
Energy Informatics

<https://proglang.informatik.uni-freiburg.de/teaching/energy-informatics/2018ws/>

Exercise Sheet 9 – SQL

2018-12-16

Exercise 1

Give the SQL-query that finds the city (city name) that has the maximum average of household's gas consumption. Its average of gas consumption should be part of the result as well.

Exercise 2

For each of the following SQL-queries, indicate which of the tables E_i are the results when executing the respective query.

$R :$	<table border="1" style="display: inline-table; vertical-align: middle;"><thead><tr><th>A</th><th>B</th></tr></thead><tbody><tr><td>1</td><td>1</td></tr><tr><td>2</td><td>2</td></tr><tr><td>2</td><td>3</td></tr><tr><td>3</td><td>2</td></tr><tr><td>4</td><td>1</td></tr><tr><td>4</td><td>3</td></tr><tr><td>4</td><td>4</td></tr><tr><td>5</td><td>1</td></tr><tr><td>5</td><td>5</td></tr></tbody></table>	A	B	1	1	2	2	2	3	3	2	4	1	4	3	4	4	5	1	5	5
A	B																				
1	1																				
2	2																				
2	3																				
3	2																				
4	1																				
4	3																				
4	4																				
5	1																				
5	5																				

$S :$	<table border="1" style="display: inline-table; vertical-align: middle;"><thead><tr><th>B</th></tr></thead><tbody><tr><td>2</td></tr><tr><td>3</td></tr><tr><td>4</td></tr></tbody></table>	B	2	3	4
B					
2					
3					
4					

$E_1 :$	<table border="1" style="display: inline-table; vertical-align: middle;"><thead><tr><th>A</th></tr></thead><tbody><tr><td>2</td></tr><tr><td>3</td></tr><tr><td>4</td></tr></tbody></table>	A	2	3	4
A					
2					
3					
4					

$E_2 :$	<table border="1" style="display: inline-table; vertical-align: middle;"><thead><tr><th>A</th></tr></thead><tbody><tr><td>2</td></tr><tr><td>2</td></tr><tr><td>3</td></tr><tr><td>4</td></tr><tr><td>4</td></tr></tbody></table>	A	2	2	3	4	4
A							
2							
2							
3							
4							
4							

$E_3 :$	<table border="1" style="display: inline-table; vertical-align: middle;"><thead><tr><th>A</th></tr></thead><tbody><tr><td>1</td></tr><tr><td>2</td></tr><tr><td>3</td></tr><tr><td>4</td></tr><tr><td>5</td></tr></tbody></table>	A	1	2	3	4	5
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

Consider the following SQL query Q :

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

1. Consider the following instance t_1 from T:

A	B
1	2
2	<i>null</i>
4	4
3	1

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

2. Consider now the following instance t_2 from T:

<i>A</i>	<i>B</i>
1	2
2	2
<i>null</i>	4
3	1

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

Exercise 4

Explain why the following queries are wrong. Give, for each, the corresponding correct SQL-query.

1. 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;
```

2. The city with the maximum population along with its id.

```
SELECT MAX(population), cityid
FROM citya ;
```