CS 115 - Introduction to Programming in Python

Lab 03

Lab Objectives: Functions

Notes:

- Upload your solutions as **a single .zip file** to the Lab03 assignment for your section on Moodle **by 17:30 on Monday, October 19**. You must use the following naming convention: Lab03_Surname_FirstName.zip where Surname is your family name and FirstName is your first name
- You should not use lists, tuples, dictionaries in your solution.
- For each of the functions below, you should include a docstring comment. The docstring should have the following format:

```
"""
Summary of what the function is for
Parameters:
param1 (param1 type): Description of param1

Returns:
type: variable/value
"""
```

1. The following will be in the script, Lab03_Q1.py:

PART A : Write the following functions:

a) *is_vowel():* takes a string and returns True if this string is a single vowel character (case-insensitive), False otherwise.
b) *count_vowels():* takes a string and counts and returns the number of vowels in this string using your *is_vowel()* function from part a).
c) *all_vowels():* takes a string and checks if all vowels exist in this string or not. The function will return True if all exist, otherwise False will be returned.
d) *display_which_vowels():* takes a string and displays which vowels exist in the string.
e) *capitalize_vowels():* takes a string and creates a new string by capitalizing the vowels in the given string. (Hint: Use `upper()` function)

PART B:
Write a program that inputs a sentence having all lowercase letters from the user and calls the above functions to have the outputs shown in the sample runs.

Sample Runs:

Enter a string: all people like soup
There are 8 number of vowels
All Vowels exist in the given string
" a " exists in " all people like soup "
" e " exists in " all people like soup "
" i " exists in " all people like soup "
" o " exists in " all people like soup "
" u " exists in " all people like soup "
New String: All pEOplE lIkE sOUp

Enter a string: she is your friend
There are 6 number of vowels
" e " exists in " she is your friend "
" i " exists in " she is your friend "
" o " exists in " she is your friend "
" u " exists in " she is your friend "
New String: shE Is yOUr frIEnd

2. The following will be in the script, Lab03_Q2.py:

a) Write a **function**, *hailstone()*, that takes an integer value n as a parameter, and displays the hailstone sequence for the given integer. The hailstone sequence is determined as follows: if the value is even, divide by 2 (floor division) or if the value is odd, calculate 3 * n + 1. The function should display each value and continue updating the value until it becomes 1.

b) Write a program to display the hailstone sequence of all integers between 5 and 10.

Sample Run:

```
5 16 8 4 2 1
6 3 10 5 16 8 4 2 1
7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
8 4 2 1
9 28 14 7 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
10 5 16 8 4 2 1
```

3. The following will be in the script, Lab03_Q3.py:

a. Write a function `sumDigits` that takes a ***positive*** integer value and returns the total sum of the digits in the integers from 1 to that number inclusive.

b. Write a program to input an integer n and call the above function in part a if n is positive, else give 'Value must be Positive' message.

Sample Runs:

```
Enter a positive integer: 1000000
The sum of the digits in the number from 1 to 1000000 is 27000001

Enter a positive integer: -2537
Value must be Positive

Enter a positive integer: 100
The sum of the digits in the number from 1 to 100 is 901
```