Assignment07

Objectives

- User defined functions
- While & for loop
- If statements

Instructions & Requirements

1) This Python program performs various computations using user defined functions. It displays a menu and asks the user to select one of options. The menu will be displayed at the beginning and then displayed whenever each option is done (except the Exit option). The program keeps running until the user choose the exit option. *Create a new `.py` file and start writing code.*

2) ***Introductory Comments:*** At the beginning of the program, include "Introductory Comments" as below. All your submissions should include a segment of introductory comments.

```
#=============================================================
# Your Name & Lab Section: (ex: Purdue Pete, Friday 1:30pm)
# Your Purdue Email: (ex: purduePete@purdue.edu)
# Program Description: In your own words, provide a brief description of
the program in 1-2 sentences.
# Academic Honesty:
# I attest that this is my original work.
# I have not used unauthorized source code, either modified or unmodified.
# I have not given other fellow student(s) access to my program.
#=============================================================
```

3) ***Inline Comments:*** Add inline comments to explain logic, assumptions, details, etc. **At least 15 InLine comments are required to get the grade.**
   `EX. #Calculate the area of the rectangle`

4) Define 4 user-defined functions using a for loop unless specified. **Note. Do NOT use any python built-in functions other than `range()`.**

   a) `displayMyInfo()`
      i. Input: none
      ii. Output: none
      iii. Task: Display programmer's info in a box.

   b) `factorial()`
      i. Input parameter(s): provide one parameter
      ii. Task: This function computes and returns a factorial of n (a natural number) using a for loop.
      A factorial of N: N! = 1* 2* 3* …. * N

c) `maximumNo()`

i. Input: float, float, float
ii. Return type: float
iii. Task: Determine the maximum of three given floats. Returns the maximum.

d) `digits()`

i. Input: int
ii. Return type: int
iii. Task: Determine the number of digits in a given number. Assume the given number is positive integer
iv. Hint: Use a while loop.

5) Define `main()` function. Add necessary code and call functions that we defined in Step 4 where they are needed in `main()`.

6) Write a **`while`** loop and set its condition appropriately to repeat all the inside code and execute followings. **Note. Do not call `main()` inside of `main()`**

7) Display a menu (as below)

```
==================== User Defined Functions Menu ====================
1. Compute n Factorial
2. Find the Maximum
3. Find the number of digits
4. Exit
=====================================================================
```

8) Prompt the user to select one of the options and read it into a variable. (*All user inputs should be assigned to variables with meaningful names and proper data types. Choosing wrong data types can produce results that are different from the desired outputs.)*

9) Using an if…else statement, check the value that the user selected.
A) **Option 1**: Compute n Factorial
a) Prompt the user to enter a natural number for n.
b) Using `factorial()`, print a factorial of n as **Desired Outputs**.

B) **Option 2**: Find the maximum of 3 numbers

a) Prompt the user to enter 3 numbers for n1, n2 and n3. Read the user's input into their corresponding variables.

b) Using maximumNo(), print the maximum of n1, n2, n3 using the value returned by the function. The maximum should be printed using the returned value from the function (i.e., Do not have a print statement inside the function). Display the maximum as shown in the sample screen captures below.

C) **Option 3**: Determine and Display the number of digits in a given number.

a) Prompt the user to enter a natural number n. Read the user's input into their corresponding variables. (n is a positive integer !!!!)

b) Using digits(),print the number of digits in n using the value returned by the function. The number of digits should be printed using the returned value from the function (i.e., Do not have a print statement inside the function). Display the number of digits as shown in the sample screen captures below.

D) **Option 4**:

a) Print a message saying goodbye to the user.

E) In the case where neither 1, 2, 3, 4, nor 5 is chosen, display messages as below indicating that the selection was invalid.

```
Choose one of options to perform: 45
Invalid option!  Enter a number between 1 and 5.
```

10) Call `main()`

Submission

- **Submit the `.py` file on Brightspace.** Only the last submission will be graded
- BEFORE submission, test your program by comparing the outputs with **Desired Outputs** below.
- AFTER submission, download your submission and test your program whether if it runs without any issue.
- NO late submission will be accepted.
- There will be penalties for wrong file submission and any errors in the program.

Desired Outputs

- Again, BEFORE submission, test your program by comparing the outputs with the figure(s) below. Your program **MUST** produce the same outputs as below when given the same inputs.

Test case 1:

```
-------------------------------------------
|                 Vijay                   |
|           CNIT 155 Assignment07         |
|           sundar17@purdue.edu           |
-------------------------------------------


==================== User Defined Functions Menu ====================
1. Compute n Factorial
2. Find the Maximum
3. Find the number of digits
4. Exit
=====================================================================

Choose one of the options to perform: 1
1. Compute n Factorial
Enter a natural number for N: 5
5 != 120



==================== User Defined Functions Menu ====================
1. Compute n Factorial
2. Find the Maximum
3. Find the number of digits
4. Exit
=====================================================================

Choose one of the options to perform: 2

2. Find the Maximum
Please enter the 1st number: 5
Please enter the 2nd number: 9
Please enter the 3rd number: 2
The greatest number among the three numbers: 9
```

```
==================== User Defined Functions Menu ====================
1. Compute n Factorial
2. Find the Maximum
3. Find the number of digits
4. Exit
=====================================================================

Choose one of the options to perform: 3

4. Find the number of digits
Enter a natural number for N: 158797
The number of digits in 158797 is 6



==================== User Defined Functions Menu ====================
1. Compute n Factorial
2. Find the Maximum
3. Find the number of digits
4. Exit
=====================================================================

Choose one of the options to perform: 67
Invalid option! Enter a number between 1 and 5


==================== User Defined Functions Menu ====================
1. Compute n Factorial
2. Find the Maximum
3. Find the number of digits
4. Exit
=====================================================================

Choose one of the options to perform: 4
Bye!
```