

# Assignment 06

By Shashank Shekhar Asthana (B21CS093)

This assignment consists of creating a database named Hospital and then working on that database to extract the queries using JDBC.

First, we have created the database, including all the tables in that database, which are displayed below.

## TABLE HOSPITAL

	HOSP_NAME	COUNTRY	ADDRESS
▶	Al-Hilal Hospital	Kingdom of Bahrain	Al-Hilal Hospital, Muharraq, Bahrain
	American Mission Hospital	Kingdom of Bahrain	Sheikh Essa Road, Manama, Bahrain
	Bahrain Defence Force Hospital	Kingdom of Bahrain	Waly Alahed Avenue, West Riffa, Bahrain
	Dar Al Shifa Hospital	Kuwait	Beirut Street, Hawally, Kuwait
	Emirates Hospital	United Arab Emirates	Jumeirah Beach Rd, Dubai, UAE
	King Faisal Specialist Hospital & Research Centre	Kingdom of Saudi Arabia	Al Mathar Ash Shamali, Riyadh 11564, Saudi Ar...
	King Hamad University Hospital	Kingdom of Bahrain	Sheikh Isa bin Salman Bridge, Al Sayh, Busaitee...
	Mayo Clinic	United States	4500 San Pablo Road, US
	Salamaniya Hospital	Kindgom of Bahrain	Salmaniya Medical Complex, Manama, Bahrain
	St Thomas' Hospital London	United Kingdom	Westminster Bridge Rd, London
★	NULL	NULL	NULL

## TABLE MEDICINE

	REG_NO	MED_NAME	PRICE	EXP_DATE
▶	20	Adol Syrup	0.3	2023-05-15
	21	Amoxil Capsules	0.7	2023-03-10
	22	Aspirin	1	2023-12-09
	23	Bonjela Gel	0.4	2024-09-23
	24	Paracetamol	1.2	2024-05-17
	25	Atorvastatin	1.5	2023-06-15
	26	Coversyl	1	2023-05-15
	27	Diamcron	0.9	2024-02-03
	28	Lipitor	1.4	2025-03-12
	29	Glucophage	1.7	2024-07-19
★	NULL	NULL	NULL	NULL

## TABLE DOCTOR

DOC_ID	DNAME	GENDER	QUALIFICATION	JOB_SPECIFICATION	HOSP_NAME	NEW_DOC_ID
1	1 Abdullah	M	MBBS	Dermatologist	Bahrain Defence Force Hospital	1
2	2 Ahmed	M	Board Certified	Ophthalmologist	King Hamad University Hospital	2
3	3 Ameera	F	MD	Pediatrician	Salamaniya Hospital	3
4	4 Ali	M	BPT	Physiotherapist	Al-Hilal Hospital	4
5	5 Carolina	F	MS	Surgeon	Mayo Clinic	5
6	6 Sarah	F	MD	Anatomy	Emirates Hospital	6
7	7 Qasim	M	MD	Radiologist	King Hamad University Hospital	7
8	8 Fatema	F	Residency	Anesthetist	Salamaniya Hospital	8
9	9 Khalid	M	MBBS	Psychiatrist	American Mission Hospital	9
10	10 Amal	F	D.M.	Nephrologist	King Hamad University Hospital	10

## TABLE NURSE

Result Grid

Filter Rows:

Edit:

Export/Import:

	NURSE_ID	NAME	GENDER	DOC_ID	HOSP_NAME
▶	1	Sanaa	F	2	King Hamad University Hospital
	2	Kathy	F	7	King Hamad University Hospital
	3	Mary	F	5	Mayo Clinic
	4	Ibrahim	M	8	Salamaniya Hospital
	5	Anaya	F	3	Salamaniya Hospital
	6	Asha	F	9	American Mission Hospital
	7	Zainab	F	1	Bahrain Defence Force Hospital
	8	Zeshan	M	10	King Hamad University Hospital
	9	Adam	M	4	Al-Hilal Hospital
	10	Hawra	F	6	Emirates Hospital
✱	NULL	NULL	NULL	NULL	NULL

## TABLE RECEPTION

REC_ID	TEL_NO	EMAIL	HOSP_NAME
41	39123456	khuh@gmail.com	King Hamad University Hospital
42	39123456	khuh@gmail.com	King Hamad University Hospital
43	39456780	mayoclinic@facebook.com	Mayo Clinic
44	33456780	emirateshospital@yahoo.com	Emirates Hospital
45	33123456	bdf@yahoo.com	Bahrain Defence Force Hospital
46	33678901	alhilal@facebook.com	Al-Hilal Hospital
47	39678901	daralshifa@gmail.com	Dar Al Shifa Hospital
48	33912045	st.thomashospital@gmail.com	St Thomas' Hospital London
49	39912045	kingfaisalshrc@yahoo.com	King Faisal Specialist Hospital & Research Centre
50	39678901	daralshifa@gmail.com	Dar Al Shifa Hospital
✱	NULL	NULL	NULL

## TABLE PATIENT

Result Grid		Filter Rows:		Edit:		Export/In	
	SSN	FNAME	LNAME	AGE	GENDER	NURSE_ID	REC_ID
▶	100000001	Sara	Majeed	27	F	7	46
	100000002	Ahmed	Jamaal	59	M	3	43
	100000003	Abdulla	Hameed	45	M	9	48
	100000004	Mariam	Muhammad	40	F	1	41
	100000005	Fatema	Hasan	64	F	6	47
	100000006	Zainab	Abdulla	55	F	2	49
	100000007	Khalil	Ibrahim	35	M	8	44
	100000008	Alyaa	Husain	57	F	5	42
	100000009	Khalid	Ahmed	60	M	4	50
	100000010	Jawad	Ali	20	M	10	45
✱	NULL	NULL	NULL	NULL	NULL	NULL	NULL

## TABLE APPOINTMENT

	APPOINT_NO	APPOINT_DATE	APPOINT_TIME	REC_ID
▶	1	2022-05-03	07:05:03	45
	2	2022-03-17	13:30:00	49
	3	2022-12-22	09:45:00	44
	4	2022-07-09	17:20:00	48
	5	2022-05-03	12:15:00	41
	6	2022-11-20	08:05:00	47
	7	2022-07-12	15:40:00	42
	8	2022-04-01	14:00:00	50
	9	2022-08-30	10:25:00	43
	10	2022-06-15	16:50:00	46
★	NULL	NULL	NULL	NULL

## TABLE VISIT

	VISIT_DATE	SSN	HOSP_NAME
▶	2021-10-10	100000009	Dar Al Shifa Hospital
	2020-05-15	100000005	Dar Al Shifa Hospital
	2022-01-30	100000006	King Faisal Specialist Hospital & Research Centre
	2019-06-04	100000002	Mayo Clinic
	2020-12-24	100000010	Bahrain Defence Force Hospital
	2020-11-11	100000004	King Hamad University Hospital
	2021-02-06	100000001	Al-Hilal Hospital
	2022-04-21	100000003	St Thomas' Hospital London
	2022-04-19	100000007	Emirates Hospital
	2021-02-07	100000008	King Hamad University Hospital

## TABLE DIAGNOSIS

	DIAGNOS_NO	ISSUE_DATE	TREATMENT	REMARKS	NURSE_ID	DOC_ID
▶	31	2022-06-04	Physiotherapy	Once a month	4	8
	32	2022-05-29	Aromatherapy	Twice a week	7	1
	33	2022-06-18	Cyrotherapy	Twice a month	5	3
	34	2022-07-07	Phototherapy	Once a month	10	6
	35	2022-08-13	Radiotherapy	Once in 3 months	2	7
	36	2022-12-03	Immunotherapy	Once a month	6	9
	37	2022-07-04	Monotherapy	Once a month	1	2
	38	2022-06-04	Pharmacotherapy	Once a month	8	10
	39	2022-07-19	Oxygen therapy	Once a week	3	5
	40	2022-06-25	Gene therapy	Once a month	9	4
•	NULL	NULL	NULL	NULL	NULL	NULL

## TABLE PURCHASE

	REG_NO	SSN
▶	20	100000007
	23	NULL
	28	100000004
	25	100000009
	21	100000003
	29	100000006
	22	100000008
	27	100000002
	24	100000007
	26	NULL

## TABLE EXAMINE

	DOC_ID	SSN
▶	1	100000004
	2	100000006
	3	100000002
	4	100000009
	5	100000008
	6	100000005
	7	100000001
	8	100000007
	9	100000003
	10	100000010

## TABLE MEDICINE\_COUNTRY

	MAN_COUNTRY	REG_NO
►	United States	20
	Australia	21
	United States	22
	Germany	23
	United Kingdom	24
	United Kingdom	25
	Kingdom of Saudi Arabia	26
	Germany	27
	Switzerland	28
	Germany	29

Now we are done with the creation of the tables; hence, we will now start with the queries

Now, before starting with the queries, let us attached the code which I have used to print the outputs for each of my function which is defined in the code

```
public static void printQuery(ResultSet rs, int columnsNumber) throws SQLException, ClassNotFoundException {
    if(!rs.next()){
        for(int i = 1; i<= columnsNumber; i++){
            if(i < columnsNumber){
                System.out.print("Null"+ " -- " );
            }
            else{
                System.out.print(s:"Null");
            }
        }
    }
    while(rs.next()){
        for(int i = 1; i<=columnsNumber; i++){
            if(i < columnsNumber){
                System.out.print(rs.getString(i) + " -- " );
            }
            else{
                System.out.print(rs.getString(i));
            }
        }
    }
}
```

**1. getList:** List down the details for all doctors and nurses available across all hospitals, ordered alphabetically on the first-name basis.

### Code for the Query

```
// 1. getList: List down the details for all doctors and nurses available across all hospitals
// ordered alphabetically on the first-name basis.

public static void getList(Connection conn) throws SQLException, ClassNotFoundException{

    System.out.println(x:"Printing Details of all the doctors for database Hospital: ");
    System.out.println();
    Statement st = conn.createStatement();

    ResultSet rs1 = st.executeQuery(sql:"SELECT * FROM doctor ORDER BY dname ASC");
    ResultSetMetaData rsmd1 = rs1.getMetaData();
    int columnsNumber1 = rsmd1.getColumnCount();

    printQuery(rs1, columnsNumber1);

    System.out.println();
    System.out.println(x:"Printing Nurse's Details: ");
    System.out.println();

    ResultSet rs2 = st.executeQuery(sql:"SELECT * FROM nurse ORDER BY name ASC");

    ResultSetMetaData rsmd2 = rs2.getMetaData();
    int columnsNumber2 = rsmd2.getColumnCount();
    System.out.println(x:"Executed getList:");
    System.out.println();

    printQuery(rs2, columnsNumber2);
}
```

**Result:-**

Printing Details of all the doctors for database Hospital:

```
2 -- Ahmed -- M -- Board Certified -- Ophthalmologist -- King Hamad University Hospital
4 -- Ali -- M -- BPT -- Physiotherapist -- Al-Hilal Hospital
10 -- Amal -- F -- D.M. -- Nephrologist -- King Hamad University Hospital
3 -- Ameera -- F -- MD -- Pediatrician -- Salamaniya Hospital
5 -- Carolina -- F -- MS -- Surgeon -- Mayo Clinic
8 -- Fatema -- F -- Residency -- Anesthologist -- Salamaniya Hospital
9 -- Khalid -- M -- MBBS -- Psychiatrist -- American Mission Hospital
7 -- Qasim -- M -- MD -- Radiologist -- King Hamad University Hospital
6 -- Sarah -- F -- MD -- Anatomy -- Emirates Hospital
```

Printing Nurse's Details:

Executed getList:

```
5 -- Anaya -- F -- 3 -- Salamaniya Hospital
6 -- Asha -- F -- 9 -- American Mission Hospital
10 -- Hawra -- F -- 6 -- Emirates Hospital
4 -- Ibrahim -- M -- 8 -- Salamaniya Hospital
2 -- Kathy -- F -- 7 -- King Hamad University Hospital
3 -- Mary -- F -- 5 -- Mayo Clinic
1 -- Sanaa -- F -- 2 -- King Hamad University Hospital
7 -- Zainab -- F -- 1 -- Bahrain Defence Force Hospital
8 -- Zeshan -- M -- 10 -- King Hamad University Hospital
```

PS C:\Users\shash\Desktop\SQL Scripts\B21CS093\_Lab6>

**2 .getPatient:** List down the details of the appointment date, doctor and hospital details along with the “treatment advised” made for each patient.

## Code for the Query

```
// 2. getPatient: List down the details of the appointment date, doctor and hospital details along with the "treatment advised" made for each patient.

public static void getPatient(Connection conn) throws SQLException, ClassNotFoundException{
    Statement st = conn.createStatement();

    ResultSet rs =
    st.executeQuery(
        "SELECT appointment.appoint_date,diagnosis.treatment AS Treatment_Advised, doctor.doc_id, doctor.dname,doctor.gender, doctor.qualification, doctor.jo
        FROM reception \n" + //
        "JOIN Patient ON reception.rec_id = patient.rec_id \n" + //
        "JOIN Appointment ON appointment.rec_id = reception.rec_id \n" + //
        "JOIN Nurse ON nurse.nurse_id = patient.nurse_id \n" + //
        "JOIN Doctor ON doctor.doc_id = nurse.nurse_id \n" + //
        "JOIN Hospital ON hospital.hosp_name = doctor.hosp_name \n" + //
        "JOIN Diagnosis ON diagnosis.doc_id = doctor.doc_id ");

    ResultSetMetaData rsmd = rs.getMetaData();
    int columnsNumber = rsmd.getColumnCount();
    System.out.println(x:"Executed getPatient:");
    System.out.println();

    printQuery(rs, columnsNumber);
}
```

## Result:-

```
Executed getPatient:
2022-05-03 -- Pharmacotherapy -- 10 -- Amal -- F -- D.M. -- Nephrologist -- King Hamad University Hospital -- Kingdom of Bahrain -- Sheikh Isa bin Salman Bridge, Al Sayh, Busaiteen, Bahrain
2022-11-20 -- Phototherapy -- 6 -- Sarah -- F -- MD -- Anatomy -- Emirates Hospital -- United Arab Emirates -- Jumeirah Beach Rd, Dubai, UAE
2022-04-01 -- Gene therapy -- 4 -- Ali -- M -- BPT -- Physiotherapist -- Al-Hilal Hospital -- Kingdom of Bahrain -- Al-Hilal Hospital, Muharraq, Bahrain
2022-12-22 -- Physiotherapy -- 8 -- Fatema -- F -- Residency -- Anesthesiologist -- Salamaniya Hospital -- Kingdom of Bahrain -- Salamaniya Medical Complex, Manama, Bahrain
2022-03-17 -- Monotherapy -- 2 -- Ahmed -- M -- Board Certified -- Ophthalmologist -- King Hamad University Hospital -- Kingdom of Bahrain -- Sheikh Isa bin Salman Bridge, Al Sayh, Busaiteen, Bahrain
2022-05-03 -- Aromatherapy -- 1 -- Abdullah -- M -- MBBS -- Dermatologist -- Bahrain Defence Force Hospital -- Kingdom of Bahrain -- Waly Alahed Avenue, West Riffa, Bahrain
2022-07-12 -- Oxygen therapy -- 5 -- Carolina -- F -- MS -- Surgeon -- Mayo Clinic -- United States -- 4500 San Pablo Road, US
2022-08-30 -- Cryotherapy -- 3 -- Ameera -- F -- MD -- Pediatrician -- Salamaniya Hospital -- Kingdom of Bahrain -- Salamaniya Medical Complex, Manama, Bahrain
2022-07-09 -- Immunotherapy -- 9 -- Khalid -- M -- MBBS -- Psychiatrist -- American Mission Hospital -- Kingdom of Bahrain -- Sheikh Essa Road, Manama, Bahrain
```



**3.update Affiliation:** Create a table Affiliation such that each doctor is associated with exactly two different hospitals (any two). Reflect the change in the database by adjusting the values in other relevant tables.

### Code for the Query:-

```
// 3. updateAffiliation: Create a table Affiliation such that each doctor is associated with
// exactly two different hospitals (any two). Reflect the change in the database by adjusting the values in other relevant tables.
public static void updateAffiliation(Connection conn) throws SQLException, ClassNotFoundException{
    Statement st = conn.createStatement();
    Statement st2 = conn.createStatement();
    st.executeUpdate(sql:"CREATE TABLE Affiliation (doc_id INT , hosp_name VARCHAR(50)) AS SELECT doc_id, hosp_name FROM doctor");
    st.executeUpdate(sql:"ALTER TABLE Affiliation ADD hosp_name2 VARCHAR(50)");
    String hosp_name1 = "Ford Hospital";
    String hosp_name2 = "Sahara Clinic";

    st.executeUpdate(sql:"ALTER TABLE doctor ADD hosp_name2 VARCHAR(50)");
    ResultSet rs = st.executeQuery(sql:"SELECT doc_id, hosp_name FROM Affiliation");

    while(rs.next()){
        if(rs.getString(columnIndex:2).equals(hosp_name1)){
            st2.executeUpdate("UPDATE Affiliation SET hosp_name2 = '"+hosp_name2+"' WHERE doc_id = '"+rs.getString(columnIndex:1)+"'");
            st2.executeUpdate("UPDATE doctor SET hosp_name2 = '"+hosp_name2+"' WHERE doc_id = '"+rs.getString(columnIndex:1)+"'");
        }
        else{
            st2.executeUpdate("UPDATE Affiliation SET hosp_name2 = '"+hosp_name1+"' WHERE doc_id = '"+rs.getString(columnIndex:1)+"'");
            st2.executeUpdate("UPDATE doctor SET hosp_name2 = '"+hosp_name1+"' WHERE doc_id = '"+rs.getString(columnIndex:1)+"'");
        }
    }
    ResultSet rs2 = st.executeQuery(sql:"SELECT * FROM Affiliation");
    ResultSetMetaData rsmd = rs2.getMetaData();
    int columnsNumber = rsmd.getColumnCount();

    System.out.println(x:"Executing updateAffiliation:");
    System.out.println();

    System.out.println(x:"Affiliation Table:");
    printQuery(rs2, columnsNumber);

    ResultSet rs3 = st2.executeQuery(sql:"SELECT * FROM doctor");
    ResultSetMetaData rsmd2 = rs3.getMetaData();
    int columnsNumber2 = rsmd2.getColumnCount();
    System.out.println(x:"Doctor Table:");
    printQuery(rs3, columnsNumber2);
}
```

### Result:-

Executing updateAffiliation:

Affiliation Table:

```
9 -- American Mission Hospital -- Ford Hospital
1 -- Bahrain Defence Force Hospital -- Ford Hospital
6 -- Emirates Hospital -- Ford Hospital
2 -- King Hamad University Hospital -- Ford Hospital
7 -- King Hamad University Hospital -- Ford Hospital
10 -- King Hamad University Hospital -- Ford Hospital
5 -- Mayo Clinic -- Ford Hospital
3 -- Salamaniya Hospital -- Ford Hospital
8 -- Salamaniya Hospital -- Ford Hospital
```

Doctor Table:

```
2 -- Ahmed -- M -- Board Certified -- Ophthalmologist -- King Hamad University Hospital -- Ford Hospital
3 -- Ameera -- F -- MD -- Pediatrician -- Salamaniya Hospital -- Ford Hospital
4 -- Ali -- M -- BPT -- Physiotherapist -- Al-Hilal Hospital -- Ford Hospital
5 -- Carolina -- F -- MS -- Surgeon -- Mayo Clinic -- Ford Hospital
6 -- Sarah -- F -- MD -- Anatomy -- Emirates Hospital -- Ford Hospital
7 -- Qasim -- M -- MD -- Radiologist -- King Hamad University Hospital -- Ford Hospital
8 -- Fatema -- F -- Residency -- Anesthesiologist -- Salamaniya Hospital -- Ford Hospital
9 -- Khalid -- M -- MBBS -- Psychiatrist -- American Mission Hospital -- Ford Hospital
10 -- Amal -- F -- D.M. -- Nephrologist -- King Hamad University Hospital -- Ford Hospital
```

**4.getVisit:** Find out all doctors and nurses associated with and details of all patients who visited the hospital King Hamad University Hospital between January and June 2022.

#### Code for the Query:-

```
// 4. getVisit: Find out all doctors and nurses associated and details of all patients who
// visited the hospital King Hamad University Hospital between January and June, 2022.

public static void getVisit(Connection conn) throws SQLException, ClassNotFoundException{
    Statement st = conn.createStatement();

    ResultSet rs =
    st.executeQuery(
        "SELECT d.dname, n.name, p.ssn, p.fname, p.lname, p.age, p.gender, v.visit_date \" + //
        \"FROM patient p \" + //
        \"JOIN nurse n ON p.nurse_id = n.nurse_id \" + //
        \"JOIN doctor d ON d.doc_id = n.doc_id \" + //
        \"JOIN visit v ON v.ssn = p.ssn \" + //
        \"WHERE v.hosp_name = 'King Hamad University Hospital' AND v.visit_date BETWEEN '2022-01-01' AND '2022-06-30' \");

    ResultSetMetaData rsmd = rs.getMetaData();
    int columnsNumber = rsmd.getColumnCount();
    System.out.println(x:"Executing getVisit:");
    System.out.println();

    printQuery(rs, columnsNumber);
}
```

#### Result:-

Executing getVisit:

```
Null -- Null -- Null -- Null -- Null -- Null -- Null -- Null
PS C:\Users\shash\Desktop\SQL Scripts\B21CS093_Lab6> █
```

**5.updateInventory:** Add stock quantity (number) as an attribute to the medicine table. Increment the price of each medicine by 5% and extend the expiry date by a year.

### Code for the Query:-

```
// 5. updateInventory: Add stock quantity (number) as an attribute to the medicine table.
// Increment the price of each medicine by 5% and extend the expiry date by a year.
public static void updateInventory(Connection conn) throws SQLException, ClassNotFoundException{

    Statement st = conn.createStatement();
    st.executeUpdate(sql:"ALTER TABLE medicine ADD stock_quantity INT NOT NULL");
    st.executeUpdate(sql:"UPDATE medicine SET price = price * 1.05, exp_date = exp_date + INTERVAL 1 YEAR");

    ResultSet rs = st.executeQuery(sql:"SELECT * FROM medicine");
    ResultSetMetaData rsmd = rs.getMetaData();
    int columnsNumber = rsmd.getColumnCount();

    System.out.println(x:"Executing getVisit:");
    System.out.println();

    printQuery(rs, columnsNumber);
}
```

### Result:-

Executing getVisit:

```
21 -- Amoxil Capsules -- 0.735 -- 2024-03-10 -- 0
22 -- Aspirin -- 1.05 -- 2024-12-09 -- 0
23 -- Bonjela Gel -- 0.42 -- 2025-09-23 -- 0
24 -- Paracetamol -- 1.26 -- 2025-05-17 -- 0
25 -- Atorvastatin -- 1.575 -- 2024-06-15 -- 0
26 -- Coversyl -- 1.05 -- 2024-05-15 -- 0
27 -- Diamicron -- 0.945 -- 2025-02-03 -- 0
28 -- Lipitor -- 1.47 -- 2026-03-12 -- 0
29 -- Glucophage -- 1.785 -- 2025-07-19 -- 0
```

PS C:\Users\shash\Desktop\SQL Scripts\B21CS093\_Lab6>

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