Exercises: Conditional Statements – 02

Task 1: (if, else, elif ….)

Create a simple program in which three whole numbers (both positive and negative) are read in from the keyboard and displayed on the screen in ascending order. Only the (nested) selection should be used to solve the task (i.e. no built-in- 'sort' function built in Python should be used).

Task 2: (if, else, elif ….)

Create a simple program with which the body mass index (BMI) is calculated and displayed appropriately on the screen. To calculate the BMI, the height and weight must be entered.

The program output must contain the calculated BMI value on the one hand and the appropriate description on the other.

The following strings can be used as a description: underweight, normal weight, overweight and obesity. The following (somewhat simplified) table:

BMI Value in kg/m^2	Description
< 18.5	Underweight
>18.5 - 25	Normal weight
>25 - 30	Overweight
>30	Obesity (=Adipositas)

Body mass index is calculated as follows: $\mathbf{BMI = m / l^2}$

Here, **m** is the body weight in kilograms and **l** is the height in meters. You can find more about Body-Massindex at Wikipedia.

A program output could look like this, for example:

```
Enter your height in centimeters: 182
Enter your weight in kilograms: 92
Your BMI: 27.8 (Overweight)
```

Task 3: (if – Statement, and-Operator, or-Operator)

Difficult task…

e.g. for advanced students who already know other programming languages.

We haven't discussed the 'and'-, 'or'-operator in the lecture.
Look yourself on the Internet for good introductory examples for 'And'-, 'Or'-operators.

We will come back to this topic later. **You don't have to be able to complete this task just yet**.

Advanced goal: In this Task should be practiced

a) the creation and correct definition of complex conditional expressions,
b) the use of selection as a control structure and
c) the evaluation of complex expressions

The following subtasks contain selections whose conditional expression still needs to be correctly defined or evaluated.

Task 3a: The following selection is given:

```
a = 1;
b = 2;
c = 1;   # c = 1 => false       if c=2 => true

if (                                  ):
    print("Genf")
```

Assumption: The int variables **a**, **b** and **c** are declared and initialized.

Define the conditional expression in such a way that the body of the selection is only carried out if **a** is either greater than **b** or a is less than half of **b** or the sum of **a** and **c** is greater than **b**.

Task 3b: The following selection is given:

```
a = 1;   #  true on a=3; false on a=1
b = 2;
c = 1;
x = True;
y = False;

if (                                  )
    print("Bern")
```

Assumption: The int variables **a**, **b** and **c** and the boolean variables **x** and **y** are declared.

Define the conditional expression so that the body of the selection is only carried out if **a** is greater than **b** or the subtraction of the numbers **a** and **c** results in a positive value (i.e. greater than zero) and the two boolean variables **x** and **y** have different values.

Task 3c:

The following selection is given:

```
a = 6;
b = 2;
c = 0;

# Testexamples:
# a=6, b=2, c=0 => true
# a=5, b=2, c=1 => true
# a=5, b=5, c=2 => false


if (                                                    ):
    print("Lugano");
```

Assumption: The int variables **a**, **b** and **c** are declared.

Define the conditional expression so that the body of the selection is only executed if half of the number **a** is an odd number or if the subtraction of the numbers **b** and **c** results in an even number, or if both **a** and **b** and also **b** and **c** have different values .

Hint:

'Half the number is an odd number' means: It is a number from the set {2, 6, 10, 14, 18,….}