Data Wrangling and Data Analysis
Lab3 Exercises: AdvancedSQL

In this lab, we will use the 3 tables specified in the next figure unless otherwise specified explicitly.

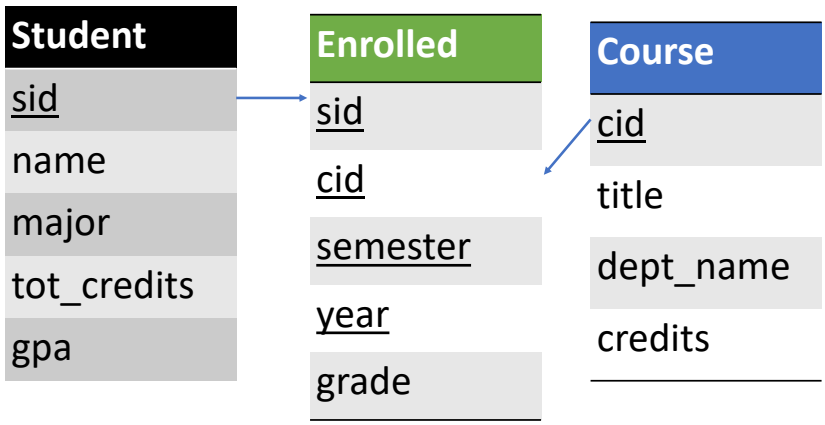

Figure 1: Sample database, the set of underline attributes represents the PRIMARY KEY, the arrows represents the references for the foriegn keys.

Question 1.
Build the database in Figure 1. Consider the following constraints:
Values in the semester field (attribute) should be one of ('Q1', 'Q2', 'Q1', 'Q2', 'Q3', 'Q4')
Values of the year should be greater than 2000.

Question 2.
Write queries to insert at least 4 records in each table. For the records tob inserted in the Student and Course relations, insert them one-by-one but for the records to be inserted in Enrolled relation, insert them in a single query.

Question 3.
The inclusion dependcy means that the values of a given attribute should appear in another attribute. The referential integrity is a special case of inclusion dependency. Write a query that returns all the records which violates the inclusion dependency between Enrolled.sid and Student.sid.

Question 4.
Consider a new table for the grades of the studnets in the INFOMDWR_Q1_2021. This relation has the following schema (sid : string, grade_ME : real, grade_RE : real, grade_HO : real, grade_FI : real).

1. Write the SQL query that creates the table. Note that grade_ME cannot be null. If a student didn't have a grade then it will be 0.

2. Instert a set of at least 4 records in the table. All the records shouldn't contain values for the grade_FI. add NULL?

3. Write a query to return the records in which a student has grades in both grade_RE and grade_HO as these are violating the rule that a student can take only one additional exam with the main exam.

4. Write a query compute the grade_FI as the average of either grade_ME and grade_RE or grade_ME and grade_HO.

Question 5.
Consider the table in csv ('fdExample.csv') file uploaded on the teams, if you know that (First name $\rightarrow$ Gender), write a python script that can check all the violation of such functional dependency.