Exercise Sheet No. 8 - Database

Energy Informatics

Winter 2016

Submission deadline: 10.02.2017, 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.

\begin{itemize}
  \item[(1)] \texttt{SELECT } A \texttt{ FROM } R \texttt{ NATURAL JOIN } S
  \item[(2)] \texttt{SELECT } A \texttt{ FROM } R \texttt{ NATURAL JOIN } S \texttt{ GROUP BY } A
  \item[(3)] \texttt{SELECT DISTINCT} \texttt{A FROM R LEFT OUTER JOIN S ON R.B = S.B}
  \item[(4)] \texttt{SELECT DISTINCT} \texttt{A FROM R RIGHT OUTER JOIN S ON R.B = S.B}
\end{itemize}

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

\begin{verbatim}
SELECT COUNT(*) AS NUM
FROM (  
    SELECT * FROM T
    WHERE A NOT IN
    (SELECT B FROM T)
  )
\end{verbatim}
a) Consider the following instance $t_1$ from $T$:

\[
\begin{array}{cc}
A & B \\
1 & 2 \\
2 & null \\
4 & 4 \\
3 & 1 \\
\end{array}
\]

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

b) Consider now the following instance $t_2$ from $T$:

\[
\begin{array}{cc}
A & B \\
1 & 2 \\
2 & 2 \\
null & 4 \\
3 & 1 \\
\end{array}
\]

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; 
```