

# **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.

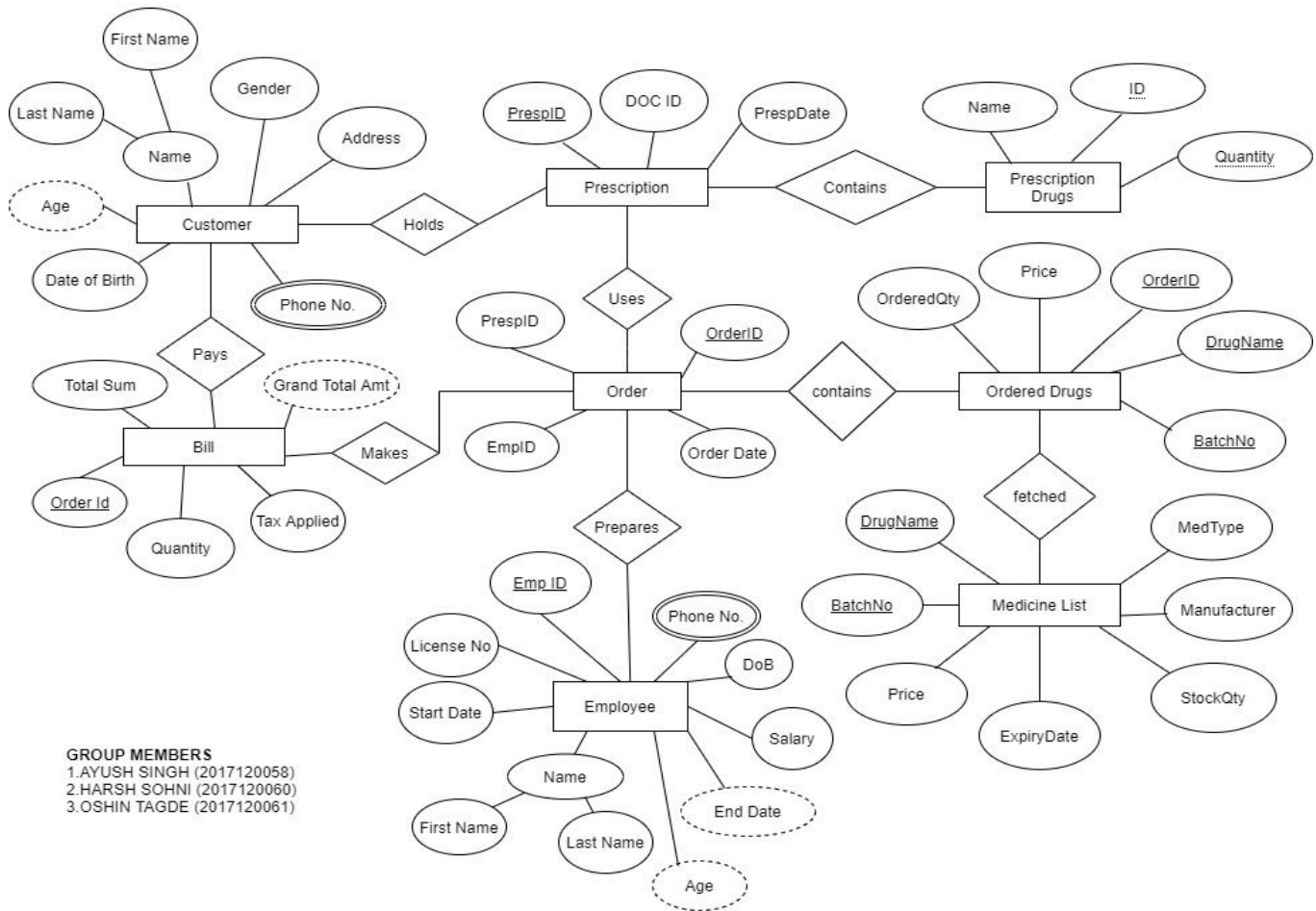
## **Medicine(Inventory)**

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:

### PHARMACY 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

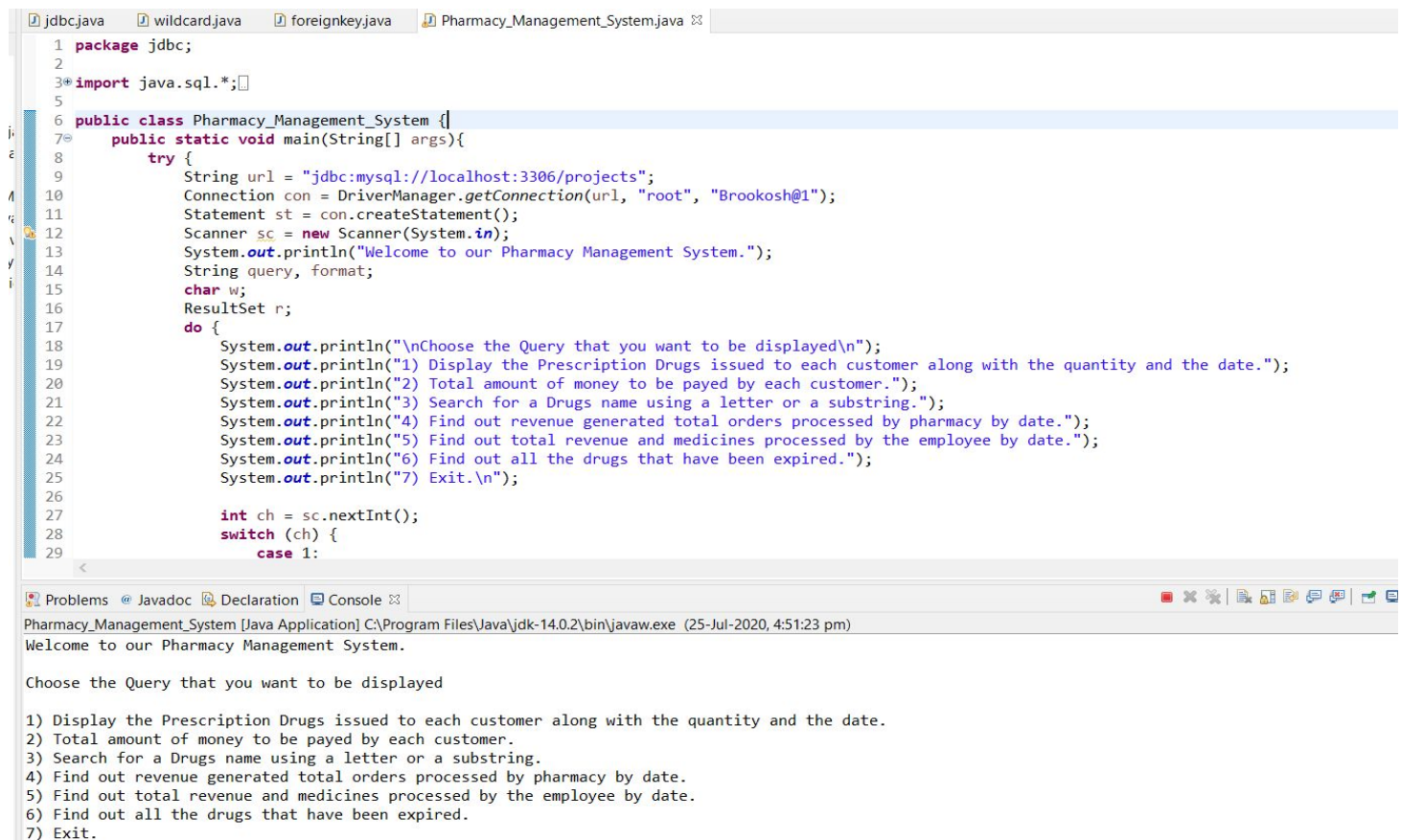
**Attributes :** Ordered Quantity, Price, Order Id, Drug Name, Batch no.

**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.



```
1 package jdbc;
2
3 import java.sql.*;
4
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 paid 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 paid 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
28     int ch = sc.nextInt();
29     switch (ch) {
30         case 1:
31             query = "select c.customer_id, c.c_name, l.name, l.quantity, l.pres_date from customers as c " +
32                    "left join (select p.name, p.quantity, pr.pres_date, pr.customer_id from prescription_drugs as p " +
33                    "inner join pres as pr on p.pres_id=pr.pres_id) as l on c.customer_id=l.customer_id";
34             r = st.executeQuery(query);
35             format = "%-20s%-30s%-10s%-10s\n";
36             System.out.println("Displaying the Prescription Drugs issued to each customer.\n");
37             System.out.printf(format, "Customer ID", "Prescription Drugs", "Quantity", "Date");
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41             Problems Javadoc Declaration Console
42             Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (25-Jul-2020, 4:51:23 pm)
43
44             Customer ID Prescription Drugs Quantity Date
45             C001 Acetaminophen 2 2020-04-12
46             C002 Adderall 4 2020-06-14
47             C003 Cyclobenzaprine 2 2017-05-11
48             C004 Januvia 1 2018-07-01
49             C005 Prednisone 4 2019-10-02
50             C006 Entresto 5 2020-06-06
51             C007 Invokana 3 2016-10-19
52             C008 Lyrica 2 2015-12-21
53             C009 Farxiga 2 2018-11-24
54             C010 Humira 5 2019-11-01
55             C011 Cephalixin 1 2017-06-09
56             C012 Azithromycin 4 2018-05-29
57             C013 Ibuprofen 5 2019-05-21
58             C014 Omeprazole 3 2020-04-13
59             C015 Wellbutrin 2 2020-05-12
60             C016 Xanax 1 2015-02-19
61             C017 Trazodone 4 2015-10-12
62             C018 Gilenya 2 2019-09-10
63             C019 Hydrochlorothiazide 2 2019-06-30
64             C020 null 0 null
65
66             Do you wish to continue: 'y/n' ??
```

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

```
47
48
49     case 2:
50         query = "select b.customer_no, c.c_name, sum(b.total_sum) as Total_sum " +
51                "from bill as b " +
52                "inner join customers as c " +
53                "on b.customer_no = c.customer_id " +
54                "group by b.customer_no " +
55                "order by Total_sum desc ";
56         ResultSet r2 = st.executeQuery(query);
57         format = "%-13s%-20s%-10s\n";
58         System.out.println("The total amount of money to be paid by each customer.\n");
59         System.out.printf(format, "Customer ID", "Customer Name", "Total sum");
60         while (r2.next()) {
61             String id = r2.getString("b.customer_no");
62             String name = r2.getString("c.c_name");
63             int sum = r2.getInt("Total_sum");
64             System.out.printf(format, id, name, sum);
65         }
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68     <
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70     Problems Javadoc Declaration Console
71     Pharmacy_Management_System [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (25-Jul-2020, 4:51:23 pm)
72
73     Customer ID Customer Name Total sum
74     C008 Srushti Yadahalli 5398
75     C019 Shriya Akella 2999
76     C005 Ketaki Ransing 2249
77     C002 Yash Moar 2200
78     C013 Rupal Handoo 1740
79     C018 Pradhuman Singh 1287
80     C006 Aditi Parmar 965
81     C007 Manish Parmar 650
82     C020 Shrishti Kaushik 630
83     C011 Anuja Sharma 425
84     C003 Pratik Pai 350
85     C014 Kaushik Jha 320
86     C001 Piy 300
87     C012 Amogh Zare 300
88     C017 Vishakha Pathak 200
89     C004 Anmol Pandita 109
90     C010 Vaibhav Pudke 70
91     C015 Pritam Mane 66
92     C016 Vedant Kumar 40
93     C009 Sreekar L 33
```

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

```
65         break;
66
67     case 3: System.out.println("Enter the substring from the Prescription Drugs name that you want to look for: ");
68             String s=sc.next();
69             query = "SELECT medicineList.DrugName,medicineList.Price,medicineList.StockQty "
70                   + "FROM medicineList WHERE medicineList.DrugName LIKE '"+s+"%' ";
71             ResultSet rs = st.executeQuery (query);
72             format = "%-20s%-20s%-10s\n";
73             System.out.println("The Drugs names are :\n");
74             System.out.printf (format, "DrugName","Price","StockQty");
75             while (rs.next ())
76             {
77                 String DrugName = rs.getString (1);
78                 int Price = rs.getInt (2);
79                 int StockQty= rs.getInt (3);
80                 System.out.printf (format, DrugName,Price,StockQty);
81             }
```

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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.

```
83         break;
84
85     case 4: query ="select orders.order_date, count(*) total_orders,\n" +
86               "sum(grand_total_amount) as total_revenue from orders\n" +
87               "left join bill\n" +
88               "on bill.order_id = orders.order_id\n" +
89               "group by order_date ";
90             r =st.executeQuery(query);
91             format = "%-20s%-20s%-10s\n";
92             System.out.println("Total Revenue generated by date.\n");
93             System.out.printf (format, "Order Date","Total Orders","Total Revenue");
94             while(r.next()){
95                 Date orderdate = r.getDate(1);
96                 int totalOrder = r.getInt(2);
97                 int totalRevenue = r.getInt(3);
98                 System.out.printf (format, orderdate,totalOrder,totalRevenue);
99             }
```

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
104     case 5: query = "select orders.order_date, orders.emp_id,\n" +
105                   "sum(grand_total_amount) as total_revenue_processed_by_the_employee,\n" +
106                   "sum(quantity) as total_medicines_processed_by_the_employee\n" +
107                   "from bill\n" +
108                   "left join orders\n" +
109                   "on bill.order_id = orders.order_id\n" +
110                   "group by emp_id,order_date;";
111     r = st.executeQuery(query);
112     format = "%-15s%-10s%-25s%-25s\n";
113     System.out.println("Total Revenue and Medicines processed by the employee are \n");
114     System.out.printf (format, "Order Date", "Employee", "Total Revenue Processed", "Total Medicine processed");
115     while(r.next()){
116         Date orderDate = r.getDate(1);
117         String emp_id = r.getString(2);
118         int t_revenue = r.getInt(3);
119         int t_medicines = r.getInt(4);
120     }
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```

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)

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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
124
125     case 6: query = "SELECT medicineList.DrugName,medicineList.ExpiryDate,medicineList.Price,medicineList.StockQty\r\n" +
126                   "FROM medicineList\r\n" +
127                   "WHERE ExpiryDate<SYSDATE(); ";
128     r = st.executeQuery (query);
129     format = "%-17s%-14s%-10s%-10s\n";
130     System.out.println("All the expired drugs are\n");
131     System.out.printf (format, "DrugName", "ExpiryDate", "Price", "StockQty");
132     while (r.next())
133     {
134         String DrugName = r.getString (1);
135         Date ExpiryDate= r.getDate(2);
136         int Price = r.getInt (3);
137         int StockQty= r.getInt (4);
138         System.out.printf (format, DrugName, ExpiryDate,Price, StockQty);
139     }
140     System.out.println();
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```

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.