

DAT475 / DIT930 Advanced databases

2021-2022, Study Period 4

Assignment 1

Background

In the introductory databases course, a text description of a domain is provided and students are asked to draw an Entity-Relationship (E-R) diagram based on the text. The students then use “mechanical” rules to generate a good relational design from the E-R diagram. In the first assignment in this course, we’ll go in the opposite direction, starting with a relational design and constructing an E-R diagram that covers the information that is present in the relational design. However, the relational design is not a good one! So you should make some improvements as you construct the E-R diagram.

Task description

Draw an E-R diagram based on the following relational design.

SeniorTeachers(teacherId, name, dept, division)

TeachingAssistants(teacherId, name, dept, division).

These can be currently registered students who are employed part-time as teaching assistants,
or they can be PhD students who are employed full-time.

Programmes(programmeCode, programmeName, dept, director)
director → SeniorTeachers.teacherId

Courses(courseCode, courseName, credits, level, dept, division, ownedBy)
ownedBy → Programmes.programmeCode
level is one of “first cycle” or “second cycle”.

programmeCourses(programme, academicYear, studyYear, course, courseType)
programme → Programmes.programmeCode
course → Courses.courseCode
studyYear is “1” or “2” for Master’s programmes and “1”, “2” or “3” for Bachelor’s programmes.
courseType is one of: “compulsory”, “compulsory-elective” or “elective”.
Programmes can include different courses in different academic years.
The same course could have a different courseType in different academic years.

CourseInstances(courseCode, studyPeriod, academicYear, instanceId, examiner)
courseCode → courses.courseCode
examiner → SeniorTeachers.teacherId

CoursePlanning(course, planningNumStudents, seniorHours, assistantHours)
course → CourseInstances.instanceId
planningNumStudents is the number of students used for planning course resources
seniorHours is the estimated number of senior teachers’ hours that the course will need.
assistantHours is the estimated number of teaching assistant hours that the course will need.

AssignedHours(courseCode, studyPeriod, academicYear, teacherId, hours)
(courseCode, studyPeriod, academicYear) →
CourseInstances.(courseCode, studyPeriod, academicYear)

ReportedHours(course, teacherId, hours)
course → CourseInstances.instanceId

Students(studentId, name, programme, year, graduated)
(programme, year) → ProgrammeCourses.(programme, academicYear)
year is the academic year in which the student joined the programme.
graduated is a Boolean attribute.

Registrations(courseInstance, student, status, grade)
course → CourseInstances.instanceId
student → Students.studentId
status is one of: "not started", "registered", "completed", "withdrawn".
For students who have completed the course, the grade is one of "5", "4" or "3".

In addition to the E-R diagram, your report should include comments:

- Stating any additional assumptions that you have made. For example, keys for the relations are not stated in the task description, and some references (foreign keys) are missing.
- Explaining design decisions that you have made. For example, if you considered more than one way to model a particular part of the domain, explain your choice and why you preferred it to the alternative that you considered.

Drawing tools

The Dia Diagram Editor¹ can be used to draw Entity-Relationship diagrams. However, you are not required to use Dia in this assignment, and you are welcome to use another drawing program if you prefer.

If you want to use Dia, you can either install it on your own computer, or you can use the version of Dia that is installed centrally on the Linux system at Chalmers (either working directly with a Linux computer in a classroom, or by using Remote Desktop to connect to a Chalmers Linux server).

Submitting work

- A PDF file that contains an E-R diagram and your comments on its design.
- (Optional) If the E-R diagram in the PDF file is not sufficiently clear, you can submit it as a separate image file in a standard image format (e.g. PNG).

In each file that you submit, give the names of the people submitting the work and your assignment group number (as given in Canvas).

Deadline: Tuesday 5 April 2022 at 23:59.

¹ <http://dia-installer.de/>