Exam II, CIS9340, Spring 2019

This is a **48-point** individual exam. Please write answers in the allocated space. The space does not imply the length of the answer

NAME: _____

1. The Scheduling database contains course schedule data of Baruch college, a week before the beginning of a semester. The database consists of the following set of relational schema.

   - course (department, course_number, course_name)
   - classroom (building, room_number, capacity)
   - employment (instructor_name, department, salary)
   - instructor (instructor_name, building, room_number, phone_number)
   - schedule (department, course_number, section, building, room_number, instructor_name, enrollment)

   The relation 'course' contains names and numbers of courses, as well as departments that offer them, e.g.:

   CIS 9340 Principles of Database Management Systems

   The relation 'classroom' contains the complete room location and number of students that a classroom can hold, e.g.:

   VC 4211 30

   The relation 'employment' lists the department that pays each instructor, along with the amount. Assume that each instructor is employed at only one department. However, an instructor may teach courses offered by departments that do not hire them.

   The relation 'instructor' gives the complete room location and the office phone number of each instructor. Assume that each instructor's name is unique.

   The relation 'schedule' lists the planned assignment of instructors, classrooms, and section slots to courses, and also the number of students enrolled in each course section, e.g.:

   CIS 9340 QTRA VC 4211 H. Wang 30

Write each query in **SQL**:

(a) (6 points) Find name, phone number, and the department of employment for all instructors who are scheduled to teach a course in a classroom whose capacity exceeds 50.

(b) (6 points) Find names and salaries of all instructors who are employed at CIS department and earn more than instructor *OLIVER TWIST* does.

(c) (7 points) Find the minimum, maximum, and average salary of all those instructors that are scheduled to teach a course into which more than 50 students are enrolled, as well as the number of such instructors.

(d) (8 points) Find names and salaries of all instructors who earn more than any instructor who is scheduled to teach in this room VC 4211.

2. The university database has the following schema:

   - STUDENT(NAME, STUDENT_NUM, CLASS, MAJOR)
   - COURSE(COURSE_NAME, COURSE_NUM, CREDITS, DEPARTMENT)
   - SECTION(SECTION_ID, COURSE_NUM, SEMESTER, YEAR, INSTRUCTOR)
   - GRADEREPORT(STUDENT_NUM, SECTION_ID, GRADE)

   Write each query in **SQL**:

   (a) (8 points) Retrieve a summary list that shows students' names along with accumulated credits for all CIS majors.

(b) (8 points) Retrieve the semester, year and names of students who take CIS 9340 and CIS 9467 in the same semester and year. CIS 9340 and CIS 9467 are values of $COURSE\_NUM$.

3. Suppose that a database system failure occurred. It is possible that certain database changes made by a given transaction may have been written to disk, while other changes made by the same transaction never reached the disk. Fortunately, the most recent backup is securely maintained, and a complete system log. DBA starts performing the system recovery, and he has a really bad luck: the system crashes during recovery. Suggest a solution or plan to help out the DBA. (5 points)