1 Lesson 3 – Fundamentals of Python

1.1 Objectives (TO COMPLETE)

The goal of this group of hands-on exercises **is to introduce participants to common tasks for managing programming environments**. After these exercises, the participants are expected to be able to:

- To implement good practices used to maintain clear and organised source code.
- Solve problems applying conditional sentences with relational operators and logic operators.
- Solve problems applying loop sentences "FOR" and "WHILE".

1.2 Code conventions

- ✓ To create the answer file for each proposed exercise, follow the following file naming convention. Let the file **l_03_exercise_01.py** be the answer to the first exercise proposed. The meaning of the proposed name is defined below as follows, **l_03 = lesson 03, exercise number 1**, which directly corresponds to the approach of the proposed exercise. Finally, after solving the problems, you will have a list of files as follows:
  - **l_03_exercise_01.py**
  - **l_03_exercise_02.py**
  - **l_03_exercise_03.py**

  …

  - **l_03_exercise_n.py**

  **** Where "n" is the last exercise***. *****
- ✓ All the exercises **must have a header indicating the author**, description and usage. Here and example (https://github.com/juancarlosmiranda/python_code_recipes/blob/main/workshop_aua_activities/HEADERS.txt)
- ✓ Put comments in order to explain the sentences.
- ✓ Name the variables and functions following the PEP8 convention. (https://peps.python.org/pep-0008/)

1.3 Exercises

1. Create a program to enter an integer number and a float number, with the following messages for the users: "INPUT AN INT NUMBER=", "INPUT A FLOAT NUMBER=". Use the "activity_03_01.py" file for help.
2. Create a program to input two integer numbers. Show to the user what is the greatest number entered. **TEST INPUT DATA: 1, 5. OUTPUT EXPECTED: "5 is greatest number entered!!!"**
3. Create a program to enter two integer numbers using the keyboard, calculate the sum and the product of both. If the result is great than 5, show a message to the user indicating as following: "Result= X THE SUM IS GREATER THAN 5!!!". **TEST INPUT DATA: 3, 5. OUTPUT EXPECTED: "Result=8 THE SUM IS GREATER THAN 5!!!"**
4. Create a program to enter 3 integer number by keyboard. The program will show to the user a message indicating what is the greatest number entered. **TEST INPUT DATA: 2, 4, 6. OUTPUT EXPECTED: "6 is the GREATER number entered by keyboard!!!"**
5. Create a program that stores data in 4 variables named as follows: A, B, C, D. These variables will store integer numbers entered from the keyboard. The program must issue activation messages to the user. A table with inputs is provided to test the program. **** The inputs provided are for testing purposes only, the program must work with keyboard input. These are not manually hardcoded numbers in the source code****.

A	B	C	D	Activation
1	2	3	4	YES
1	2	4	3	NO
3	4	6	7	YES
4	3	6	7	NO
4	3	7	6	NO

6. Create a program that allows you to input 10 integers. From the number list, the program should calculate as follows:

a) Summation.
b) Average

TEST INPUT DATA: 2, 2, 4, 6, 6, 6, 7 ,8, 10, 11

OUTPUT EXPECTED: "SUM: 62", "AVG=6.2"

7. Create a program that permits enter 10 integer numbers, implement the loop using the sentence **"FOR".** From the list, the program must calculate as following:

a) Sum of all numbers.
b) Average of all numbers.
c) Total numbers greater than 5
d) Total numbers between 5 and 10, includes start and end.

TEST INPUT DATA: 2, 2, 4, 6, 6, 6, 7 ,8, 10, 11

OUTPUT EXPECTED: "SUM= 62", "AVG=6.2, GREATER_THAN_5=7, COUNTER=6"

8. Create a program that permits enter 10 integer numbers, implement the loop using the sentence **"WHILE".** From the list, the program must calculate as following:

e) Sum of all numbers.
f) Average of all numbers.
g) Total numbers greater than 5
h) Total numbers between 5 and 10, includes start and end.

TEST INPUT DATA: 2, 2, 4, 6, 6, 6, 7 ,8, 10, 11

OUTPUT EXPECTED: "SUM= 62", "AVG=6.2, GREATER_THAN_5=7, COUNTER=6"

9. Given a matrix structure with integer data, develop a program to print each number with it coordinates inside the matrix. For example, the program must print something like this: "M[0][1]=10". In this exercise implement this program using FOR LOOP.

   TEST DATA INPUT: M=[[0, 10, 1],[1, 2, 3],[4, 5, 6]]

   OUTPUT DATA:

   "M[0][0]=0"

   "M[0][1]=10"

   "M[0][2]=1"

   "M[1][0]=1"

   "M[1][1]=2"

   "M[1][2]=3"

   …

1.4 Final words, tips

x.

1.5 Recomended reading

x.