CS 115 - Introduction to Programming in Python

Lab 02

Lab Objectives: Conditional Statements, Loops – for and while, Strings

1. Write a Python script, `Lab02_Q1.py` that takes three integers from the user, each describing the length of a side of a triangle (a, b, c). In order a triangle to exist, the value of the lengths should satisfy the triangular inequality. That is the sum of lengths of any two sides must be larger than the length of the other third side.

   The program will take three integers from user and check if the entered values satisfy triangular inequality.

   Note: Please make sure that you perform input validation like in the sample run. That is side lengths cannot be negative or zero.

   Sample Runs: (User inputs are shown in red.)

   ```
   Enter the length of side a :5

   Enter the length of side b :7

   Enter the length of side c :15
   This is NOT a valid triangle.
   ```

   ```
   Enter the length of side a :5

   Enter the length of side b :9

   Enter the length of side c :6
   This is a valid triangle.
   ```

   ```
   Enter the length of side a :0

   Enter the length of side b :-6

   Enter the length of side c :3
   Side lengths cannot be negative or zero. Exiting...
   ```

2. Write a Python script, `Lab02_Q2.py` that calculates the net income of a person (income TAX subtracted from a person's income). The program will input the the income. The income TAX percentage is proportional to the income level of the person. In the table below the percentages are categorized according to the income:

Income Interval	Applied TAX Percentage
0 < income < 10000 TL	22%
10000 TL ≤ income < 100000 TL	26%
100000 TL ≤ income	33%

Note: Give a valid message if the given income value is negative or zero.

Sample Runs: (User inputs are shown in red.)

```
Enter the total income (TL) : 5000
The net income is  3900.0 TL
```

```
Enter the total income (TL) : 0
Entered income value is not valid. Exiting...
```

```
Enter the total income (TL) : 15000
The net income is  11100.0 TL
```

```
Enter the total income (TL) : 200000
The net income is  134000.0 TL
```

3. Write a Python script, `Lab02_Q3.py` that does the following:

   a. Uses a for loop to calculate and display the first 10 powers of 2.

   b. Uses a while loop to find the first power of 2 greater than 5000.

   Sample Run:

```
2 to the power 1 is 2
2 to the power 2 is 4
2 to the power 3 is 8
2 to the power 4 is 16
2 to the power 5 is 32
2 to the power 6 is 64
2 to the power 7 is 128
2 to the power 8 is 256
2 to the power 9 is 512
2 to the power 10 is 1024

First power of 2 > 5000 is 2 to the power 13 which is 8192
```

4. Write a program, `Lab02_Q4.py`, that inputs a string from the user, and creates a new string that deletes each non-alphanumeric character in the original string. You should solve this problem in 2 ways, first use a for loop that iterates through each character in the string, the second should use a while loop that iterates through a range. Keep spaces in the new string also.

   Hint: You can invoke the `isalnum()` function on a character, and it will return True if the string is alphanumeric, False if not. `'5'.isalnum()` -> True. You can invoke the `isspace()` function on a character to check if the character is a space or not.

   Sample Run:

```
Enter a string: Hey! Come on Ebru, Can, Merve... Hurry up!
New string: Hey Come on Ebru Can Merve Hurry up
New string: Hey Come on Ebru Can Merve Hurry up
```