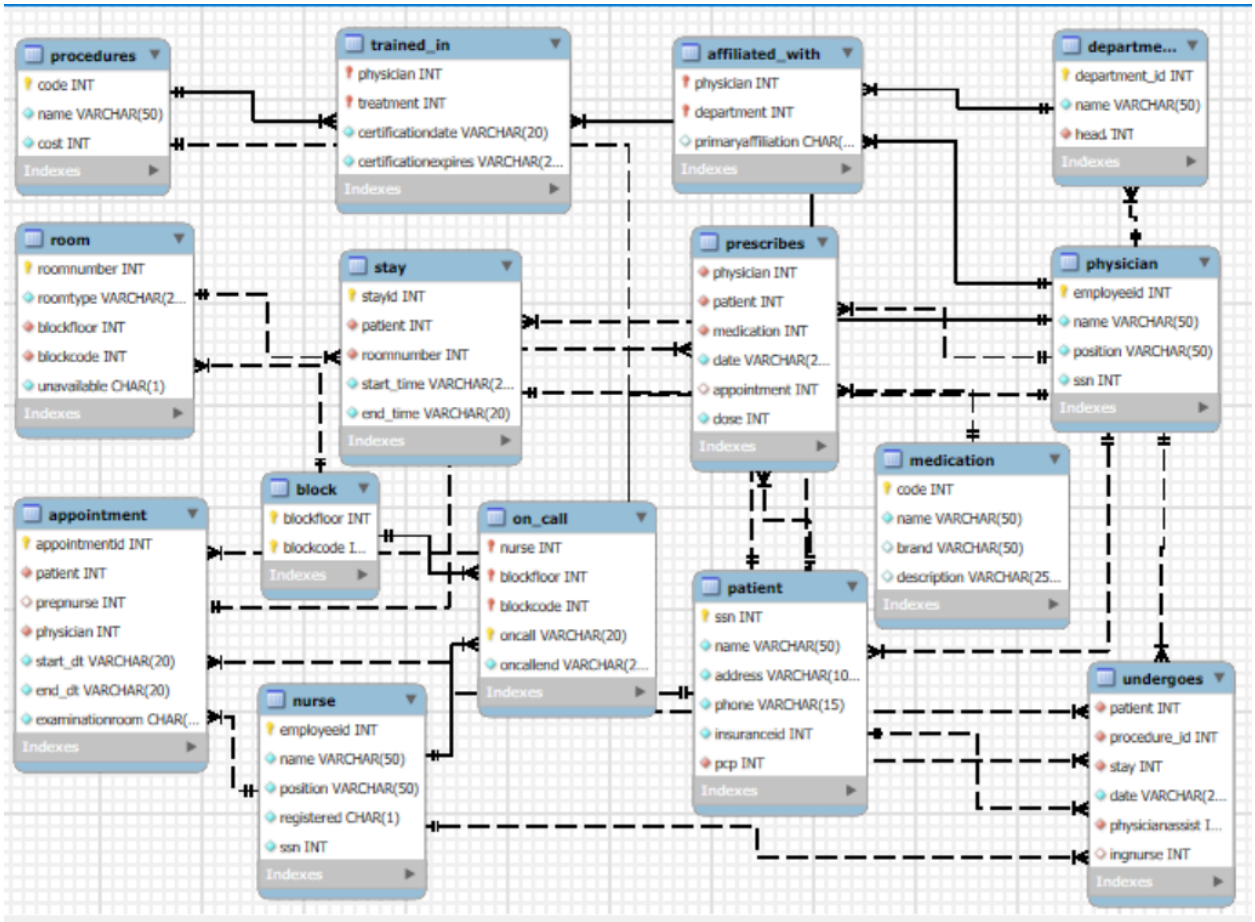
Hospital Database Management

1. Introduction

Hospitals are the most important part of our lives, trying to provide the best medical facilities to people suffering from various types of illness, which may be due to change in climate conditions, increased work-load, emotional trauma, stress etc. It is very much difficult for the hospital to maintain its day-to-day activities and records manually. That is why a database is required to keep records of all types of activities of a hospital.

2. ER Diagram



3. Data Description

1. Physician:

- employeeid – this is a unique ID of a physician
- name – this is the name of a physician
- position – this is the designation of a physician
- ssn – this is a security number of a physician

2. Department:

- departmentid – this is a unique ID for a department
- name – this is the name of a department
- head – this is the ID of the physician who is the head of a department, referencing to the column employeeid of the table physician

3. Affiliated_with:

- physician – this is the ID of the physicians which is referencing to the column employeeid of the physician table
- department – this is the ID the department which is referencing to the column departmentid of the department table
- primaryaffiliation – this is a logical column which indicate that whether the physicians are yet to be affiliated or not
- *Note: The combination of physician, department will come once in that table.*

4. Procedure:

- code – this is the unique ID of a medical procedure
- name – the name of the medical procedure
- cost – the cost for the procedure

5. Trained_in:

- physician – this is ID of the physicians which is referencing to the column employeeid of the physician table
- treatment – this is the ID of the medical procedure which is referencing to the column code of the procedure table
- certificationdate – this is the starting date of certification
- certificationexpires – this is the expiry date of certification
- *Note: The combination of physician and treatment will come once in that table.*

6. Patient:

- ssn – this is a unique ID for each patient
- name – this is the name of the patient

- address – this is the address of the patient
- phone – this is the phone number of the patient
- insuranceid – this is the insurance id of the patient
- pcp – this is the ID of the physician who primarily checked up the patient which is referencing to the column employeeid of the physician table

7. Nurse:

- employeeid – this is the unique ID for a nurse
- name – name of the nurses
- position – the designation of the nurses
- registered – this is a logical column which indicates that whether the nurses are registered for nursing or not
- ssn – this is the security number of a nurse

8. Appointment:

- appointmentid – this is the unique ID for an appointment
- patient – this is the ID of each patient which is referencing to the ssn column of patient table
- prepnurse – the ID of the nurse who may attend the patient with the physician, which is referencing to the column employeeid of the nurse table
- physician – this is the ID the physicians which is referencing to the employeeid column of the physician table
- start_dt_time – this is the schedule date and approximate time to meet the physician
- end_dt_time – this is the schedule date and approximate time to end the meeting
- examinationroom – this the room where to meet a patient to the physician

9. Medication:

- code – this is the unique ID for a medicine
- name – this is the name of the medicine
- brand – this is the brand of the medicine
- description – this is the description of the medicine

10. Prescribes:

- physician – this is the ID of the physician referencing to the employeeid column of the physician table
- patient – this is the ID of the patient which is referencing to the ssn column of the patient table
- medication – the ID of the medicine which is referencing to the code of the medication table
- date – the date and time of the prescribed medication

- appointment – the prescription made by the physician to a patient who may taken an appointment which is referencing to column appointmentid of appointment table
- dose – the dose prescribed by the physician
- *Note: The combination of physician, patient, medication, date will come once in that table.*

11. Block:

- blockfloor – ID of the floor
- blockcode - ID of the block
- *Note: The combination of blockfloor, blockcode will come once in that table.*

12. Room:

- roomnumber – this is the unique ID of a room
- roomtype – this is type of room
- blockfloor - this is the floor ID where the room in
- blockcode – this is the ID of the block where the room in
- unavailable – this is the logical column which indicate that whether the room is available or not
- *Note: The of blockfloor, blockcode columns are refercing to the combination of blockfloor and blockcode columns of the table block.*

13. On_call:

- nurse – this is ID of the nurse which is referencing to the employeeid column of the table nurse
- blockfloor - this is the ID of the floor
- blockcode – this is the ID of block
- oncallstart - the starting date and time of on call duration
- oncallend – the ending date and time of on call duration
- *Note: The combination of nurse, blockfloor, blockcode, oncallstart, oncallend will come once in that table and the combination of blockfloor, blockcode columns are refercing to the combination of blockfloor and blockcode columns of the table block .*

14. Stay:

- stayid - this is unique ID for the admission
- patient – this is the ID of the patient which is referencing the ssn column of patient table
- room - this is the ID of the room where the patient admitted and which is referencing to the roomnumber column of the room table
- start_time – this is the time when a patient admitted
- end_time – this is the time how long a patient is staying

15. Undergoes:

- patient - this is ID of the patient which is referencing to the ssn column of the patient table
- procedure – this is ID of the procedure and referencing to the code column of the procedure table
- stay - this is the ID admission of a patient, which is referencing to the stayid column of the stay table
- date – this is the date when a patient undergoes for a medical procedure
- physician – this is the ID of a physician which is referencing to the column employeeid of the table physician
- assistingnurse – this is the ID of a nurse who will assists the physician, referencing to the column employeeid of the table nurse
- *Note: The combination ofpatient, procedure, stay, date will come once in that table.*

4. Data

```
CREATE DATABASE hospital_db;
USE hospital_db;

-- ================================
-- BLOCK TABLE
-- ================================
CREATE TABLE block (
    blockfloor INT NOT NULL,
    blockcode INT NOT NULL,
    PRIMARY KEY (blockfloor, blockcode)
);

INSERT INTO block VALUES
(1,1),(1,2),(1,3),
(2,1),(2,2),(2,3),
(3,1),(3,2),(3,3),
(4,1),(4,2),(4,3);

-- ================================
-- ROOM TABLE
-- ================================
CREATE TABLE room (
    roomnumber INT PRIMARY KEY,
    roomtype VARCHAR(20) NOT NULL,
    blockfloor INT NOT NULL,
    blockcode INT NOT NULL,
    unavailable CHAR(1) NOT NULL,
    FOREIGN KEY (blockfloor, blockcode) REFERENCES block(blockfloor, blockcode)
);

INSERT INTO room VALUES
```

```
(101,'Single',1,1,'f'),
(102,'Single',1,1,'f'),
(103,'Single',1,1,'f'),
(111,'Single',1,2,'f'),
(112,'Single',1,2,'t'),
(113,'Single',1,2,'f'),
(121,'Single',1,3,'f'),
(122,'Single',1,3,'f'),
(123,'Single',1,3,'f'),
(201,'Single',2,1,'t'),
(202,'Single',2,1,'f'),
(203,'Single',2,1,'f'),
(211,'Single',2,2,'f'),
(212,'Single',2,2,'f'),
(213,'Single',2,2,'t'),
(221,'Single',2,3,'f'),
(222,'Single',2,3,'f'),
(223,'Single',2,3,'f'),
(301,'Single',3,1,'f'),
(302,'Single',3,1,'t'),
(303,'Single',3,1,'f'),
(311,'Single',3,2,'f'),
(312,'Single',3,2,'f'),
(313,'Single',3,2,'f'),
(321,'Single',3,3,'t'),
(322,'Single',3,3,'f'),
(323,'Single',3,3,'f'),
(401,'Single',4,1,'f'),
(402,'Single',4,1,'t'),
(403,'Single',4,1,'f'),
(411,'Single',4,2,'f'),
(412,'Single',4,2,'f'),
(413,'Single',4,2,'f'),
(421,'Single',4,3,'t'),
(422,'Single',4,3,'f'),
(423,'Single',4,3,'f');

-- ================================
-- PHYSICIAN TABLE
-- ================================
CREATE TABLE physician (
    employeeid INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    position VARCHAR(50) NOT NULL,
    ssn INT UNIQUE NOT NULL
);

INSERT INTO physician VALUES
(1,'John Dorian','Staff Internist',111111111),
(2,'Elliot Reid','Attending Physician',222222222),
```

```
(3,'Christopher Turk','Surgical Attending Physician',333333333),
(4,'Percival Cox','Senior Attending Physician',444444444),
(5,'Bob Kelso','Head Chief of Medicine',555555555),
(6,'Todd Quinlan','Surgical Attending Physician',666666666),
(7,'John Wen','Surgical Attending Physician',777777777),
(8,'Keith Dudemeister','MD Resident',888888888),
(9,'Molly Clock','Attending Psychiatrist',999999999);

-- ================================
-- NURSE TABLE
-- ================================
CREATE TABLE nurse (
    employeeid INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    position VARCHAR(50) NOT NULL,
    registered CHAR(1) NOT NULL,
    ssn INT UNIQUE NOT NULL
);

INSERT INTO nurse VALUES
(101,'Carla Espinosa','Head Nurse','t',111111110),
(102,'Laverne Roberts','Nurse','t',222222220),
(103,'Paul Flowers','Nurse','f',333333330);

-- ================================
-- DEPARTMENT TABLE
-- ================================
CREATE TABLE department (
    department_id INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    head INT NOT NULL,
    FOREIGN KEY (head) REFERENCES physician(employeeid)
);

INSERT INTO department VALUES
(1,'General Medicine',4),
(2,'Surgery',7),
(3,'Psychiatry',9);

-- ================================
-- AFFILIATED_WITH TABLE
-- ================================
CREATE TABLE affiliated_with (
    physician INT,
    department INT,
    primaryaffiliation CHAR(1),
    PRIMARY KEY (physician, department),
    FOREIGN KEY (physician) REFERENCES physician(employeeid),
    FOREIGN KEY (department) REFERENCES department(department_id)
);
```

```
INSERT INTO affiliated_with VALUES
(1,1,'t'),
(2,1,'t'),
(3,1,'f'),
(3,2,'t'),
(4,1,'t'),
(5,1,'t'),
(6,2,'t'),
(7,1,'f'),
(7,2,'t'),
(8,1,'t'),
(9,3,'t');

-- ================================
-- PATIENT TABLE
-- ================================
CREATE TABLE patient (
    ssn INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    address VARCHAR(100) NOT NULL,
    phone VARCHAR(15) NOT NULL,
    insuranceid INT NOT NULL,
    pcp INT NOT NULL,
    FOREIGN KEY (pcp) REFERENCES physician(employeeid)
);

INSERT INTO patient VALUES
(100000001,'John Smith','42 Foobar Lane','555-0256',68476213,1),
(100000002,'Grace Ritchie','37 Snafu Drive','555-0512',36546321,2),
(100000003,'Random J. Patient','101 Omgbbq Street','555-1204',65465421,2),
(100000004,'Dennis Doe','1100 Foobaz Avenue','555-2048',68421879,3);

-- ================================
-- APPOINTMENT TABLE
-- ================================
CREATE TABLE appointment (
    appointmentid INT PRIMARY KEY,
    patient INT NOT NULL,
    prepnurse INT,
    physician INT NOT NULL,
    start_dt VARCHAR(20) NOT NULL,
    end_dt VARCHAR(20) NOT NULL,
    examinationroom CHAR(1) NOT NULL,
    FOREIGN KEY (patient) REFERENCES patient(ssn),
    FOREIGN KEY (prepnurse) REFERENCES nurse(employeeid),
    FOREIGN KEY (physician) REFERENCES physician(employeeid)
);

INSERT INTO appointment VALUES
```

```
(13216584,100000001,101,1,'24/4/2008','24/4/2008','A'),
(26548913,100000002,101,2,'24/4/2008','24/4/2008','B'),
(36549879,100000001,102,1,'25/4/2008','25/4/2008','A'),
(46846589,100000004,103,4,'25/4/2008','25/4/2008','B'),
(59871321,100000004,NULL,4,'26/4/2008','26/4/2008','C'),
(69879231,100000003,103,2,'26/4/2008','26/4/2008','C'),
(76983231,100000001,NULL,3,'26/4/2008','26/4/2008','C'),
(86213939,100000004,102,9,'27/4/2008','27/4/2008','A'),
(93216548,100000002,101,2,'27/4/2008','27/4/2008','B');

-- ================================
-- MEDICATION TABLE
-- ================================
CREATE TABLE medication (
    code INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    brand VARCHAR(50),
    description VARCHAR(255)
);

INSERT INTO medication VALUES
(1,'Procrastin-X',NULL,'N/A'),
(2,'Thesisin','Foo Labs','N/A'),
(3,'Awakin','Bar Laboratories','N/A'),
(4,'Crescavitin','Baz Industries','N/A'),
(5,'Melioraurin','Snafu Pharmaceuticals','N/A');

-- ================================
-- PRESCRIBES TABLE
-- ================================
CREATE TABLE prescribes (
    physician INT NOT NULL,
    patient INT NOT NULL,
    medication INT NOT NULL,
    date VARCHAR(20) NOT NULL,
    appointment INT,
    dose INT NOT NULL,
    FOREIGN KEY (physician) REFERENCES physician(employeeid),
    FOREIGN KEY (patient) REFERENCES patient(ssn),
    FOREIGN KEY (medication) REFERENCES medication(code),
    FOREIGN KEY (appointment) REFERENCES appointment(appointmentid)
);

INSERT INTO prescribes VALUES
(1,100000001,1,'24/4/2008',13216584,5),
(9,100000004,2,'27/4/2008',86213939,10),
(9,100000004,2,'30/4/2008',NULL,5);

-- ================================
-- PROCEDURES TABLE
```

```
-- ================================
CREATE TABLE procedures (
    code INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    cost INT NOT NULL
);

INSERT INTO procedures VALUES
(1,'Reverse Rhinopodoplasty',1500),
(2,'Obtuse Pyloric Recombobulation',3750),
(3,'Folded Demiophtalmectomy',4500),
(4,'Complete Walletectomy',10000),
(5,'Obfuscated Dermogastrotomy',4899),
(6,'Reversible Pancreomyoplasty',5600),
(7,'Follicular Demiectomy',25);

-- ================================
-- TRAINED_IN TABLE
-- ================================
CREATE TABLE trained_in (
    physician INT NOT NULL,
    treatment INT NOT NULL,
    certificationdate VARCHAR(20) NOT NULL,
    certificationexpires VARCHAR(20) NOT NULL,
    PRIMARY KEY (physician, treatment),
    FOREIGN KEY (physician) REFERENCES physician(employeeid),
    FOREIGN KEY (treatment) REFERENCES procedures(code)
);

INSERT INTO trained_in VALUES
(3,1,'1/1/2008','31/12/2008'),
(3,2,'1/1/2008','31/12/2008'),
(3,5,'1/1/2008','31/12/2008'),
(3,6,'1/1/2008','31/12/2008'),
(3,7,'1/1/2008','31/12/2008'),
(6,2,'1/1/2008','31/12/2008'),
(6,5,'1/1/2007','31/12/2007'),
(6,6,'1/1/2008','31/12/2008'),
(7,1,'1/1/2008','31/12/2008'),
(7,2,'1/1/2008','31/12/2008'),
(7,3,'1/1/2008','31/12/2008'),
(7,4,'1/1/2008','31/12/2008'),
(7,5,'1/1/2008','31/12/2008'),
(7,6,'1/1/2008','31/12/2008'),
(7,7,'1/1/2008','31/12/2008');

-- ================================
-- STAY TABLE
-- ================================
CREATE TABLE stay (
```

```
    stayid INT PRIMARY KEY,
    patient INT NOT NULL,
    roomnumber INT NOT NULL,
    start_time VARCHAR(20) NOT NULL,
    end_time VARCHAR(20) NOT NULL,
    FOREIGN KEY (patient) REFERENCES patient(ssn),
    FOREIGN KEY (roomnumber) REFERENCES room(roomnumber)
);

INSERT INTO stay VALUES
(3215,100000001,111,'1/5/2008','4/5/2008'),
(3216,100000003,123,'3/5/2008','14/5/2008'),
(3217,100000004,112,'2/5/2008','3/5/2008');

-- ================================
-- ON_CALL TABLE
-- ================================
CREATE TABLE on_call (
    nurse INT NOT NULL,
    blockfloor INT NOT NULL,
    blockcode INT NOT NULL,
    oncall VARCHAR(20) NOT NULL,
    oncallend VARCHAR(20) NOT NULL,
    PRIMARY KEY (nurse, blockfloor, blockcode, oncall),
    FOREIGN KEY (nurse) REFERENCES nurse(employeeid),
    FOREIGN KEY (blockfloor, blockcode) REFERENCES block(blockfloor, blockcode)
);

INSERT INTO on_call VALUES
(101,1,1,'4/11/2008','4/11/2008'),
(101,1,2,'4/11/2008','4/11/2008'),
(102,1,3,'4/11/2008','4/11/2008'),
(103,1,1,'4/11/2008','4/11/2008'),
(103,1,2,'4/11/2008','4/11/2008'),
(103,1,3,'4/11/2008','4/11/2008');

-- ================================
-- UNDERGOES TABLE
-- ================================
CREATE TABLE undergoes (
    patient INT NOT NULL,
    procedure_id INT NOT NULL,
    stay INT NOT NULL,
    date VARCHAR(20) NOT NULL,
    physicianassist INT NOT NULL,
    ingnurse INT,
    FOREIGN KEY (patient) REFERENCES patient(ssn),
    FOREIGN KEY (procedure_id) REFERENCES procedures(code),
    FOREIGN KEY (stay) REFERENCES stay(stayid),
    FOREIGN KEY (physicianassist) REFERENCES physician(employeeid),
```

```
    FOREIGN KEY (ingnurse) REFERENCES nurse(employeeid)
);

INSERT INTO undergoes VALUES
(100000001,6,3215,'2/5/2008',3,101),
(100000001,2,3215,'3/5/2008',7,101),
(100000004,1,3217,'7/5/2008',3,102),
(100000004,5,3217,'9/5/2008',6,NULL),
(100000001,7,3217,'10/5/2008',7,101),
(100000004,4,3217,'13/5/2008',3,103);
```

5. Assignment Tasks

1. Write a query in SQL to obtain the name of the physicians with department who are yet to be affiliated
2. Write a query in SQL to obtain the name of the patients with their physicians by whom they got their preliminary treatment
3. Write a query in SQL to find the name of the patients and the number of physicians they have taken appointment
4. Write a query in SQL to count number of unique patients who got an appointment for examination room C
5. Write a query in SQL to find the name of the patients and the number of the room where they have to go for their treatment
6. Write a query in SQL to find the name of the nurses and the room scheduled, where they will assist the physicians.
7. Write a query in SQL to find the name of the patients who taken the appointment on the 25th of April at 10 am, and also display their physician, assisting nurses and room no.
8. Write a query in SQL to find the name of patients and their physicians who does not require any assistance of a nurse
9. Write a query in SQL to find the name of the patients, their treating physicians and medication
10. Write a query in SQL to find the name of the patients who taken an advanced appointment, and also display their physicians and medication
11. Write a query in SQL to count the number of available rooms for each block in each floor
12. Write a query in SQL to find out the floor where the minimum no of rooms are available
13. Write a query in SQL to obtain the name of the patients, their block, floor, and room number where they are admitted
14. Write a query in SQL to obtain the name and position of all physicians who completed a medical procedure with certification after the date of expiration of their certificate.

15. Write a query in SQL to obtain the name of all those physicians who completed a medical procedure with certification after the date of expiration of their certificate, their position, procedure they have done, date of procedure, name of the patient on which the procedure had been applied and the date when the certification expired.