Computer Science and Programming
Lab Class 2

Task 1 ***Review: Input–Assignment–Output*** *(5 minutes)*

Implement the following in Python: Assign variable `a` with the value obtained from user input and assign variable `b` with `a`'s value. Finally, print the value of `b`.
Hint: Make use of the built-in functions `input()` and `print()`.

Task 2 ***Python as a Calculator*** *(5 minutes)*

Write a Python program which calculates the value of following expression $([a] = int(a))$

$$\left[\frac{8000.01 + 19}{37}\right] * 15^2 - 3861$$

Task 3 ***Boolean Expression*** *(5 minutes)*

Type the following code in your Spyder IDE and evaluate the output of the following expressions:

```
print (5<6)
print (5<=6)
print (5==6)
print (5>=4)
print (5==6 or 6==6)
print (5==6 and 6==6)
print (not(5==6) and 6==6)
```

Task 4 ***If/else*** *(5 minutes)*

Implement the following in Python: Assign variable a with the value 5 and assign variable b with the value obtained from user input. If a is smaller than b, we want to increase a by two. Otherwise, we want to decrease a by one. Finally, print the value of a.
Hint: Use function input().

Task 5 ***If/elif/else*** *(15 minutes)*

Calculate your Grade Point (GP) of a certain course with the following rules. For your grade of a certain course,
(1) If the grade is smaller than 60, GP = 0;
(2) If the grade is within [60,69], GP = 1;
(3) If the grade is within [70,79], GP = 2;
(4) If the grade is within [80,84], GP = 3;
(5) If the grade is within [85,100], GP = 4.

Task 6 *If/else* (5 minutes)

Please implement a simple login system in Python. When user types in the correct user name and password (e.g. `'User'` and `'123456'`) print 'logged in', otherwise print 'sorry'.

Task 7 *If/else* (10 minutes)

Implement a Python program which assigns four numbers to variables `a`, `b`, `c`, `d` (for instance, a=3, b=8, c=7, d=6). Identify and print the largest number among them. Note that your code should work for all possible variable assignments, not only the given example.

Task 8 *Int and float* (10 minutes)

(1) See the output of the following expressions: (5 minutes)

```
a=7
b=8

print(int(a/2))
print(a/2)
print(int(b/10)*10==b)
```

(2) Input a number b from the user. If b is a multiple of 7, print 'yes'. Otherwise, print 'no'. (5 minutes)

Task 9 *Sort sequence* (10 minutes)

Suppose that you are given 3 numbers `a1`,`a2`,and `a3`. please sort them with increasing order. For instance, if your input is `a1=3`, `a2=7`, `a3=4`., you need to ouput the following result: 3,4,7. (Note: Please read the three numbers with `input()`.)

If you finish this task, please think about how to solve this problem with more numbers (`a4`,`a5`,...).

Task 10 *Triangle's angle computation* (25 minutes)

Input three points that are described with six variables corresponding to their coordinates, `x1`,`x2`,`x3`,`y1`,`y2`,`y3` (see Figure 1). Given the six variables, for instance, generated by user input, please compute the angle between two shorter sides of the generated triangle. Please note that the shorter sides of the triangle depend on the user input; they have to be determined by your program!

Hint: You can implement this task using the `math` package that has been introduced. A more thorough introduction of it is in its official website: `https://docs.python.org/3/library/math.html`.

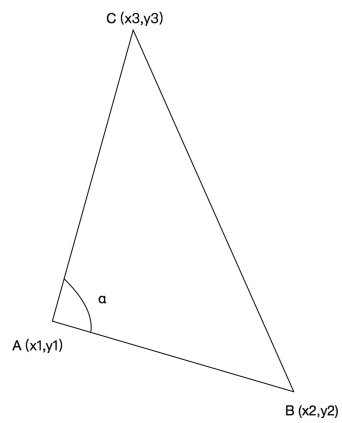**Hint**: After implementing your program, you can start with designed constants for the variables in order to test your program.

Figure 1: Triangle for Task 10