

Homework: Jupyter basics and numerical data types

The homework assignments in this notebook supplement the tutorial *Jupyter basics and numerical data types*.

- Solve the assignments according to the instructions.
- Upload the completed notebook to the module platform.
- Do not forget to enter your name in the markdown cell below.

The homework set carries a total of 20 points. Square brackets in the assignment titles specify individual point contributions.

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Preparation

The graphics file `mdhomework.png` is expected to reside in the working directory. Identify the file on the module platform and upload it to the same folder as this Jupyter notebook.

Assignment: Markdown language [6]

Create a new markdown cell and typeset the short piece of formatted text captured by the graphics file `mdhomework.png` displayed below. Note that the *United Nations* hyperlink is supposed to point to the URL `https://www.un.org`.

[United Nations](#) General Assembly Resolution 217(III), 1948

- Article 1. All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in spirit of brotherhood.
- Article 2. Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind [...]
- Article 3. Everyone has the right to life, liberty and security of person.
- [...]

Level-four header (4 hash marks)

This blockquote separates a **level-four header** from a *level-five header*.

Level-five header (5 hash marks)

> This is not a blockquote.

In Python, integers and strings are of the types (classes) `int` and `str`, respectively.

Assignment: Basic arithmetics [4]

Create a new code cell, set $a = 2$, $b = 8$, $c = -4$, then compute and print out $a + bc$, $b - \frac{c}{a}$, $b + c - \frac{a}{b}$, $a^b - b^a$.

```
In [2]: a=2
b=8
c=-4
print(a+b*c)
print(b-c/a)
print(b+c-a/b)
print(a**b - b**a)

-30
10.0
3.75
192
```

Assignment: Numerical data types [5]

Complete the code cell below according to the instructions included as comments.

```
In [16]: n = 123
x = -45.6
y = 7.89e2
### Compute sum and product of n and x, show the data types
w=n+x
print(w,type(w))
p=n*x
print(p,type(p))

### Subtract n from y, show the data type
a=y-n
print(a,type(a))

### Compute the square root of n, show the data type
d=n**0.5
print(d,type(d))

### Compute the largest integer smaller than x, show the data type
import math
m= math.ceil(x)
print(m,type(m))

77.4 <class 'float'>
-5608.8 <class 'float'>
666.0 <class 'float'>
11.090536506409418 <class 'float'>
-45 <class 'int'>
```

Assignment: Boolean expressions [5]

Complete the code cell below according to the instructions included as comments.

```
In [19]: ### Define integers a,b,c,x1,x2,y1,y2.
a = 2
b = -6
c = 4
x1 = 1
x2 = 2
y1 = 1
y2 = 2
### Check if b*b is larger than 4*a*c.
t= b*b>4*a*c
print(t)

### Check if a*x1**2 + b*x1 + c is zero.
w= a*x1**2 + b*x1 + c ==0
print(w)

### Check if a*x2**2 + b*x2 + c is zero.
k= a*x2**2 + b*x2 + c ==0
print(k)
### Check if y1 is in the half-open interval ]x1,x2].
p= x1<=y1 and y1<x2
print(p)
### Check if y2 is in the half-open interval ]x1,x2].
v= x1<=y2 and y2<x2
print(v)

True
True
True
True
False
```