Lab 3: Database design

Due date: Wednesday, April 24, 11:59pm.

This is a **team lab**. Each group submits one set of deliverables.

Lab Overview

This lab includes the following tasks:

- Revisit your Lab 2 design submission and enhance/update it to take instructor comments (once you receive them!), and unsatisfied customer requirements into account.
- Determine database constraints that are not expressible outright in the E-R model.
- Prepare the relational database schema for your design.

Assignment

Database Redesign

You received your initial design documents with instructor's comments on Wednesday, April 17, during the lab period.

Each team shall prepare a revised design document. The document shall contain a revised version of your Entity-Relationship model.

The redesign shall essentially follow the same structure as the initial design and shall contain the Entity-Relationship Diagram of the database, accompanied by the lists of entity sets (with all attributes, **and their types!**) and relationship sets (with any attributes, multiplicity specification and full lists of participating entity sets). All weak entity sets shall be identified together with their identifying relationship sets and owners.

The revision shall be prepared as a single, text-processed file. All figures, tables and diagrams shall be included in the design document. The document **shall contain the team name and the names of all team members**. You can combine the contents of the revision with the new material you have to submit into a single document.

Change Log

To simplify grading, and to simplify tracking the changes in your design, each team shall compile a changelog document. This document shall include the following:

- List of specific changes in the design of the database.
- List of responses to any instructor's comments on your Lab 3 submission, which were not addressed by the redesign (e.g., you believe that your original design already does what was needed).

The changelog shall be included at the top of the document you are submitting.

Database Constraints

The database you are designing may have consistency constraints that are not expressable in E-R model terms. Each team must be aware of these constraints and take care of them during the software development stages of the project.

For each constraint discovered by each team, the team will need to make an eventual decision on how this constraint will be dealt with. (The standard options are either to monitor the database, and resolve inconsistencies as they come, or prevent the constraint violation in the software by running appropriate checks).

You shall compile a list of the database constraints.

Note: At this stage, you need not make any specific decisions on **how** you will be dealing with each constraint. You are simply asked to enumerate them.

Logical Database Design

Based on your E-R model design and redesign, each group shall prepare the initial logical database design.

The logical database design is the relational database schema obtained from your E-R diagram. Each group shall prepare the following:

- Database description, which consists of the following information:

1. List of relational tables in the database.
2. For each relational table, list of all attributes.
3. Identification of primary keys for **all** tables.
4. Identification of any foreign keys (this can be done on separate lines, in the form, `"Attributes X, Y, Z are a foreign key referencing table R"`.
5. Specification of any constraints on the database that cannot be preserved in the database schema, but must be kept track of by the software (see above).

- SQL DDL commands creating the database.

Submission Instructions

Submit the following deliverables.

The following deliverables shall be submitted on the due date:

1. **[Hardcopy]:** your **original** Lab 2 submission — **the one with all the comments**. I will be using my comments to your Lab 2 submission to judge your Lab 3 submission. Hand it to me during the lab period on Wednesday, April 24. I am happy to make a copy for you, but I need to see my original comments when grading your new submission.
2. **[Googledocs]:** the E-R model redesign document.
3. **[Googledocs]:** the change log.
4. **[Googledocs]:** the list of constraints.
5. **[Googledocs]:** logical database design document.
6. **[Googledocs]:** electronic copy of the DDL commands. Name the file `DB-setup.sql`.
7. **[Googledocs]:** electronic copy of the DDL commands deleting all the tables in the database. Name the file `DB-cleanup.sql`.

Please note, the first four googledocs deliverables: the E-R model, the change log, the list of constraints, and the logical DB design can (and probably should) be submitted in the form of a single document. The remaining two SQL scripts must be submitted separately.

Please make sure the name of your team appears in all filenames (I will be placing them in a single directory on my googledocs drive, want to make sure no filename conflicts arise).