COSC 1336
Spring 2022

Assignment 2: Types, Variables, Assignments, and Expressions

[1] **Objectives**: In the last assignment, we have practiced the following Python syntax:

- Using variables,
- Printing values including string literals (quoted strings) and variables mixed in one print() statement, and
- Reading a string from input and saving it in a variable,

Before working on this assignment, make sure you are familiar with the above. This assignment will cover the basic syntax of Assignment Statements and some other issues, including

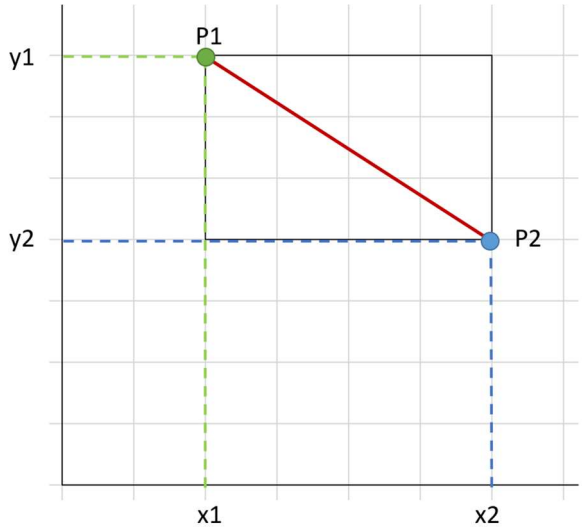
- Reading integer and floating-point numbers,
- Casting a string into a number,
- Writing expressions using various operators and operands,
- Importing modules so that we can do more calculations without writing codes,
- Using a function/method of a module and using a built-in function,
- Using separator and end-of-line character to alter the print output (recall there were a few annoying extra spaces in Assignment 1), and
- Using f-strings to format the output.

That sounds a lot, but they are not as scary. The instructor will explain how to do each one of them. Your job is to put them together to solve a problem.

[2] **Description**: This assignment is about two-dimensional (planar) space points. A point can be represented by two values, the x-coordinate and the y-coordinate. These numbers will be stored as floating-point numbers in Python.

Task 1: Compute the distance of two given points $P_1 = (x_1, y_1)$ and $P_2 = (x_2. y_2)$. Specifically,

- Prompt the user to enter the two points, i. e., the four values,
- Cast the values into floating-point numbers (they were strings when entered into the program),
- Print the two points out so that we can be sure they are correct,
- Compute the distance and save the result in a variable,
- Print the result out in a "nice" format.



The distance between two points (x_1, y_1) and (x_2, y_2) is given by the following formula:

$$\boldsymbol{d} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

To compute the square root, you will need the help of a mathematical function. The function can be found in the math module of Python. All you need to do is import the math module and use the sqrt() function. I will demonstrate this in class.

Task 2: The two points also forms a rectangle with (x_1,y_1), (x_1,y_2), (x_2,y_1), and (x_2,y_2) as the corners of the rectangle. Continue from Task 1, compute the area of the rectangle. The equation below shows how to compute the area.

$$area = |x_1 - x_2| * |y_1 - y_2|.$$

Implementing this program may take as few as ten lines, excluding comments and blank lines. This is NOT a requirement. Making your code more readable is more critical.

[3] **Output**: A sample output is given below. Your code should work for any legitimate input.

```
For P1, please enter the x-coordinate: 1.2
For P1, please enter the y-coordinate: 2.3
For P2, please enter the x-coordinate: 3.4
For P2, please enter the y-coordinate: 4.5

The two points are: P1 = (1.20, 2.30), and P2 = (3.40, 4.50).
The distance between the two points P1 and P2 is 3.11127.
The area of the rectangle bounded by P1 and P2 is 4.84000.
```

[4] **Submission**: Submit the Python program file to the Blackboard, named "<last name>_hw2.py". Assignment submitted through other forms will not be accepted.

[5] **Deadline**: 11:59 pm, Monday, February 14, 2022