Assignment #1: ER Modeling

Submission Instructions

Due: Friday, 2/2/2017 at 11:59 pm

- Submit your solutions as a Word or PDF file through **Canvas>Assignments>To-Do**.
- ***If you do not follow the instructions, your assignment will be counted late.***
- Late Assignment policy: All assignments will be assessed a 50% penalty (subtracted from that assignment's score) for the first day (i.e. 24 hours) they are late. No credit will be given for assignments turned in more than 24 hours past the deadline.

Evaluation

Your diagrams will be graded using several factors:

- The correct identification of entities and attributes.
  - Make sure each entity has a primary key (a unique identifier) underlined.
- The correct identification of relationships between your entities.
- The identification of cardinality between entities (one-to-one, one-to-many, or many-to-many).
- The correct identification of relationship attributes.

Plagiarism and Academic Dishonesty

Please note that the work needs to be done individually. If you need help, you may consult with the instructor. Check the course syllabus for more detailed information. The following considered plagiarism and/or academic dishonesty (not an exclusive list):

- Copy from another student's assignment
- *Using material from a source without a proper citation*
- *Turning in an assignment from a previous semester as if it were your own*
- *Having someone else complete your homework or project and submitting it as if it were your own*
- *Using material from another student's assignment in your own assignment*
- *Submitting work done for a different course or section without the instructor's approval ahead of time*
- *Helping others to plagiarize or cheat, or doing the work of another person*

If you use text, figures, and data in reports that were created by someone other than yourself, you must identify the source and clearly differentiate your work from the material that you are referencing. There are many different acceptable formats that you can use to cite the work of others. You must clearly show the reader what is your work and what is a reference to somebody else's work.

Plagiarism and cheating are serious offenses. Penalties for such actions are given at my discretion, and can range from a failing grade for the individual assignment, to a failing grade for the entire course, to expulsion from the program.

Create an ER model for each scenario. There are two scenarios in total.

Make sure that you read the description carefully. Your diagram should reflect all entities, relationships, and attributes in the description. You should make sure each entity has a primary key (a unique identifier). Use the relationship types (i.e. cardinality) we used in class (one-to-one, one-to-many, or many-to-many). Don't forget, attributes can describe both entities and relationships.

You must create your diagrams electronically, and they cannot be hand-drawn. Use ERDPlus to create your diagrams (https://erdplus.com/#/standalone). It's free, and there is a short YouTube tutorial on the course website that shows you how to create ERDs using ERDPlus and export the diagrams as a graphic which can be placed into a Word document.

Scenario 1: Safety Incident Database for Amusement Park

A medium-sized amusement park in suburban Philadelphia is required to keep a record of all safety-related inspections and incidents (such as accidents) for each ride.

A ride is described by a name and type. An operator is described by first name, last name and social security number. Each time an operator runs a ride at the park, the date and shift are recorded (there is only one operator each time a ride is operated). Each ride has at least one operator, and different operators may run the same ride over time. Operators may be included in the database even if they haven't operated any ride (i.e., new operators with no ride), and an operator may run different rides.

An incident involves both a ride and an operator. All operators and rides are included in the database whether or not they've been involved in a safety incident. (Hence it is possible that there are operators who have no incident; similarly, it is possible that there are rides without incident). When an incident occurs, its date and time are recorded along with a description of the incident.

Inspection records are also recorded in the database. An inspection occurs at a particular date and time, with a numeric score from 1 to 5, and notes about the outcome of the inspection. There is only one ride per inspection, but a ride can have multiple inspections over time. A ride may be included in the database even if no inspection has been performed yet. Inspectors may be included in the database even if they haven't performed any inspection, and can perform multiple inspections. The information that needs to be recorded about the inspector is first name and last name.

Scenario 2: Tracking Trips for the SchUber Taxi Service

A new Philadephia startup called SchUber is a matching service between freelance taxi drivers and passengers. The database to support the service tracks trips, passengers, and ratings that drivers and passengers can give each other.

The basic transaction for SchUber is the trip. A trip is described by the date and time the trip occurs and the fare. A trip involves one driver and at least one passenger. A driver has a first name, a last name, a social security number, and an email address. Drivers' information is collected before they start offering any ride (hence it is possible for new drivers to have no trip yet). A passenger has a first name, a last name, and an email address. Note that only passengers who paid the fare are recorded. If there are multiple passengers on a trip, they can split the fare, and each of their paid amounts should be recorded in the database.

The database keeps track of addresses. An address is described by the street address, city, state, and zip code. A trip is associated with exactly two addresses, an origin address and destination address. An address can be included in the database even if it is not associated with any trip.

Passengers have the option to associate one address with their account (their home address) – this is useful for billing and for making a request for a home pick-up. Some addresses may not be associated with any passenger, and some addresses are associated with multiple passengers.

The rating system is one of the key features of SchUber. Both drivers and passengers can have ratings, although some of them may not have any ratings, especially if they just started with the service. When a driver or a passenger submits a rating regarding a trip, they give a numeric score (1 to 5), a brief comment, and the type of rating (i.e., for driver or for passenger) is also recorded. Therefore, each rating is associated with a driver, a passenger, and a trip. A trip may have no rating at all, or could have multiple ratings (for both the driver and the passenger, or if there were multiple passengers on the trip). A driver or a passenger may have no rating at all, or could have many ratings over time.

Frequently Questioned Answers

1. Can I have **three** entities linked to the same relationship?

    - No. Each relationship is linked to exactly two entities.

2. Would it be possible to have three entities, all related to each other (like a loop)?

    - Yes. That is possible. If you have three entities, A, B and C, it is possible to have three relationships (A-B, B-C, and A-C).

3. Can I use the assignment instructions from another session or previous years?

    - No. The assignment details may be different.

4. Can I work with another student on the assignment?

    - Discussion among students is encouraged. However, the assignments should be done individually and should represent your own work.

5. Would there be foreign keys in an ERD?

    - No. There is no foreign key in an ERD. Foreign keys are added when we convert an ERD to a schema.

6. If the problem statement does not mention primary keys, do I need to manually add primary keys?

    - Yes. In the ERD, you need to have a primary key for every entity.

7. How to insert an image in Word?

    - For some of the assignments and exercises, you need to put images into a Word document. Here are a few ways of inserting an image to a Word document.

        1) **Inserting an image file into Word.** If you have an image file (such as .png from ERDplus), follow the instructions here: Insert pictures in Office 2013 and Office 2016
        2) **Capturing screenshots.**
            - If you have Windows, you can use Snipping Tool provided by Windows to capture screen shots: Use Snipping Tool to capture screen shots
            - If you have Mac, you can press **COMMAND+SHIFT+4** simultaneously to snip a specific area of the screen. Here are the steps: How to take a screenshot on your Mac
        3) **Converting Powerpoint objects.** You can copy an object from Powerpoint, and paste it into Word as an image. Here are the steps: How to Convert PowerPoint Objects to Word Pictures