Assignment 4 – While Loops

Learning Objective

Write a Python program that uses while loops.

Assignment Description

Write a program that allows the user to enter an unknown amount of numbers. The user will signal that they are done entering numbers by entering -1. The program will determine the smallest number entered and largest number entered by using variables and branching.

Steps

1. In PyCharm (Community Edition), open your existing ITP115 project.

2. Under the Assignments directory, create a new directory called **a4_*last_first*** where *last* is your last/family name and *first* is your preferred first name. Use all lowercase letters.

3. In the directory, create a new Python file called **assignment4.py**.

4. At the top of the file, put comments in the following format and replace the name, email, and section with your actual information:

```
# Name, USC email
# ITP 115, Fall 2022
# Section: number or nickname
# Assignment 4
# Description:
# Describe what this program does.
```

5. You will need to calculate the average (mean) of a set of numbers that the user enters. Remember that average equals the sum of the numbers divided by the count. Create variables to hold the count and sum. Set them to 0.

6. Display the following message to the user:

```
Input an integer greater than or equal to 0 or -1 to quit:
```

7. Get input from the user using the following prompt:

```
> 8
```

8. Create variables to hold the smallest number and largest number. Set them to the variable that you saved the user's input into.

9. Create a **while** loop that ends when the user's input is the sentinel value of **-1**.

10. In the while loop, determine the largest number entered and the smallest number entered by using variables and branching.

11. In the while loop, update the count and sum variables appropriately.

12. In the while loop, get input from the user using the following prompt:

```
> 8
```

13. After the while loop (when the user enters **-1**), print out the largest number, the smallest number, and the average of all the numbers entered. To calculate the average, remember that average = sum / count of numbers. Here is an example:

```
The largest number is 34
The smallest number is 1
The average number is 13.0
```

14. After finding the largest, smallest, and average numbers, ask the user if they would like to enter another set of numbers.

```
Would you like to enter another set of numbers (y/n)? y
```

15. To handle the user entering another set of numbers, you will need an outer **while** loop and make it a "do while" loop, which is a loop that makes sure to run at least once. This should be created before you create the variables for the count and sum.

16. Solve this assignment without using lists. If you don't know what a list is, that's great! We haven't taught you about them yet.

17. Be sure to comment your code. This means that there should be comments throughout your code. Generally, a comment for every section of code explaining what it does. Points will be deducted for not having comments.

18. Follow coding conventions.

19. Test the program. Look at the Sample Output below. When testing, the graders will only enter integers greater than or equal to 0. Assignments that do not run are subject to 20% penalty.

20. Prepare your submission:

    o   Find the **a4_*last_first*** folder on your computer and compress it. This cannot be done within PyCharm.

    o   On Windows, use **File Explorer** to select the folder. Right click and select the Send to -> Compressed (zipped) folder option. This will create a zip file.

    o   On Mac OS, use **Finder** to select the folder. Right click and select the Compress "*FolderName*" option. This will create a zip file.

21. Upload the zip file to your Blackboard section:

    o   On Blackboard, navigate to the appropriate item.

    o   Click on the specific item for this assignment.

    o   Click on the **Browse Local Files** button and select the file.

    o   Click the **Submit** button.

Grading

- This assignment is worth 30 points.

- Make sure that you the program runs. Points will be taken off if the graders have to edit the source code to test your program.

- Make sure to submit your assignment correctly as described above. Points will be taken off for improper submission.

Item	Points
User input	5
Inner while loop for entering numbers	5
Calculate and print smallest number	5
Calculate and print largest number	5
Calculate and print average	5
Outer while loop for entering another set of numbers	5
Total	30

Sample Output

<u>Example 1:</u>
```
Input an integer greater than or equal to 0 (-1 to quit)
> 1
> 8
> 34
> 9
> -1
The largest number is 34
The smallest number is 1
The average number is 13.0

Would you like to enter another set of numbers (y/n)? y
Input an integer greater than or equal to 0 (-1 to quit)
> 7
> 2
> 3
> 2
> 2
> -1
The largest number is 7
The smallest number is 2
The average number is 3.2

Would you like to enter another set of numbers? (y/n): N

Goodbye!
```

<u>Example 2:</u>
```
Input an integer greater than or equal to 0 (-1 to quit)
> 6
> 12
> -1
The largest number is 12
The smallest number is 6
The average number is 9.0

Would you like to enter another set of numbers (y/n)? q

Goodbye!
```