CS 327E Class 5

October 8, 2018

1) Does `Q1` contain a subquery?

```
Q1: SELECT * FROM ACL_Lineup
    WHERE artist_id = (SELECT id FROM ACL_Artist
                       WHERE artist_name = 'Khalid');
```

A. Yes
B. No

2) When run on the `ACL` tables shown, what is the output from the subquery in `Q2`?

```
Q2: SELECT * FROM ACL_Lineup WHERE artist_id =
(SELECT id FROM ACL_Artist WHERE artist_name = 'Metallica');
```

ACL_Lineup

id	date	time	duration	stage_id	artist_id
1	2018-10-05	19:45	135	amex	pmc
2	2018-10-13	20:00	120	amex	mtc
3	2018-10-05	17:35	60	honda	kh
4	2018-10-06	19:30	60	ml	stv
5	2018-10-06	20:00	120	amex	mtc
6	2018-10-05	14:45	60	ha	nn
7	2018-10-07	12:30	30	akl	sor

ACL_Artist

id	artist_name
pmc	Paul McCartney
kh	Khalid
stv	St. Vincent
mtc	Metallica
nn	Noname
sor	School of Rock

A. mtc
B. NULL
C. 2, 5
D. None of the above

3) When run on the ACL tables shown, how many rows does Q3 produce?

```
Q3: SELECT * FROM ACL_Lineup WHERE artist_id =
(SELECT id FROM ACL_Artist WHERE artist_name = 'Metallica');
```

ACL_Lineup

id	date	time	duration	stage_id	artist_id
1	2018-10-05	19:45	135	amex	pmc
2	2018-10-13	20:00	120	amex	mtc
3	2018-10-05	17:35	60	honda	kh
4	2018-10-06	19:30	60	ml	stv
5	2018-10-06	20:00	120	amex	mtc
6	2018-10-05	14:45	60	ha	nn
7	2018-10-07	12:30	30	akl	sor

ACL_Artist

id	artist_name
pmc	Paul McCartney
kh	Khalid
stv	St. Vincent
mtc	Metallica
nn	Noname
sor	School of Rock

A. 0
B. 1
C. 2
D. 3

4) When run on the ACL tables shown, what input does the outer query receive in Q4?

```
Q4: SELECT * FROM ACL_Lineup WHERE artist_id =
(SELECT id FROM ACL_Artist WHERE artist_name = 'Beyoncé');
```

ACL_Lineup

id	date	time	duration	stage_id	artist_id
1	2018-10-05	19:45	135	amex	pmc
2	2018-10-13	20:00	120	amex	mtc
3	2018-10-05	17:35	60	honda	kh
4	2018-10-06	19:30	60	ml	stv
5	2018-10-06	20:00	120	amex	mtc
6	2018-10-05	14:45	60	ha	nn
7	2018-10-07	12:30	30	akl	sor

ACL_Artist

id	artist_name
pmc	Paul McCartney
kh	Khalid
stv	St. Vincent
mtc	Metallica
nn	Noname
sor	School of Rock

A. 0
B. NULL
C. None of the above

5) Given the table definitions below, the queries `Q5` and `Q6` are functionally equivalent.

```
ACL_Lineup(id, date, time, duration, stage_id, artist_id)
ACL_Artist(id, artist_name)

Q5: SELECT id, date, time, duration, stage_id
    FROM ACL_Lineup WHERE artist_id =
     (SELECT id
      FROM ACL_Artist
      WHERE artist_name = 'Paul McCartney');

Q6: SELECT l.id, l.date, l.time, l.duration, l.stage_id
    FROM ACL_Lineup l
    JOIN ACL_Artist a ON l.artist_id = a.id
    WHERE a.performer = 'Paul McCartney';
```

A. True
B. False

Syntax of Subqueries: `WHERE` clause

```
SELECT <list of desired fields>
FROM <single table>
WHERE <single field> =
      (SELECT * FROM ...)
```

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

Syntax of Subqueries: `WHERE` clause

```
SELECT <list of desired fields>
FROM <single table>
WHERE <single field> IN
      (SELECT <single field> FROM ...)
```

List Membership Operator:
`IN`
`NOT IN`

Syntax of Subqueries: `WHERE` clause

```
SELECT <list of desired fields>
FROM <single table>
WHERE EXISTS
      (SELECT * FROM ...)
```

Existential Quantifier:
`EXISTS`
`NOT EXISTS`

Syntax of Subqueries: `FROM` clause

```
SELECT <list of desired fields>
FROM (SELECT * FROM ...)
WHERE <boolean condition>
```

Syntax of Subqueries: `HAVING` clause

```
SELECT <unaggregated fields> <aggregate functions>
FROM <single table>
WHERE <boolean condition>
GROUP BY <unaggregated field>
HAVING <aggregate function> = (SELECT * FROM ...)
```

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

First Question

Who does not take CS327E?

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept)

Takes(sid, cno, grade)

Teaches(tid, cno)

First 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)

Second 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)

iClicker 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)

Does this query require a subquery?

A. Yes
B. No

Third Question

Who are the youngest students?

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept)

Takes(sid, cno, grade)

Teaches(tid, cno)

Fourth Question

Which classes are taken by more students than the overall average number of students per class?

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept)

Takes(sid, cno, grade)

Teaches(tid, cno)

iClicker Question

Which classes are taken by more students than the overall average number of students per class?

How many subqueries are contained in this query?

A. 0 B. 1 C. 2 D. 3

Student(sid, fname, lname, dob)

Class(cno, cname, credits)

Teacher(tid, fname, lname, dept)

Takes(sid, cno, grade)

Teaches(tid, cno)