CS 150 Lab 9
Do/While & Nested Loops

The objective of today's lab is to practice do-while loops, for loops, and nested loops.

- Be sure your output looks exactly like the specified output.
- Be sure to submit the completed project to CS150-01 Lab by Friday at 5pm.
- Be sure to follow the coding standards and add comments to your code!
- Your projects are to be created in **PUNetIDLabsSecond**
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You are to do <u>at least 2</u> of the following labs. You can select any 2 or all 3 if you want. If you are looking for a challenge, then do Lab 9.2 and Lab 9.3 OR you can start with Lab 9.2 and see how that goes. If it goes well, you can select 9.3. If not, then select 9.1.

Show the instructor or TA your solution after each part is implemented below.

Lab 9.1

Write a complete C++ program in a project called **09_1_Square** 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|
-----
```

Lab 9.2

Write a complete C++ program in a project called **09_2_TriangleSum** 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
```

Lab 9.3

Write a complete C++ program in a project called **09_3_Triangles** that will 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:

```
*** 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!
```

Show the instructor or TA your solution

1) Your programs are to compile without any errors or warnings.

2) Do not use any magic constants in your program. Define your constants before defining the rest of your program's variables.

Once your projects are complete, place your solution into the CS150-01 Drop folder on grace. Your solution is to have ALL previous projects completely working and correct.