

IT 108 - Advanced Database Management System

SQL Joins Activity

TASK INSTRUCTIONS:

This activity is a by-pair effort. Kindly look for a partner. Perform the following steps listed below. During your execution kindly record your screen and explain what is the purpose and process of each step.

Note: I am expecting that during your activity, you will be explaining interchangeably with your partner from start to finish while screen recording. Don't forget to introduce your name first for me to be able to identify.

Requirement:

- download postgresql and select your OS.
Link here: <https://www.postgresql.org/download/>
- install and set up your pgadmin by following the recommended settings.
- Don't forget to add your postgresql bin to the system environment variable of your computer to allow your command prompt / terminal to execute sql commands.
- To set Windows PATH for PostgreSQL tools, firstly, open **System Properties** > open the **"Environment Variable"** window > select the **"Path"** variable under the **system variables** > click on the **"Edit.."** button > select the **"NEW"** button > paste / specify the **Postgres bin** directory's path > and click on the **"OK"** button to save all the changes.
- This activity is based on the Hospital Management System scenario below.

Scenario.

Aim: ACE hospital is a multi specialty hospital that includes a number of departments, rooms, doctors, nurses, compounders, and other staff working in the hospital. Patients having different kinds of ailments come to the hospital and get checkups done from the concerned doctors. If required they are admitted in the hospital and discharged after treatment. The aim of this case study is to design and develop a database for the hospital to maintain the records of various departments, rooms, and doctors in the hospital. It also maintains records of the regular patients, patients admitted in the hospital, the check up of patients done by the doctors, the patients that have been operated on, and patients discharged from the hospital.

In the hospital, there are many departments like Orthopedic, Pathology, Emergency, Dental, Gynecology, Anesthetics, I.C.U., Blood Bank, Operation Theater, Laboratory, M.R.I., Neurology, Cardiology, Cancer Department, Corpse, etc. There is an OPD where patients come and get a card (that is, entry card of the patient) for check up from the concerned doctor. After making entry in the card, they go to the concerned doctor's room and the doctor checks up their ailments. According to the ailments, the doctor either prescribes medicine or admits the patient in the concerned department. The patient may choose either private or general room according to his/her need. But before getting admission in the hospital, the patient has to fulfill certain formalities of the hospital like room charges, etc. After the treatment is completed, the doctor discharges the patient. Before discharging from the hospital, the patient again has to complete

certain formalities of the hospital like balance charges, test charges, operation charges (if any), blood charges, doctors' charges, etc. Next we talk about the doctors of the hospital. There are two types of doctors in the hospital, namely, regular doctors and call on doctors. Regular doctors are those doctors who come to the hospital daily. Calls on doctors are those doctors who are called by the hospital if the concerned doctor is not available.

Description:

Following are the tables along with constraints used in the Hospital Management database.

1. **DEPARTMENT:** This table consists of details about the various departments in the hospital. The information stored in this table includes department name and its functions.

Constraint: Department name will be unique for each department.

2. **DOCTORS:** This table stores information about all the doctors working for the departments they are associated with. This table stores personal details of doctors like name, license_no, address, salary, date of joining and the type of doctors they are working (if they are regular or on-call). Each doctor is given an identity number starting with DR (if regular) or DC (if on-call) prefixes only.

Constraint: Identity number is unique for each doctor and the corresponding department should exist in the DEPARTMENT table.

3. **PAT_ENTRY:** The record in this table is created when any patient arrives in the hospital for a check up. When a patient arrives, a patient number is generated which acts as their identification. Other details like name, age, sex, address and entry date. After storing the necessary details, the patient is sent to the doctor for check up.

Constraint: Patient number should begin with prefix PT and Sex should be M or F only.

4. **PAT_CHKUP:** This table stores the details about the patients who get treatment from the doctor referred to. Details like patient number from patient entry table, doctor number, date of check up and diagnosis are stored. If a patient is admitted, further details are stored in the PAT_ADMIT table and if a patient is referred for operation, the further details are stored in the PAT_OPR table.

Constraint: Patient number should exist in PAT_ENTRY table and it should be unique.

All patients must be checked first before referring to an admit.

5. **PAT_ADMIT:** When a patient is admitted, his/her related details are stored in this table. Information stored includes checkup number, advance payment, mode of payment, room number, and date of admission.

Constraint: Checkup number should exist in PAT_CHKUP table. Admission will be referred once checkup is done. Room numbers must exist.

6. **PAT_OPR:** If a patient is operated on in the hospital, his/her details are stored in this table. Information stored includes admission number, date of operation and the doctor who conducted the operation. (assuming one doctor per operation)

Constraint: Admission number should exist in PAT_ADMIT table. The patient should be admitted first before referring to the operation. .

7. **PAT_DIS:** An entry is made in this table whenever a patient gets discharged from the hospital. Each entry includes details like admission number, treatment given, amount pay and date of discharge.

Constraint: Admission number should exist in PAT_ADMIT table.

8. **ROOM_DETAILS:** It contains details of all rooms in the hospital. The details stored in this table include room number, capacity and room type (general or private)

Constraint: Room number should be unique and room type can only be G or P.

TASK INSTRUCTIONS:

1. This is a by-pair activity.
2. Design an ERD based on the scenario above and identify the appropriate attributes and constraints (Primary Keys & Foreign Keys).
3. Create a logical schema of your ERD into the rdbms (postgresql / pgadmin 4) by creating tables.
4. Provide or insert sample meaningful data, at least 3 records in each table and follow the following constraints stated above.
5. Perform the following steps listed below. During your execution kindly record your screen and explain what is the purpose and process of each step. Make sure your voice is clear while explaining.

5.1 Create tables by executing the following commands and retrieve some of the requested data. Perform this in your windows command prompt / terminal or psql shell.

Note: blue color text indicates the commands to be executed and the red color indicates that you need to provide explanation. Provide your explanation during the screen video recording while you perform each step.

Step 1: Open command prompt / terminal or psql shell.

Step 2: type `psql -U postgres` -What is this command all about?

Enter your postgres password. This password is given during your postgres installation.

Step 3: enter command `CREATE DATABASE hospitaldb;` -What is this command all about?

Step 4: `\c hospitaldb;` -What is this command all about?

Step 5: Perform the following commands to create a schema or logical table in your database.

Syntax:

```
CREATE TABLE table_name (  
    column1 datatype(size),  
    column2 datatype(size),  
    column3 datatype,  
    ....  
    constraints(column)  
);
```

Step 6: Based on your ERD, create all the tables by typing the *CREATE TABLE* commands in your command prompt. I will be providing the first two tables as an example.

```
CREATE TABLE tbl_department (  
    dep_name varchar(30),  
    function varchar(50),  
    PRIMARY KEY (dep_name) -Explain what this line is all about?  
);
```

```
CREATE TABLE tbl_doctors(  
    id_number varchar(10),  
    name varchar(30),  
    license_no varchar(30),  
    addr varchar(30),  
    salary numeric (7, 2),  
    date_join date,  
    type varchar(10),  
    dep_name varchar(30),  
    PRIMARY KEY(id_number),  
    FOREIGN KEY (dep_name) REFERENCES tbl_department(dep_name)  
); -Explain what the last line is all about?
```

Step 7: Now, it's your turn to perform the other table creations.

More table creation syntax: https://www.w3schools.com/sql/sql_create_table.asp

List of postgresql Data types: https://www.w3schools.com/sql/sql_datatypes.asp

– adding constraints syntax –

Primary Key: https://www.w3schools.com/sql/sql_primarykey.asp

Foreign Key: https://www.w3schools.com/sql/sql_foreignkey.asp

Step 8: \dt - what is the use of this command?

Step 9: Insert at least 3 sample relevant & meaningful data to the created tables.

see here for more data insertion syntax: https://www.w3schools.com/sql/sql_insert.asp

Step 10: Now, it's time to retrieve the data. Explain your answer while executing the commands.

10.1 Perform a query for the following reports below. For dealing multiple tables, Join expression is mandatory to used:

- Display the total number of on-call and regular doctors who perform operations (e.g doctor type, total doctor)
- Display the list of patients who were admitted on January 02, 2023 only. (e.g patient's name, gender, checkup date, date admit & room number) note: make sure you have sample data for January 02, 2023 admission. Checkup date should be earlier than the date of admission.
- Display the list of patients who have been discharged from the year 2022-2023. (e.g patient's name, address, date of admission, diagnosis and room number)
- Display the lists of doctors who perform and not perform any operations yet in the year 2023. (e.g doctor name, license number, department name and date of operations)
- Display the list of rooms occupied and not occupied by patients. (e.g room number, patient name, diagnosis and date of admission)
- List the patients who did not undergo operation but were admitted to the hospital in March 2023. (e.g patient id, name, checkup date, date admission and room number)
- Display all the vacant and occupied rooms (e.g room number, type and date occupied), arranged from the vacant to the list of occupancy dates.
- Display the list of doctors who did not perform an operation on March 5, 2023. (e.g doctor name, license number, department name, salary and doctor type)

Submission Instruction:

In a long bond paper, write your answer in a handwritten format.
Your bond paper should have the following information:

- Names (*with your partner*) & Section.
- The ERD
- SQL commands in each problem set and
- The result or output of your query in each problem set.
- For your screen recorded video, submit your shared link in this google form:
> <https://forms.gle/hbnxXR2wXeCWmEa29>

Note: Encoded answers will not be accepted.
Deadline: September 4, 2024 @ 05:00PM