Introduction to Data Management AY2022

Exercise 2. Entity-Relationship Modelling

Dates

Class session: June24th (Fri). Submission due**: June 30th (Thu)**.

Submission

Please submit your solutions as the following package:

1. *xml* file(s) containing your ER diagram or diagrams if many;
2. image files (*jpg* or *png*) containing diagram(s) converted to images;
3. text file with the brief description of your ER model. Please write some explanation of your model. You can use any document editing software.

Scope

For a suggested subject domain and its description, you define and describe a possible ER model containing major entities with their attributes and basic relationships between the entities. Unlike to exercise 1, in exercise 2 you create **your own diagram from scratch** (no sample diagram provided).

Instructions

We use the browser-based **draw.io** editor, which works on any platform we have in computer classes.

Please access the editor at https://www.draw.io/. Before working on your own project read the user manual at https://support.draw.io/display/DO/Draw.io+Online+User+Manual. Save your diagrams as *xml* files and try to open the saved file. Export your diagrams in an image format, such as *png*.

1. Select your problem according to individual assignments (see below how to know your problem)..
2. Read the problem description (find below the *Problem Description* assigned to you).
3. Design your model and draw the corresponding ER diagrams.
4. Export the diagrams to PNG image.
5. Write your explanations in a separate document.
6. Prepare a zip archive and submit your solution.

Useful Sources

In order to learn more about ER diagrams, please use the lecture materials.

In addition, for your self-study and better preparation for the exercise, the following sources are very helpful:

https://en.wikipedia.org/wiki/Entity%E2%80%93relationship_model

https://www.smartdraw.com/entity-relationship-diagram/

https://creately.com/blog/diagrams/er-diagrams-tutorial/

Grading

The grading criteria are as follows:

- Your design contains a relevant number of entities and relationships with their necessary attributes. Just for your orientation: good solution should include 5-10 entities.
- You appropriately used strong and weak entities/attributes.
- You correctly decided on whether the relationships are one-to-one, one-to-many, zero-to-many, mandatory-one-to-many, etc.
- Your diagram is well structured and readable.
- You provided clear explanations about your model.
- You prepared your submission as requested.

The diagram gives you up to 60% of your score, your explanation file and submission gives you up to 30% of your score. 10% of your score are about your submission preparation (correct archive, correct submission name).

Assignment

Your individual assignment is as follows:

Your student ID ends with…	**Your problem**
0 or 5	A
1 or 6	B
2 or 7	C
3 or 8	D
4 or 9	E

Example: if the student ID is s1250003**3** (thus, the last digit is 3), the assigned problem is **D.**

Use the problem description according to your assignment. Below you can find all the problem descriptions.

Every problem description gives you some orientation about the suggested subject domain for your ER modeling exercises. **We encourage you to be creative and to think about possible extensions of the suggested problem.**

Points to note

1. Please think about necessary attributes of each entity you decide to include to your model.
2. Please pay attention to the relationships between the entities you define.
3. **Feel free to extend the suggested model with respect to your own experience. Show your creativity!**

Problem A. Banking

A customer is a client of a bank, where this customer may have several bank accounts. Bank may have many customers with their individual accounts. Each customer may have one or more accounts. At least one account is required to become a bank client. Bank account cannot be uniquely identified by its own attributes, but relies on bank entity. The customer may access the account by using bank machines, online system, or by contacting bank managers. A bank machine is attributed by its location. Online system is accessed via user login and one-time password. One-time password is generated and sent to a registered user's mobile number. A bank manager belongs to a particular bank branch. A bank may have many branches. A bank branch should have location attribute.

Problem B. Software Bug Tracking

A bug tracking system work with many projects. Each project belongs to a project owner. Project owners is a user with e-mail used as ID. A software project consists of several milestones. A project team works on the project. A team includes many engineers (at least one). Team members should be registered users of the system. One of team members is a project owner. Each milestone has the deadline date/time and the short name. A milestone includes a number of tasks. Tasks have IDs, descriptions and date/time deadline. Tasks are assigned to engineers. The team leader (only one in the project) is responsible for task assignments and marking the tasks as completed. An implementation is a developed solution for the task. Bugs can be reported for implementations. There could be no bugs or many bugs associated with an implementation.

Problem C. Museum

A museum has its name. A museum consists of several buildings (at least one). A building has its name and location. There are many rooms in each building. Each room has its number and area. Rooms cannot be uniquely identified, but in the context of the building. Exhibits are exposed in museum rooms. An exhibit is characterized by its name, unique ID, year of creation, year of acquisition. In principle, exhibits can be moved between the buildings and even between the museums, so they can be identified by its own attributes. A visitor can rent an audio guide. The audio guide contains a number of routes in the museum. Each route includes room descriptions. A room description includes the exhibit highlights with images and explanations. Museum can hold temporary exhibitions. Exhibition can include the exhibits from this or other museums.

Problem D. Baggage Delivery

A baggage delivery company delivers the items of its customers. A customer has a name, an address, unique e-mail address, and registered phone number. Customers may reserve an item pick up time and address. Customers may use different delivery companies. A delivery company has its own sorting centers belonging to the company. One baggage order may include several items to be delivered as one pack. At least one item should be in a baggage order. Every baggage item has a tag containing a unique baggage item number, a sender's address, a destination address, a receiver's phone number.

Problem E. Airlines

An airline company uses one or more airplanes. An airplane has a model number, a unique registration number, and the capacity to take one or more passengers. A flight has a unique code, a departure airport, a destination airport, a departure date and time, and an arrival date and time. An airport has the unique airport code and location information. An airline company may have its main airport. Each flight is carried out by a single airplane. However, an airplane may serve several flights of different airline companies (shared flights). A passenger has given names, a surname, and a unique email address. Passengers book flights.