LHS (Customer_id) is the super key No transitive dependency and so , it satisfies both 3NF and BCNF.

CUSTOMER ORDER :

Possible FDs : {cust_order_id -> customer_id, order_date, delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email; doctor_id -> doctor_name, doctor_phone, doctor_email; cust_order_id, medicine_id ->quantity, unit_price }

DECOMPOSE :

FDs : {cust_order_id -> customer_id;
cust_order_id -> order_date;
cust_order_id -> delivery_date;
cust_order_id -> doctor_id; cust_order_id -> doctor_name; cust_order_id -> doctor_phone; cust_order_id -> doctor_email; doctor_id -> doctor_name; doctor_id -> doctor_phone; doctor_id -> doctor_email; cust_order_id, medicine_id ->quantity; cust_order_id, medicine_id ->unit_price} **REDUNDANCY :**

a. cust_order_id -> customer_id

   Without it $\{cust\_order\_id\}^+$={cust_order_id, order_date, delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email}

   As customer_id $\notin \{cust\_order\_id\}^+$, it is not redundant

b. cust_order_id -> order_date

   Without it $\{cust\_order\_id\}^+$={cust_order_id, customer_id, delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email}

   As order_date $\notin \{cust\_order\_id\}^+$, it is not redundant

c. cust_order_id -> delivery_date

   Without it $\{cust\_order\_id\}^+$={cust_order_id,customer_id, order_date, doctor_id, doctor_name, doctor_phone, doctor_email}

   As delivery_date $\notin \{cust\_order\_id\}^+$, it is not redundant

d. cust_order_id -> doctor_id

Without it $\{cust\_order\_id\}^+$={cust_order_id,customer_id, order_date, delivery_date, doctor_name, doctor_phone, doctor_email}

As doctor_id $\notin \{cust\_order\_id\}^+$, it is not redundant

e. cust_order_id -> doctor_name

Without it $\{cust\_order\_id\}^+$={cust_order_id,customer_id, order_date, delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email}

As doctor_name $\in \{cust\_order\_id\}^+$, it is redundant
So we can remove it from FD

f. cust_order_id -> doctor_phone

Without it $\{cust\_order\_id\}^+$={cust_order_id,customer_id, order_date, delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email}

As doctor_phone $\in \{cust\_order\_id\}^+$, it is redundant
So we can remove it from FD

g. cust_order_id -> doctor_email

Without it $\{cust\_order\_id\}^+$={cust_order_id,customer_id, order_date, delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email}

As doctor_email $\in \{cust\_order\_id\}^+$, it is redundant
So we can remove it from FD

h. doctor_id -> doctor_name

Without it $\{doctor\_id\}^+$={doctor_phone, doctor_email}

As doctor_name $\notin \{doctor\_id\}^+$, it is not redundant

i. doctor_id -> doctor_phone

Without it {doctor_id}$^+$={doctor_name, doctor_email}
As doctor_phone $\notin$ {doctor_id}$^+$, it is not redundant

j. doctor_id -> doctor_email

Without it {doctor_id}$^+$={doctor_phone, doctor_name}
As doctor_email $\notin$ {doctor_id}$^+$, it is not redundant

k. cust_order_id, medicine_id ->quantity

Without it {cust_order_id, medicine_id}$^+$={ cust_order_id, medicine_id , customer_id, order_date, delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email, unit_price}
As quantity $\notin$ { cust_order_id, medicine_id}$^+$ so it is not redundant

l. cust_order_id, medicine_id -> unit_price

Without it {cust_order_id, medicine_id}$^+$={ cust_order_id, medicine_id , customer_id, order_date, delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email, quantity}
As unit_price $\notin$ { cust_order_id, medicine_id}$^+$ so it is not redundant

Extravaneous Attributes :

a. cust_order_id, medicine_id ->quantity, unit_price

It is not an extravaneous attributes

Final FDs = { cust_order_id -> customer_id; cust_order_id -> order_date; cust_order_id -> delivery_date; cust_order_id -> doctor_id; doctor_id -> doctor_name; doctor_id -> doctor_phone; doctor_id -> doctor_email; cust_order_id, medicine_id ->quantity; cust_order_id, medicine_id ->unit_price}

Here, there is only one candidate key i.e {cust_order_id, medicine_id}

Prime Attributes = { cust_order_id, medicine_id } Remaining are non prime attributes

Check for 1NF :

As there is no multi valued or composite attributes it satisfices

1NF

Check for 2NF :

As one FD cust_order_id -> customer_id, order_date, delivery_date, doctor_id is a partial dependency violate 2NF i.e PA->NPA so, we need to divide it into two relations

R1 : Customer_order(cust_order_id, customer_id, order_date , delivery_date, doctor_id, doctor_name, doctor_phone, doctor_email)
With FD = { cust_order_id -> customer_id, order_date, delivery_date, doctor_id;
doctor_id -> doctor_name, doctor_phone, doctor_email}
with cust_order_id as only candidate key
PA = {Φ}

R2 : Customer_order_list(cust_order_id, medicine_id, quantity, unit_price)
With FD = { cust_order_id, medicine_id ->quantity, unit_price}
With {cust_order_id, medicine_id} as only candidate key
PA ={ cust_order_id, medicine_id} and Cust_order_id will be refered from
R1

Check for 3NF :

In R1, doctor_id -> doctor_name, doctor_phone, doctor_email is a transitive dependency violates 3NF as NPA->NPA
So, we need to separate it into two relations
R11 : Doctor(doctor_id, doctor_name, doctor_phone, doctor_email)
With FD = { doctor_id -> doctor_name, doctor_phone, doctor_email}
With doctor_id as only candidate key
R12 : Customer_order(cust_order_id, customer_id, order_date , delivery_date, doctor_id)
With FD = cust_order_id -> customer_id, order_date, delivery_date, doctor_id
With cust_order_id as its only candidate key and doctor_id will be referenced from R11
R2 : Customer_order_list(cust_order_id, medicine_id, quantity, unit_price)
With FD = { cust_order_id, medicine_id ->quantity, unit_price}
With {cust_order_id, medicine_id} as only candidate key

PA ={ cust_order_id, medicine_id} and Cust_order_id will be refered from
R12

Check for BCNF:

All relations follows BCNF as it has super key in lhs

So, finally the relations are

R11 : Doctor(doctor_id, doctor_name, doctor_phone, doctor_email)
With FD = { doctor_id -> doctor_name, doctor_phone, doctor_email}
With doctor_id as only candidate key

R12 : Customer_order(cust_order_id, customer_id, order_date , delivery_date, doctor_id)
With FD = cust_order_id -> customer_id, order_date, delivery_date, doctor_id
With cust_order_id as its only candidate key and doctor_id will be referenced from R11

R2 : Customer_order_list(cust_order_id, medicine_id, quantity, unit_price)
With FD = { cust_order_id, medicine_id ->quantity, unit_price}
With {cust_order_id, medicine_id} as only candidate key
PA ={ cust_order_id, medicine_id} and Cust_order_id will be refered from R12

PAYMENT :

Possible FD : {payment_id->pay_date, pay_amount}

Decomposition :

FD = {payment_id->pay_date; Payment_id->pay_amount}

Redundancy :

a. payment_id -> pay_date

Without it $\{payment\_id\}^{+}$={payment_id, pay_amount}
So it is not redundant

b. payment_id -> pay_amount

Without it $\{payment\_id\}^{+}$={payment_id, pay_date} So it is not redundant **Extravaneous :**

There are no extravaneous variables **Normalisation :**

Payment_id is the only candidate key

So PA = {}

So it satisfies 1NF as it has no multivalued attributes

It satisfies 2NF as there is no Prime Attributes

It satisfies 3NF as there is no NPA->NPA

It satisfies BCNF as all FD has super key in LHS

So, finally the FDs are

FD = {payment_id->pay_date;

Payment_id->pay_amount}

MANUFACTURER –

F1 = {

MANUFACTURER_ID -> MANUFACTURER_NAME , ADDRESS, PHONE , EMAIL }

DECOMPOSE –

MANUFACTURER_ID -> MANUFACTURER_NAME, ADDRESS, PHONE, EMAIL

MANUFACTURER_ID -> MANUFACTURER_NAME

MANUFACTURER_ID -> ADDRESS

MANUFACTURER_ID -> PHONE

MANUFACTURER_ID -> EMAIL

F1 = {

MANUFACTURER_ID -> MANUFACTURER_NAME

MANUFACTURER_ID -> ADDRESS

MANUFACTURER_ID -> PHONE

MANUFACTURER_ID -> EMAIL

}

EXTRANEOUS –

THERE IS NO EXTRANEOUS IN THESE FD'S

REDUNDANCY –

1. CHECKING IF MANUFACTURER_ID -> MANUFACTURER_NAME IS REDUNDANT

{ MANUFACTURER_ID } = { MANUFACTURER_ID, ADDRESS, PHONE, EMAIL}

{ MANUFACTURER_NAME} IS NOT IN { MANUFACTURER_ID, ADDRESS, PHONE,
EMAIL}

NOT REDUNDANT.

2. CHECKING IF MANUFACTURER_ID -> ADDRESS IS REDUNDANT

{ MANUFACTURER_ID } = { MANUFACTURER_ID, MANUFACTURER_NAME, PHONE, EMAIL}

{ADDRESS} IS NOT IN {MANUFACTURER_ID, MANUFACTURER_NAME, PHONE, EMAIL}

NOT REDUNDANT.

3. CHECKING IF MANUFACTURER_ID -> PHONE IS REDUNDANT

{ MANUFACTURER_ID } = { MANUFACTURER_ID, MANUFACTURER_NAME, ADDRESS, EMAIL}

{PHONE} IS NOT IN {MANUFACTURER_ID, MANUFACTURER_NAME, ADDRESS, EMAIL}

NOT REDUNDANT.

4. CHECKING IF MANUFACTURER_ID -> EMAIL IS REDUNDANT

{ MANUFACTURER_ID } = { MANUFACTURER_ID, MANUFACTURER_NAME, ADDRESS, PHONE}

{EMAIL} IS NOT IN {MANUFACTURER_ID, MANUFACTURER_NAME, ADDRESS, PHONE}

NOT REDUNDANT.

FINAL FD = {
MANUFACTURER_ID -> MANUFACTURER_NAME
MANUFACTURER_ID -> ADDRESS
MANUFACTURER_ID -> PHONE
MANUFACTURER_ID -> EMAIL

}

AS {MANUFACTURER_ID} -> { MANUFACTURER_ID, MANUFACTURER_NAME, AD-
DRESS,
PHONE,EMAIL}
IT IS THE ONLY CANDIDATE KEY.

CHECKING FOR 1NF –
THIS RELATION HAS MULTI-VALUED ATTRIBUTES (PHONE).
THEREFORE, IT IS NOT IN 1NF.

WE HAVE TO DIVIDE THE RELATION INTO TWO.
R1 : MANUFACTURER_ID, MANUFACTURER_NAME , ADDRESS, EMAIL
R2 : MANUFACTURER_ID, PHONE
BY DOING THIS, IT FOLLOWS
1NF .

CHECKING FOR 2NF –
R1 : MANUFACTURER_ID, MANUFACTURER_NAME , ADDRESS, EMAIL
FD'S : MANUFACTURER_ID -> MANUFACTURER_NAME
MANUFACTURER_ID -> ADDRESS
MANUFACTURER_ID -> EMAIL
{ MANUFACTURER_ID}$^+$ = { MANUFACTURER_ID, MANUFACTURER_NAME , AD-
DRESS,
EMAIL}
MANUFACTURER_ID IS THE PRIMARY ATTRIBUTE AND HAS NO PROPER SUBSET.
THEREFORE, IT IS IN 2NF

R2 : MANUFACTURER_ID, PHONE
FD'S : MANUFACTURER_ID -> PHONE {
MANUFACTURER_ID}$^+$ = { MANUFACTURER_ID,
PHONE} IT IS PA AND HAS NO PROPER SUBSET.
THEREFORE, IT IS IN 2NF.

CHECKING FOR 3NF –
R1 : MANUFACTURER_ID, MANUFACTURER_NAME , ADDRESS, EMAIL
FD'S : MANUFACTURER_ID -> MANUFACTURER_NAME
MANUFACTURER_ID -> ADDRESS
MANUFACTURER_ID -> EMAIL
LHS IS A SUPER KEY AND HAS NO TD(NPA -> NPA)
THEREFORE, IT IS IN 3NF AND ALSO BCNF.

R2 : MANUFACTURER_ID, PHONE
FD'S : MANUFACTURER_ID -> PHONE
LHS IS A SUPER KEY AND HAS NO TD(NPA ->
NPA) THEREFORE, IT IS IN 3NF AND ALSO
BCNF.

SUPPLIER_ORDER –

```
F1 = {
   ORDER_ID -> ORDER_DATE , DELIVERY_DATE, QUANTITY, TOTAL_PRICE
    MEDICINE_ID -> SUPPLIER_ID, UNIT_PRICE
    ORDER_ID, QUANTITY -> TOTAL_PRICE
}
```

DECOMPOSE –

1. ORDER_ID -> ORDER_DATE, DELIVERY_DATE
   ORDER_ID -> ORDER_DATE
   ORDER_ID -> DELIVERY_DATE
   ORDER_ID ->QUANTITY
   ORDER_ID -> TOTAL_PRICE

2. MEDICINE_ID -> SUPPLIER_ID, UNIT_PRICE
   MEDICINE_ID -> SUPPLIER_ID
   MEDICINE_ID -> UNIT_PRICE

```
F1 = {
      ORDER_ID -> ORDER_DATE
      ORDER_ID -> DELIVERY_DATE
      ORDER_ID ->QUANTITY
      ORDER_ID -> TOTAL_PRICE
      MEDICINE_ID -> SUPPLIER_ID
      MEDICINE_ID -> UNIT_PRICE
      ORDER_ID, QUANTITY -> TOTAL_PRICE
}
```

EXTRANEOUS –

1. ORDER_ID, QUANTITY -> TOTAL_PRICE

   CHECKING IF ORDER_ID IS EXTRANEOUS
   QUANTITY -> TOTAL_PRICE

{ QUANTITY } = { QUANTITY, TOTAL_PRICE }

{ORDER_ID} DOES NOT BELONGS TO {QUANTITY, TOTAL_PRICE }

IT IS NOT EXTRANEOUS

CHECKING IF QUANTITY IS EXTRANEOUS
ORDER_ID -> TOTAL_PRICE

{ORDER_ID } ={ ORDER _ID, ORDER_DATE , DELIVERY_DATE, QUANTITY,
TOTAL_PRICE }

QUANTITY BELONGS TO {ORDER _ID, ORDER_DATE , DELIVERY_DATE,
QUANTITY, TOTAL_PRICE}

IT IS EXTRANEOUS.

F1 = {
ORDER_ID -> ORDER_DATE
ORDER_ID -> DELIVERY_DATE
ORDER_ID ->QUANTITY
ORDER_ID -> TOTAL_PRICE
MEDICINE_ID -> SUPPLIER_ID
MEDICINE_ID -> UNIT_PRICE
}

REDUNDANCY –

1. CHECKING IF ORDER_ID -> ORDER_DATE IS REDUNDANT
   {ORDER_ID= {ORDER_ID, DELIVERY_DATE, QUANTITY, TOTAL_PRICE}
   {ORDER_DATE} DOES NOT BELONGS TO {ORDER_ID, DELIVERY_DATE,
   QUANTITY, TOTAL_PRICE}

   SO, IT IS NOT REDUNDANT.

2. CHECKING IF ORDER_ID -> DELIVERY_DATE IS REDUNDANT
   {ORDER_ID } = {ORDER_ID, ORDER_DATE, QUANTITY, TOTAL_PRICE}
   {DELIVERY_DATE} DOES NOT BELONGS TO {ORDER_ID, ORDER_DATE,
   QUANTITY, TOTAL_PRICE}

```
      SO, IT IS NOT REDUNDANT.

   3. CHECKING IF ORDER_ID -> QUANTITY IS REDUNDANT
      {ORDER_ID } = {ORDER_ID, ORDER_DATE, DELIVERY_DATE, TO-
      TAL_PRICE}
      {QUANTITY} DOES NOT BELONGS TO {ORDER_ID, ORDER_DATE, QUAN-
      TITY,
      TOTAL_PRICE}

      SO, IT IS NOT REDUNDANT.

   4. CHECKING IF ORDER_ID -> TOTAL_PRICE IS REDUNDANT
      {ORDER_ID } = {ORDER_ID, ORDER_DATE, DELIVERY_DATE, QUANTITY
      }

      {TOTAL_PRICE} DOES NOT BELONGS TO {ORDER_ID,
      ORDER_DATE,DELIVERY_DATE, QUANTITY}

      SO, IT IS NOT REDUNDANT.

   5. CHECKING IF MEDICINE_ID -> SUPPLIER_ID IS REDUNDANT
      {MEDICINE_ID} = {MEDICINE_ID, UNIT_PRICE}

      {SUPPLIER_ID} DOES NOT BELONGS TO { MEDICINE_ID, UNIT_PRICE}

      SO, IT IS NOT REDUNDANT.

   6. CHECKING IF MEDICINE_ID -> UNIT_PRICE IS REDUNDANT
      {MEDICINE_ID} = {MEDICINE_ID, SUPPLIER_ID}

      {UNIT_PRICE} DOES NOT BELONGS TO { MEDICINE_ID, SUPPLIER_ID}

      SO, IT IS NOT REDUNDANT.

FINAL FD = {
      ORDER_ID -> ORDER_DATE
      ORDER_ID -> DELIVERY_DATE
      ORDER_ID ->QUANTITY
      ORDER_ID -> TOTAL_PRICE
      MEDICINE_ID -> SUPPLIER_ID
      MEDICINE_ID -> UNIT_PRICE
}
```

AS {ORDER_ID, MEDICINE_ID} -> { ORDER_DATE , DELIVERY_DATE, QUANTITY,
UNIT_PRICE, SUPPLIER_ID, TOTAL_PRICE}
IT IS THE ONLY CANDIDATE KEY.

CHECKING FOR 1NF –
AS THERE IS NO COMPOSITE AND MULTI-VALUED ATTRIBUTES, THESE FD'S ARE IN 1NF.

CHECKING FOR 2NF –
RELATION R (ORDER_ID, ORDER_DATE, DELIVERY_DATE, QUANTITY, TOTAL_PRICE, MEDICINE_ID -> SUPPLIER_ID, UNIT_PRICE)
HAS PARTIAL DEPENDENCY WHICH VIOLATES 2NF (THAT IS : PA -> NPA). SO, WE NEED TO DIVIDE INTO TWO RELATIONS.

R1: (ORDER_ID, ORDER_DATE, DELIVERY_DATE, QUANTITY, TOTAL_PRICE)
FD'S : ORDER_ID -> ORDER_DATE
ORDER_ID -> DELIVERY_DATE
ORDER_ID ->QUANTITY
ORDER_ID -> TOTAL_PRICE

$\{ORDER\_ID\}^+$ = { ORDER_ID, ORDER_DATE, DELIVERY_DATE, QUANTITY, TOTAL_PRICE}
ORDER_ID IS THE PRIMARY ATTRIBUTE AND IT HAS NO PARTIAL SUBSET.
THEREFORE, IT IS IN 2NF

R2: (MEDICINE_ID -> SUPPLIER_ID, UNIT_PRICE)
FD'S : MEDICINE_ID -> SUPPLIER_ID
MEDICINE_ID -> SUPPLIER_ID
$\{MEDICINE\_ID\}^+$ = { MEDICINE_ID, SUPPLIER_ID, UNIT_PRICE}
MEDICINE_ID IS THE PRIMARY ATTRIBUTE AND IT HAS NO PARTIAL SUBSET.
THEREFORE, IT IS IN 2NF

CHECKING FOR 3NF –
R1: (ORDER_ID, ORDER_DATE, DELIVERY_DATE, QUANTITY, TOTAL_PRICE)
FD'S : ORDER_ID -> ORDER_DATE
ORDER_ID -> DELIVERY_DATE
ORDER_ID ->QUANTITY
ORDER_ID -> TOTAL_PRICE

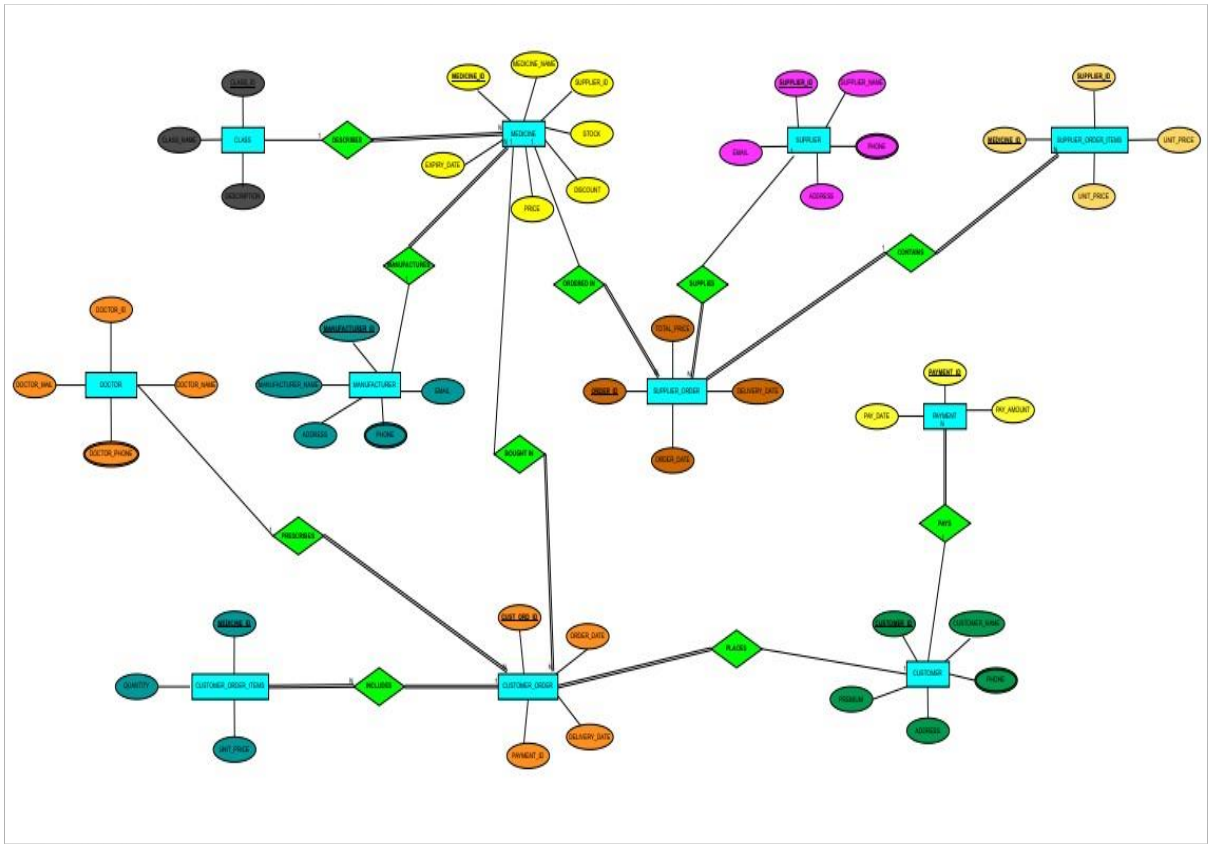
LHS IS A SUPER KEY AND IT DOES NOT HAVE TRANSITIVE DEPENDENCY (NPA -> NPA) THEREFORE, IT IS IN 3NF

R2: (MEDICINE_ID -> SUPPLIER_ID, UNIT_PRICE)
FD'S : MEDICINE_ID -> SUPPLIER_ID
MEDICINE_ID -> SUPPLIER_ID
LHS IS A SUPER KEY AND IT DOES NOT HAVE TD
THEREFORE, IT IS ALSO IN 3NF

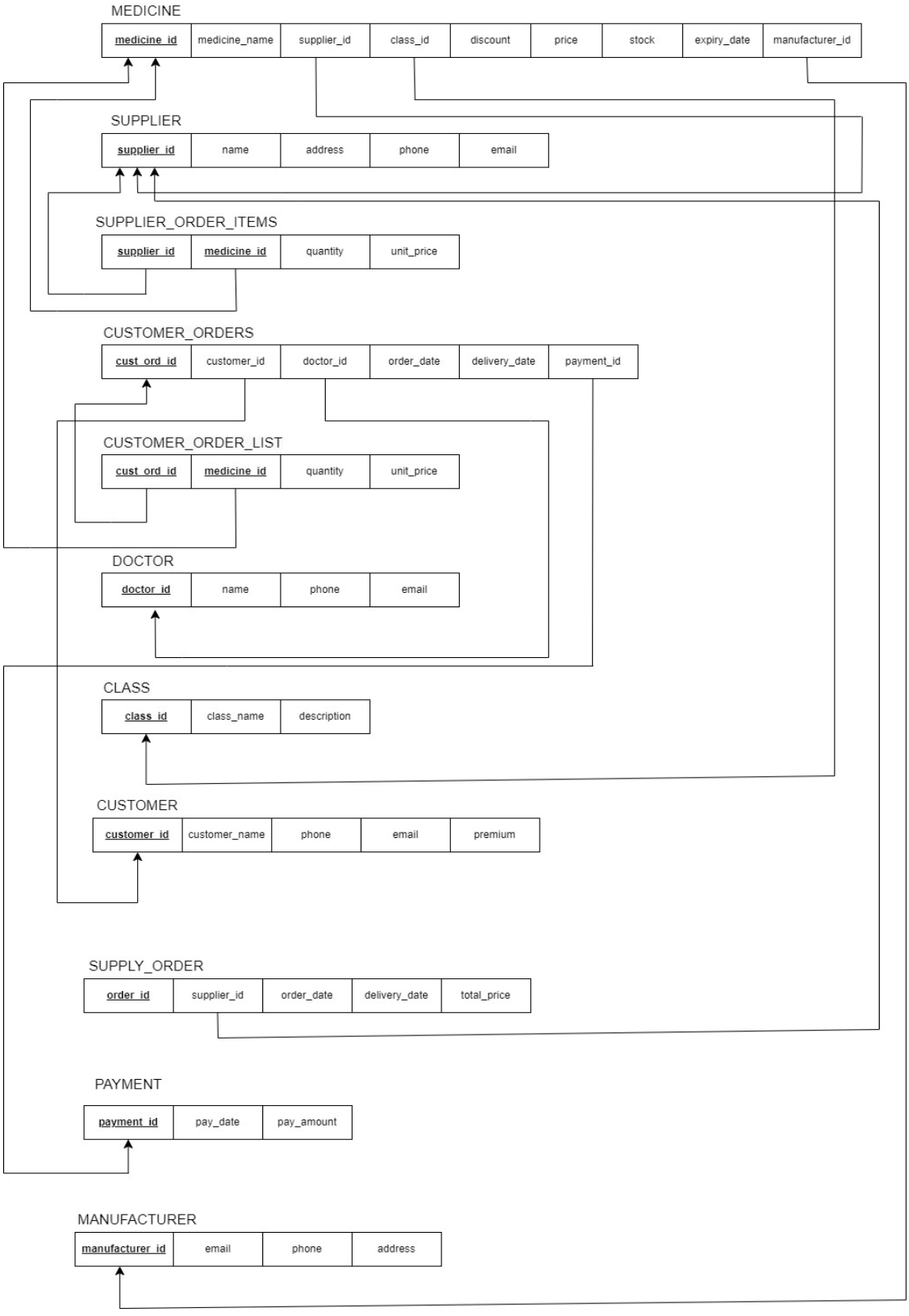
CHECKING FOR BCNF –
SINCE, BOTH RELATIONS HAS LHS AS THE SUPER KEY AND IT IS IN 3NF, IT MUST BE IN BCNF.

After Normalisation -

Modified ER Diagram :



Modified Schema Diagram -

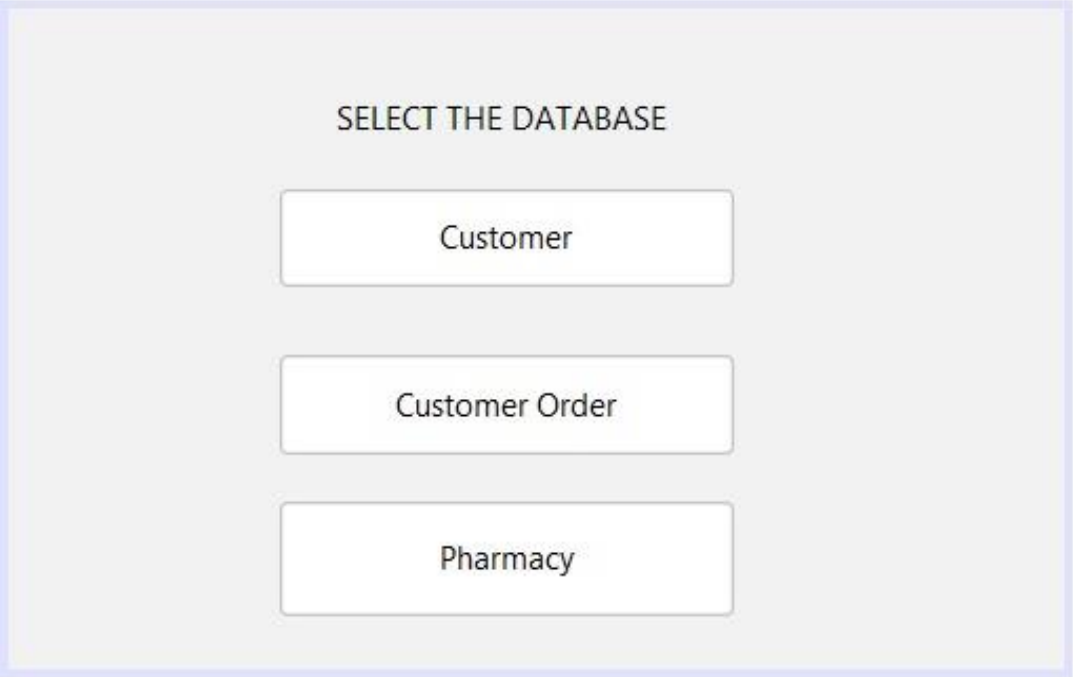


Implementing GUI and Database Connectivity Database Connectivity Code:

Homepage -

```
private void initComponents() {

        jButton1 = new javax.swing.JButton();
        jButton2 = new javax.swing.JButton();
        jLabel1 = new javax.swing.JLabel();
        jButton3 = new javax.swing.JButton();

        setDefaultCloseOperation(javax.swing.WindowConstants.EXIT_ON_CLOSE);

        jButton1.setText("Customer");
        jButton1.addActionListener(new java.awt.event.ActionListener() {
            public void actionPerformed(java.awt.event.ActionEvent evt) {
                jButton1ActionPerformed(evt);
            }









        });

        jButton2.setText("Pharmacy");
        jButton2.addActionListener(new java.awt.event.ActionListener() {
            public void actionPerformed(java.awt.event.ActionEvent evt) {
                jButton2ActionPerformed(evt);
            }
        });

        jLabel1.setText("SELECT THE DATABASE");


        jButton3.setText("Customer Order");
        jButton3.addActionListener(new java.awt.event.ActionListener() {
            public void actionPerformed(java.awt.event.ActionEvent evt) {
                jButton3ActionPerformed(evt);
```

```
        }
    });
```



 Initializing UI Components: Creating buttons and labels for the interface. Assigning text to the buttons and defining their click actions

This interface shows whether we are going
to access the application for

- Customer Details
- Customer Medicine Order
- Pharmacist

Customer:

INSERT –

```
        String query = "INSERT INTO Customer (customer_id, customer_name,
email, phone, premium_subscription, address) VALUES (?, ?, ?, ?, ?, ?)";

        try  {
            PreparedStatement pst = con.prepareStatement(query);
            int customerId = getNextCustomerId(con);
            pst.setInt(1, customerId);
            pst.setString(2, txtCustomerName.getText());
            pst.setString(3, txtEmail.getText());
            pst.setString(4, txtPhone.getText());
            pst.setString(5, txtPremiumSubscription.getText());
            pst.setString(6, txtAddress.getText());
            pst.executeUpdate();
            JOptionPane.showMessageDialog(this, "Customer inserted success-
fully!");
            txtCustomerId.setText(String.valueOf(customerId)); // Update the
customer ID field
        } catch (SQLException ex) {

            JOptionPane.showMessageDialog(this, "Error inserting customer: " +
ex.getMessage());
        }
```

DELETE –

```
 String query = "DELETE FROM Customer WHERE customer_id = ?";
        try {
             PreparedStatement pst = con.prepareStatement(query);
            pst.setInt(1, Integer.parseInt(txtCustomerId.getText()));
            pst.executeUpdate();
            JOptionPane.showMessageDialog(this, "Customer deleted success-
fully!");
        } catch (SQLException ex) {

            JOptionPane.showMessageDialog(this, "Error deleting customer: " +
ex.getMessage());
```

```
        }
```

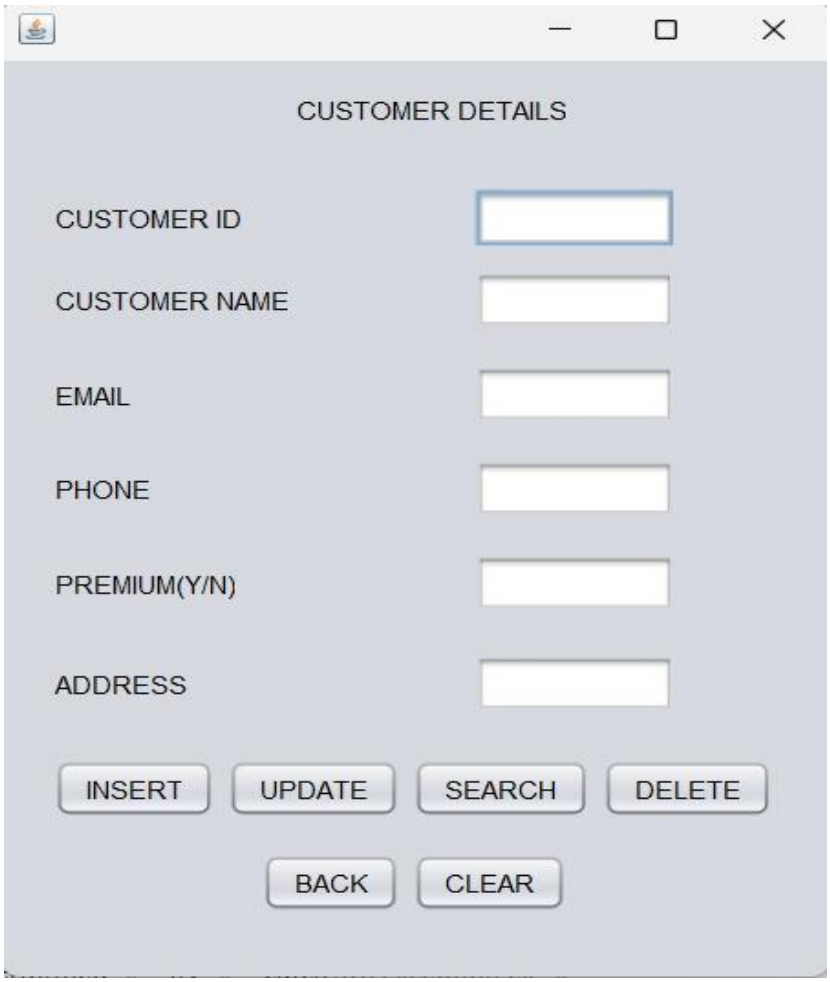
SEARCH –

```
   String query = "SELECT * FROM Customer WHERE customer_id = ? OR (cus-
tomer_name = ? AND phone = ?)";
        try {
             PreparedStatement pst = con.prepareStatement(query);
            pst.setInt(1, Integer.parseInt(txtCustomerId.getText().isEmpty() ?
"0" : txtCustomerId.getText()));
            pst.setString(2, txtCustomerName.getText());
            pst.setString(3, txtPhone.getText());
            try (ResultSet rs = pst.executeQuery()) {
                if (rs.next()) {
                    txtCustomerId.setText(String.valueOf(rs.getInt("cus-
tomer_id")));
                    txtCustomerName.setText(rs.getString("customer_name"));
                    txtEmail.setText(rs.getString("email"));
                    txtPhone.setText(rs.getString("phone"));
                    txtPremiumSubscription.setText(rs.getString("premium_sub-
scription"));
                    txtAddress.setText(rs.getString("address"));
                } else {
                    JOptionPane.showMessageDialog(this, "Customer not
found!");
                }
            }
        } catch (SQLException ex) {

            JOptionPane.showMessageDialog(this, "Error searching customer: " +
ex.getMessage());
        }
```

UPDATE –

```
    String query = "UPDATE Customer SET customer_name = ?, email = ?, phone =
?, premium_subscription = ?, address = ? WHERE customer_id = ?";
        try {
             PreparedStatement pst = con.prepareStatement(query);
            pst.setString(1, txtCustomerName.getText());
            pst.setString(2, txtEmail.getText());
            pst.setString(3, txtPhone.getText());
            pst.setString(4, txtPremiumSubscription.getText());
```

```
            pst.setString(5, txtAddress.getText());
            pst.setInt(6, Integer.parseInt(txtCustomerId.getText()));
            pst.executeUpdate();
            JOptionPane.showMessageDialog(this, "Customer updated success-
fully!");
        } catch (SQLException ex) {

            JOptionPane.showMessageDialog(this, "Error updating customer: " +
ex.getMessage());
        }
```



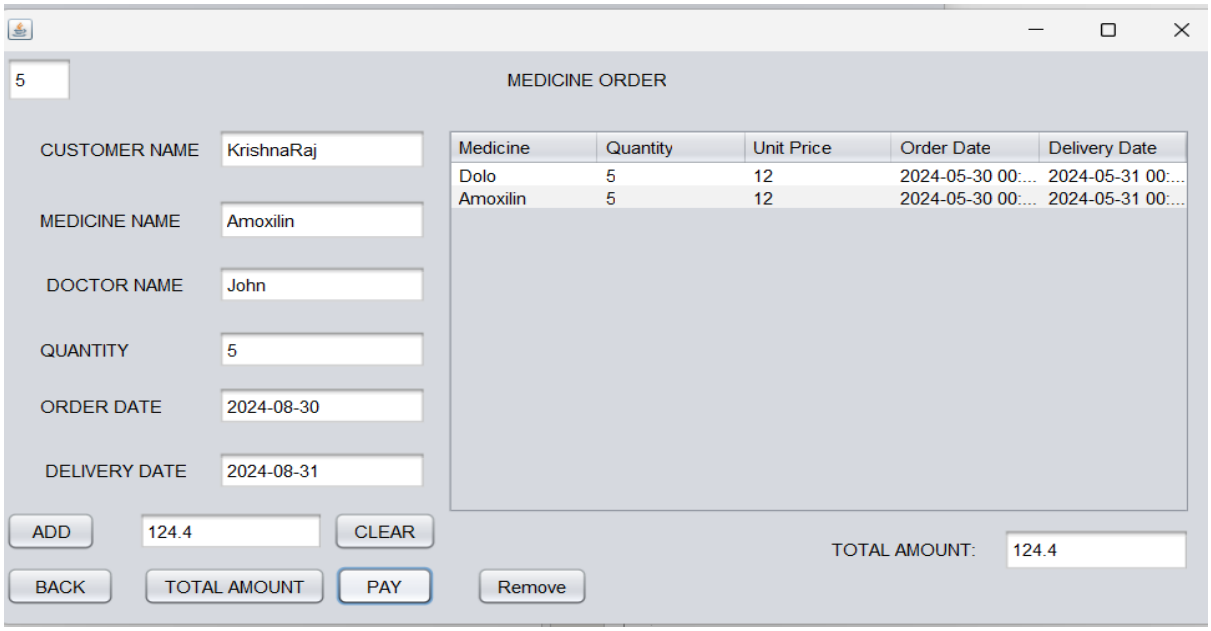
❖ This interface Customer Details is to add a new customer in the database

- We can search the customer details using customer id
- We can update the customer's details if needed
- When customer wants to delete their info , it can also be done using delete option which deletes their information

CUSTOMER MEDICINE ORDER-

```
private double fetchUnitPrice(Connection con, int medicineId) throws SQLExcep-
tion {
    String query = "SELECT price FROM Medicine WHERE medicine_id = ?";
    try (PreparedStatement pst = con.prepareStatement(query)) {
        pst.setInt(1, medicineId);
        try (ResultSet rs = pst.executeQuery()) {
            if (rs.next()) {
                return rs.getDouble(1);
            }
        }
    }
    return -1; // Not found
}

private int generateNewOrderId(Connection con) throws SQLException {
    String query = "SELECT MAX(cust_order_id) FROM Customer_order";
    try (Statement st = con.createStatement(); ResultSet rs = st.exe-
cuteQuery(query)) {
        if (rs.next()) {
            return rs.getInt(1) + 1;
        }
    }
    return 1; // If no records found, start with ID 1
}

private int generateNewPaymentId(Connection con) throws SQLException {
    String query = "SELECT MAX(payment_id) FROM Payment";
    try (Statement st = con.createStatement(); ResultSet rs = st.exe-
cuteQuery(query)) {
        if (rs.next()) {
            return rs.getInt(1) + 1;
        }
```

```
    }
    return 1; // If no records found, start with ID 1
}
private int fetchExistingPaymentId(Connection con, int customerId, Date deliv-
eryDate) throws SQLException {
    String query = "SELECT p.payment_id " +
                   "FROM Payment p " +
                   "JOIN Customer_order co ON p.payment_id = co.payment_id " +
                   "WHERE co.customer_id = ? AND p.pay_date = ?";
    try (PreparedStatement pst = con.prepareStatement(query)) {
        pst.setInt(1, customerId);
        pst.setDate(2, deliveryDate);
        try (ResultSet rs = pst.executeQuery()) {
            if (rs.next()) {
                return rs.getInt(1);
            }
        }
    }
    return -1; // No existing payment found
}

private void updatePaymentAmount(Connection con, int paymentId, double addi-
tionalAmount) throws SQLException {
    String query = "UPDATE Payment SET pay_amount = pay_amount + ? WHERE pay-
ment_id = ?";
    try (PreparedStatement pst = con.prepareStatement(query)) {
        pst.setDouble(1, additionalAmount);
        pst.setInt(2, paymentId);
        pst.executeUpdate();
    }
}
```

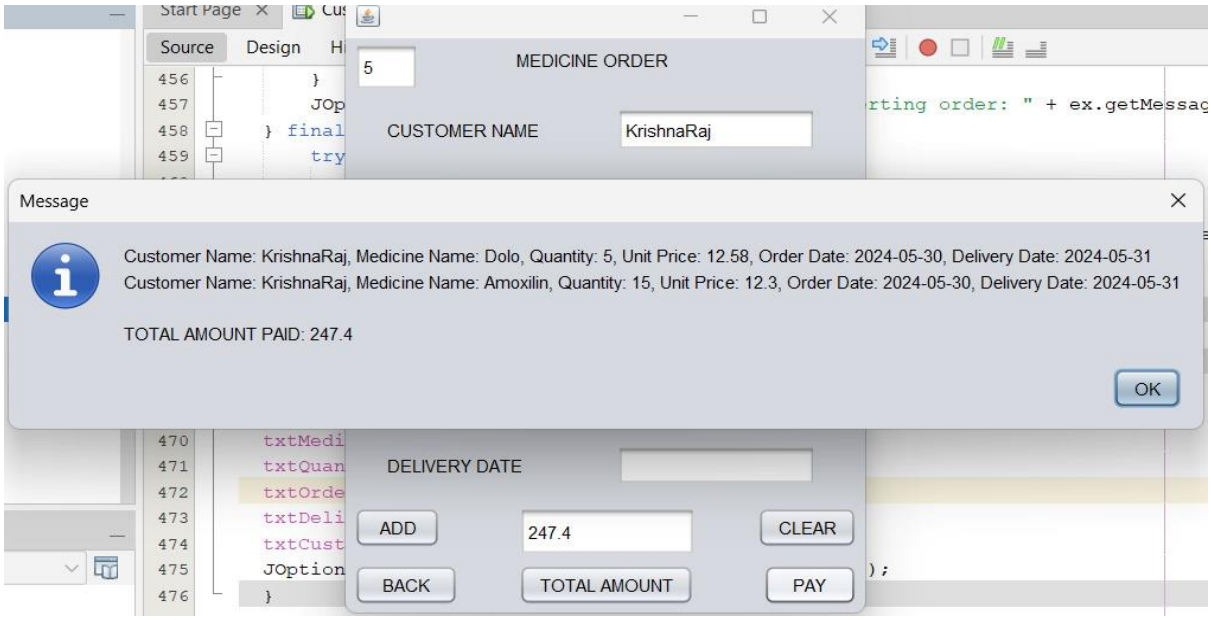


- This interface is to order medicine which is done by the customer
- We can see the total amount before Paying the bill also we can view the Medicines added to the list with the help of the table
- This needs the details about customer name, medicine name, quantity, order date and delivery date

Bill Generated –

```
  String billQuery = "SELECT cu.customer_name, m.medicine_name, cl.quantity,
cl.unit_price, m.discount, c.order_date, c.delivery_date, p.pay_amount " +
                           "FROM customer_order_list cl " +
                           "JOIN customer_order c ON cl.cust_order_id =
c.cust_order_id " +
                           "JOIN customer cu ON c.customer_id = cu.customer_id
" +
                           "JOIN payment p ON c.payment_id = p.payment_id " +
                           "JOIN medicine m ON m.medicine_id = cl.medicine_id
" +
                           "WHERE c.customer_id = ? AND c.cust_order_id = ?";

        try (PreparedStatement pst = con.prepareStatement(billQuery)) {
            pst.setInt(1, customerId);
            pst.setInt(2, custOrderId);
```

```
            try (ResultSet rs = pst.executeQuery()) {
                if (rs.next()) {
                    StringBuilder billDetails = new StringBuilder();
                    double totalAmount = 0;
                   do {
                        String customerNameFetched = rs.getString("cus-
tomer_name");
                        String medicineName = rs.getString("medicine_name");
                        int quantity = rs.getInt("quantity");
                        double unitPrice = rs.getDouble("unit_price");
                        double discountPrice = rs.getDouble("discount");
                        Date orderDateFetched = rs.getDate("order_date");
                        Date deliveryDate = rs.getDate("delivery_date");

                        if (isPremium) {
                            unitPrice -= discountPrice;
                        }

                billDetails.append("Customer Name: ").append(customerNameFetched)
                                        .append(", Medicine Name: ").append(medi-
cineName)
                                        .append(", Quantity: ").append(quantity)
                                        .append(", Unit Price: ").append(unitPrice)
                                        .append(", Order Date: ").append(orderDate-
Fetched)
                                        .append(", Delivery Date: ").append(deliv-
eryDate)
                                        .append("\n");

                        totalAmount += unitPrice * quantity;
                    } while (rs.next());

                    billDetails.append("\nTOTAL AMOUNT PAID: ").append(to-
talAmount);
                    JOptionPane.showMessageDialog(this, billDe-
tails.toString());
                } else {
                    JOptionPane.showMessageDialog(this, "No orders found for
the specified customer. Please recheck IDs.");
                }
            }
        }
    } catch (SQLException ex) {
        JOptionPane.showMessageDialog(this, "Error generating bill: " +
ex.getMessage());
    }
```



- This is the bill generated after paying for the Medicine which contains the details of the order which includes medicine name, quantity, price, date, total price etc …

Pharmacy Medicine Order –

INSERT –

```
  String sql = "INSERT INTO Medicine (medicine_id, medicine_name, supplier_id,
manufacturer_id, stock, discount, price, expiry_date, class_id) VALUES (?, ?,
?, ?, ?, ?, ?, ?, ?)";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            ps.setString(2, jTextField2.getText());
            ps.setInt(3, Integer.parseInt(jTextField3.getText()));
            ps.setInt(4, Integer.parseInt(jTextField4.getText()));
            ps.setInt(5, Integer.parseInt(jTextField5.getText()));
            ps.setDouble(6, Double.parseDouble(jTextField6.getText()));
            ps.setDouble(7, Double.parseDouble(jTextField7.getText()));
            ps.setString(8, (jTextField8.getText()));
            ps.setInt(9, Integer.parseInt(jTextField9.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Inserted");
        }
```

```
        catch(SQLException ex)
        {
                Logger.getLogger(medicine.class.getName()).log(Level.SEVERE,
null, ex);
        }
```

DELETE –

```
  String sql ="DELETE FROM Medicine WHERE medicine_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Deleted");
        }
        catch(SQLException ex)
            {
                Logger.getLogger(medicine.class.getName()).log(Level.SEVERE,
null, ex);
            }
```

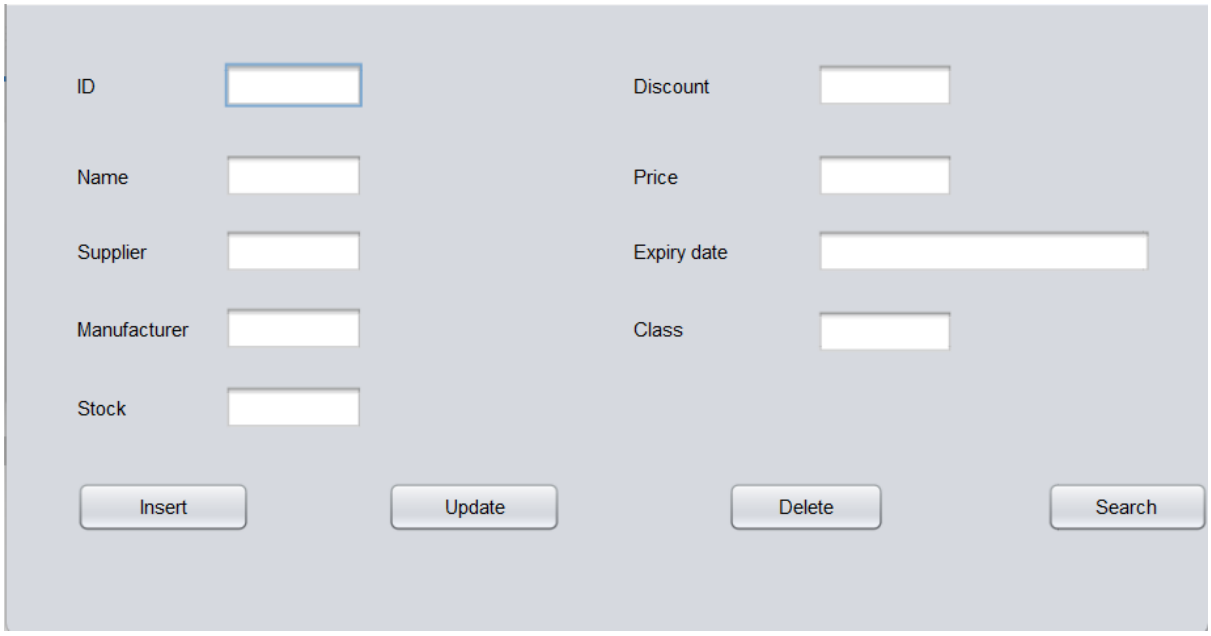
UPDATE –

```
 String sql = "UPDATE Medicine SET medicine_name = ?, supplier_id = ?, manu-
facturer_id = ?, stock = ?, discount = ?, price = ?, expiry_date = ?, class_id
= ? WHERE medicine_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setString(1, jTextField2.getText());
            ps.setInt(2, Integer.parseInt(jTextField3.getText()));
            ps.setInt(3, Integer.parseInt(jTextField4.getText()));
            ps.setInt(4, Integer.parseInt(jTextField5.getText()));
            ps.setDouble(5, Double.parseDouble(jTextField6.getText()));
            ps.setDouble(6, Double.parseDouble(jTextField7.getText()));
            ps.setString(7, jTextField8.getText()); // Set expiry_date as
string
            ps.setInt(8, Integer.parseInt(jTextField9.getText()));
            ps.setInt(9, Integer.parseInt(jTextField1.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Updated");
        }
        catch(SQLException ex)
        {
```

```
            Logger.getLogger(medicine.class.getName()).log(Level.SEVERE, null,
ex);
        }
```

SEARCH –

```
 String sql = "SELECT * FROM Medicine WHERE medicine_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            rs = ps.executeQuery();
            if (rs.next()) {
                    jTextField2.setText(rs.getString(2));
                    jTextField3.setText(rs.getString(3));
                    jTextField4.setText(rs.getString(4));
                    jTextField5.setText(rs.getString(5));
                    jTextField6.setText(rs.getString(6));
                    jTextField7.setText(rs.getString(7));
                    jTextField8.setText(rs.getString(8));
                    jTextField9.setText(rs.getString(9));
            }
        }
        catch(SQLException ex)
        {
                Logger.getLogger(medicine.class.getName()).log(Level.SEVERE,
null, ex);
        }
```



- This interface is used by Pharmacy to add medicine bought from the supplier into the database.
- Also be used to update and Search the stock, Supplier , Manufacturer ,Stock , Price ,Expiry date , Class of a specific medicine using the Medicine ID.
- This interface offers user-friendly CRUD operations (Create, Read, Update, Delete)

Manufacturer -

INSERT –

```
String sql = "INSERT INTO Manufacturer VALUES (?, ?, ?, ?, ?)";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            ps.setString(2, jTextField2.getText());
            ps.setString(3, jTextField3.getText());
            ps.setString(4, jTextField4.getText());
            ps.setString(5, jTextField5.getText());
            ps.executeQuery();
            JOptionPane.showMessageDialog(null,"Inserted");
        }
```

DELETE –

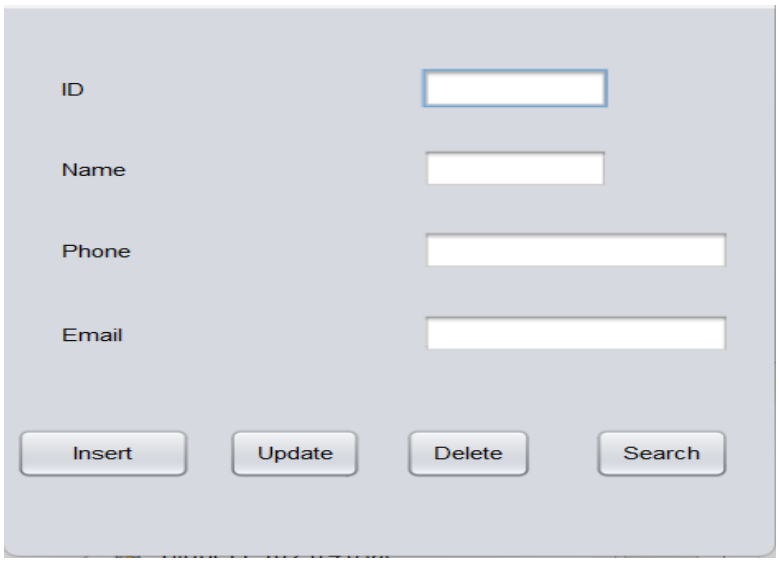
```
        // TODO add your handling code here:
        String sql = "DELETE FROM Manufacturer WHERE manufacturer_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Deleted");
        }
```

UPDATE –

```
  String sql = "UPDATE Manufacturer SET manufacturer_name = ?, email = ?,
phone = ?, address = ? WHERE manufacturer_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setString(1, jTextField2.getText());
            ps.setString(2, jTextField3.getText());
            ps.setString(3, jTextField4.getText());
            ps.setString(4, jTextField5.getText());
            ps.setInt(5, Integer.parseInt(jTextField1.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Updated");

        }
```

SEARCH –

```
String sql = "SELECT * FROM Manufacturer WHERE manufacturer_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            rs=ps.executeQuery();
            if (rs.next()) {
                    jTextField2.setText(rs.getString(2));
                    jTextField3.setText(rs.getString(3));
                    jTextField4.setText(rs.getString(4));
                    jTextField5.setText(rs.getString(5));
            }
```



- This interface is used to add Manufacturer details into the database when a new manufacturer is added
- Also used to see , update , delete their details by using their Manufacturer_id number

Supplier -

INSERT –

```
String sql = "INSERT INTO Supplier (supplier_id, supplier_name, email, phone,
address) VALUES (?, ?, ?, ?, ?)";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            ps.setString(2, jTextField2.getText());
            ps.setString(3, jTextField3.getText());
            ps.setString(4, jTextField4.getText());
            ps.setString(5, jTextField5.getText());
            ps.executeQuery();
            JOptionPane.showMessageDialog(null,"Inserted");
        }
```

UPDATE –

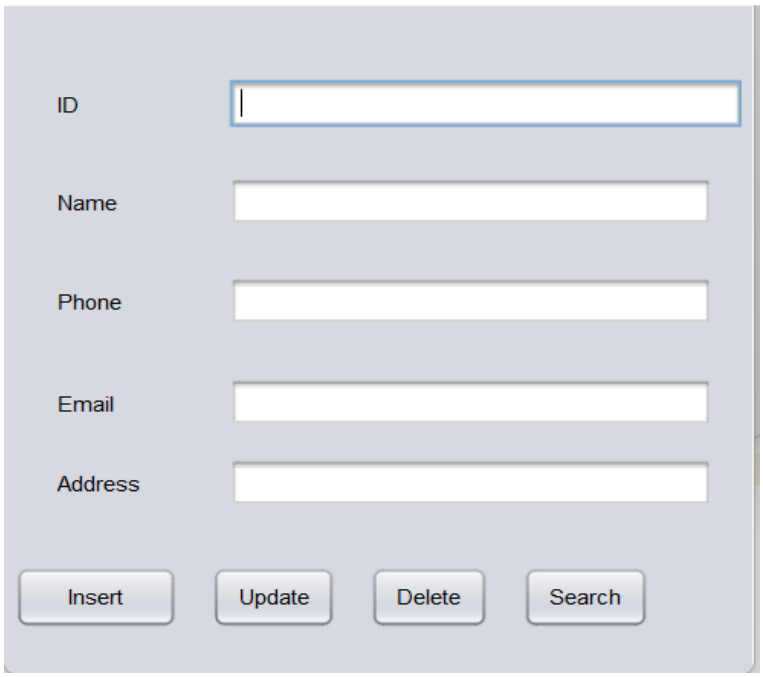
```
String sql = "UPDATE Supplier SET supplier_name = ?, email = ?, phone = ?, ad-
dress = ? WHERE supplier_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setString(1, jTextField2.getText());
            ps.setString(2, jTextField3.getText());
            ps.setString(3, jTextField4.getText());
            ps.setString(4, jTextField5.getText());
            ps.setInt(5, Integer.parseInt(jTextField1.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Updated");

        }
```

DELETE –

```
 String sql = "DELETE FROM Supplier WHERE supplier_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Deleted");
        }
```

SEARCH –

```
 String sql = "SELECT * FROM Supplier WHERE supplier_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            rs=ps.executeQuery();
            if (rs.next()) {
                    jTextField2.setText(rs.getString(2));
                    jTextField3.setText(rs.getString(3));
                    jTextField4.setText(rs.getString(4));
                    jTextField5.setText(rs.getString(5));
            }

        }
```



- This interface is used to add supplier details into the database when a new supplier is added
- Also used to see , update , delete their details by using their Supplier_id number.

Doctor -

INSERT -

```
 String sql = "INSERT INTO Doctor (doctor_id, doctor_name, doctor_phone, doc-
tor_email) VALUES (?, ?, ?, ?)";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            ps.setString(2, jTextField2.getText());
            ps.setString(3, jTextField3.getText());
            ps.setString(4, jTextField4.getText());
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Inserted");
```

UPDATE –

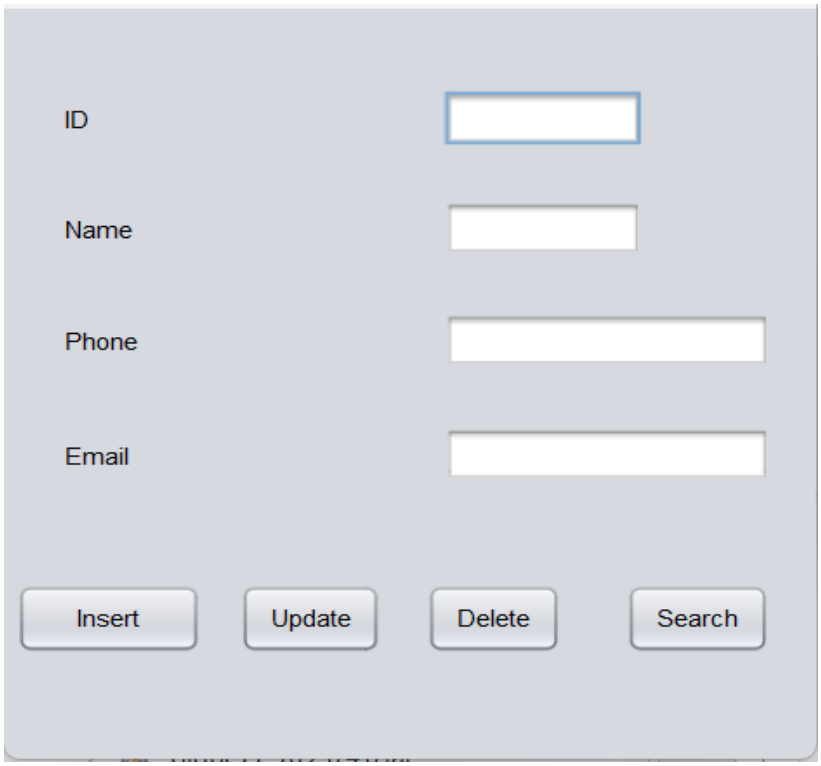
```
String sql = "UPDATE Doctor SET doctor_name = ?, doctor_phone = ?, doc-
tor_email = ? WHERE doctor_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setString(1, jTextField2.getText());
            ps.setString(2, jTextField3.getText());
            ps.setString(3, jTextField4.getText());
            ps.setInt(4, Integer.parseInt(jTextField1.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Updated");
        }
```

DELETE –

```
   String sql = "DELETE FROM Doctor WHERE doctor_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            ps.executeQuery();
            JOptionPane.showMessageDialog(null, "Deleted");
        }
```

SEARCH –

```
String sql = "SELECT * FROM Doctor WHERE doctor_id = ?";
        try
        {
            ps = con.prepareStatement(sql);
            ps.setInt(1, Integer.parseInt(jTextField1.getText()));
            rs=ps.executeQuery();
            if (rs.next()) {
                    jTextField2.setText(rs.getString(2));
                    jTextField3.setText(rs.getString(3));
                    jTextField4.setText(rs.getString(4));
                }
```

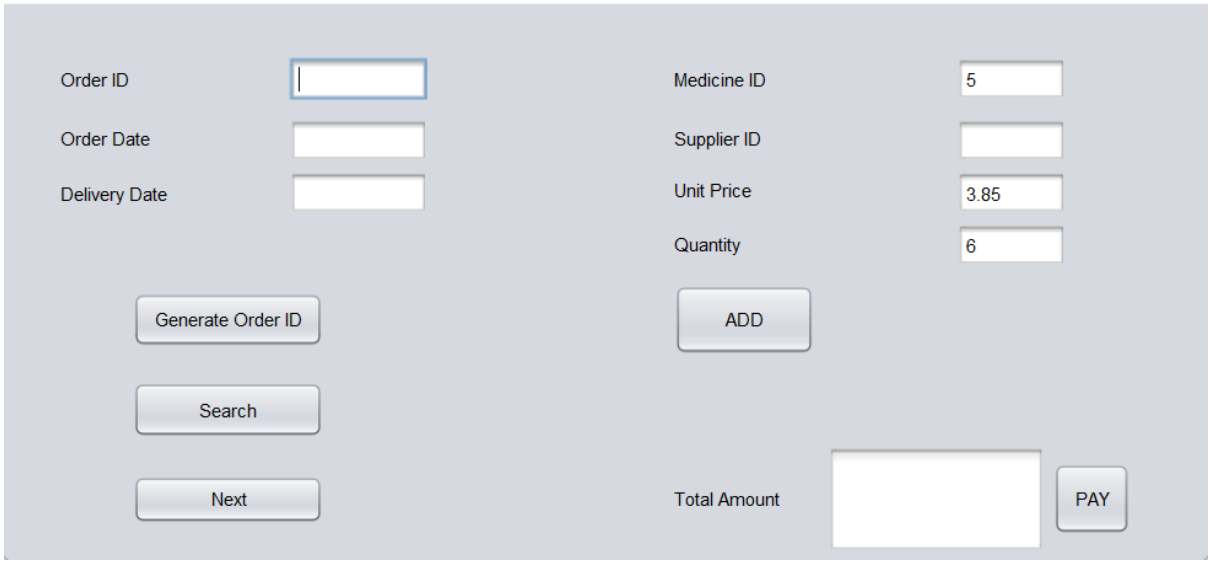


- This is to provide information about Doctor.
- This table can be used to add a new doctor in the database with a ID number
- This can be used to verify if the Medicine prescription is given by a verified doctor as the customer order checks the doctor_id is available before adding the order

Supply Order -

```
  String insertOrderItemSql = "INSERT INTO Supply_order_List (order_id, medi-
cine_id, unit_price, qty) VALUES (?, ?, ?, ?)";
        String updateTotalPriceSql = "UPDATE Supplier_Order so SET total_price
= (SELECT SUM(sul.unit_price * sul.qty) FROM Supply_order_List sul WHERE
sul.order_id = so.order_id) WHERE order_id = ?";

    try {

        ps = con.prepareStatement(insertOrderItemSql);
        int orderId = Integer.parseInt(jTextField1.getText());
        int medicineId = Integer.parseInt(jTextField5.getText());
        double unitPrice = Double.parseDouble(jTextField7.getText());
        int quantity = Integer.parseInt(jTextField8.getText());

        ps.setInt(1, orderId);
        ps.setInt(2, medicineId);
        ps.setDouble(3, unitPrice);
        ps.setInt(4, quantity);

        ps.executeUpdate();


        ps = con.prepareStatement(updateTotalPriceSql);
        ps.setInt(1, orderId); // Set the order_id for the update
        ps.executeUpdate();


        ps = con.prepareStatement("SELECT total_price FROM Supplier_Order
WHERE order_id = ?");
        ps.setInt(1, orderId);
        rs = ps.executeQuery();
        if (rs.next()) {
            double newTotalPrice = rs.getDouble("total_price");
            jTextField4.setText(String.valueOf(newTotalPrice));
        }
        String str = "UPDATE Medicine SET stock = stock + ? where medicine_id
= ?";
        ps = con.prepareStatement(str);
        ps.setInt(1, quantity);
        ps.setInt(2, medicineId);
        ps.executeQuery();
        JOptionPane.showMessageDialog(null, "Item Added");
```

```
}
```



- This interface is used by the pharmacy to order medicine as a whole from the Supplier
- Also used to set the price , Quantity to be ordered and Search if a medicine is available and Pay for the medicines