CS 150 Lab 10
Do/While & Nested Loops

Date: Tuesday October 28, 2008

The purpose of today's lab is for you to get some hands-on experience with the different things you can do with nested loops and do/while loops.

- **Be sure to answer the given questions before you start**
- Be sure your output looks exactly like the specified output
- Be sure to submit your solution to CS150-01 Lab when you are done (By Friday, Oct 31, 5pm)
- Show the instructor or TA your solution before submitting it

Lab 10.1

For this lab, you will need to create a new Visual Studio project that will contain your source code. Name this project "10a-SquaresXXXXXXXX", replacing the XXXXXXXX with your PUNetID.

Write a program that will ask the user for a single digit integer greater than 0. Validate the input and ask the user for input until a valid integer is given. You must use a do/while loop.

Use the integer given by the user to build a square on the screen. The size of the square should be based on the integer given and the square should be displayed in a frame. The length of the side of the square should be equal to the input integer. Sample input and output follows:

```
  /----------------/
 / Integer Square /
/----------------/

Please enter a single digit, positive, non-zero integer: 10

Please enter a single digit, positive, non-zero integer: 3

Here is your square:
-----
|333|
|333|
|333|
-----
```

```
  /----------------/
 / Integer Square /
/----------------/

Please enter a single digit, positive, non-zero integer: 5

Here is your square:
-------
|55555|
|55555|
|55555|
|55555|
|55555|
-------
```

What data will you need to track in your program? What data types will you need to use?

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_____

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What elements of the output need to be produced by a loop? What data will control when these loops will terminate?

_____

_____

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What loops need to be nested in other loops?

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Lab 10.2

For this lab, you will need to create a new Visual Studio project that will contain your source code. Name this project "10b-TriangleXXXXXXXX", replacing the XXXXXXXX with your PUNetID.

Write a program that will ask the user for a single digit integer greater than 0. Validate the input and ask the user for input until a valid integer is given.

Use the integer given by the user to build a right triangle on the screen. The size of the triangle should be based on the integer given. The length of the sides of the triangle should be equal to the input integer. Calculate the **sum of each row in the triangle** and the **sum of all the integers in the triangle**. Sample input and output follows:

```
  /------------------/
 / Integer Triangle /
/------------------/

Please enter a single digit, positive, non-zero integer: 10

Please enter a single digit, positive, non-zero integer: 3

Here is your triangle:
  1 sum: 1
 22 sum: 4
333 sum: 9
    sum: 14


```

```
  /------------------/
 / Integer Triangle /
/------------------/

Please enter a single digit, positive, non-zero integer: 5

Here is your triangle:
    1 sum: 1
   22 sum: 4
  333 sum: 9
 4444 sum: 16
55555 sum: 25
      sum: 55
```

What data will you need to track in your program? What data types will you need to use?

_____

_____

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What elements of the output need to be produced by a loop? What data will control when these loops will terminate?

_____

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What loops need to be nested in other loops?

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Challenge!

Create a new Visual Studio project that will draw triangles on the screen. Name this project "10c-PyramidXXXXXXXX", replacing the XXXXXXXX with your PUNetID.

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. 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!
```