Lab 5: Functions

Recall that lab4 was on control structures (conditionals and loops). In today's lab session, we will focus on functions objects. At the end of the lab session, you will be able to:

- Define your own functions (i.e. user-defined functions).
- Call the functions you have already defined.
- Differentiate between local and global scopes
- Demonstrate at least 3 argument passing modes in Python (Positional/Required, Keyword and Default)

Starter Questions

1. What is a function? Name some advantages of using functions in our programs.
2. List some of the predefined (built-in) functions you have used so far.

Additional resources: w3schools.com, python.org

Activity 1: Recap

- Take a moment to revisit our classroom discussion on functions.
- Try out some of the examples on your terminal/Spyder IDE.
- Go to **Pythontutor.com** and familiarize yourself with the website. Execute simple Python codes you have written so far and visualize your codes in action.

Activity 2: problem solving

Remember, it is a good habit to write comments in all your codes. All your functions in this activity must have a Docstring inside the functions you write.

1. Write a function to find the hypotenuse of a right angle triangle given its two sides (using Pythagorean Theorem).
2. Define two functions named **area()** and **perimeter()** to compute the area and perimeter of a trapezoid.
3. Write a function named **Swap()** that accepts two numbers and swaps/exchanges their values.
4. Write a function named **Max5()** that accepts five integer numbers and displays the maximum of the five.

5. Write a function that takes a number (e.g. 50) and displays all integers from 1 up to that number. Next, modify the function to display only the odd numbers 1 up to that number.
6. Write a function named **Factorial()** that computes the factorial of a given number.
7. Write a function named **SumEven()** that computes the sum of the even numbers between 100 and 200 (inclusive).

8. Write a menu-based program that accepts two numbers from the user and performs the 4 arithmetic operationsby using functions.
   You menu should look like:
   [1] Addition
   [2] Subtraction
   [3] Multiplication
   [4] Division

   Let the user decide which operation s/he wants to perform i.e. if user selects 1, perform addition, if 2, perform subtraction, and so on.

9. Local vs Global scopes
   - Define your own function that has both local variables. Introduce some global variables too in your code.
   - Try to access each value both from within and outside of the function.
   - Notice your observation.
10. Practice with various ways of passing arguments in Python (Positional, Keyword, Default).
    - Experiment with these modes of passing arguments.
    - You can use some of the functions you have already defined so far.
    - Comment on your observation.