Taibah University

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Department of Computer Science

Project (Hospital Database)

CS 372: Database Syst

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we need to construct a database that manages the hospital data. The hospital contains four departments (Department of Internal Medicine, Orthopedic department, pediatric department, surgery department), each department has several doctors; each department receives and treats several patients. Each doctor has an ID number (unique); Full Name; Gender; Department ID number, each patient has an ID number (unique); Full Name; Gender; Department ID number; Condition (admitted or not), The doctor in charge; the described medications (serial number of the medicine) where the patients can take more than one medicine. Each patient is treated by one doctor. The hospital medicine storages have several medicines where each has a serial number, type, and name

1. Starting with the ER diagram:

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. We firstly identified entities. Then we specified the attributes that define its properties and chose a Primary key for each entity. Finally, we added the relationships between them and the constraints numbers for each. Here we have 4 entities (Department, Patient, Doctor, Medicine), and 4 relationships (Has, Receive, Treat, Take).
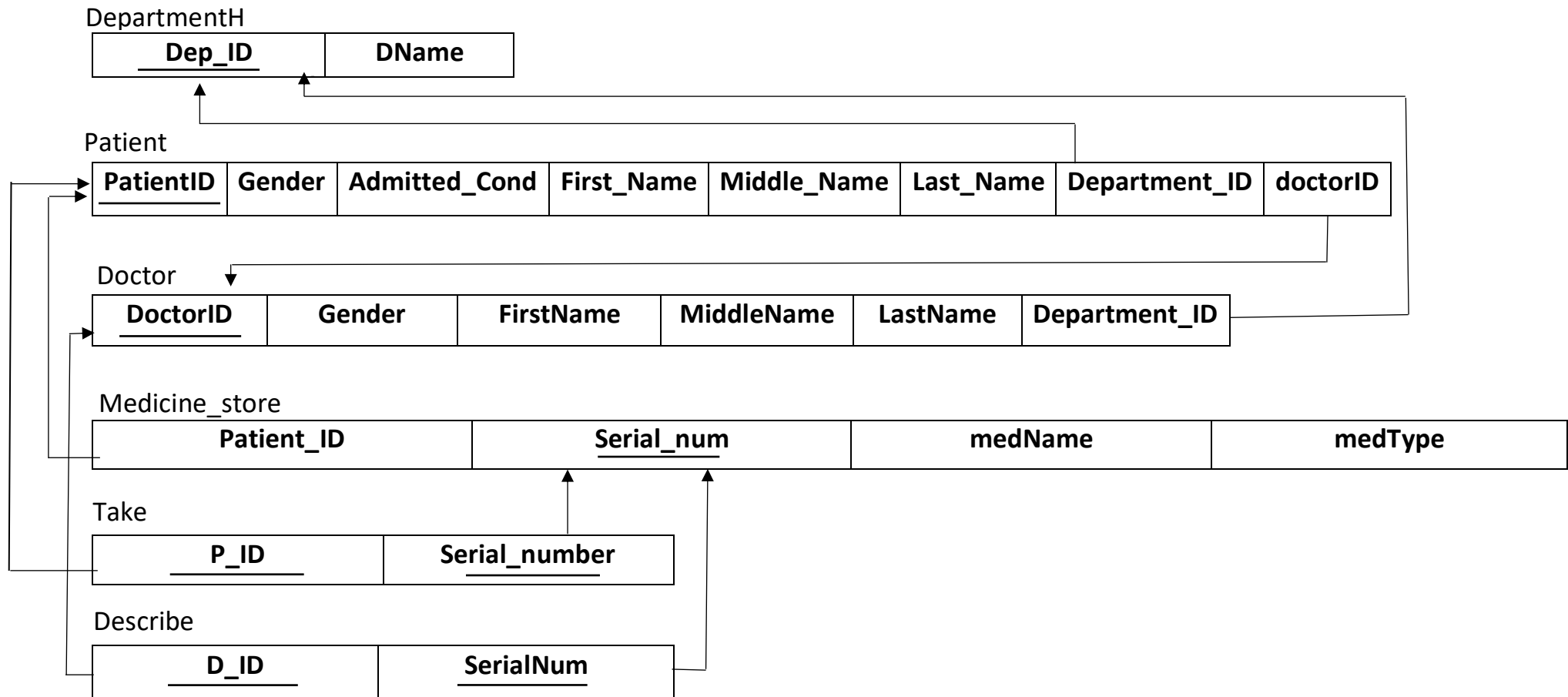
Hospital ER Diagram
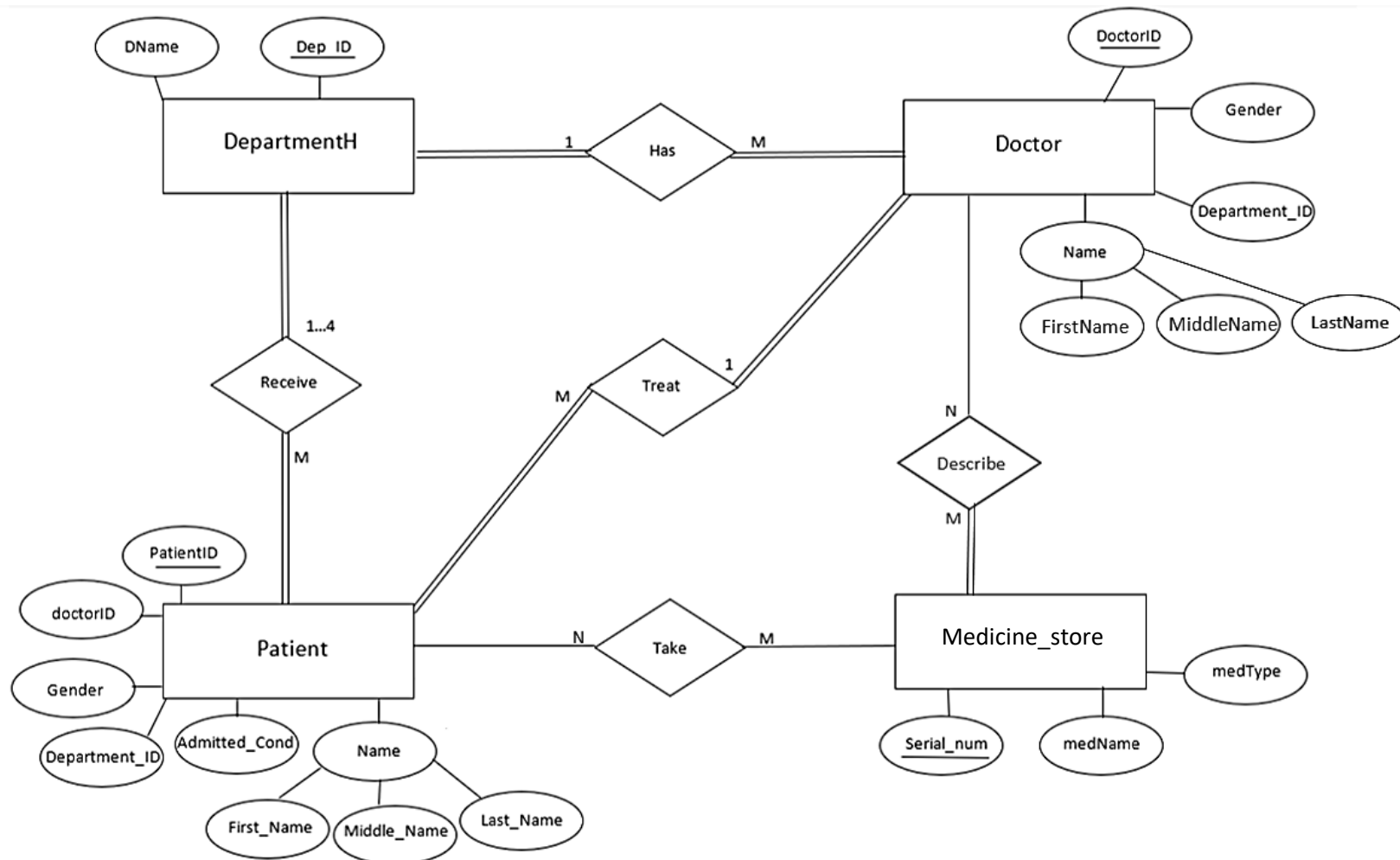
2. Relational Schema:

A Relational Schema here acts like blueprint of our database that outlines the way its structure organizes data into tables, we have the 4 entity tables in addition to the two M:N tables

Hospital Relational Schema

DepartmentH

__Dep_ID__	DName

Patient

PatientID	Gender	Admitted_Cond	First_Name	Middle_Name	Last_Name	Department_ID	doctorID

Doctor

DoctorID	Gender	FirstName	MiddleName	LastName	Department_ID

Medicine_store

Patient_ID	Serial_num	medName	medType

Take

__P_ID__	Serial_number

Describe

__D_ID__	SerialNum

3. Database Tables Design

A Database Tables Design will be useful to understand the structure and way in which we are going to implement our tables including name, data type, size and constraints. Here we have 6 tables. 4 entity tables: (Department, Patient, Doctor), 2 M:N relational tables (Medicine, Take, Describe)

Hospital Tables Design

Primary Key	Foreign Key

Field name	Data type	Size	Constraints
DoctorID 🔑	INT	-	NOT NULL
FirstName	VARCHAR	50	NOT NULL
MiddleName	VARCHAR	50	NOT NULL
LastName	VARCHAR	50	NOT NULL
Gender	VARCHAR	20	DEFAULT 'Male'
Department_ID 🔑	INT	-	REFERENCES DepartmentH (Dep_ID)

Doctor Table

Field name	Data type	Size	Constraints
PatientID 🔑	INT	-	NOT NULL
First_Name	VARCHAR	50	NOT NULL
Middle_Name	VARCHAR	50	NOT NULL
LastName	VARCHAR	50	NOT NULL
Gender	VARCHAR	20	DEFAULT 'Male'
Department_ID 🔑	INT	-	REFERENCES DepartmentH(Dep_ID)
Admitted_Cond	VARCHAR	50	DEFAULT 'Admitted'
doctorID 🔑	INT	-	REFERENCES Doctors(DoctorID)

Patient Table

Field name	Data type	Size	Constraints
medName	VARCHAR	80	NOT NULL, UNIQU
medType	VARCHAR	50	NOT NULL
Serial_num 🔑	INT	-	NOT NULL
Patient_ID 🔑	INT	-	REFRENCE Patient(PatientID)

Medicine_store Table

Field name	Data type	Size	Constraints
Dep_ID 🔑	INT	-	NOT NULL
DName	VARCHAR	80	UNIQUE, NOT NULL

Departments Table

Field name	Data type	Size	Constraints
Serial_number 🔑	INT	-	REFERENCES Medicine_store (Serial_num)
P_ID 🔑	INT	-	REFERENCES Patient(PatientID)

Take Table

Field name	Data type	Size	Constraints
SerialNum 🔑	INT	-	REFERENCES Medicine_store (Serial_num)
D_ID 🔑	INT	-	REFERENCES Doctor(DoctorID)

Describe Table

4. Database Implementation

A Database Implementation using Sqlserver is going to simulate the reality by inserting real data into the tables previously created. That would be very helpful to retrieve some specific information from our database.

	Dep_ID	DName
1	1	Internal Medicine department
2	2	Orthopedic department
3	3	pediatric department
4	4	surgery department

	DoctorID	FirstName	MiddleName	LastName	Gender	Department_ID
1	101010	Osama	Rakan	Al johani	Male	2
2	111111	Ahmad	Hasan	Banjar	Male	1
3	222222	Mohamad	Zakariya	Al Azzazy	Male	2
4	333333	Manal	Mansour	Al Geth...	Female	3
5	444444	Hassan	Adnan	Al Bukhari	Male	4
6	555555	Ali	Raza	Shams...	Male	1
7	666666	basm	Wlie	sabt	Male	2
8	777777	Nisren	Ali	Ahmad	Female	3
9	888888	Hend	Khaled	Moham...	Female	4
10	999999	Dareen	Abduallah	Al Bukhari	Female	1

	PatientID	First_Name	Middle_Name	Last_Name	Gender	Admitted_Cond	Department_ID	doctorID
1	1	Osama	Khaled	Al ahmmadi	Male	admitted	1	111111
2	2	Turkey	Ahmad	Al johani	Male	admitted	2	222222
3	3	Hend	Khaled	Al ahmmadi	Female	admitted	3	333333
4	4	Mohammad	Ali	Al assadi	Male	admitted	4	444444
5	5	Ali	Hassan	Ahmad	Male	Not admitted	1	555555
6	6	Ahlam	Osama	Al badawi	Female	Not admitted	2	666666
7	7	Assaf	Hatem	Al dbagh	Male	Not admitted	3	777777
8	8	Fisal	Ebrahim	Al ragib	Male	admitted	4	888888
9	9	Bader	Emad	saker	Male	admitted	1	999999
10	10	Hamed	Mohammad	Al khaldi	Male	admitted	2	101010

	medName	medType	Serial_num	Patient_ID
1	Profen-400	Capsules	1001001	1
2	Indomin	Capsules	2002002	2
3	Fevadol	Liquid	3003003	3
4	Ibuprofen	Tablet	4004004	4
5	Morphine	Capsules	5005005	5
6	FOSAMAX	Liquid	6006006	6
7	MEDROL	Tablet	7007007	7
8	LODINE	Capsules	8008008	8
9	Ventor	Liquid	9009009	9
10	Sulide	Tablet	10010010	10

	P_ID	Serial_number
1	1	1001001
2	2	2002002
3	3	3003003
4	4	4004004
5	5	5005005
6	6	6006006
7	7	7007007
8	8	8008008
9	9	9009009
10	10	10010010

	D_ID	SerialNum
1	111111	1001001
2	222222	2002002
3	333333	3003003
4	444444	4004004
5	555555	5005005
6	666666	6006006
7	777777	7007007
8	888888	8008008
9	999999	9009009
10	101010	10010010

Here we created the Database

```sql
CREATE DATABASE HospitalData
```

Here we created the Department table

```sql
---Department table 1 ---
CREATE TABLE DepartmentH(
Dep_ID INT NOT NULL PRIMARY KEY,
DName VARCHAR (80) NOT NULL UNIQUE
)
```

Here we created the Doctor table

```sql
--- Doctors table 2---
CREATE TABLE Doctor(
DoctorID INT NOT NULL PRIMARY KEY,
FirstName VARCHAR(50) NOT NULL,
MiddleName VARCHAR(50)NOT NULL,
LastName VARCHAR(50) NOT NULL,
Gender VARCHAR(20) DEFAULT 'Male',
Department_ID INT FOREIGN KEY REFERENCES DepartmentH(Dep_ID)
)
```

Here we created the Patient table
```sql
---patient table 3----
```

```sql
CREATE TABLE Patient (
PatientID INT NOT NULL PRIMARY KEY,
First_Name VARCHAR(50) NOT NULL,
Middle_Name VARCHAR(50)NOT NULL,
Last_Name VARCHAR(50) NOT NULL,
Gender VARCHAR(20) DEFAULT 'Male',
Admitted_Cond VARCHAR(50) DEFAULT 'Admitted' ,
Department_ID INT FOREIGN KEY REFERENCES DepartmentH(Dep_ID),
doctorID INT FOREIGN KEY REFERENCES Doctor(DoctorID),
)
```

Here we created the Medicine Store table

```sql
---- medicine table 4---
CREATE TABLE Medicine_store (
medName VARCHAR(80) NOT NULL UNIQUE,
medType VARCHAR(50) NOT NULL,
Serial_num INT NOT NULL PRIMARY KEY,
Patient_ID INT FOREIGN KEY REFERENCES Patient(PatientID)
)
```

Here we created Take table

```sql
----Take table 5----
CREATE TABLE Take (
P_ID INT FOREIGN KEY REFERENCES Patient(PatientID),
Serial_number INT FOREIGN KEY REFERENCES Medicine_store(Serial_num)
)
```

Here we created Describe table

```
---- Describe table 6----
CREATE TABLE Describe (
D_ID INT FOREIGN KEY REFERENCES Doctor(DoctorID) ,
SerialNum INT FOREIGN KEY REFERENCES Medicine_store(Serial_num)
)
```

Here we inserted values for the Department table

```
---- values of first table ----
INSERT INTO DepartmentH
VALUES ( 1, 'Internal Medicine department')
INSERT INTO DepartmentH
VALUES ( 2, 'Orthopedic department')
INSERT INTO DepartmentH
VALUES ( 3, 'pediatric department')
INSERT INTO DepartmentH
VALUES ( 4, 'surgery department')
```

Here we inserted values for the Doctor table

```sql
----- values of second table ---
INSERT INTO Doctor
VALUES(111111 ,'Ahmad','Hasan','Banjar','Male', 1)
INSERT INTO Doctor
VALUES(222222 ,'Mohamad','Zakariya','Al Azzazy','Male', 2)
INSERT INTO Doctor
VALUES(333333 ,'Manal','Mansour','Al Gethamy','Female', 3)
INSERT INTO Doctor
VALUES(444444 ,'Hassan','Adnan','Al Bukhari','Male', 4)
INSERT INTO Doctor
VALUES(555555 ,'Ali','Raza','Shamsuddin','Male', 1)
INSERT INTO Doctor
VALUES(666666 ,'basm','Wlie','sabt','Male', 2)
INSERT INTO Doctor
VALUES(777777 ,'Nisren','Ali','Ahmad','Female', 3)
INSERT INTO Doctor
VALUES(888888 ,'Hend','Khaled','Mohammad','Female', 4)
INSERT INTO Doctor
VALUES(999999 ,'Dareen','Abduallah','Al Bukhari','Female', 1)
INSERT INTO Doctor
VALUES(101010 ,'Osama','Rakan','Al johani','Male', 2)
```

Here we inserted values for the Patient table

```sql
----- values of third table ---
INSERT INTO Patient
VALUES(001,'Osama','Khaled','Al ahmmadi','Male','admitted', 1, 111111)
```

```
INSERT INTO Patient
VALUES(002,'Turkey','Ahmad','Al johani','Male','admitted', 2, 222222)
INSERT INTO Patient
VALUES(003,'Hend','Khaled','Al ahmmadi','Female','admitted', 3, 333333)
INSERT INTO Patient
VALUES(004,'Mohammad','Ali','Al assadi','Male','admitted', 4, 444444)
INSERT INTO Patient
VALUES(005,'Ali','Hassan','Ahmad','Male','Not admitted', 1, 555555)
INSERT INTO Patient
VALUES(006,'Ahlam','Osama','Al badawi','Female','Not admitted', 2, 666666)
INSERT INTO Patient
VALUES(007,'Assaf','Hatem','Al dbagh','Male','Not admitted', 3, 777777)
INSERT INTO Patient
VALUES(008,'Fisal','Ebrahim','Al ragib','Male','admitted', 4, 888888)
INSERT INTO Patient
VALUES(009,'Bader','Emad','saker','Male','admitted', 1, 999999)
INSERT INTO Patient
VALUES(010,'Hamed','Mohammad','Al khaldi','Male','admitted', 2, 101010)
```

Here we inserted values for the Medicine Store table

```
----- values of forth table ---
INSERT INTO Medicine_store
VALUES('Profen-400' ,'Capsules',001001001 , 001)
INSERT INTO Medicine_store
VALUES('Indomin' ,'Capsules',002002002, 002)
INSERT INTO Medicine_store
```

```sql
VALUES('Fevadol' ,'Liquid',003003003 , 003)
INSERT INTO Medicine_store
VALUES('Ibuprofen' ,'Tablet',004004004 , 004)
INSERT INTO Medicine_store
VALUES('Morphine' ,'Capsules',005005005, 005)
INSERT INTO Medicine_store
VALUES('FOSAMAX' ,'Liquid',006006006, 006)
INSERT INTO Medicine_store
VALUES('MEDROL' ,'Tablet',007007007, 007)
INSERT INTO Medicine_store
VALUES('LODINE' ,'Capsules',008008008, 008)
INSERT INTO Medicine_store
VALUES('Ventor' ,'Liquid',009009009, 009)
INSERT INTO Medicine_store
VALUES('Sulide' ,'Tablet',010010010, 010)
```

Here we inserted values for the Take table

```sql
----- values of fifth table ---
INSERT INTO Take
VALUES(001 , 001001001)
INSERT INTO Take
VALUES(002 , 002002002)
INSERT INTO Take
VALUES(003 , 003003003)
INSERT INTO Take
VALUES(004 , 004004004)
```

```
INSERT INTO Take
VALUES(005 , 005005005)
INSERT INTO Take
VALUES(006 , 006006006)
INSERT INTO Take
VALUES(007 , 007007007)
INSERT INTO Take
VALUES(008 , 008008008)
INSERT INTO Take
VALUES(009 , 009009009)
INSERT INTO Take
VALUES(010 , 010010010)
```

Here we inserted values for the Describe table

```
----- values of sixth table ---
INSERT INTO Describe
VALUES(111111 , 001001001)
INSERT INTO Describe
VALUES(222222 , 002002002)
INSERT INTO Describe
VALUES(333333 , 003003003)
INSERT INTO Describe
VALUES(444444 , 004004004)
INSERT INTO Describe
VALUES(555555 , 005005005)
INSERT INTO Describe
VALUES(666666 , 006006006)
INSERT INTO Describe
```

```sql
VALUES(777777 , 007007007)
INSERT INTO Describe
VALUES(888888 , 008008008)
INSERT INTO Describe
VALUES(999999 , 009009009)
INSERT INTO Describe
VALUES(101010 , 010010010)
```

Here we retrieve all the attribute values from each table

```sql
----Retrieve all the attribute values from each table
SELECT * FROM DepartmentH
SELECT * FROM Doctor
SELECT * FROM Patient
SELECT * FROM Medicine_store
SELECT * FROM Take
SELECT * FROM Describe
```

Here we retrieve for each patient ID the medication Name describe and show whether admitted or not

```sql
--Retrieve for each patient ID the medication Name describe and show whether admitted or not--
SELECT PatientID,First_Name, medName, Admitted_Cond
```

```
FROM Patient
CROSS JOIN Medicine_store
WHERE Patient.PatientID = Medicine_store.Patient_ID
```

Here we retrieve for each patient the department name & number which he is in and the serial number of the medication he is taking

```
--Retrieve for each patient the department name & number which he is in and the serial number of the
medication he is taking--
SELECT  Patient.First_Name, Dname , Dep_ID, Serial_num
FROM DepartmentH INNER JOIN Patient
ON DepartmentH.Dep_ID = Patient.Department_ID
INNER JOIN Medicine_store
ON Medicine_store.Patient_ID = Patient.PatientID
```

	First_Name	Dname	Dep_ID	Serial_num
1	Osama	Internal Medicine department	1	1001001
2	Turkey	Orthopedic department	2	2002002
3	Hend	pediatric department	3	3003003
4	Mohammad	surgery department	4	4004004
5	Ali	Internal Medicine department	1	5005005
6	Ahlam	Orthopedic department	2	6006006
7	Assaf	pediatric department	3	7007007
8	Fisal	surgery department	4	8008008
9	Bader	Internal Medicine department	1	9009009
10	Hamed	Orthopedic department	2	10010010

	PatientID	First_Name	medName	Admitted_Cond
1	1	Osama	Profen-400	admitted
2	2	Turkey	Indomin	admitted
3	3	Hend	Fevadol	admitted
4	4	Mohammad	Ibuprofen	admitted
5	5	Ali	Morphine	Not admitted
6	6	Ahlam	FOSAMAX	Not admitted
7	7	Assaf	MEDROL	Not admitted
8	8	Fisal	LODINE	admitted
9	9	Bader	Ventor	admitted
10	10	Hamed	Sulide	admitted