Milestone 3

CSC 261/461 (Introduction to Databases), Spring 2022,
University of Rochester
Due Date: 04/15/2022 (11:59 pm)

Introduction

This milestone has both theoretical and application components. In the first part, you will provide us the functional dependencies present in all the relations (or tables) that you are using. Then you will convert these relations into BCNF (Boyce–Codd normal form) if the relations are not in BCNF already.

For the second part, You will work on mostly `HTML` and `PHP + SQL`. This is the first time you will share your database with the whole world (or at least with everyone in UofR). In this last milestone, you will transform the logical design of your database into a physical design. You will populate your tables and provide us 'real' interfaces for interacting with the database.

Task A: BCNF Normalization

A relational schema R is in Boyce–Codd normal form if and only if for every one of its dependencies $X \to Y$, at least one of the following conditions hold:

- $X \to Y$ is a trivial functional dependency ($Y \subseteq X$)
- X is a superkey for schema/relation/table R

  For this milestone, you need to make sure all of your relations are in Boyce-Codd normal form. Provide us a list of dependencies for each relation. Decompose them if the tables are not in BCNF. After the decomposition, all the resultant relations should be in BCNF.

  If you decide to keep a particular relation in 3NF instead of BCNF, justify the decision. (Hint: Lossless and/or Dependency preserving decomposition). Submit `TaskA.pdf` which contains the details of the transformation from the initial schema to the final schema where all the relations are in BCNF. This file should also contain all the functional dependencies you have started with. Note: It is quite possible that your initial schema is already in BCNF and in that case you just need to provide us the functional dependencies and convince us that the relations are already in BCNF.

Task B: Create forms using HTML

In Milestone 1, you gave us your web-interface as images. This time you will provide these as HTML files. Provide us a list of `HTML` files for the interface. These interfaces are mostly used for collecting input from the users. This task does not require any PHP coding or database connectivity. We are only interested in the interface. You may additionally want to add `css` files for styling, and `javascript` files for input validation if required.

Put all the `html, css, javascript` (if any) files into a directory `taskB`.

Task C: Creating and loading relations

In Milestone 2, you have designed the relations (table) required for your project. For this milestone, you will create the actual relations. Create a file `create.sql` which will create all the tables in your database. Load these relations from data files (tab or comma separated files). The tab or comma separated files can be created by you (dummy values) or you can provide the sources. Create a `load.sql` file for bulk loading.

Create a `readme.txt` file which states the source of your data.

Put `create.sql`, `load.sql`, all the `.dat` files(or `.csv` files, or data files in any other format) and a `readme.txt` file into a directory `taskC`.

(Note: `create.sql` and `load.sql` files should have the table structure as defined in the previous milestones)

Task D: Accessing the relations from Web

For Task D, all we need is an address of a web page on Betaweb server. This webpage should contain links to view the content of each relation/table you created in Task C.

Save the address of the web page as `taskD.txt`. This file should also contain a brief description of contributions made by each member. We expect to see an even distribution of the workload.

Submission instructions

Create a new directory `milestone3`. Copy file `taskA.pdf`, directory `taskB`, directory `taskC`, and `taskD.txt` to `milestone3`. Compress the folder as `milestone3.zip`.

Submit the zip file on BB as usually.

(*) Note: One submission of the compressed file per group is sufficient. In addition to the group submission, each member of the group must individually submit an independent evaluation for all members (including themselves) with: a grade out of 5 (max), a brief description of the contribution of each member in all milestones and an opinion on their overall work and contribution in the project.

Important Note on Grading

This milestone will be graded as follows:

1. 80% of the points will be determined based on the quality of the group submission.
2. 20% of the points will be determined based on individual evaluations.
3. We reserve the right to give extra points up to a maximum of 20% for submissions that go above and beyond the requirements with respect to: user interface, styling, functionalities of the code, etc.

Acknowledgment

Contents adapted from a previous version of the project by Tamal Biswas.