Fall 2010 CS 3200 Class Project: Milestone 2

The goal of this milestone is to practice ER modeling. This milestone is to be completed individually (i.e., no teams). You can discuss problems with other students, but you have to create all deliverables yourself from scratch. In particular, it is not allowed to copy somebody else's code or text and modify it.

The report for this milestone is due on Friday, **September 24 at 5pm**. For late submissions you will lose one percentage point per hour after the deadline. This milestone is worth 10% of your overall homework score. Please email the deliverables to both me and Yue. You should receive a confirmation email from either of us. If you need to send multiple files, please create a single zip file. Many other attachments types, in particular rar files, are rejected by the CCIS mail server.

Practicing ER Modeling

Exercise 2.2 from the textbook.

Project Scenario

Extending our example from class, the goal is to design a database for all freshmen dorms to help track the flow of certain objects and social networking. You receive the following specifications:

1. There are several dorm buildings, each with 10 to 40 rooms. A dorm room houses between 1 and 4 students, but some might not be occupied. Every student can live in at most one dorm room and all students in our application live in some dorm room.
2. Every dorm building has the following staff: exactly one dorm manager, one or more janitors, and one or more counselors. Each dorm manager and dorm counselor is responsible for at most one dorm. Janitors might work for multiple dorm buildings.
3. Students living in the dorms and staff working there own CDs, DVDs, books, and video games that they would like to share. Each object is owned by a single person, and there are no items without owner. Since different people might own copies of the same item (e.g., many students in CS 3200 own the textbook), owners appropriately mark their items to distinguish these copies.
4. An owner can lend an item to a single borrower. The borrower can pass this item on to another person, but only if the new borrower is a friend of the owner. Similarly, that borrower can further pass it on to yet another borrower, as long as that borrower is also a friend of the owner, and so on.
5. Friendship status is determined based on personal messages sent from one person to another, i.e., each message has exactly one sender and one recipient. Each message is classified as being "nice" or "mean" (e.g., by a data mining tool). Person A is considered a friend of person B if in the last 30 days B sent at least 10 messages to A, A sent at least 5 messages to B, and for both directions at least 90% of the messages were "nice".
6. Every time somebody borrows an item, both participants of this exchange can rate each other. However, neither person is required to submit a rating. A rating consists of a number of stars between 1 and 5, plus an optional text comment. Ratings can only be submitted after the item

was exchanged, and a rating has to be submitted within 2 weeks of the exchange. Within those two weeks, the text can be updated any time, but the star rating cannot.

7. To discourage unlimited free-riding, a person should only be able to borrow another object, if the number of objects currently borrowed by this person does not exceed the number of objects that person has lent to others by more than 10. In addition, at no time should anybody have more than 2 borrowed video games.
8. Students are worried about items getting lost and therefore want to enforce the following policy: Whenever an item belonging to a student living in building X is passed to a student living in another building Y, the owner should be notified.
9. To encourage good behavior, people want to be warned when an item exchange involves a person whose rating is among the bottom 5% of all users and also below 3 stars. In particular, if the borrower has such a low rating, and the lender is not the owner of the item, then the owner should receive a notification stating the following: which item was passed, who borrowed it from whom, and where does the borrower live.
10. Whenever a person's average rating drops from above 2 stars to 2 stars or lower, all owners of items currently borrowed by that person should be notified with the following information: whose rating fell, old rating, new rating, room number and building where the borrower lives.

Deliverables

Create a report for this milestone with the following content:

1. Solutions for the textbook exercise.
2. ER diagram for the project scenario.
    a. Like in the real world, some specifications might be ambiguous. If that affects your ER design, make common-sense decisions for how to resolve them and briefly explain the problem and your solution in the report. In practice you would have to clarify these issues by talking to your "customer". For this project, let's assume the customer cannot give you more information. Of course, you can still contact us, but only for **major** issues. We want you to make your own design decisions, not try to guess ours.
    b. Remember that ER diagrams cannot represent certain constraints. You also cannot express queries or notifications. But you need to make sure that the diagram contains all entities, relationships, and attributes necessary for producing the information needed for these queries and notifications.
    c. If you find it difficult to model all entities and relationships together, start by modeling the individual requirements separately. Then see how they fit together.
    d. Some entities might participate in many relationships. For readability, you can duplicate entities in the diagram, i.e., draw the same entity rectangle multiple times. This is equivalent to attaching multiple relationships to a single box, but more readable if entities participate in more than 4 relationships.

You can draw the diagrams by hands and scan them, or better yet, use some drawing tools like those built into PowerPoint. To fit a large picture, just zoom in enough when drawing or use a bigger canvas.