

SQL Exercises: Subqueries

Schema

Student(<u>sID</u> , surName, firstName, campus, email, cgpa)	Offering[dept, cNum] \subseteq Course[dept, cNum]
Course(<u>dept</u> , <u>cNum</u> , name, breadth)	Took[sID] \subseteq Student[sID]
Offering(<u>oID</u> , dept, cNum, term, instructor)	Took[oID] \subseteq Offering[oID]
Took(<u>sID</u> , <u>oID</u> , grade)	

Questions

1. What does this query do? (The || operator concatenates two strings.)

```
SELECT sid, dept || cnum as course, grade
FROM Took,
    (SELECT *
     FROM Offering
     WHERE instructor = 'Horton') Hofferings
WHERE Took.oid = Hofferings.oid;
```

2. What does this query do?

```
SELECT sid, surname
FROM Student
WHERE cgpa >
    (SELECT cgpa
     FROM Student
     WHERE sid = 99999);
```

3. What does this query do?

```
SELECT sid, dept || cnum AS course, grade
FROM Took JOIN Offering ON Took.oid = Offering.oid
WHERE
    grade >= 80 AND
    (cnum, dept) IN (
        SELECT cnum, dept
        FROM Took JOIN Offering ON Took.oid = Offering.oid
        JOIN Student ON Took.sid = Student.sid
        WHERE surname = 'Lakemeyer');
```

4. (a) Suppose we have these relations: R(a, b) and S(b, c). What does this query do?

```
SELECT a
FROM R
WHERE b in (SELECT b FROM S);
```

- (b) Can we express this query without using subqueries?

5. What does this query do?

```
SELECT instructor
FROM Offering Off1
WHERE NOT EXISTS (
    SELECT *
    FROM Offering
    WHERE
        oid <> Off1.oid AND
        instructor = Off1.instructor );
```

6. What does this query do?

```
SELECT DISTINCT oid
FROM Took
WHERE EXISTS (
    SELECT *
    FROM Took t, Offering o
    WHERE
        t.oid = o.oid AND
        t.oid <> Took.oid AND
        o.dept = 'CSC' AND
        took.sid = t.sid )
ORDER BY oid;
```

7. Now let's write some queries! For each course find the instructor who has taught the most offerings of it. If there are ties, include them all Report the course (eg "csc343"), instructor and the number of offerings of the course by that instructor. Suggestion: Use one or more views to hold intermediate step(s).
8. Let's say that a course has level "junior" if its cNum is between 100 and 299 inclusive, and has level "senior" if its cNum is between 300 and 499 inclusive. Report the average grade, across all departments and course offerings, for all junior courses and for all senior courses. Report your answer in a table that looks like this:

level	levelavg
junior	
senior	

Each average should be an average of the individual student grades, not an average of the course averages.