

Exercise Sheet No. 10 - Programming
Energy Informatics
Winter 2016
Submission deadline: 14.02.2016, at 11:15

Note: For Exercise 1 and Exercise 2, make sure your code is running, well formatted and commented properly, then submit it for correction **per Email** at: alzoghba@informatik.uni-freiburg.de

Exercises for class

Functions in Python

- Develop converter functions:
 - Two functions to convert distances between KM and Mile (and back)
 - Two functions to convert temperatures between Centigrade and Fahrenheit (and back)
- Write a function that takes two numbers considered as (x,y) coordinates and computes the distance of this point to the origin.
- Define the function `cube_volume`, which accepts the length of a side of an equilateral cube and computes its volume. If you have time, consider defining `cube_surface`, too.
- Define the function `bool_imply`. It consumes two Boolean values, call them `sunny` and `friday`. The answer of the function is True if `sunny` is False or `friday` is True.
- Define the function `string_insert`, which consumes a string and a number i and which inserts “_” at the i^{th} position of the string. Assume i is a number between 0 and the length of the given string (inclusive). How would you deal with the empty string?

Exercises for class

(More functions) Develop some other function that requires case distinction to work

- A hydroelectric power plant wants to translate the frequency f of the AC output into directives for controlling its turbines.
 - $f < 50$: more water
 - $f \sim 50$: steady
 - $f > 50$: decrease water supply
 - $f \ll 50$ or $f \gg 50$: disconnect
- Write a function that recognizes a palindrome
- Write a function that reverses a string (or list)

Exercise 1: (Geometry with functions and lists, 5 pts)

Write a function `line_point_distance` (`line`, `point`) where

- `line` is a list $[a, b, c]$ defining a line $ax + by + c = 0$ in the plane.
- `point` is a list $[x_0, y_0]$

The function is to return the closest distance of (x_0, y_0) to the line.

Exercise 2: (Reading text from console, 5 pts)

Write a function that reads three marks ranging between 0 and 100 inclusive on one line from `stdin`. Marks may be floating point numbers. Print the average of the marks correct to two decimal places. When unexpected input is given, the method should print an error message suitable for each different case (out of range input, or input of invalid type,...).