

Introduction to Data Management AY2022

Exercise 1. ER Diagramming Basics

Dates

Class session: June 17th (Fri). Submission due: **June 23rd (Thu)**.

Submission

Please submit your solution as the zip package containing the following:

1. *xml* file (containing your ER diagram);
2. image file (*png*) – your diagram converted to a PNG image.

Scope

You extend the sample diagram describing the basics of university academic process. Please download this sample from Moodle (academic-er.xml). You are about including some more entities with their attributes and relationships so that to extend the given model.

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>. Try to experiment with the basic shapes available by using the palette toolbox. Try to put some texts inside the shapes and connect them. Save your diagram as *xml* file and try to open the saved file. Learn how to export your diagrams in other formats, particularly such as *png*.

1. Download the sample diagram **academic-er** from Moodle.
2. Open this diagram in draw.io.
3. Extend the diagram according to the requirements (see *Problem Description* below).
4. Save the extended diagram.
5. Export the diagram to PNG image.
6. Prepare a zip archive and submit your solution.

DO NOT FORGET TO SAVE YOUR DIAGRAM, before leaving the draw.io page. Unsaved diagrams could not be restored. Please be accurate.

Problem Description

The given sample diagram describes the following:

The university offers one or more programs. A program is made up of one or more courses (at least one). A student must enroll in one program. The courses are parts of the program. A program has a name attribute. A course has the following attributes: name, capacity and course ID. Students have names and IDs.

The following entities and relationships are used in the sample diagram:

- `Student` is a strong entity, with an `ID` attribute used to distinguish between students, and `name`.
- `Program` is a strong entity, with the program name.

- Each student must be enrolled in a program, so the *Student* entity participates totally in the many-to-exactly one *enrolls_in* relationship with *Program*. A program can exist without having any enrolled students, so it participates partially in this relationship.
- *Course* has meaning only in the context of a *Program*, so it's a weak entity with weak attributes. As a weak entity, *Course* participates totally in the many-to-one identifying relationship with its owning *Program*. It is assumed that the program must include at least one course.

Extend this diagram by supporting the following:

1. A Program has total credit points required to graduate (attribute).
2. A Teacher teaches one or more courses.
3. A Course must have at least one teacher.
4. A Student has the year of first enrollment (attribute).
5. A Manager coordinates the Program and notifies students (use a simple directed association relationship).
6. A Student must have one Academic Record. Academic Record has meaning only in the context of Student.
7. An Academic Record is considered as an entity with attributes "credits collected" and "average score".
8. A Teacher can access and modify the student's academic record.
9. There are Compulsory and Elective Courses.
10. A Program consists of Compulsory Courses.
11. A Teacher can teach several Elective Courses (but may have no Elective Courses at all).
12. A Student must be enrolled in one elective course regardless of the program she is enrolled in.

Grading

The grading criteria are as follows:

- You included all the necessary entities and relationships.
- 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.
- You followed all the requirements.
- Your diagram is well structured and readable.
- You prepared your submission as requested.