CS1555 Recitation 5

Objective: To practice relational algebra, especially aggregations, joins, and division.

Consider the following relation schemas:

STUDENT (sid, name, class, major)
STUDENT _DIR (id, address, phone)
    FK: (id) → STUDENT (sid)
COURSES_TAKEN (course_no, term, sid, grade)
    FK: (course_no) → COURSE (course_no); (sid) → STUDENT (sid)
COURSE (course_no, course_name, level)
INSTRUCTOR (id, fname, lname)
COURSES _OFFERED(course_no, term, instructor_id)
    FK: (course_no) → COURSE (course_no); (instructor_id) → INSTRUCTOR (id)

Write a relational algebra query using the nested notation for each of the queries below:

1. Find for each instructor, the course names of the courses he/she was teaching in Fall 19. List in addition to the course name, the first name and the last names of the instructor.

2. List the sid, name, and address (if available) of all students.

Write a relational algebra query using the sequence notation for each of the queries below:

1. Find the total number of students who have enrolled in the course “Operating Systems”.

2. Find the sid(s) of the student(s) who has/have the highest GPA

3. Find the sid (s) of the student(s) who has/have taken all courses at the UGrad level

4. Find for each instructor the number of courses he/she has taught or is teaching. List the first name and the last name of each instructor along with his/her ID and number of courses.

5. List the SID of the students who did not enroll in any course in Fall 19.