



Database Management Systems, Spring 2024

## **Homework 3: ER-design**

by Hildur Davíðsdóttir & Björn Þór Jónsson

### **Introduction**

The goal of this homework assignment is to train you in designing an ER-diagram based on a requirement specification. To that end, we give you 10 requirements, and you must produce a PDF file with an ER-diagram. If you have any questions, please ask us on Piazza.

## Deliverables

This project is a group project, with **3** students per group (you must form your own groups). The deadline is at **23:59 on Sunday, March 3<sup>rd</sup>**. Individual submissions will not be accepted unless you have been granted permission by the teachers. Late submissions will **not be accepted**. Each group must submit one file to **Gradescope**: A PDF file named ER.pdf.

## Instructions

The ER-diagram must reflect the requirements below as strictly as possible, using the ER-notation of the PDBM textbook, with amendments made in lectures. You may not extend the notation to fit the requirements; where the ER-diagram cannot implement (part of) a requirement, it should not do so. We strongly recommend using software to create the diagram (for example draw.io); if it is hand-drawn, then it must be drawn very clearly.

## Requirement Specification

The language department in Awesome University wants to build a language learning platform for their students. Furthermore, they have chosen you as their database designer. The first step is to create an ER-diagram. These are their requirements:

- A.** (10%) The database must keep track of all languages that are taught on the platform. It should store their ID, name, and the number of native speakers in the world.
- B.** (10%) The platform hosts language courses. Courses have an ID, name, start date and a difficulty level. Each course covers a single language but there can be multiple courses covering the same language.
- C.** (10%) To use the platform, one must sign up as a subscriber. Each subscriber has an ID and their name, unique username and unique email are also stored. All subscribers are teachers and/or learners. For learners, their last login date is stored as well as experience points (XP) that they can collect on the platform.
- D.** (10%) For teachers, their unique phone numbers are stored, as well as their office hours. Their bank account number is also stored (divided into bank, ledger, and account number). Courses are taught by a single teacher, but a teacher teaches one or more courses.

- E.** (10%) Learners can be registered to courses. Courses are cancelled if fewer than 10 learners sign up. Moreover, learners can review teachers, regardless of whether they are registered to a course of theirs. However, since the same subscriber can be a teacher and learner, it is important that learners cannot review themselves as teachers. In each review, the learner gives stars from 1 to 5. A single learner can review the same teacher multiple times.
- F.** (10%) Each course has at least one milestone. Milestones have IDs and credits. Learners make progress in the courses that they are registered to by completing the milestones within it. When a learner completes a milestone, their grade is stored.
- G.** (10%) Milestones can stand alone (such as reading material, etc.), but they can also be divided into either Assignments or Exams. Assignments have a due date, and exams have a date and duration.
- H.** (10%) Exams can be partitioned into one or more questions. Each question in an exam is identified with its number on the exam. The questions' text and weights are also stored.
- I.** (10%) Learners can follow each other on the platform. Learners may be part of squads for studying together or socializing. Each squad has an ID, a name, and an optional address of their meeting point. Of course, a squad is not a squad if it has no members! Squads can be associated to a specific language but that is not a requirement.
- J.** (10%) Furthermore, the university has decided that teachers may nominate selected learners and squads for sponsorship. These sponsees must be kept track of. Sponsees have an ID and the grant amount they receive is also stored. A teacher may nominate the same learner/squad multiple times, but only once per year.

