NOTE: Please read this description carefully.

Part1: (E)ER design (25 point)

Hospital Database

The goal of this project is to develop a general database for a hospital that meets the following requirements:

- The hospital employs physicians and nurses who provide services to patients.
- The hospital comprises several rooms, each designated for patient accommodation.
- Each room has a unique number, capacity (number of patients it can accommodate), and a nightly fee.
- Each patient has a name, a unique ID, address, and phone number.
- Patients may have a health record that includes a unique ID for each patient, details of diseases, dates of diagnosis, status (e.g., ongoing, resolved), and a detailed description of their health condition.
- Each patient is assigned to a specific room for a certain number of nights during hospitalization. We record the check-in and check-out dates of a room for each patient.
- Each physician has a unique ID, name, certification number, field of expertise, address, and phone number.
- Physicians monitor assigned patients for specific durations.
- Each nurse has a unique ID, name, certification number, address, and phone number.
- Nurses execute physician orders with each execution recorded and its status noted.
- Nurses administer medications for patients. We keep the date of adminster and the type and amount of given medications.
- Physicians order specific instructions for patient care, each with a unique code, description, and associated fee.
- All care provided to patients, including room accommodation, medication, and executed instructions, are recorded as payables
- The hospital issues invoices with unique account number and issue date for each patient. Invoice has start date and end date and includes all the payables in this duration. Payable items such as room charges, medication, and specific instructions provided by physicians. Each payable has a amount, date, description and a unique id. The hospital may issue multiple invoices for

an account number with different issue dates.

- Patients pay payments to the hospital, and each payment is recorded with the date and amount paid. Hospital track the patient balance by substracting payments from total invoices' amount for each patient.

Note that the rest of the project, including mapping your (E)ER to the relational schema, and coming up with the correct set of relations, implementing the relations, populating the database, and defining queries, views, and triggers, depends on the first part

Grading criteria:

- The correctness of your designed EERD with respect to the given requirements and your assumptions
- Capturing all the entities and attributes of the universe of discourse
- Specifying the entity types including their primary keys and their attributes
- Specifying the correct relationships and the cardinality of the relationships and also attributes of the relationships
- Correctly specifying specialization/generalization and union if applicable.
- Correctly specifying the type of attributes, relationship, and entities (e.g. weak entity, identifying relationship, or derived attribute)

Part 2: Relational Mapping, Creating Database Schema, and Populating Database (25 point):

1- Using your EER design of Part1, map the conceptual design to a set of relations and also specify the primary key and foreign keys(s) of each relation. Use the following format for each relation:

RelationC(Attr1, Attr2, Attr3)

primary key: {Attr1}

foreign key: {Attr2 references RelationA(Attr1), Attr3 references RelationB(Attr1)}

2- Using relations, primary key, and foreign key, create a database schema in your MySQL environment.

The name of your database should be **hospital**.

Create hospital-schema.sql and put the following statements at the top of hospital-schema.sql:

DROP DATABASE IF EXISTS hospital;

CREATE DATABASE hospital;

USE hospital;

Put all create table, alter table, etc in hospital-schema.sql.

3- You need to populate your database with at least 5 tuples for each table. Put all insert statements in hospital-data.sql.

Grading criteria:

- Specifying the correct set of relations, including their primary keys and foreign keys (map your (E)ER to the relational schema)
- The correctness of your hospital-schema.sql
- The correctness of your hospital-data.sql
- Having at least 5 tuples for each table

Part3: Query, View, Trigger, Transaction and Final Report (50 point):

The outcome of this project is a working hospital database in the MySQL environment as well as a full report.

Your report must contain:

- A complete EERD that satisfies the requirements. Make sure the ERD is on one page. If you have improved the EERD based on the feedback on Part 1, describe what you have changed.
- The set of all used assumptions that are not covered by the given requirements.
- The set of relations, including their primary keys and foreign keys.
- The description, body, and execution result of your SQL queries. You need to include at leas **15 queries.** The set of queries must contain at least **three join queries**, **three aggregation querie**s, and **three nested queries.**
- The description and body of views. Also, include a discussion on why the provided view is useful for your database.
- The description and body of triggers. Also, include a discussion on why the provided trigger is useful for your database.
- The description and body of transactions. Also, include a discussion on why the provided transaction is useful for your database.

Your SQL query needs to have variety and contain more complex SQL queries. Queries such as the followings do not get any point:

```
select * from Room;
```

```
select * from Nurse;
```

```
select * from Physician;
```

Report Preparation

Your report is a very important artifact of your project, it should be a single file, clearly written and self-explanatory including the following **sections**:

1- Assumptions

- The set of all used assumptions that are not covered by the given requirements.

2- (E)ERD

- A complete EERD that satisfies the requirements. Make sure the ERD is on one page

3- Relations and keys

- The set of relations, including their primary keys and foreign keys.

4- Views and descriptions

- The description and body of views. Also, include a discussion on why the provided view is useful for your database.

5- Triggers and descriptions

- The description and body of triggers. Also, include a discussion on why the provided trigger is useful for your database.

6- Queries, descriptions, and results.

- The description, body, and execution result of your SQL queries
- You need to include your SQL query, their description, and a screenshot of the output results for each query separately.

7- Transactions and description

- The description and body of transactions. Also, include a discussion on why the provided transaction is useful for your database.

Grading criteria

- You need to include at least three views for your databases.
- You need to include at least three triggers for your databases.
- You need to include at least two transactions for your databases.
- You need to include at least 15 queries that cover the functionality of your database (the complexity of your query statements matters in this class)

- Your set of queries must contain at least three join queries, three aggregation queries, and three nested queries
- Your queries should be plausible.

Submission Instruction

- Each member of the group must submit **individually**, **write the name of all involved group members** in the preparation of the project **on your report**
- Create a folder named firstname_lastname_project (e.g. sara_riazi_project)
- Put your final report in the folder (your report must be in PDF format)
- Create a subfolder sqls and place all sql files (hospital-schema.sql, hospital-data.sql, hospital-query.sql) in it.
- Zip and submit on Gradescope.

Double-check the submitted file and make sure it is not empty.

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