DAT475 Advanced databases - Assignment 1

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Reflection on our database design

In this assignment, we started with a relational design and constructed an E-R diagram that covers the information in the relational design. In this report, we will describe the approach taken, such as design changes and the primary key briefly.

Primary keys for each entity

- Students(studentId) is the primary key.
- Teacher(teacherId) is the primary key for SeniorTeacher and TeachingAssistant (Phd and Assistant). We added a *Teacher* entity as a base class for senior teachers, teaching assistants, and PhD students, which means that they have the same primary key. This design choice makes it flexible if we want to add teacher types at a later time.
- Courses(courseCode) and Programmes(programmeCode) have primary keys as indicated by their names.
- CourseInstances(courseCode, studyPeriod, academicYear): Instead of using the surrogate primary key instanceId for *CourseInstances*, we used courseCode, studyPeriod, and academicYear as the composite primary key, since courses cannot be held in parallel.
- Registrations(courseInstance, student) is the composite primary key.
- ProgrammeCourses(programme, academicYear, studyYear, course) is the composite key.

Foreign keys

Even though foreign keys were not fully stated in the description, we assumed some to improve the design.

- ownedBy in Courses → Programmes(programmeCode).

- director in Programmes → SeniorTeachers(teacherId).
- examiner in CourseInstances → SeniorTeachers(teacherId).
- programme in Students → Programmes(programmeCode).

Design choice

In this description, we had **CoursePlanning** entity which is removed in the new design. We moved the attributes (planningNumStudents, seniorHours, assistantHours) to **CourseInstances** because the information is related to a specific course instance.

Since the same course cannot be given in parallel in the same study period and year, (courseCode, studyPeriod, academicYear) is used as a composite primary key instead of instanceId.

ProgrammeCourses and *CourseInstances* are weak entities. *ProgrammeCourses* depend on Courses and Programs. *CourseInstances* identifying attributes include courseCode from Courses.

The enrollment of students in programs is a relation originally between *Students* and *ProgrammeCourses*, but was changed to be a relation between *Students* and *Programs* with an attribute for the year of admission. This was due to that *ProgrammeCourses* contains multiple entries for each pair of program and courses (connecting the courses to programs), thereby connecting students to program-course pairs instead of just a program.

RegisteredHours and *AssignedHours* was also removed and replaced by relations with attributes between *CourseInstances* and *SeniorTeacher/Assistant* since the function of *RegisteredHours* and *AssignedHours* are to connect 'people' with instances of a course with related planed and registered working hours.