Comments, Variables, Console

Solve the following exercises and upload your solutions to Moodle until the specified due date. Make sure to use the *exact filenames* that are specified for each individual exercise. Unless explicitly stated otherwise, you can assume correct user input and correct arguments. You are *not allowed* to use any concepts and modules that have not yet been presented in the lecture.

Exercise 1 – Submission: `a1_ex1.py` 25 Points

Create four variable of data types `bool` (boolean), `int` (integer), `float` (floating point) and `str` (string). You can choose arbitrary variable names and values. Print the variables (to the console) but with the following additional rules:

- The integer must have a minimum print width of 5 and must have leading zeros.
- The float must have a minimum print width of 10, and the number of decimals (precision) must be set to 3.
- The string must be printed three times next to each other, i.e., if the string is `A`, then `AAA` must be printed.

Example output for boolean = `True`, integer = `12`, float = `1.5` and string = `hello` (the ␣ character below represents a space, you do not have to literally print this character):

```
True
00012
␣␣␣␣␣1.500
hellohellohello
```

Exercise 2 – Submission: `a1_ex2.py` 25 Points

Read four numbers `a`, `b`, `c` and `d` from the console and convert them to integers. Afterwards, perform the following calculations and print the results (no string formatting required; see the example input and output below for how it must look like):

- The sum of `a`, `b` and `d`
- The product of all four numbers
- The sum of `a` and `b` times the sum of `c` and `d`
- The result of an integer division when dividing `a` by `d`
- The result of a regular division when dividing `a` by `d`
- The remainder of a division (modulo) when dividing `a` by `b`
- $\texttt{c}^{-\texttt{a}}$
- $\sqrt{\texttt{b}} = \texttt{b}^{\frac{1}{2}}$
- $\frac{\texttt{b}}{3} \cdot \left(\texttt{b}^{\texttt{a}+\frac{\texttt{d}}{2}} - 1\right) + \texttt{c}$

Example input and output:[1]

```
a: 20
b: 19
c: 18
d: 17
Sum of a, b and d: 56
Product of all numbers: 116280
The sum of a and b times the sum of c and d: 1365
a divided by d (int): 1
a divided by d (float): 1.1764705882352942
Remainder of a divided by b: 1
c to the power of -a: 7.844222393007239e-26
b to the power of 1/2 (square root): 4.358898943540674
Complex equation: 1.7624222759183791e+37
```

Exercise 3 – Submission: `a1_ex3.py` 25 Points

Write a program that computes and prints several metrics of a room given a user-specified `length`, `width` and `height` (see the example input and output below for how it must look like). All three numbers have to be converted to float and are assumed to be meters. The metrics to compute are the following:

- The circumference of the room (float)
- The volume of the room (float)
- The wall area of the room, i.e., the four side walls (float)
- The number of required windows (int). A window is required for every full 12 square meters of wall area. For example, a wall area of 26.3 square meters requires 2 windows. A conversion to an integer is necessary here.
- The amount of paint that is needed to paint the walls (float). For every square meter of wall, 0.75 liters of paint are required. The area that must be painted is the wall area of the room but without the windows. A single window has an area of 2 square meters.

All float results must be printed with 2 decimal places.

Example input and output:

```
Length (meters): 5.6
Width (meters): 4.5
Height (meters): 2.7
Circumference: 20.20 meters
Volume: 68.04 cubic meters
Wall area: 54.54 square meters
Number of windows: 4
Needed paint: 34.91 liters
```

[1] Green colored text indicates user input from the console.

Exercise 4 – Submission: `a1_ex4.py` 25 Points

Write a program that can print a small order form for a store that sells PC parts (see the example input and output below for how it must look like). You have to read in three integer numbers, which will then be part of such an order:

- The number of ordered cables. Each cable costs 9.90 euros.
- The number of ordered monitors Each monitor costs 249.99 euros.
- The number of ordered keyboards Each keyboard costs 27.50 euros.

Calculate the total cost for these three positions, and finally, compute the total cost of the entire order. The number of ordered items must have a minimum print width of 3 (you have to format only the output, not the user input). All float results must be printed with 2 decimal places.

Example input and output:

```
================================================
PC Parts Store - Order
================================================
Number of cables: 25
Number of monitors: 5
Number of keyboards: 20
 25 cables (9.90 EUR each) = 247.50 EUR
  5 monitors (249.99 EUR each) = 1249.95 EUR
 20 keyboards (27.50 EUR each) = 550.00 EUR
------------------------------------------------
Total: 2047.45 EUR
================================================
```

Important Information!

Please try to *exactly match the output* given in the examples (naturally, the input can be different). We are running automated tests to aid in the correction and grading process, and deviations from the specified output lead to a significant organizational overhead, which we cannot handle in the majority of the cases due to the high number of submissions.

For example, if the exercise has an output of
`Number of cables: XYZ`
(where `XYZ` is some user input), do not write
`The number of cables: XYZ`
(additional `The` and lowercase `n`) or
`Number of cables:XYZ`
(missing space after the colon).

Feel free to copy the output text from the assignment sheet, and then change it according to the exercise task.