School of Computer Science, McGill University

COMP-421B Database Systems, Winter 2015

Programming Project 1: Data Modeling

Due date: Feb 2nd, 10:00 AM

In the programming project of this course, you will develop and build a database application for a real-world domain. Step by step, you will design a schema, create a database using DB2/PostgreSQL, populate your database with data, maintain, query and update your data, develop application programs, and implement a user-friendly interface. The interface can be very simple so no requirement for web-programming, etc. You will only use a standard programming language in the last project deliverable. The course itself will cover Java but you can use another programming language (with approval from the instructor and the TAs). Each team turns in one solution for each project deliverable.

If you fulfill the requirements below you will receive a total of 90 points (representing a solid A). You can get a 100 points on a deliverable if you do something that is beyond what is exactly required and described in the individual tasks or you do something that is extremely high quality

For this first deliverable, you could get the extra 10 points, e.g., by providing an external well formulated requirement analysis, or a more sophisticated / larger E/R schema than required.

1 Assignment

In this first assignment you have to choose an application domain and design your database. Below are several possibilities. But you can choose any other application that can be typically found on the Internet. If you choose an application not listed below consult with me to see whether it is ok. You have to perform the requirement analysis for your application, design an entity-relationship schema (E/R) for the data described in the data analysis, and translate it into relational model. Choose an application you are interested in; then you will have more motivation doing the assignments!

The application should be substantial but not too big. Consider a range of 6 to 10 entity sets, and a similar number of relationship sets. The model should include different kinds of relationships and different data types. Do not force features such as weak entity sets or is-a relationships if they are not appropriate.

You have to turn in the following:

1. (35 Pts) A requirement analysis of the application. This is a half-formal specification. It should list in a coherent way all data that needs to be stored in the

database (data requirements), and the operations that need to be executed on the data (functional requirements). If there are any unique or difficult aspects, point them out. Be precise about the real-life concepts that you want to model, their relationships etc. Also consider constraints, restrictions or special requirements that your application might have. An example of how such a description should look like can be found in the written assignment which will be handed out soon. Your description is expected to be more detailed.

2. (40 Pts) An E/R diagram including your data requirements. Be careful not to forget to underline key attributes, indicate the types of relationship sets, etc. If there are any constraints within the application that you cannot depict in the E/R diagram, point them out.
3. (15 Pts) Use the method for translating an E/R diagram to relations described in class and depict each resulting relation in the form RelationName(attr1, attr2, … , attrn) underlining the key attributes (e.g. Students(sid, name, age, gpa)). Are there opportunities to combine relations without introducing redundancy? If so, indicate which, and if not, tell us there are none.
   Note: You do not yet need to give the SQL create statements or decide on the data types.
4. (0 Pts) Indicate one or two web-sites that inspired your design

2 Project Topics

Below are several pretty widely defined topics that your application could be chosen from. Of course, You have to decide on a more specific domain/area/application/enterprise within the topic and do research on what are the specific characteristics of the application.
The data you want to store should be realistic in the sense that for the chosen application domain, this is really the information that is relevant and should be maintained.

- A Private Online Social Network System POSN. The application includes a collection of tables and a form-based user interface to provide the various activities and services provided by the POSN. The POSN system enable members in a privately running server to share information and ideas. It provide services for people sharing interests, activities, and backgrounds among themselves. The POSN system allow its members to create a profile, to create a list of other members with whom to share connection, and to view and cross the connections within the system. It also allow members to interact among each other via e-mail and instant messaging as well as sharing ideas, pictures, posts, activities, events, interests with members in their network. Also, it allow members to create groups that share common interests or affiliations, upload or stream live videos, and hold discussions in forums.
- A management information system for the administrators of the hospital in order to facilitate viewing/tracking of various information on patients who visited or admitted to the hospital as well as information on the doctors, nurses, and administrative staffs in different departments.
- An online shopping system.

If the application you would like to develop does not fit within any of the given topics, please talk to me to check whether it is ok.

I DO NOT ACCEPT

- A university database.
- An airline company.
- A general purpose enterprise consisting of employees, projects, products, etc. Although your application might include any of these entity sets, you should choose a more specific enterprise (what kind of products, projects, etc.).
- A database that resembles the example database project that is provided from the previous year.