

PHOT 110: Introduction to programming

Lecture 10: exercises on modules

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Exercises on modules

Modules are separate python script files which contain functions and variables to be imported in other scripts.

Exercise 1: A simple module for calculations

Add the following functions to a separate module script called `my_module.py`

```
def add(a, b):  
    """ adds a + b """  
    return a + b  
  
def mul(a, b):  
    """ multiplies a * b """  
    return a * b
```

Then import this module into your main script-file and call the module functions to perform the following calculations: $x = 6 + 43$ and $y = (3 + 6) * 4$ and print the results to the console.

Exercise 2: A module for light at an interface

Create a module to calculate the reflected light rays and refracted light rays at a vertical interface. You can use the following example code:

Listing 1 themodule.py

```
def calc_reflection_angle(angle_inc):
    # ...
    # code to calculate the reflection at an interface
    # ...
    return angle_reflection

def calc_refraction_angle(angle_inc, n1, n2):
    # ...
    # code to calculate the refraction at an interface
    # ...
    return angle_refraction
```

Exercise 3: A module for converting text

Create a module with a function to convert text into upper-case text with all exclamation marks (!) removed. Name the module file `my_io.py`. In your main script do the following: - Import the module - Ask the user for an input sentence - Convert the sentence by using the function of the module

Then add another function to the module to convert text in a text file into a minimal html page. You can use the following example code to convert the text into html:

```
html_text = """<!doctype html>
<html lang=en>
  <head>
    <meta charset=utf-8>
    <title>""" + title + """</title>
  </head>
  <body>
    <p>""" + text + """</p>
  </body>
</html>
"""
```

Provide the main script with a sample text file and after conversion try to open your html-file.

Listing 2 thescript.py

```
# Import your module
import themodule as lm

# Parameters
angle_inc = 45

# Calculate the angle of reflection at a vertical interface
angle_reflection = lm.calc_reflection_angle(angle_inc)
print(angle_reflection)

# Calculate the angle of refraction at a vertical interface
# with media n1 = 1, and n2 = 1.5
angle_refraction = lm.calc_refraction_angle(angle_inc, 1, 1.5)
print(angle_refraction)
```
