CSC 3141 - IMAGE PROCESSING LABORATORY
(2022/2023)
Assignment 01 - Python Basics

Due date: Feb 14th 2024, 11.59 pm

This assignment is a sequence of exercises in Python. Each exercise requires you to write a program in a file called QN_S19XXX.py, where N is the question number and XXX is the last three numbers of your registration number (e.g. Q1_S19123). Use bare python to accomplish the following tasks.

1. Write a program that reads the input parameter of following shapes from the user and compute the area and circumstance.
    a. Rectangle
    b. Circle
    c. Triangle
    d. Parallelogram
    (Hint: for circle input parameter is radius)
2. Write a function to compute the factorial of a given number (n).
3. Write a function to display Fibonacci sequence up to the nth term.
4. Write a function to solve the quadratic equation. (input parameters a,b,c)
    a. Find the solution for the following equations.
        i. $5x^2 + 17x - 10$
        ii. $12x^2 + 10 + 20$
        iii. $x^2 + 5x + 6$
5. Write a function to calculate the distance between two points.
6. Write a program to perform the following tasks.
    a. Read ten marks of a student and store it in to an empty list called ‘marks’.
    b. Sort the ‘marks’ list in ascending order.
    c. Print the total, mean, median and mode element of the ‘marks’ list. (Import a suitable library to calculate mean, median and mode).
    d. Create a new list called ‘grade’ with the same size as ‘marks’ and find the grade for each mark and insert into ‘grade’ list by using following grade criteria.

Marks	Grade
100 ≥ marks ≥ 80	A
79 ≥ marks ≥ 60	B
59 ≥ marks ≥ 50	C
49 ≥ marks ≥ 30	D
29 ≥ marks ≥ 00	F

7. Write a Python program to get the total number of words included in a given text file. You may consider the words separated by commas or dashes as two different words.

First create a text file (words_file.txt) with the content below inside your working directory.
words_file.txt:

"Python is an interpreted high-level general-purpose programming language. Its design philosophy emphasizes code readability with its use of significant indentation. Its language constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically-typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly, procedural), object-oriented and functional programming. It is often described as a 'batteries included' language due to its comprehensive standard library. Guido van Rossum began working on Python in the late 1980s, as a successor to the ABC programming language, and first released it in 1991 as Python 0.9.0. [33] Python 2.0 was released in 2000 and introduced new features, such as list comprehensions and a cycle-detecting garbage collection system (in addition to reference counting). Python 3.0 was released in 2008 and was a major revision of the language that is not completely backward-compatible. Python 2 was discontinued with version 2.7.18 in 2020. Python consistently ranks as one of the most popular programming languages."