

IT 108 - Advanced Database Management System Case Study #1

Hospital Management System

Aim: XYZ 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.

Description: In 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.

Table 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, department location, and facilities available in that department.

Constraint: Department name will be unique for each department.

2. **DOCTORS:** This table stores information about all the doctors working for the hospital and the departments they are associated with. This table stores personal details of doctors like name, license_no, address, phone number, 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 a primary key. Other details like name, age, sex, address, city, phone number, entry date, doctor who accommodates. After storing the necessary details, the patient is sent to the doctor for check up.

Constraint: Patient number should begin with prefix PT. Sex should be M or F only. Doctors who accommodates must exist first.

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. One more field / attribute status is used to indicate whether a patient is admitted, referred for operation or is a regular patient to the hospital. If a patient is admitted, further details are stored in the PAT_ADMIT table. If a patient is referred for operation, the further details are stored in the PAT_OPR table and if the patient is a regular patient to the hospital, the further details are stored in the PAT_REG table.

Constraint: Patient number should exist in PAT_ENTRY table and it should be unique. All patients must be checked first before referring to admit, operation or as a regular patient.

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, department, date of admission and initial condition.

Constraint: Checkup number should exist in PAT_CHKUP table. Admission will be referred once checkup is done. Department, doctor number, room number must exist.

6. **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, treatment advice, amount pay, mode of payment and date of discharge.

Constraint: Admission number should exist in PAT_ADMIT table.

7. **PAT_REG:** Details of regular patients are stored in this table. Information stored includes checkup number, date of visit, diagnosis, treatment and medicine recommended

Constraint: Checkup number should exist in PAT_CHKUP table. There can be multiple entries of one patient as the patient might be visiting the hospital repeatedly for check up.

8. **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, number of the doctor who conducted the operation, type of operation and treatment advice.

Constraint: Admission number should exist in PAT_ADMIT table. The patient should be admitted first before referring to the operation. Only the supervising doctor should be recorded. Department, doctor number should exist or should be valid.

9. **ROOM_DETAILS:** It contains details of all rooms in the hospital. The details stored in this table include room number, room type (general or private), status (whether occupied or not).

Constraint: Room number should be unique. Room type can only be G or P and status can only be Y or N.

TASKS:

1. This is a team effort (maximum of 3 members only)
groupings link here: [groupings](#)
2. Design a relational database model for this case study and identify the appropriate attributes, Primary Keys & Foreign Keys as well as the cardinality in each table.
3. Execute your relational schema into the rdbms (postgresql / pgadmin 4) using the DDL commands
4. Provide or insert meaningful data at least 5 records in each table and follow the following constraints stated above.

5. Perform a query for the following requested reports below:
- Display the total number of on-call and regular doctors working in the hospital (e.g doctor type, total employees)
 - Display the list of patients who were admitted on July 17, 2023. (e.g patient's name, gender, checkup date, date admit & room number)
note: make sure you have sample data for July 17, 2023 admission. Checkup date should be earlier than the date of admission.
 - Display the list of patients who have not been discharged yet. (e.g patient's name, address, date of admission, diagnosis and room number)
 - Display the lists of doctors' names who perform operations in the year 2023. (e.g doctor name, license number, department name, operation type and date of operations)
 - Retrieve the list of patients who are referred to regular patients only. (e.g patient number, patient's name, doctor's name who accommodated during checkup and the referring status type)
 - Display the list of rooms occupied by patients. (e.g room number, status, date of admission and department name)
 - Retrieve the list of on-call doctors in a hospital (e.g identification number, doctor's name, license no, salary, department name, doctor type)
 - List the patients information who did not undergo operation but admitted to the hospital (e.g patient number, name, checkup date, status, date admission and room number)
 - Display all vacant rooms (e.g room number, type and status)
 - 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)

Note: Make sure you have 2-3 results data provided in each number that satisfy its report requirements.

6. Perform your actual answer in the pgadmin workspace. Before running your answer, explain the process why you come-up with that query. Make sure everyone from the group is able to explain the answer. Record your execution in the pgadmin using any screen recorder and upload it in your google drive.

Submission: Your submission should include the following:

1. List of members name;
2. Final ERD generated based from the case study;
3. Your query as per number report;
4. And the link of your recorded video.

Save it as a pdf document. Submit your pdf to the activity module in the LMS (make sure your video is set to public). Only one member can submit the document.

Note: Your score in this activity will be based on how you explain your ERD & the queries. Don't forget to introduce yourself first for easy identification. This is an individual score assessment.

Deadline: September 4, 2023 @11:59pm