IS 671 Python Programming 2019/2020

Assignment02 *19 November 2019*

INSTRUCTIONS

This lab covers **Chapter 03 Control Structures.** Code should be typed in Jupyter Notebook**.** Each part of the question should be answered in a different Cell. There must be a heading before the solution in each cell to show which part of the question you are answering. Refer to template of Assignment 02. Filename should be in the format `SURNAME_Firstname_Assignment02.ipynb` Where SURNAME and Firstname refers to your names. You should also attach a pdf file where you have captured the outputs after running the question solution. Filename should be the same as above BUT with extension pdf.

Submission deadline: Latest by `Thursday 28th November 2019 at 1800 hrs. Submit through email.`

Question 01

Write a program using **for** loop that displays a table of values of temperature in Centigrade from -40 to +40 in steps of 5 degrees and corresponding temperature in Fahrenheit using 3 decimal places as shown in Table below.

Centigrade	***Fahrenheit***
-40	
-35	
.....	
35	
40	

Question 02

Repeat Question 1 using **while** loop

Question 03

Write a program which prompt the user to enter two positive numbers and in turn display number of even numbers and also the average of even numbers within the range. Example: There are **6** even numbers between **3** and **14** (which are 4, 6, 8, 10, 12 and 14) and average of these even numbers is: **9.** Sample display will be as follows:

```
Enter starting point: 3
Enter ending point: 14
There are 6 Even numbers between 3 and 14 (all inclusive)
```

```
Average of even numbers between 3 and 14 (all inclusive) is: 9
```

Test your program with:

(a) 3, 14 (b) 14, 146 (c) 64, 1024 (d) 14, 3

Note: If the second number is smaller than the first one (like in (d) above), the program should swap the two numbers so that the first is smaller than the second. Example: entering 14 and then 3 should give the same results as entering 3 first and then entering 14.

Counter-check your results using other means such as calculator, Excel, R, etc.

Question 04

Write a program which prompts the user to enter scores of ten (10) postgraduate students at UDSM in one of the courses. The program should in turn calculate and display (***without using any imported modules and without using max and min functions***):

(a) Entered marks (in one line, where comma is used to separate entered marks)
(b) The lowest mark
(c) The highest mark
(d) The average and Standard deviation (display to two decimal places)
(e) Number of students who have passed and number of students who have failed
(f) Summary of grades with corresponding number of students for each grade as shown in following table:

Grade	No. of Students
A	
B+	
B	
C	
D	
E	

Pass mark is 50. Marks should be restricted between 0 and 100 (all inclusive). Test your program with different marks. Use following samples.

(a) 95.5, 45.5, 37, 23, 38.5, 54, 66.5, 61, 67, 52
(b) 90, 12, 43.5, 88, 62.5, 67, 69, 64, 68, 72
(c) 69, 55, 83.5, 75, 58, 53.5, 63, 67, 98, 79
(d) 56.5, 66.5, 36.5, 57.7, 45.5, 51, 54, 58, 54.5, 63.5

Formula for standard deviation is given by:

$$sdev = \sqrt{\frac{\sum_{i=1}^{N}\left(x_i - \overline{x}\right)^2}{N}}$$

Counter-check your results using other means such as calculator, Excel, R, etc.

Question 05

Repeat Question 4 BUT now you are allowed to use max, min functions and also to import modules such as math and statistics.

Question 06

In Tanzania, resident individual's month income Tax Rates with effect from 1st July, 2017 is given in the following Table:

Monthly Income	**Tax Rate**
Where total income does not exceed Tshs 170,000/=	NIL
Where total income exceeds Tshs 170,000/= but does not exceed Tshs 360,000/=	9% of the amount in excess of Tshs 170,000/
Where total income exceeds Tshs. 360,000/= but does not exceed Tshs 540,000/=	Tshs 17,100/= plus 20% of the amount in excess of Tshs 360,000/=
Where total income exceeds Tshs 540,000/= but does not exceed Tshs 720,000/=	Tshs 53,100/= plus 25% of the amount in excess of Tshs 540,000/=
Where total income exceeds Tshs 720,000/=	Tshs 98,100/= plus 30% of the amount in excess of Tshs 720,000/=

Write a program which will prompt a user to enter month income and in turn calculate and display the tax. Restrict month income to be greater than zero and display the income and tax to two decimal places. Include thousand separator in your display. After displaying the results, the user should be asked if he/she has more entries. If the answer is Y or y, then he/she should enter new value of income and display the results. If answer is N or n, then terminate the program. If the answer is not in (Y, y, N, n) then he/she should be prompted to re-enter the answer.

Format of display is:

```
Enter month income: …….
For month income =…… tax to pay is …….
Do you have more entries (Y/N)?: …….
```

Test your program with following income amounts:

(a) 360,000 (b) 850,000 (c) 3,520,000 (d) 5,711,000 (e) 4,722,500 (f) 160,000

Counter check your results using TRA calculator at:
https://www.tra.go.tz/calculators/paye.htm

Question 07

Write a program that accepts an integer month (1 up to 12), and the year (1990 up to 2019) from the keyboard, and in turn display the month name (January, February, …) and number of days in that month and state whether it is a leap year or not. Examples:

```
Enter Month number: 3
Enter Year: 2019
Month name is March
Number of days in that month is 31
2019 is NOT Leap Year

Enter Month number: 2
Enter Year: 2016
Month name is February
Number of days in that month is 29
2016 is Leap Year

Use following samples for testing your program:
(a)  March 2019  (b) February 2016  (c) February 2002  (d) November
     2012
```

Compare your results for leap year using: http://www.onlineconversion.com/leapyear.htm
Restrict the month to be in the range 1..12 and also year between 1990 and 2019.

=== END ===