CS 327E Class 3

September 23, 2019

1) Which SQL join type does this query contain?

```
S(a: int, b: string);
T(c: string, d: date);

SELECT *
FROM T, S;
```

A. Inner Join
B. Natural Join
C. Cross Join
D. None of the above

2) The following query, when run on `T` and `U` as shown, produces the result table `V`.

T

street	city
San Jacinto Blvd	Austin
Memorial Dr	Houston
Court Ave	Fort Davis

U

city	state	zip
Austin	TX	78705
Houston	TX	77019
Fort Davis	TX	79734

V

street	city	state	zip
San Jacinto Blvd	Austin	TX	78705
Memorial Dr	Houston	TX	77019
Court Ave	Fort Davis	TX	79734

```
SELECT street, T.city, state, zip
FROM T NATURAL JOIN U;
```

A. True
B. False

3) The fields in a join condition must be of compatible type and share a common domain.

A. True
B. False

4) The following queries, when run on `T` and `U` as shown, produce equivalent results.

```
SELECT *
FROM T JOIN U;

SELECT *
FROM T RIGHT OUTER JOIN U
ON T.city = U.city;
```

T

street	city
San Jacinto Blvd	Austin
Memorial Dr	Houston
Court Ave	Fort Davis
San Antonio St	Marfa

U

city	state	zip
Austin	TX	78705
Houston	TX	77019
Fort Davis	TX	79734

A. True
B. False

5) Which is <u>not</u> a valid join type?

A. Self join
B. Left outer join
C. Right outer join
D. Left inner join

Syntax of Join Queries

SELECT <list of desired fields>

FROM <single table T1>

JOIN <single table T2> ON <T1.c1 = T2.c1>
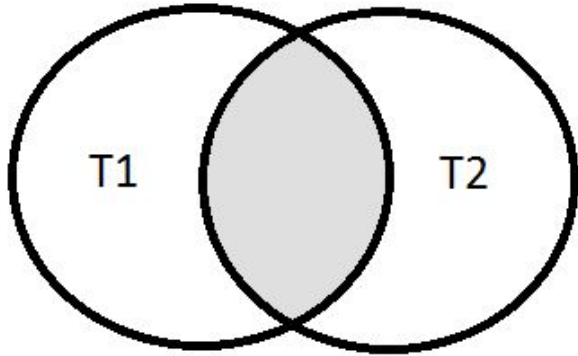
WHERE <boolean conditions>

ORDER BY <list of fields to sort on>

Inner Join

```
SELECT *
FROM T1
[INNER] JOIN T2 ON T1.c1 = T2.c1
```

Inner Join

```
SELECT *
FROM T1
[INNER] JOIN T2 ON T1.c1 = T2.c1
[INNER] JOIN T3 ON T2.c2 = T3.c2
```

Inner Join

```
SELECT *
FROM T1
[INNER] JOIN T2 ON T1.c1 = T2.c1 AND T1.c2 = T2.c2
[INNER] JOIN T3 ON T2.c2 = T3.c2
```

Inner Join

Employee

empid	emp_name	emp_dep
2	Mike	1
23	Dave	2
3	Sarah	
5	Jim	4
6	Sunil	1
37	Morgan	4

Department

depid	dep_name
1	Sales
2	Product
3	Research
4	Engineering
5	HR

SELECT emp_name, dep_name
FROM Employee **JOIN** Department **ON** emp_dep = depid;

Result Table

emp_name	dep_name
Mike	Sales
Dave	Product
Jim	Engineering
Sunil	Sales
Morgan	Engineering

First Question

What are first names, last names, and grades of students who take CS329E with Prof. Mitra?

Current_Student(sid, fname, lname, dob, cno, cname, credits, grade)

New_Student(sid, fname, lname, dob)

Class(tid, instructor, dept, cno, cname, credits)

iClicker Question

What are first names, last names, and grades of students who take CS329E with Prof. Mitra?

How many records are in the answer?

A. 1
B. 2
C. 3

Second Question

Who are the students who take both CS327E and CS329E?

Current_Student(sid, fname, lname, dob, cno, cname, credits, grade)

New_Student(sid, fname, lname, dob)

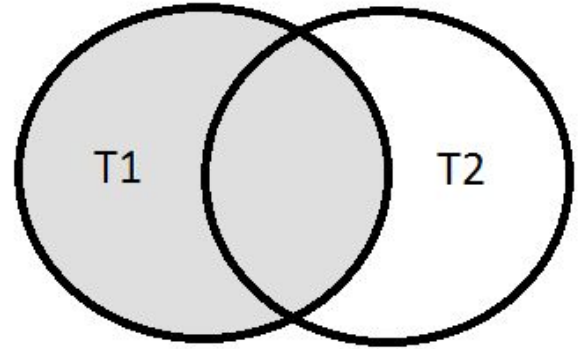Class(tid, instructor, dept, cno, cname, credits)

Second Question

Who are the students who take both CS327E and CS329E?

```
SELECT sid
FROM Current_Student
JOIN Current_Student on sid = sid
WHERE cno = 'CS327E'
AND cno = 'CS329E'
```

Left Outer Join

```
SELECT *
FROM T1 LEFT [OUTER] JOIN T2
ON T1.c1 = T2.c1
```

Left Outer Join

Employee

empid	emp_name	emp_dep
2	Mike	1
23	Dave	2
3	Sarah	
5	Jim	4
6	Sunil	1
37	Morgan	4

Department

depid	dep_name
1	Sales
2	Product
3	Research
4	Engineering
5	HR

SELECT emp_name, dep_name
FROM Employee **LEFT JOIN** Department **ON** emp_dep = depid
ORDER BY emp_name;

Result Table

emp_name	dep_name
Dave	Product
Jim	Engineering
Mike	Sales
Morgan	Engineering
Sarah	
Sunil	Sales

Right Outer Join

```
SELECT *
FROM T1 RIGHT [OUTER] JOIN T2
ON T1.c1 = T2.c1
```
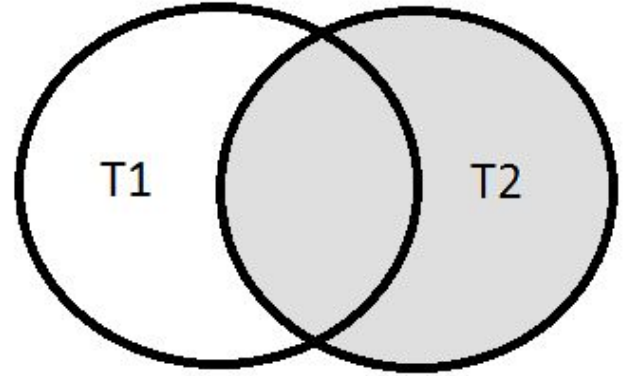
Right Outer Join

Employee

empid	emp_name	emp_dep
2	Mike	1
23	Dave	2
3	Sarah	
5	Jim	4
6	Sunil	1
37	Morgan	4

Department

depid	dep_name
1	Sales
2	Product
3	Research
4	Engineering
5	HR

SELECT emp_name, dep_name
FROM Employee **RIGHT JOIN** Department **ON** emp_dep = depid
ORDER BY dep_name, emp_name;

Result Table

emp_name	dep_name
Jim	Engineering
Morgan	Engineering
	HR
Dave	Product
	Research
Mike	Sales
Sunil	Sales

Full Outer Join

```
SELECT *
FROM T1 FULL [OUTER] JOIN T2
ON T1.c1 = T2.c1
```
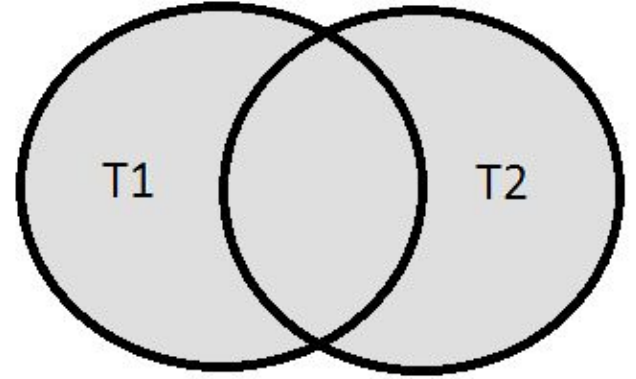
Full Outer Join

Employee

empid	emp_name	emp_dep
2	Mike	1
23	Dave	2
3	Sarah	
5	Jim	4
6	Sunil	1
37	Morgan	4

Department

depid	dep_name
1	Sales
2	Product
3	Research
4	Engineering
5	HR

SELECT emp_name, dep_name
FROM Employee **FULL JOIN** Department **ON** emp_dep = depid
ORDER BY dep_name, emp_name;

Result Table

emp_name	dep_name
Jim	Engineering
Morgan	Engineering
	HR
Dave	Product
	Research
Mike	Sales
Sunil	Sales
Sarah	

Third Question

Which instructors have no students in their class?

Current_Student(sid, fname, lname, dob, cno, cname, credits, grade)

New_Student(sid, fname, lname, dob)

Class(tid, instructor, dept, cno, cname, credits)

iClicker Question

Which instructors have no students in their class?

What type of join does this query require?

A. Self join
B. Outer join
C. Inner join

Fourth Question

Which classes are taught by two teachers?

Show the answer as the cno of the class and tid for both teachers.

Current_Student(sid, fname, lname, dob, cno, cname, credits, grade)

New_Student(sid, fname, lname, dob)

Class(tid, instructor, dept, cno, cname, credits)

iClicker Question

Which classes are taught by two teachers?

Show the answer as the cno of the class and tid for both teachers.

How many records does the answer have?

A.   4
B.   3
C.   2
D.   1

Demo: Creating the initial ERD

College ERD v1

college_staging.Classes		
tid	String
instructor	String
dept	String
cno	String
cname	String
credits	Integer

college_staging.Current_Student		
sid	String
fname	String
lname	String
dob	String
cno	String
cname	String
credits	Integer
grade	String

college_staging.New_Student		
PK	sid	String
	fname	String
	lname	String
	dob	String

Milestone 3

http://www.cs.utexas.edu/~scohen/milestones/Milestone3.pdf