

Project 1

**Part II: Due February 25, 2020 (Tue) midnight in WebCT. PDF version submission required!**

1. For each of the following query in English, provide a SQL statement, and show its evaluated result. No view is allowed to use and the query must be a single statement.

- (a) The names of students who have failed in Physics ( $\text{SCORE} < 60$ ).
- (b) The average score in Physics.
- (c) The names of students who performed lower than average in Physics.
- (d) The names of students who performed lower than average in each course. Show both student name (SNAME) and course number (CNO) so that in which course(s) the student performed lower than the course average is (are) clear. Do not treat Null in any special way. Explain how the system takes care of Null in the average computation.
- (e) The numbers (CNO) and names (CNAME) of courses taken by J. Brown, sorted on CNO in descending order.
- (f) The names of female students in any course taken by J. Brown. Do it using a nested query with "IN".
- (g) The names of female students who take every course taken by J. Brown and no other course.
- (h) The courses for which there are no grades as no one took them.
- (i) The numbers (SNO) and names (SNAME) of students having no scores at all (NULL score value is considered as no score in addition to the case having no entry in RESULT).
- (j) The possible names of Miss U. Smith's boyfriend. We know that he has taken every course that was taken by Miss Smith.
- (k) The average score for each course in ascending order by CNO.
- (l) For each student who took more than two courses, list the name of the student and the number of the courses the student took.

2. Given the query, "The course names which are taken by the students living at Whitney,"

- (a) Write an SQL statement.
- (b) Define a view for "the students living at Whitney," and rephrase (a) by using the view.
- (c) Show how the systems catalog stores the view definition.

3 . The following points should be observed and discussed. Do this with SQL.

- (a) The STUDENT relation is to be modified by adding an additional column SEMESTER. Investigate how it can be done in SQL, and discuss what you have discovered on this. You may try to make an update on this new column, for example, by adding semester values for 3 or 4 entries of the table and see how it turns out. Does the system change the table when modifying the schema, or when updating the table?

- (b) Do the following two problems: (1) Create an index with UNIQUE option on SNO of STUDENT. Show that you successfully created the index. (2) This time try to create an index with UNIQUE option on ADDRESS of STUDENT. Discuss your result of this attempt.
- (c) How does the system treat updates on views. For example, create a view for STUDENT (SEX, ADDRESS) and do the followings: insert (F, E. Quad); delete (M, Whitney); and update (M, E. Quad) to (F, E. Quad). Can you do these?

**On Report Format:** Include your name in the first page of your report. Your report should contain the solution for each subproblem in the following forms (a) Problem number, (b) SQL expression, (c) Machine-generated solution, and (d) Comments or discussion if they were required. Your solution ordering should follow the problem ordering. **The problem numbers should be highlighted for easy recognition!** Your report must be uploaded as **one PDF** document with the file name, **lastname\_Project1.pdf**.

Any report not following this format is subject to **5% penalty**.

The penalty for a late report is **5% off per a weekday**.