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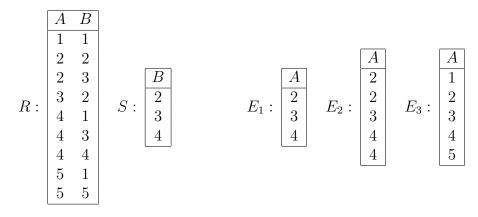Exercise Sheet No. 8 - Database
Energy Informatics
Winter 2015-2016

Submission deadline: 05.02.2016, at 11:15 a.m.

Exercise 1: (3 pts)
Give the SQL-query that finds the city (city name) that has the maximum average of gas consumption.
Its average of gas consumption should be part of the result as well.

Exercise 2: (2 pts)
For each of the following SQL-queries, indicate which of the tables E_i are the results when executing
the respective query.

$R:$

A	B
1	1
2	2
2	3
3	2
4	1
4	3
4	4
5	1
5	5

$S:$

B
2
3
4

$E_1:$

A
2
3
4

$E_2:$

A
2
2
3
4
4

$E_3:$

A
1
2
3
4
5

(1) `SELECT A FROM R NATURAL JOIN S`
(2) `SELECT A FROM R NATURAL JOIN S GROUP BY A`
(3) `SELECT DISTINCT A FROM R LEFT OUTER JOIN S ON R.B = S.B`
(4) `SELECT DISTINCT A FROM R RIGHT OUTER JOIN S ON R.B = S.B`

Exercise 3: (3 pts)
Consider the following SQL query Q:

```
SELECT COUNT(*) AS NUM
FROM (
  SELECT * FROM T
  WHERE A NOT IN
    (SELECT B FROM T)
);
```

a) Consider the following instance t_1 from T:

A	B
1	2
2	null
4	4
3	1

Give the result of Q on t_1. Justify your answer.

b) Consider now the following instance t_2 from T:

A	B
1	2
2	2
null	4
3	1

Give the result of Q on t_2. Justify your answer.

Exercise 4: (2pts)
Explain why the following queries are wrong. Give, for each, the corresponding correct SQL-query.

a) List the names of all cities with the number of their buildings.
```
SELECT name, count(*) AS building_count
FROM    citya natural JOIN building
GROUP BY cityid
ORDER BY building_count DESC;
```

b) The city with the maximum population along with its id.
```
SELECT MAX(population), cityid
FROM    citya ;
```