SQL Data Analysis

Data Analyst Program

Ram Kedem

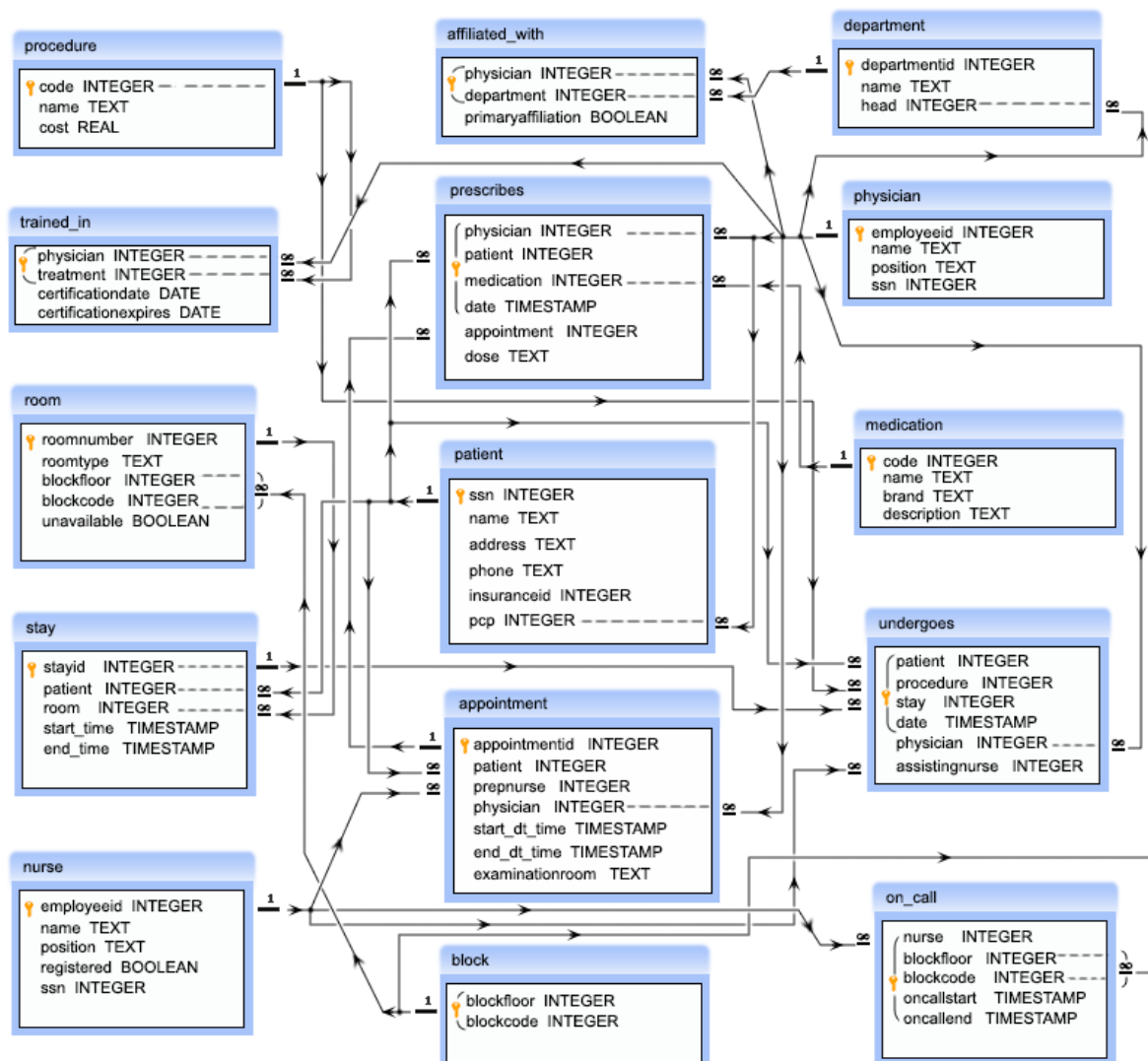# Contents

Hospital Database - Introduction

Hospitals are the most important part of our lives, trying to provide the best medical facilities to people suffering from various type 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 acitivities and records manually. That is why a database is required to keep records of all type of acitivities of a hospital.

The database for hospital management system used for this exercises is based upon a database available in Wikipedia.

List of tables:

- physician
- department
- affiliated_with
- procedure
- trained_in
- patient
- nurse
- appointment
- medication
- prescribes
- block
- room
- on_call
- stay
- undergoes

ERD

procedure
- 🔑 code INTEGER
- name TEXT
- cost REAL

trained_in
- physician INTEGER
- 🔑 treatment INTEGER
- certificationdate DATE
- certificationexpires DATE

room
- 🔑 roomnumber INTEGER
- roomtype TEXT
- blockfloor INTEGER
- blockcode INTEGER
- unavailable BOOLEAN

stay
- 🔑 stayid INTEGER
- patient INTEGER
- room INTEGER
- start_time TIMESTAMP
- end_time TIMESTAMP

nurse
- 🔑 employeeid INTEGER
- name TEXT
- position TEXT
- registered BOOLEAN
- ssn INTEGER

affiliated_with
- 🔑 physician INTEGER
- 🔑 department INTEGER
- primaryaffiliation BOOLEAN

prescribes
- physician INTEGER
- patient INTEGER
- 🔑 medication INTEGER
- date TIMESTAMP
- appointment INTEGER
- dose TEXT

patient
- 🔑 ssn INTEGER
- name TEXT
- address TEXT
- phone TEXT
- insuranceid INTEGER
- pcp INTEGER

appointment
- 🔑 appointmentid INTEGER
- patient INTEGER
- prepnurse INTEGER
- physician INTEGER
- start_dt_time TIMESTAMP
- end_dt_time TIMESTAMP
- examinationroom TEXT

block
- 🔑 blockfloor INTEGER
- blockcode INTEGER

department
- 🔑 departmentid INTEGER
- name TEXT
- head INTEGER

physician
- 🔑 employeeid INTEGER
- name TEXT
- position TEXT
- ssn INTEGER

medication
- 🔑 code INTEGER
- name TEXT
- brand TEXT
- description TEXT

undergoes
- patient INTEGER
- 🔑 procedure INTEGER
- stay INTEGER
- date TIMESTAMP
- physician INTEGER
- assistingnurse INTEGER

on_call
- nurse INTEGER
- blockfloor INTEGER
- 🔑 blockcode INTEGER
- oncallstart TIMESTAMP
- oncallend TIMESTAMP

Detailed Description

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

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

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.*

procedure:

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

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

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

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 indicate that whether the nurses are registered for nursing or not
- ssn – this is the security number of a nurse

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

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

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.*

block:

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

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.*

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 .*

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

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.*

Tasks

1. Obtain the names of all physicians that have performed a medical procedure they have never been certified to perform.

	Name
1	Christopher Turk

2. Obtain the names of all physicians that have performed a medical procedure that they are certified to perform, but such that the procedure was done at a date (Undergoes.Date) after the physician's certification expired (Trained_In.CertificationExpires).

	Name
1	Todd Quinlan

3. Obtain the information for appointments where a patient met with a physician other than his/her primary care physician. Show the following information: Patient name, physician name, nurse name (if any), start and end time of appointment, examination room, and the name of the patient's primary care physician.

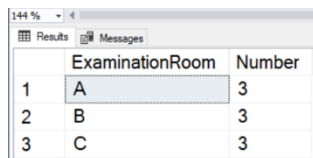 | | patient_name | physician_name | nurse_name | start_time | end_time | room | primary_physician |
   |---|---|---|---|---|---|---|---|
   | 1 | Dennis Doe | Percival Cox | Paul Flowers | 2008-04-25 10:00:00.000 | 2008-04-25 11:00:00.000 | B | Christopher Turk |
   | 2 | Dennis Doe | Percival Cox | NULL | 2008-04-26 10:00:00.000 | 2008-04-26 11:00:00.000 | C | Christopher Turk |
   | 3 | John Smith | Christopher Turk | NULL | 2008-04-26 12:00:00.000 | 2008-04-26 13:00:00.000 | C | John Dorian |
   | 4 | Dennis Doe | Molly Clock | Laverne Roberts | 2008-04-27 10:00:00.000 | 2008-04-21 11:00:00.000 | A | Christopher Turk |

4. The Patient field in Undergoes is redundant, since we can obtain it from the Stay table. There are no constraints in force to prevent inconsistencies between these two tables. More specifically - the Undergoes table may include a row where the patient ID does not match the one we would obtain from the Stay table. Select all rows from Undergoes that exhibit this inconsistency.

	stay	patient_id_from_undergoes	patient_id_from_stay
1	3217	100000001	100000004

5. Obtain the names of all the nurses who have ever been on call for room 123.

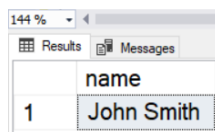 | | Name |
   |---|---|
   | 1 | Laverne Roberts |
   | 2 | Paul Flowers |

6. The hospital has several examination rooms where appointments take place. Obtain the number of appointments that have taken place in each examination room.

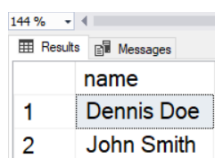|	ExaminationRoom	Number
1	A	3
2	B	3
3	C	3

7. Obtain the names of all patients who have been prescribed some medication by their primary care physician.

	name
1	John Smith

8. Obtain the names of all patients who have been undergone a procedure with a cost larger that $5,000.

	name
1	Dennis Doe
2	John Smith
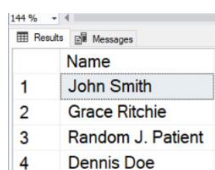
9. Obtain the names of all patients who have had at least two appointments

	Name	num_of_appointments
1	Dennis Doe	3
2	Grace Ritchie	2
3	John Smith	3

10. Obtain the names of all patients which their care physician is not the head of any department

	Name
1	John Smith
2	Grace Ritchie
3	Random J. Patient
4	Dennis Doe