Energy Informatics

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

Exercise Sheet 13 - Revision

2019-02-06

Exercise 1 (Sheet 3, 1.2)
A hydroelectric power plant wants to translate the frequency f of the AC output into directives for controlling its turbines.

- $f < 50$: more water
- f 50 : steady
- $f > 50$: decrease water supply
- $f < 49$ or $f > 51$: disconnect

Write a function that takes as input the frequency and returns the appropriate command.

Exercise 2 (Sheet 3, 2.1)
You are given the firstname and lastname of a person on two different lines. Your task is to read them and print the following:

```
Hello firstname lastname! You just delved into python.
```

Exercise 3 (Sheet 4, 3)
The file `movie.csv`[1] contains the top 100 most profitable movies. The first three rows are shown below. Domestic indicates the gross income in USA. Gross is in millions of $.

Rank	Title	Studio	Total Gross	Domestic	Overseas	Year
1	Avatar	Fox	”2,788.00”	760.5	”2,027.50”	2009
2	Titanic	Par.	”2,186.80”	658.7	”1,528.10”	1997
3	Star Wars: The Force Awakens	BV	”2,068.20”	936.7	”1,131.60”	2015

1. Write a function to get the proportion of domestic and overseas gross income in the top 100.
2. Write a function which print the list of companies, sorted by gross income.

Reminder: You can use pandas, which supports the `groupby`, `sum` and `sort` operation on dataframes.

Exercise 4 (Sheet 9, 2)
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] Source: https://spreadsheets-to-programs.github.io/

(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 5 (Sheet 9, 3)
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   city 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 ;
```