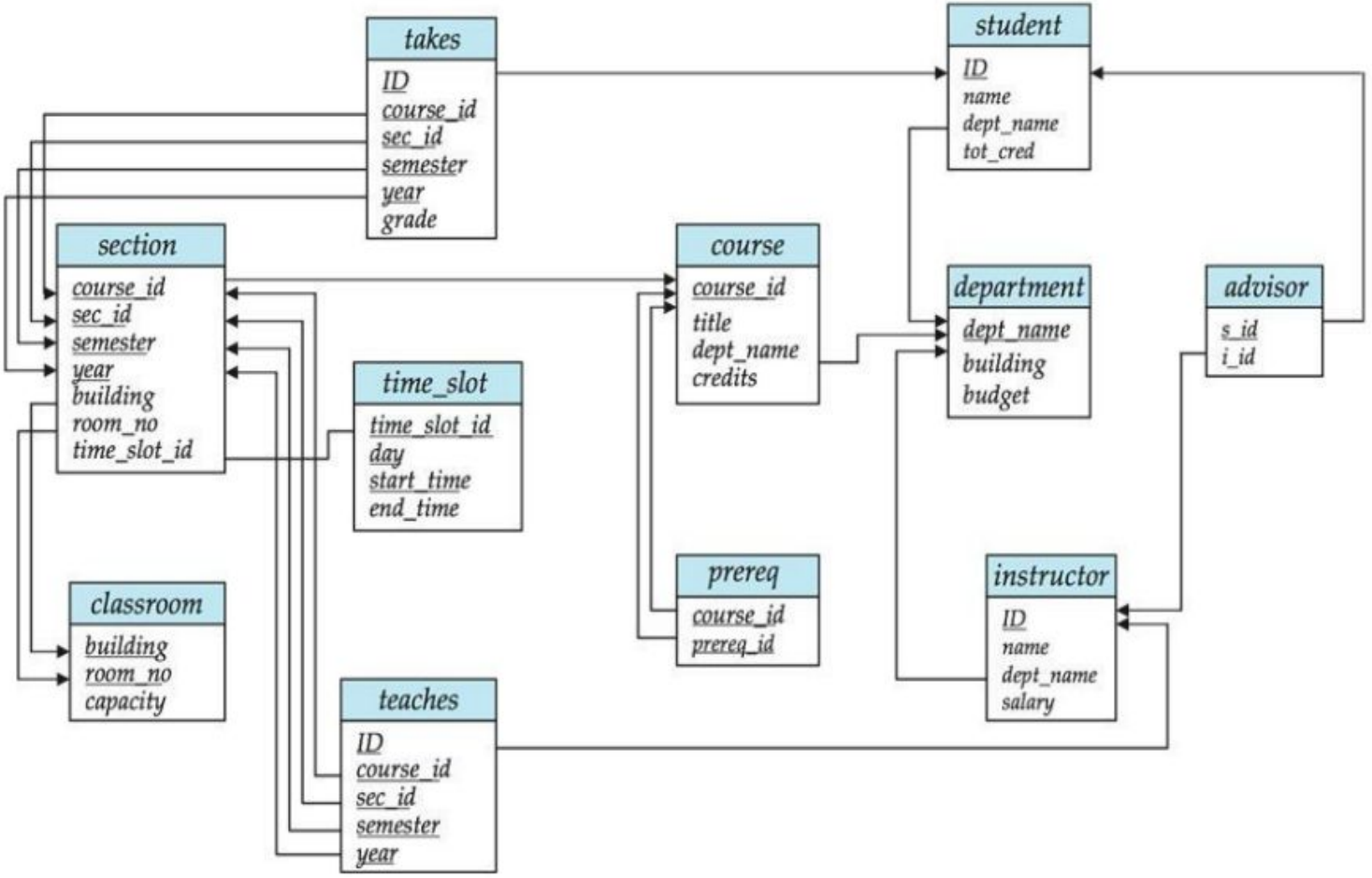
Homework 2

Due 2/26/2018

Use the university schema to answer the following questions

Schema Diagram for University Database



1. Create an equivalent SQL query for the following relational algebra expression (5 points):

$$\Pi_{course\_id}(\sigma_{semester=\text{“Fall”} \wedge year=2009}(section)) \cup \Pi_{course\_id}(\sigma_{semester=\text{“Spring”} \wedge year=2010}(section))$$

2. Create an equivalent SQL query for the following relational algebra expression (5 points):

$$\Pi_{name,course\_id}(\sigma_{instructor.ID=teaches.ID}(\sigma_{depart\_name = \text{“Physics”}}(instructor \times teaches)))$$

3. Create a query in SQL for the following statements (20 points):
   a. Create a new course "CS-100", department Com. Sci., titled "Weekly Seminar", with 0 credits.

   b. Create a section of this course in Fall 2009, with sec_id of 1.

   c. Delete enrollments in the above section where the student's name is Jackson or Johnson.

   d. Update the new course "CS-100", set its title to "Weekly CS Seminars", with 1 credit.

4. Create a query in SQL for the following statements (20 points):
   a. Select all the courses that have a department with a budget greater than 160,000,000.

   b. Select the instructors that have taught more than one course in the Fall 2009 or in the Fall 2010.

   c. Find the instructor with the largest salary, in the department with the largest budget.

   d. Select all the courses that have a prereq of 'CMSC-100'

Bonus (3 points):

5. When would a natural join return a different result set than a cartesian join? Use an example to explain your answer.