
Energy Informatics

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

Exercise Sheet 1 – Introduction to Python

2018-10-17

In this course, we will be using Python **3**. The last version is 3.7, which is recommended.

You can download and install it here: <https://www.python.org/downloads/>.

For now, we will be using python *interactively* by typing commands in python and getting the output directly, like a calculator. Launch the python interpreter with the command `python3`.

```
>>> 1
1
>>> 2 + 3
5
>>> "Hello" + "World!"
'HelloWorld!'
>>> me = "Gabriel Radanne"
>>> me
'Gabriel Radanne'
```

i Arithmetic and strings in python

- int(egers): 0, 1, -1, 42, -32768, ...
- float(ing point numbers): 1.0, 3.14159, .2288, -43.4 ...
- usual arithmetic operators: +, -, *, /, % (remainder)
- "a string"
- 'Monty Python\'s flying circus'
- Operations: concatenation (+), indexing (s[3]), and many more

Exercise 1

Try some basic arithmetic and string operations.

1. What happens when the types are not matched? Try to multiply a string by a number.
2. What happens when you try to give invalid indices in strings ?

i Variable and functions

You can declare variables and functions with the following syntax.

```
>>> a = 2 + 3
>>> def double(n): # define function named 'double'
...     return 2*n # return value of expression
...
>>> double(21)
42
>>> double("la") # ??
```

Beware: Indentation inside functions is mandatory!

Exercise 2

Try to define a few small functions and variables. What happens when you call a variable that is not a function? What happens if a function or variable is not defined?

Exercise 3

Write some simple conversion functions between:

1. Kilometers and Miles
2. Centigrade and Fahrenheit

Python modules

In python, you can import modules to use additional functions. For instance, Math functions are contained in the `math` module.

```
>>> import math
>>> math.sin(math.pi/4)
0.7071067811865475
```

The documentation for each module is available here: <https://docs.python.org/3.7/tutorial/index.html>. You can also consult the documentation of an imported module with `help(math)`.

Exercise 4

Execute the following commands:

```
>>> import turtle
>>> turtle.forward(20)
>>> turtle.right(45)
>>> turtle.forward(50)
```

1. Write functions to draw simple forms: triangle, squares, ...
2. Can you write a function that takes a number of sides, and draw the associated regular polyhedron ?
3. Try to draw the figure below

