DBMS EXPERIMENT No.8

Pharmacy Management System

JDBC Connectivity

BATCH -C

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Database sed: MySQL

Frontend: Java

Connectivity: JDBC Connector

Description of the case study: The Pharmacy Management System is built in order to replace manual based systems to computerize. Here system is expected to be efficient, useful and affordable on implementing tasks that are ordered by the pharmacy manager. The Pharmacy management system illuminates the problems of the current system. This accessibility of the information will be of great advantage as it will reduce further medical errors associated with the physicians and the nurses. This system handles all the aspects of the inventory control function. It allows the pharmacist to receive new batches of drugs, delete obsolete drugs and modify the current dosage and identification of the drug in the database.

Requirement :

Customer

When a customer arrives in the pharmacy, we identify them based on their SSN. If they are a new customer, they are asked for their name, date of birth, phone number, gender and address. The address and date of birth are required to be recorded for drug control purposes.

Employee

An employee has the same details as a customer but they are also given a company ID, that is unique for them. An employee has to have one of the following roles:

1. Pharmacist
2. CPhT (Certified Pharmacy Technician)
3. Intern (can work in the pharmacy part time)
4. Cashier

Apart from cashier, all other roles require a license from State's Medical Board as they directly deal with mixing and preparation of drugs.
Prescription

Most of the drugs in the pharmacy can only be sold with a prescription. A prescription contains the customer's name, the prescribing Doctor’s ID (required by law) and when the prescription was prescribed.

Each prescription contains a number of prescribed drugs with drug name, quantity and refill limit of each of them. By law, a pharmacy cannot sell more than prescribed quantity or anything that is not listed on prescription.

Order

An order is created from the prescription. This data has to be stored separately because customer may:

1. Buy less medicine than prescription specifies
2. Come back for refills based on same prescription

Each order has a unique Order ID that is automatically assigned by the system. Each order can have multiple drugs, each with their ordered quantity and price. We also record the batch number of the drug.

Bill

Once an order has been completed, a bill is generated by the system. This bill is handed over to the customer and contains order information, insurance information as well as breakdown of amount paid.

The breakdown should be automatically calculated by the system based on insurance, customer and medicine data.

Medicine(Inventory)

Drugs are divided into “over the counter”, “restricted” and “prescription only”. Federal Law only divides restricted drugs into 5 schedules and requires “readily accessible” inventory for schedule 2 drugs.

While not needed by law everywhere, it is beneficial to store an up to date inventory for record keeping as well knowing when we run out of stock.

ER DIAGRAM:

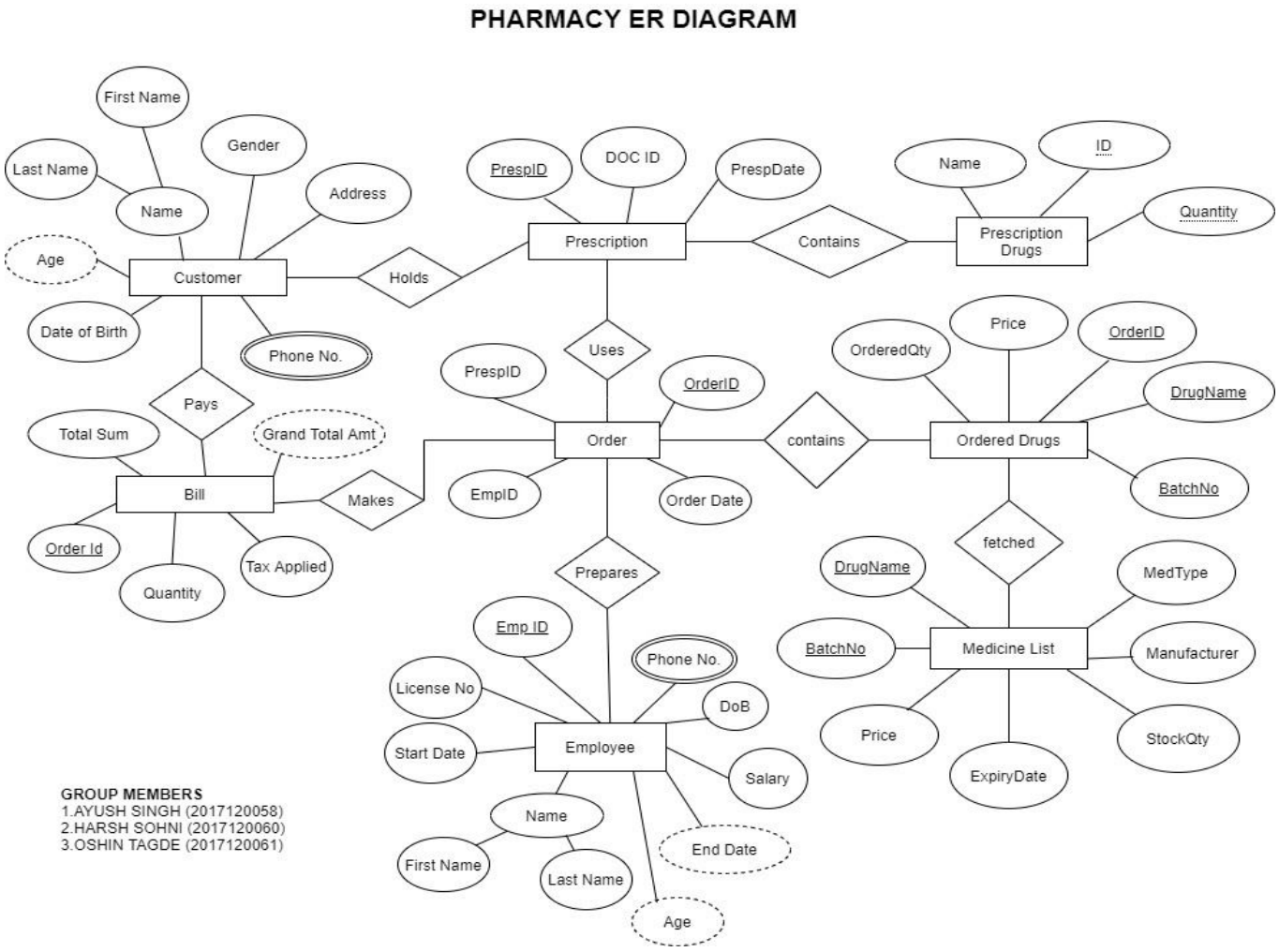

Table Description :

1. Table name: Customer

Attributes : Customer ID, Name, Age, Date Of Birth, Gender, Address, Phone No.

Constraints : 1) Customer ID is the primary key here.

2) Name and address are composite attributes.

3) Age is a derived attribute from Date Of Birth.

4) Phone No. is a multivalued attribute.

2.Table name: Employee

Attributes : Name, Start Date, License No., Emp ID, Phone no, DoB, Salary, End Date, Age.

Constraints : 1) Employee ID is the primary key here.

2) Name and address are composite attributes.

3) Phone No. is a multivalued attribute.

4) End date is a derived attribute from the sum of the start date and Date Of Birth

3.Table name: Prescription

Attributes : Prescription ID, DOC ID, Prescription Date

Constraints: 1) Prescription ID is a primary key.

4.Table name: Order

Attributes : PrespID, OrderID, Emp ID, Order Date.

Constraints : 1) OrderID, PrespID, Emp ID are primary key.

2) Order Date is Not Null.

5.Table name: Bill

Attributes : Total sum, Order ID, Quantity, Tax Applied, Grand Total Amount.

Constraints : 1) Order ID is a primary key.

2) Grand total amt. is a derived attribute from total sum and tax amount.

6.Table name: Medicine (Inventory)

Attributes : Batch no., DrugName, Price, Expiry Date, StockQty, Manufacturer, MedType.

Constraints : 1) Batch no is a primary key

7.Table name: Prescription Drugs

Attributes : Name, ID,Quantity

Constraints : 1) Name and Quantity are a Not Null.

2) ID is the primary key.

8.Table name: Ordered Drugs

Attributes : Ordered Quantity, Price, Order Id, Drug Name, Batch no.

Constraints: 1)OrderID,Drug Name, Batch No are primary key.

2)Price and Ordered Quantity are Not Null.

JDBC Connectivity:

1. The java application connects the Pharmacy database, and the connection is established. Here we have 6 various functions to get information about the Customers, Employee,Drugs etc.

jdbc.java | wildcard.java | foreignkey.java | Pharmacy_Management_System.java

```
1  package jdbc;
2
3  import java.sql.*;
5
6  public class Pharmacy_Management_System {
7      public static void main(String[] args){
8          try {
9              String url = "jdbc:mysql://localhost:3306/projects";
10             Connection con = DriverManager.getConnection(url, "root", "Brookosh@1");
11             Statement st = con.createStatement();
12             Scanner sc = new Scanner(System.in);
13             System.out.println("Welcome to our Pharmacy Management System.");
14             String query, format;
15             char w;
16             ResultSet r;
17             do {
18                 System.out.println("\nChoose the Query that you want to be displayed\n");
19                 System.out.println("1) Display the Prescription Drugs issued to each customer along with the quantity and the date.");
20                 System.out.println("2) Total amount of money to be payed by each customer.");
21                 System.out.println("3) Search for a Drugs name using a letter or a substring.");
22                 System.out.println("4) Find out revenue generated total orders processed by pharmacy by date.");
23                 System.out.println("5) Find out total revenue and medicines processed by the employee by date.");
24                 System.out.println("6) Find out all the drugs that have been expired.");
25                 System.out.println("7) Exit.\n");
26
27                 int ch = sc.nextInt();
28                 switch (ch) {
29                     case 1:
```

Problems | Javadoc | Declaration | Console

```
Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe  (25-Jul-2020, 4:51:23 pm)
Welcome to our Pharmacy Management System.

Choose the Query that you want to be displayed

1) Display the Prescription Drugs issued to each customer along with the quantity and the date.
2) Total amount of money to be payed by each customer.
3) Search for a Drugs name using a letter or a substring.
4) Find out revenue generated total orders processed by pharmacy by date.
5) Find out total revenue and medicines processed by the employee by date.
6) Find out all the drugs that have been expired.
7) Exit.
```

2. Here we have used inner join to display the Prescription Drugs issued by each Customer along with the quantity and date.

```
26
27              int ch = sc.nextInt();
28              switch (ch) {
29                  case 1:
30                          query = "select c.customer_id, c.c_name, l.name, l.quantity, l.pres_date from customers as c " +
31                                  "left join (select p.name, p.quantity, pr.pres_date, pr.customer_id from presciption_drugs as p "
32                                  + "inner join pres as pr on p.pres_id=pr.pres_id) as l on c.customer_id=l.customer_id";
33                          r = st.executeQuery(query);
34                          format = "%-20s%-30s%-10s%-10s%n";
35                          System.out.println("Displaying the Prescription Drugs issued to each customer.\n");
36                          System.out.printf(format, "Customer ID", "Prescription Drugs", "Quantity", "Date");
```

Problems Javadoc Declaration Console

Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (25-Jul-2020, 4:51:23 pm)

```
Customer ID         Prescription Drugs            Quantity  Date
C001                Acetaminophen                 2         2020-04-12
C002                Adderall                      4         2020-06-14
C003                Cyclobenzaprine               2         2017-05-11
C004                Januvia                       1         2018-07-01
C005                Prednisone                    4         2019-10-02
C006                Entresto                      5         2020-06-06
C007                Invokana                      3         2016-10-19
C008                Lyrica                        2         2015-12-21
C009                Farxiga                       2         2018-11-24
C010                Humira                        5         2019-11-01
C011                Cephalexin                    1         2017-06-09
C012                Azithromycin                  4         2018-05-29
C013                Ibuprofen                     5         2019-05-21
C014                Omeprazole                    3         2020-04-13
C015                Wellbutrin                    2         2020-05-12
C016                Xanax                         1         2015-02-19
C017                Trazodone                     4         2015-10-12
C018                Gilenya                       2         2019-09-10
C019                Hydrochlorothiazide           2         2019-06-30
C020                null                          0         null

Do you wish to continue: 'y/n' ??
```

3.Total amount of money to be paid by each customer.

```
47                  case 2:
48                          query = "select b.customer_no, c.c_name, sum(b.total_sum) as Total_sum " +
49                                  "from bill as b " +
50                                  "inner join customers as c " +
51                                  "on b.customer_no = c.customer_id " +
52                                  "group by b.customer_no " +
53                                  "order by Total_sum desc ";
54                          ResultSet r2 = st.executeQuery(query);
55                          format = "%-13s%-20s%-10s%n";
56                          System.out.println("The total amount of money to be payed by each customer.\n");
57                          System.out.printf(format, "Customer ID", "Customer Name", "Total sum");
58                          while (r2.next()) {
59                              String id = r2.getString("b.customer_no");
60                              String name = r2.getString("c.c_name");
61                              int sum = r2.getInt("Total_sum");
62                              System.out.printf(format, id, name, sum);
63                          }
```

Problems Javadoc Declaration Console

Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (25-Jul-2020, 4:51:23 pm)

```
Customer ID  Customer Name       Total sum
C008         Srushti Yadahalli   5398
C019         Shriya Akella       2999
C005         Ketaki Ransing      2249
C002         Yash Moar           2200
C013         Rupal Handoo        1740
C018         Pradhuman Singh     1287
C006         Aditi Parmar        965
C007         Manish Parmar       650
C020         Shrishti Kaushik    630
C011         Anuja Sharma        425
C003         Pratik Pai          350
C014         Kaushik Jha         320
C001         Piy                 300
C012         Amogh Zare          300
C017         Vishakha Pathak     200
C004         Anmol Pandita       109
C010         Vaibhav Pudke       70
C015         Pritam Mane         66
C016         Vedant Kumar        40
C009         Sreekar L           33
```

4. Here we have used a wildcard to find a Drug Name using a letter or a substring.

```
                        break;

                case 3: System.out.println("Enter the substring from the Prescription Drugs name that you want to look for: ");
                        String s=sc.next();
                        query = "SELECT medicineList.DrugName,medicineList.Price,medicineList.StockQty "
                        + "FROM medicineList WHERE medicineList.DrugName LIKE '%"+s+"%' ";
                        ResultSet rs = st.executeQuery (query);
                        format = "%-20s%-20s%-10s%n";
                        System.out.println("The Drugs names are :\n");
                        System.out.printf (format, "DrugName","Price","StockQty");
                        while (rs.next ())
                        {
                            String DrugName = rs.getString (1);
                            int Price = rs.getInt (2);
                            int StockQty= rs.getInt (3);
                            System.out.printf (format, DrugName,Price,StockQty);
                        }
```

Problems Javadoc Declaration Console

```
Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe  (25-Jul-2020, 4:51:23 pm)

1) Display the Prescription Drugs issued to each customer along with the quantity and the date.
2) Total amount of money to be payed by each customer.
3) Search for a Drugs name using a letter or a substring.
4) Find out revenue generated total orders processed by pharmacy by date.
5) Find out total revenue and medicines processed by the employee by date.
6) Find out all the drugs that have been expired.
7) Exit.

3
Enter the substring from the Prescription Drugs name that you want to look for:

am
The Drugs names are :

DrugName            Price               StockQty
Acetaminophen       500                 100
Amlodipine          550                 300
Amoxicillin         350                 200

Do you wish to continue: 'y/n' ??
```

5.It finds out the revenue generated total orders processed by pharmacy by date.

```
                        break;

                case 4: query ="select orders.order_date, count(*) total_orders,\n" +
                        "sum(grand_total_amount) as total_revenue from orders\n" +
                        "left join bill\n" +
                        "on  bill.order_id = orders.order_id\n" +
                        "group by order_date ";
                        r =st.executeQuery(query);
                        format = "%-20s%-20s%-10s%n";
                        System.out.println("Total Revenue generated by date.\n");
                        System.out.printf (format, "Order Date","Total Orders","Total Revenue");
                        while(r.next()){
                            Date orderdate = r.getDate(1);
                            int totalOrder = r.getInt(2);
                            int totalRevenue = r.getInt(3);
                            System.out.printf (format, orderdate,totalOrder,totalRevenue);
                        }
```

Problems Javadoc Declaration Console

```
Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe  (25-Jul-2020, 4:51:23 pm)
2) Total amount of money to be payed by each customer.
3) Search for a Drugs name using a letter or a substring.
4) Find out revenue generated total orders processed by pharmacy by date.
5) Find out total revenue and medicines processed by the employee by date.
6) Find out all the drugs that have been expired.
7) Exit.

4
Total Revenue generated by date.

Order Date          Total Orders        Total Revenue
2020-03-22          2                   0
2020-03-23          3                   0
2020-03-24          4                   0
2020-03-25          4                   0
2020-03-26          4                   0
2020-03-27          3                   0
2020-03-28          5                   0
2020-03-29          6                   0

Do you wish to continue: 'y/n' ??
```

6. It finds out the total revenue and medicines processed by the employee by date.

```
102
103                     case 5: query = "select orders.order_date, orders.emp_id,\n" +
104                             "sum(grand_total_amount) as total_revenue_processed_by_the_employee,\n" +
105                             "sum(quantity) as total_medicines_processed_by_the_employee\n" +
106                             "from bill\n" +
107                             "left join orders\n" +
108                             "on bill.order_id = orders.order_id\n" +
109                             "group by emp_id,order_date;";
110                             r = st.executeQuery(query);
111                             format = "%-15s%-10s%-25s%-25s%n";
112                             System.out.println("Total Revenue and Medicines processed by the employee are \n");
113                             System.out.printf (format, "Order Date","Employee","Total Revenue Processed", "Total Medicine processed");
114                             while(r.next()){
115                                 Date orderDate = r.getDate(1);
116                                 String emp_id = r.getString(2);
117                                 int t_revenue = r.getInt(3);
```

Problems Javadoc Declaration Console

```
Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe  (25-Jul-2020, 4:51:23 pm)
5
Total Revenue and Medicines processed by the employee are

Order Date     Employee  Total Revenue Processed  Total Medicine processed
2020-03-22     E001      0                        6
2020-03-23     E001      0                        16
2020-03-23     E002      0                        2
2020-03-24     E002      0                        25
2020-03-25     E003      0                        34
2020-03-25     E004      0                        2
2020-03-26     E004      0                        6
2020-03-26     E005      0                        14
2020-03-27     E005      0                        7
2020-03-27     E006      0                        2
2020-03-28     E006      0                        26
2020-03-28     E007      0                        13
2020-03-29     E007      0                        6
2020-03-29     E008      0                        16
2020-03-29     E009      0                        5

Do you wish to continue: 'y/n' ??
```

7. It finds out all the drugs that have been expired.

```
123                     case 6: query = "SELECT medicineList.DrugName,medicineList.ExpiryDate,medicineList.Price,medicineList.StockQty\r\n" +
124                             "FROM medicineList\r\n" +
125                             "WHERE ExpiryDate<SYSDATE(); ";
126                             r = st.executeQuery (query);
127                             format = "%-17s%-14s%-10s%-10s%n";
128                             System.out.println("All the expired drugs are\n");
129                             System.out.printf (format,"DrugName","ExpiryDate","Price", "StockQty");
130                             while (r.next())
131                             {
132                                 String DrugName = r.getString (1);
133                                 Date ExpiryDate= r.getDate(2);
134                                 int Price = r.getInt (3);
135                                 int StockQty= r.getInt (4);
136                                 System.out.printf (format, DrugName, ExpiryDate,Price, StockQty);
137                             }
138                             System.out.println();
```

Problems Javadoc Declaration Console

```
Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe  (25-Jul-2020, 4:51:23 pm)
Choose the Query that you want to be displayed

1) Display the Prescription Drugs issued to each customer along with the quantity and the date.
2) Total amount of money to be payed by each customer.
3) Search for a Drugs name using a letter or a substring.
4) Find out revenue generated total orders processed by pharmacy by date.
5) Find out total revenue and medicines processed by the employee by date.
6) Find out all the drugs that have been expired.
7) Exit.

6
All the expired drugs are

DrugName         ExpiryDate    Price     StockQty
Cephalexin       2018-05-21    560       200
Cyclobenzaprine  2019-04-13    77        50
Doxycycline      2019-07-26    200       400
Gilenya          2019-10-15    30        400
Wellbutrin       2017-07-23    700       400

Do you wish to continue: 'y/n' ??
```

```
143                 }
144
145                 System.out.println("Do you wish to continue: 'y/n' ??");
146                 w=sc.next().charAt(0);
147
148             }while(w == 'y' || w == 'Y');
149         }
150         catch (Exception e){
151             System.out.println("Error occured " + e.getMessage());
152         }
153         finally {
154             System.out.println("Bye Bye :)");
155         }
156     }
157 }
```

Problems Javadoc Declaration Console

```
<terminated> Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe  (25-Jul-2020, 4:51:23 pm – 5:01:59 pm)
Cyclobenzaprine  2019-04-13    77        50
Doxycycline      2019-07-26    200       400
Gilenya          2019-10-15    30        400
Wellbutrin       2017-07-23    700       400

Do you wish to continue: 'y/n' ??
n
Bye Bye :)
```

Conclusion: The pharmacy project was a good learning experience for implementing a real world DBMS and helped us to understand the nuances of a full implementation. The final implementation is robust and can handle various edge cases and scenarios. Paired with a capable application front end, it can handle day to day operations for a pharmacy.