Stevens Institute of Technology
Department of Computer Science
CS442: Database Management System
Fall 2016

Handout 6. Midterm exam – sample questions (October 24, 2016)

(The solutions of Question 1 and 2 were discussed in class)

3. SQL queries

Consider the following schema:

- Department (D-code, D-Name, Chair-SSn)
- Course (D-code, C-no, Title, Units)
- Prereq (D-code, C-no, P-code, P-no)
- Class (Class-no, D-code, C-no, Instructor-SSn)
- Faculty (Ssn, F-Name, D-Code, Rank)
- Student (Ssn, S-Name, Major, Status)
- Enrollment (Class-no, Student-Ssn)
- Transcript (Student-Ssn, D-code, C-no, Grade)

Write the SQL queries for the following questions:

(1) List the courses (D-code and C-no), along with the names of the students who are currently taking them.

```
SELECT C.D-Code, C.C- no, S.S-Name
FROM Course C, Student S, Enrollment E
WHERE C.C-no = E.Class-no AND S. Ssn = E.Student_Ssn;
```

(2) List the courses (D-Code and C-No) that do not require any pre-requisites.

Solution 1:

```
SELECT C. D-code, C.C-no
FROM Course C
WHERE NOT EXIST
    (SELECT P.D-code, P.C-no
    FROM Prereq P
    WHERE P.D-code=C.D-code and P.C-no=C.C-no)
```

Solution 2:

```
SELECT C.D-code, C.C-no
FROM Course C
EXCEPT
SELECT P.D-code, P.C-no
FROM Prereq P;
```

Note:

The first solution uses nested queries. The 2nd solution does not use nested queries but the set operators instead.

(3) Give the students (SSN) who are enrolled in CS442 (i.e., D-code="CS" and C-no="442") and have satisfied all its prerequisites.

```
SELECT S.Ssn
FROM Student S, Enrollment E, Class C
WHERE C.D-code='CS' AND C.C-no='442' AND C.Class-no = E.Class-no AND
E.Student-SSn=S.Ssn AND NOT EXIST
   (SELECT P.P-code, P.P-no
    FROM Prereq P
    WHERE P.D-code ='CS' AND  P.C-no='442'
    EXCEPT
    SELECT T.D-code, T.C-no
    FROM Transcript T
     WHERE T.Student_Ssn=S.Ssn)
```

Note:

- The statement

  "SELECT P.P-code, P.P-no
  FROM Prereq P
  WHERE P.D-code ='CS' AND P.C-no='442'"

  Returns the D-code and C-no of all requisites of CS442. Let this set be A.

- The statement

  "SELECT T.D-code, T.C-no
  FROM Transcript T
  WHERE T.Student_Ssn=S.Ssn"

  Returns the D-code and C-no of all courses that the student has taken (note this student is the one that is defined in the outer query). Let this set be B

  If the student has taken all perquisites of CS442, then A – B should be an empty set. In other words, NOT EXISTS should return TRUE. Then for all students who enrolled in CS442 and have taken all prerequisite of CS442, the statement "WHERE C.D-code="CS" AND C.C-no="442" AND C.Class-no = E.Class-no AND E.Student-SSn=S.Ssn AND NOT EXIST…" should return TRUE.