

CMPT 354 - Database Systems I

Assignment 2

Due date: Oct 26, 2015
20 marks, 10%

J.P. Delgrande
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Important Note: Students must work individually on this, and other CMPT 354, assignments. You may not discuss the specific questions in this assignment, nor their solutions with any other student. You may not provide or use any solution, in whole or in part, to or by another student.

You are encouraged to discuss the general concepts involved in the questions in the context of completely different problems. If you are in doubt as to what constitutes acceptable discussion, please ask!

In this assignment you will implement and query the course administration database that you considered in the previous assignment.

1. Create the database schema (8 marks)

Please use the following schema:

```
Courses(CourseNo, Title)
CourseSections(CourseNo, SectionNo, InstructorNo, Year, Semester, RoomNo,
               Weekday, StartTime, FinishTime, Capacity)
Instructors(InstructorNo, FirstName, LastName)
Students(StudentNo, FirstName, LastName, Year, GPA)
Enrollments(CourseNo, SectionNo, Year, Semester, StudentNo, Grade)
Areas(AreaName)
AreasOfCourse(CourseNo, AreaName)
AreasOfInstructor(InstructorNo, AreaName)
```

Domains of attributes should be specified as follows:

- (a) All attributes except for Year of students, GPA of students, and Grade of enrolments must not be NULL.
- (b) A course title can have up to 100 characters. The other string attributes (names) have a maximum length of 40 characters.
- (c) Any attribute with name of the form “<name>No” should have user-defined datatypes based on integers. CourseNo, InstructorNo, and StudentNo must be in the interval [000..999]. (For this, the easiest thing to do is use decimal(-,-) – see SQL Server Management Studio.) SectionNo, Semester, and Weekday are single digits.
- (d) StartTime and FinishTime may be represented as integers, e.g. 930 for 9:30 a.m. and 1430 for 2:30 p.m.
- (e) Year, Term, Weekday, and Capacity may be represented as integers.

(f) Use floats for GPA and Grade.

Specify primary keys for the schemas, and give any UNIQUE constraints that may hold.

2. Create the database instance (2 marks)

The course home page has a link to relation instances, given as text files. Import the following files into the respective table:

Courses.txt, CourseSections.txt, Instructors.txt, Students.txt, Enrollments.txt, Areas.txt, AreasOfCourse.txt, AreasOfInstructor.txt.

Note that Students doesn't have attribute values for GPA.

3. Query the database: (10 marks)

- (a) Find the name of student with student number 708.
- (b) Find the number of CourseSections taught in the first term of 2012.
- (c) Find the Title of all Courses in the Area of "Software and Hardware Systems".
- (d) Find the Name of the Students who have taken course 454.
- (e) Find the Name of the Instructors who can teach all courses which have already been taught by Instructor "Ian Goldman".
- (f) For each course find the name of the course, and the total enrollment of that course for each semester.
- (g) For each Instructor in the "Databases" or "Data Mining" Area, find the number of individual Students he/she has taught.