Programming Assignment: Triangle Detector

Problem Statement:

In this assignment, you will write a program that asks the user for the lengths of the three sides of a triangle and declares it to be either an invalid triangle, an equilateral triangle, an isosceles triangle or a scalene triangle. In addition, it reports if it is a right-angle triangle.

Specifically, write a program that

1. asks user to enter lengths of three sides of a triangle.
2. detects if the given lengths can form a valid triangle: If sum of any two sides is less than or equal to the third side, it cannot form a valid triangle. e.g. A triangle with sides 2, 3, 7 is invalid because (2 + 3) < 7, whereas a triangle with sides 10, 13, 20 is a valid triangle because 10 + 13 > 20 and 10 + 20 > 13 and 13+20 > 10.
3. if it is an invalid triangle,
    a. prints "It is an invalid triangle, Exiting."
4. else,
    a. detects and reports what type of a triangle it is using the following rule:
        1. if all sides are equal in length
            1. prints that it is an equilateral triangle
        2. else if any two of the three sides are equal in length,
            1. prints that it is an isosceles triangle
        3. else
            1. prints that it is a scalene triangle
5. Next, it also detects if it is a right-angle triangle using the Pythagoras Theorem (sum of squares of two sides equals square of the third side). If detected as right-angle triangle, prints a message telling so in addition.

Save the program to a file with a name of the format first_last_triangle.py and submit it as your solution.

Possible points: 40

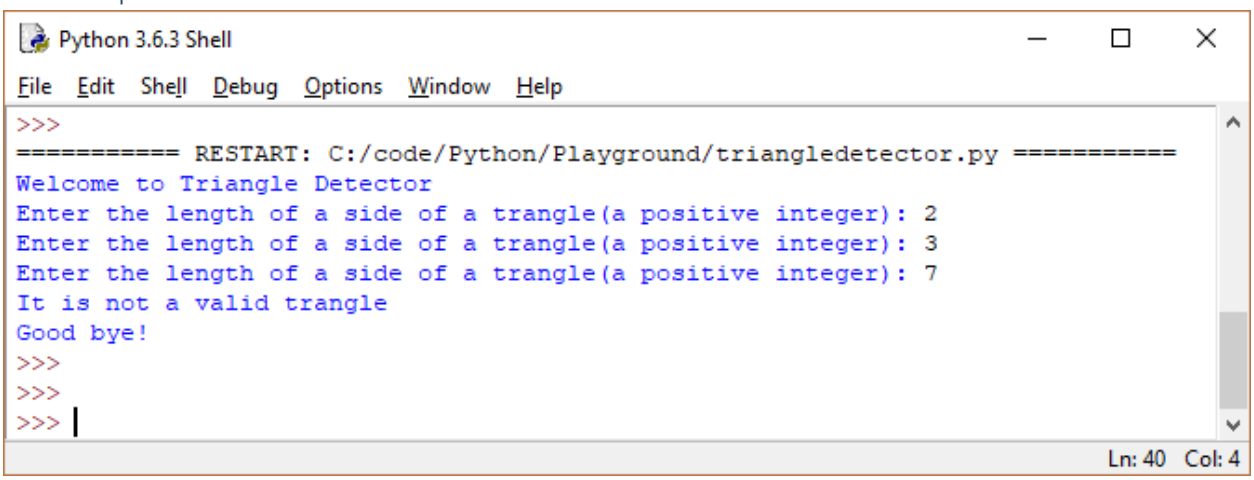
Notes:

- Read the instructions carefully. Make sure you understand the problem statement and all the steps. Ask for clarification if steps are not clear.
- Assume user enters positive integer values for the sides. No need to validate the inputs.
- At step 2, make sure you check all the three possible combinations of the sides, while checking if it is a valid triangle.
- At step 4.2, make sure you check all three possible pairs of the sides, while checking if it is an isosceles triangle.

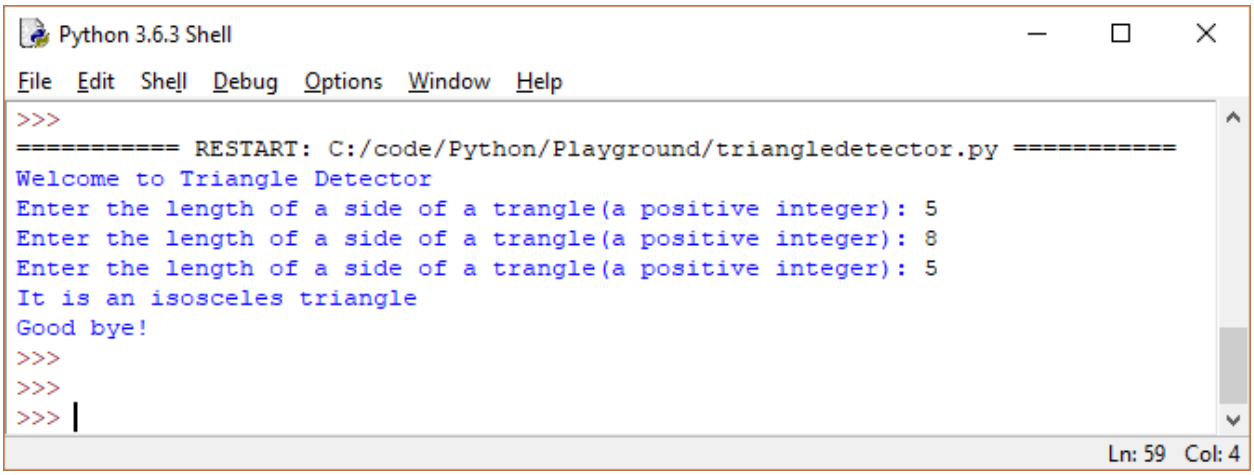
- At step 5, make sure you check all three possible combinations of the sides, while checking if it is a right-angle triangle.

Sample Runs:

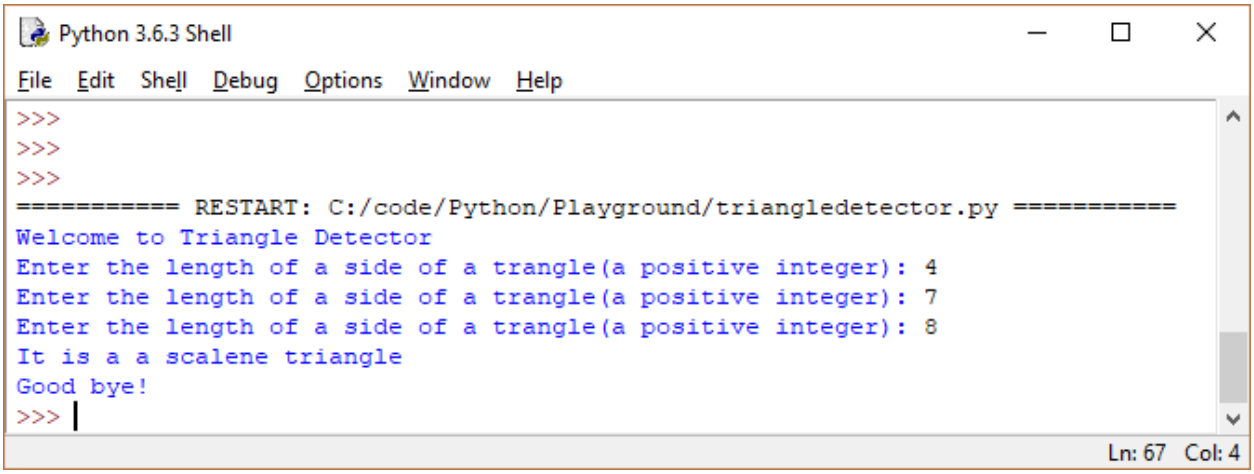
Invalid input:



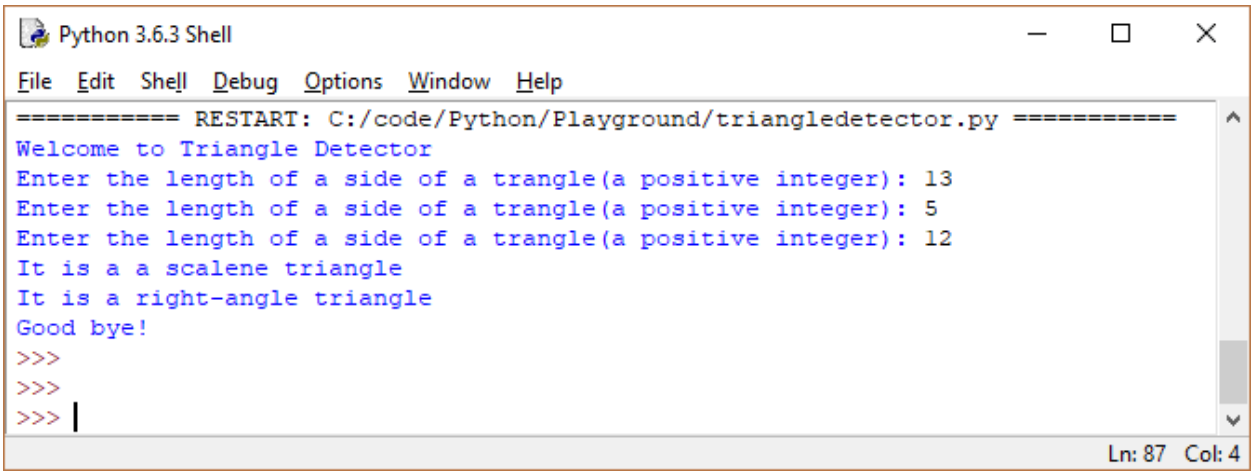
Valid input 1: Isosceles Triangle which is not a right-angle triangle



Valid Input 2: Scalene Triangle which is not a right-angle triangle



Valid Input 3: Scalene Triangle which is a right-angle triangle



Valid Input 4: Equilateral triangle