

--To warm up for HW3, let's do some exercise on "Nested Subqueries":

--Example:

-- Same database as last week:

-- Class(dept, number, title)

-- Instructor(username, fname, lname, started_on)

-- Teaches(username, dept, number)

-- See section1's sql file for CREATE TABLE and sample data for this database.

Q1). How many classes are being taught by at least one instructor?

- Case 1 - no subquery

```
SELECT COUNT(DISTINCT number) AS class_count
FROM Teaches;
```

- Case 2 - use subquery

```
SELECT COUNT(*) AS class_count
FROM (
  SELECT 1
  FROM Teaches
  GROUP BY dept, number
);
```

Q2). Which instructors teach more than 1 class?

- Case 1 - no subquery

```
SELECT i.username, i.fname, i.lname
FROM Instructor i, Teaches t
WHERE i.username = t.username
GROUP BY i.username, i.fname, i.lname
HAVING COUNT(*) > 1
;
```

- Case 2 - use subquery

```
SELECT i.username, i.fname, i.lname
FROM Instructor i
WHERE 1 < (
  SELECT COUNT(*)
  FROM Teaches t
  WHERE t.username = i.username
);
```

```
WHERE t.username = i.username  
);
```

Q3). Which courses does neither Dr. Hank Levy nor Dr. David Wetherall teach?

- Case 1 - no subquery (incorrect attempt)

```
SELECT c.dept, c.number, c.title  
FROM Class c, Teaches t  
WHERE c.dept = t.dept AND  
      c.number = t.number AND  
      t.username NOT IN ('levy', 'djw');
```

- Case 2 - use subquery

```
SELECT *  
FROM Class c  
WHERE c.dept = 'CSE' AND  
      c.number NOT IN (  
        SELECT c.number  
        FROM Class c, Teaches t  
        WHERE c.dept = t.dept AND  
              c.number = t.number AND  
              t.username IN ('levy', 'djw')  
      );
```

-- This (correctly) returns only CSE 378.

Class

dept	number	title
CSE	378	Machine Organization and Assembly Language
CSE	451	Introduction to Operating Systems
CSE	461	Introduction to Computer Communication Networks

Instructor

username	fname	lname	started_on
zahorjan	John	Zahorjan	1985-01-01
djw	David	Wetherall	1999-07-01
tom	Tom	Anderson	1997-10-01
levy	Hank	Levy	1988-04-01

Teaches

username	dept	number
zahorjan	cse	378
tom	cse	451
tom	cse	461
zahorjan	cse	451
zahorjan	cse	461
djw	cse	461
levy	cse	451