CS 353 Spring 2024
Homework 3
Due: March 6, Wednesday till midnight
You will use the Moodle course page for submission of this assignment

Q.1 [80 pts, 8 pts each] Given the following relational schema for an employee database:

Employee(TCK-no, ename, dept-no, birth-year, nationality, salary)
dept-no is a foreign key to Department
Project(proj-no, pname, pbudget, leader-TCK)
leader-TCK is a foreign key to Employee
WorksOn(TCK-no, proj-no)
TCK-no is a foreign key to Employee, proj-no is a foreign key to Project
Department(dept-no, dname, dbudget, city)

For each of the following queries, give an expression in **SQL**.

(a) Find the employees (TCK-no, ename) from the departments located in Ankara and have a budget higher than 10 million TL.
(b) Find the projects (proj-no, pname) led by someone who is of Turkish nationality and from a department located in Ankara.
(c) Find the projects (proj-no, pname) which do not have any employee from a department located in Ankara.
(d) Find the employees (TCK-no, ename) who are working in the projects led by a USA citizen and have a budget higher than 1 million TL.
(e) For each project with a budget higher than 1 million TL, find the average salary of the employees who are younger than 30 years old.
(f) Find the departments (dept-no) which have at least 50 employees of Turkish nationality who are younger than 30 years old.
(g) Find the maximum employee salary for each project with a Turkish leader and having at least 20 employees.
(h) Find the departments (dept-no) with a budget which is at least twice the total salary of its employees.
(i) Find the employee(s) (TCK-no, ename) who works on the highest number of projects.
(j) For each department find the employee(s) (TCK-no, ename) who works on the highest number of projects.

Q.2 [20 pts, 5 pts each] Given the following relational schema for a university database:

Students(s-id, sname, cgpa, department)
Enroll(s-id, c-id, grade)
s-id is a foreign key to Students, c-id is a foreign key to Courses
Courses(c-id, cname, i-id, department)
i-id is a foreign key to Instructors
Instructors(i-id, iname, deparment)

For each of the following expressions in **SQL**, give the corresponding query in English.

(a)

```
SELECT S.s-id, S.sname, AVG(E.grade)
FROM Students S, Enroll E, Courses C
WHERE S.department = “CS” AND S.s-id=E.s-id AND E.c-id = C.c-id
      AND C.department = “MATH”
GROUP BY  S.s-id, S.sname
```

(b)

```
SELECT S.s-id, S.sname
FROM Students S, Enroll E, Courses C, Instructors I
WHERE S.department = “EE” AND S.s-id=E.s-id AND E.c-id = C.c-id
    AND C.i-id = I.i-id AND I.department = “CS”
GROUP BY  S.s-id, S.sname
HAVING COUNT(*) > 5
```

(c)

```
SELECT S.s-id, S.department
FROM Students S
WHERE S.cgpa > 3.5 OR S.s-id IN (SELECT E.s-id
                                 FROM Enroll E, Courses C, Instructors I
                                 WHERE E.c-id = C.c-id AND C.i-id = I.i-id
                                       AND I.department = “CS” )
```

(d)

```
SELECT S.s-id, S.sname
FROM Students S
WHERE S.s-id IN
    (SELECT E.s-id
     FROM Enroll E, Courses C, Instructors I
     WHERE E.c-id = C.c-id AND C.department = “CS” AND C.i-id = I.i-id
         AND I.department = “EE” AND C.cname  like “I _ _ _ _ _ _ _ _ _ %”)
```