

Exercise 1

Jupyter-Notebook and Python Script

Programming Basics: Python

25.09.2023

Remark: The files created are mandatory for exercise 2 (Deadline **10.10.2023**).

Exercise 1.1: Jupyter Notebook

Watch this video(3:38 min) demonstrating the *pythagorean theorem* in jupyter-notebook (<https://jupyter.org/>, see quick introduction here (2:47 min))

a) Copy the jupyter notebook script described in the video (and shown in the image beneath) and save it as `pythagorean.ipynb`. Mark the cells either with **Markdown** or **Code**.

```
# Pythagorem Theorem

## Introduction

In this notebook, we are to use the Pythagorean Theorem to calculate the length of the hypotenuse of a right triangle.
To do so, we will use the following formula:

$$c = \sqrt{a^2 + b^2}$$

where

- a and b are the lengths of the legs of the triangle
- c is the length of the hypotenuse.

# function to compute hypotenuse
def hypotenuse(a, b):
    c = (a**2 + b**2)**0.5
    return c

## Example

Let us compute an example where
 $a=3, b=4$ 

a = 3
b = 4
c = hypotenuse(a, b)
print(c)
```

b) Add an image to your script which shows the right triangle and the sides a , b , and c .

c*) Run the script locally on your computer. Feel free to use the editor you are most comfortable with. We advise you to use either VS Studio or PyCharm.

Exercise 1.2: Python Script

Rewrite your jupyter notebook script (`pythagorean.ipynb`) as a Python Script called `pythagorean.py`. You can see an example on how it is done with VS Studio in this video (12:03 min). Compute c for

$$a = 33 \quad \text{and} \quad b = 44.$$

Use the command `print(...)` to display the equation in the form

$$33^2 + 44^2 = 55^2$$

using a , b , and the computed c . Do not hard-code the output with the numbers; use the letters instead.