CS 150 Lab 7

Even more Loops, Loops, Loops!

Objectives

For this lab, you are to create a new Visual Studio project to solve the following problem. You will need to use loops and many of the other statements we have studied. Be sure that you use at **least one `for` loop** and **at least one pre-fix or post-fix operation (++ or --)**. Create a project called 07RectanglesXXX where the XXX is your PUNet ID.

Problem statement

For this project, the program you write will display a number of rectangles on the screen. Your program should ask the user how many rectangles they would like to build. For each rectangle, your program should ask the user for the height and width of the rectangle and also the character to use to draw it. Some sample input and output is below.

Your program should be able to produce rectangles of height 1 through 20 and width 1 through 20. If the user asks for a rectangle that has a measurement outside of either of these ranges, print an appropriate error message and prompt the user up to 2 more times for valid numbers. If the user still does not give valid numbers after the third prompt, display a message that the rectangle could not be built and move on to the next rectangle.

Before exiting, the program should display a message to the user stating how many rectangles were drawn to the screen.

Sample output

```
*****************************************
*               Rectangles              *
*****************************************

How many rectangles would you like to build? 3

Rectangle 1:
Enter the height and width of the rectangle: 3 5
What character should be used to create the rectangle? *

Rectangle 1:
*****
*****
*****

Rectangle 2:
Enter the height and width of the rectangle: 0 999
Sorry, the height and the width are both invalid.

Enter the height and width of the rectangle: 5 999
Sorry, the width is invalid.

Enter the height and width of the rectangle: -5 9
Sorry, the height is invalid.

Rectangle 3:
Enter the height and width of the rectangle: 5 2
What character should be used to create the rectangle? .

Rectangle 3:
..
..
..
..
..

Done! You built 2 rectangles successfully!
```

Testing your project

You should test your project on the following values:

Number of rectangles: 1
>   Height and width of rectangle: 1, 5
>   Character to use: *

Number of rectangles: 3
>   Height and width of rectangle: 5, 10
>   Character to use: \

>   Height and width of rectangle: 2, -5 ; 2, 5
>   Character to use: /

>   Height and width of rectangle: 0, 0; 0, 10; 10, 0

Before submitting your final project, show that your program works by demonstrating it to the instructor or TA.

Submitting your finished project

Once you have completed your lab projects, you will need to submit it for grading. You will submit your projects to the 'CS150-02 Lab' folder on Turing. You may only submit your projects once, so make sure that they are in their final form. Also, make sure that you submit the correct project. Be sure to close Visual Studio before copying and moving your folder.

To submit the project, copy (do not move) the folder you created on the Desktop, '07RectanglesXXXXXXXX', to the directory Turing\Students\CS150-02 Lab.

To save a copy of your project for yourself, move the folder you created on the Desktop to Turing\Students\XXXXXXXX, where XXXXXXXX is your PUNet ID.

Be sure to close Visual Studio before attempting to copy this folder.

If you do not have time to finish these assignments in Lab, we will continue working on this lab and the challenge problem in lab on October 18.

CHALLENGE PROBLEM

Create a new Visual Studio project that will draw triangles on the screen. Ask the user how many triangles they would like to draw. For each triangle ask the user for the height of the triangle and the character to use to draw it. Your program should be able to build triangles of height 1 through 10. Give error messages as described in the above project, and skip drawing a triangle if the user gives an invalid height too many times (3 times). Sample input and output follow:

Sample output

```
*****************************************
*                 Triangles             *
*****************************************

How many triangles do you want to build? 2

Triangle 1:
Enter the height of the triangle: 3
What character should be used to create the triangle? *

Triangle 1:
  *
 ***
*****

Triangle 2:
Enter the height of the triangle: 5
What character should be used to create the triangle? !

Triangle 2:
    !
   !!!
  !!!!!
 !!!!!!!
!!!!!!!!!

Done! You built 2 triangles successfully!
```