CS 353 Fall 2022
Homework 1
Due: 30 Sept, Friday till midnight
You will use the Moodle course page for submission of this assignment

Q.1 [54 pts, 6 pts each] Given the following relational schema for a course enrollment system:

> **student**(s-id, s-name, dept, year)
> **course**(c-id, c-name, dept, credits)
> **take**(s-id, c-id, grade) s-id is a foreign key to student, c-id is a foreign key to course
> **prereq**(c-id, p-id) both c-id and p-id are foreign keys to course

(a) Find the CS students (s-id and s-name) who have taken a 3 credit course from the EE department.
(b) Find the 4th year CS students who have taken all the 4 credit courses from the MATH department.
(c) Find the CS students who have received an "A" grade from any course which has the prerequisite "CS101".
(d) Find the CS students who have taken at least one of the prerequisite(s) of "CS353" and got an "A" grade in this prerequisite course.
(e) Find the 3rd year CS students whose "CS353" grade is higher than their "CS342" grade.
(f) Find the first year CS students who have not received a grade lower that "C".
(g) Find the number of students who have received "A" in "CS353".
(h) Find the courses (c-id) which have at least 3 prerequisite courses.
(i) Find the courses with the maximum number of prerequisite courses.

Q.2 [36 pts, 6 pts each] Given the following relational schema for the Turkish Basketball League:

> **team**(tname, city, budget)
> **player**(p-id, pname, tname, age) tname is a foreign key to team
> **game**(home-team, away-team, date, home-points, away-points) home-team and away-team are foreign keys to team

(a) Find the teams (tname) which have won their home games against "Anadolu Efes".
(b) Find the players (p-id, pname) whose teams have won their away games against "Anadolu Efes".
(c) Find the teams which have won all the games they have played at home.
(d) Find the age of the youngest player of each team in İstanbul.
(e) Find the youngest player of each team in İstanbul.
(f) Find the team with the lowest budget among the teams that have won their home games against "Anadolu Efes".

Q.3 [10 pts] Given relations R and S having the same schema.

Prove or disprove the following: $\sigma_\Theta(R \cup S) = \sigma_\Theta(R) \cup S$