# CS348: Introduction to Database Systems

(Spring 2018)

Assignment 1 (due by 10am, Wednesday, May 23rd)

Overview: This assignment consists of ten questions. In each case, you are given a requirement in English and your task is to write a relational calculus query implementing the requirement. All queries are to be formulated over a relational database recording information about students, courses and enrollments. The conceptual view of the database is illustrated by the following relational database schema. Note that this includes an indication of primary and foreign key constraints in the manner discussed in class.
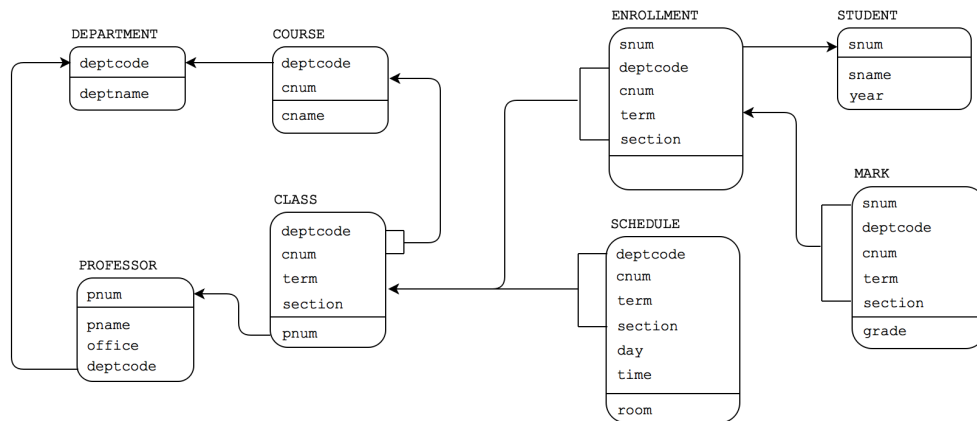
The schema stores information about both ongoing and past classes for a course. In particular, this means two things: (1) no marks are recorded for any enrollment of an ongoing class, and (2) for a past class, a mark is recorded for each of its enrollments. You may also assume that each class has at least one enrollment and that a department has at least one professor.

Assignment submission: You must submit a PDF file containing your answers to all questions to crowdmark by the assignment due date and time. Each answer must be given on a separate page.

In formulating your answers to any of the questions, you are free to use conditions of the form "x op y" or "x op c", where "op" is a comparison operator ($<, \leq, =, \geq, >$), and where "c" is a constant.

1. The student number and name of second year students who have obtained a grade lower than 65 in at least two courses in a department with the name "computer science".

2. The number and name of professors who are in the CS department (i.e., CS is the deptcode of the department) and have never taught either CS 240 or CS 245.

3. The number and name of professors who have taught a CS 245 class in which a student obtained a grade that is among the highest ever recorded for CS 245.

4. The number and name of students who are in their fourth year, and who have obtained a final grade of at least 85 in every course that he or she has completed in either the *combinatorics and optimization* (CO) or CS departments.

5. The number, name, office and department of each professor who is currently teaching on Mondays before noon and on Fridays after noon.

6. The minimum and maximum final grade of each class for a third year CS course, together with the number, name and department of the professor who taught the class.

7. The department code and course number of any course not currently being taught by either a CS professor or a CO professor.

8. The number, name and department of any professor who has taught on Monday, and, whenever this has been the case, has always had to teach also on Friday.

9. The number and name of fourth year students who have taken CS 348 and, whenever they did, obtained a lower grade in all other classes taken during the same term.

10. The number and name of each professor who has taught CS 348 at least three times where no students obtained a grade less than 75.