

CS 327E Class 8

November 4, 2019

1) Does Q1 contain a subquery?

```
Q1: SELECT * FROM Lineup
     WHERE band_id = (SELECT id FROM Band
                     WHERE name = 'Asleep at the Wheel')
```

- A. Yes
- B. No

2) What is the output from Q2's **subquery** when run against the tables shown?

```
Q2: SELECT venue_id FROM Lineup WHERE band_id =  
(SELECT id FROM Band WHERE name = 'Blushing')
```

Lineup

<u>id</u>	date	time	length	venue_id	band_id
1	2019-10-05	00:15	30	vegas	bor
2	2019-10-04	00:45		pclub	blu
3	2019-10-11	00:00	40	coopers	wy
4	2019-10-09	23:50	15	barra	db
5	2019-10-05	00:00	40	cclub	wy
6	2019-10-04	12:45	45	honda	aw

Band

<u>id</u>	name	genre
bor	Borzoi	Punk
blu	Blushing	Rock
wy	Western Youth	Rock
db	Deezie Brown	Hip-Hop
aw	Asleep at the Wheel	Swing

A. NULL B. 'blu' C. 'pclub'

3) How many records does Q3 return?

```
Q3: SELECT venue_id FROM Lineup WHERE band_id =  
      (SELECT id FROM Band WHERE name = 'Western Youth')
```

Lineup

<u>id</u>	date	time	length	venue_id	band_id
1	2019-10-05	00:15	30	vegas	bor
2	2019-10-04	00:45		pclub	blu
3	2019-10-11	00:00	40	coopers	wy
4	2019-10-09	23:50	15	barra	db
5	2019-10-05	00:00	40	cclub	wy
6	2019-10-04	12:45	45	honda	aw

Band

<u>id</u>	name	genre
bor	Borzoi	Punk
blu	Blushing	Rock
wy	Western Youth	Rock
db	Deezie Brown	Hip-Hop
aw	Asleep at the Wheel	Swing

A. 1

B. 2

C. 6

4) What inputs are passed to the outer query of Q4?

Q4: `SELECT venue_id FROM Lineup WHERE band_id =
(SELECT id FROM Band WHERE genre = 'Rock')`

Lineup

<u>id</u>	date	time	length	venue_id	band_id
1	2019-10-05	00:15	30	vegas	bor
2	2019-10-04	00:45		pclub	blu
3	2019-10-11	00:00	40	coopers	wy
4	2019-10-09	23:50	15	barra	db
5	2019-10-05	00:00	40	cclub	wy
6	2019-10-04	12:45	45	honda	aw

Band

<u>id</u>	name	genre
bor	Borzoi	Punk
blu	Blushing	Rock
wy	Western Youth	Rock
db	Deezie Brown	Hip-Hop
aw	Asleep at the Wheel	Swing

A. 'blu' B. 'wy' C. {'blu', 'wy'}

5) The queries Q5 and Q6 are functionally equivalent based on the table definitions given.

```
Lineup(id, date, time, length, venue_id, band_id)
Band(id, name, genre)
```

```
Q5: SELECT id, date, time, length, venue_id
     FROM Lineup WHERE band_id IN
     (SELECT id
      FROM Band
      WHERE name = 'Asleep at the Wheel')
```

- A. True
- B. False

```
Q6: SELECT l.id, l.date, l.time, l.length, l.venue_id
     FROM Lineup l
     JOIN Band b ON l.band_id = b.id
     WHERE b.name = 'Asleep at the Wheel'
```

Scalar Subqueries: WHERE clause

```
SELECT a, b, c
FROM T1
WHERE a =
      (SELECT x FROM T2 ...)
```

Comparison Operators: =, !=, >, <, <=, >=

Practice Question

Who are the oldest students?

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept)

Takes(sid, cno, grade)

Teaches(tid, cno)

Scalar Subqueries: HAVING clause

```
SELECT a, b, c <aggregate functions>  
FROM T1  
[WHERE <boolean condition>]  
GROUP BY a, b, c  
HAVING <aggregate function> = (SELECT x  
                                FROM T2 ...)
```

Comparison Operators: = != > < <= >=

Practice Question

Which classes have a higher enrollment than the overall average enrollment per class?

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept)

Takes(sid, cno, grade)

Teaches(tid, cno)

List Subqueries: WHERE clause

```
SELECT a, b, c
FROM T1
WHERE d IN
      (SELECT x FROM T2 ...)
```

List Membership Operators:

```
IN
NOT IN
```

Practice Question

*Who does **not** take CS327E?*

Is this query a correct implementation?

```
SELECT sid
FROM Takes
WHERE cno != 'CS327E'
```

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept)

Takes(sid, cno, grade)

Teaches(tid, cno)

Practice Question

*Who takes **only** CS313E?*

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept)

Takes(sid, cno, grade)

Teaches(tid, cno)

List Subqueries: FROM clause

```
SELECT a, b, c  
FROM (SELECT a, b, c FROM ...)  
[WHERE]  
[ORDER BY]
```

Correlated Subqueries

```
SELECT a, b, c  
FROM T1  
WHERE d > (SELECT y FROM T2 WHERE T1.a = T2.x)
```

Comparison Operators: =, !=, >, <, <=, >=

Practice Question

Which teachers earns more than the average salary in their department?

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept, sal)

Takes(sid, cno, grade)

Teaches(tid, cno)

Correlated Subqueries: EXISTS

```
SELECT a, b, c
FROM T1
WHERE EXISTS
      (SELECT x FROM T2 WHERE T1.a = T2.x)
```

Existential Quantifiers:

EXISTS

NOT EXISTS