SE113 – LAB#7 2023-2024 SPRING

Aim: Understanding built-in functions as well as user defined functions.

Create a Python project in which you have the following file: **lab7.py**

1. Define a function `my_function` that takes an integer **x** as a parameter and decides if **x** is an even or an odd number. The function returns no value. To test your function, read an integer from the user and print out whether it is even or odd using the function.

2. Write a Python script that performs the following computations via user-defined functions.

   a) Define a function `sine_function` that takes a real number ***d*** as a parameter (that is an angle value in degrees) and returns ***sine of d***.
   Hint: Within the definition of your function, you can call the built-in function `math.sin`, however this function takes the angle in radians, not degrees. So, you may consider converting ***d*** from degrees to radians. (pi =3.14)

   b) Define a function `logarithm_function` that takes two positive real values (i.e., ***b*** and ***n***) and returns the result of $\boldsymbol{log_b(n)}$.
   Hint: Within the definition of your function you can use the built-in function `math.log` (By the way, check the following reference page for all built-in Mathematical functions available to use in the module `math` of Python3: https://docs.python.org/3/library/math.html).

3. Fibonacci numbers form such a sequence that each number is calculated as the sum of the two preceding numbers. That is,

$$F_0 = 0\,, \quad F_1 = 1$$

$$F_n = F_{n-1} + F_{n-2} \qquad \text{for n} > 1$$

   The sequence is the following: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ...

   Define an iterative function that takes an integer ***n*** as a parameter and returns the corresponding Fibonacci number F_n using a while loop structure. In your Python script, test your function by passing an argument value.

   Hint: https://en.wikipedia.org/wiki/Fibonacci_number

TODO@HOME

a. Write a Python script that includes a simple calculator which contains all the functions that we have designed in the first 3 questions. Firstly, print out a menu to list the options that represent the operations that the calculator would perform, then ask the user to select one of the operations.

SAMPLE OUTPUT (bold parts are entered by user):

```
To decide whether a given number is even or odd, Enter 1.
To calculate sine of a given degree, Enter 2.
To calculate the logarithm of a given number, Enter 3.
To calculate the Fibonacci value for a given number, Enter 4.

Select an operation: 1
Enter a number to check whether it is even or odd: 25
25 is an odd number.
```

b. Improve your script in the following way: Add an exit option to the menu. If the user enters 0, the program will immediately exit. Make the program run in a loop until the user selects the exit option.