Programming Challenges on TYPES OF NESTED LOOP STRUCTURES (Chapter#6) – WKS#6-8 –for in class/lab work

1. **Rectangle Display with variations**

Write a program that asks the user for two positive integers. The program should then use a count controlled nested loop structure to display a rectangle on the screen using the character 'X'. The numbers entered by the user represent the "width" of each row and "height" indicating the number of rows. Odd number input for width will generate a filled-in rectangle and an even number width should generate an outline of a rectangle. *Here is a sample output of this more advanced challenge ….*

For example, if the user enters 5 and 7 then program should display the following filled in rectangle ….

```
XXXXX
XXXXX
XXXXX
XXXXX
XXXXX
XXXXX
XXXXX
```

And if the user enters 6 and 7 then program should display the following outline of a rectangle…..

```
XXXXXX
X    X
X    X
X    X
X    X
X    X
XXXXXX
```
What type of loops did you use?

Write another program that asks the user for two positive integers between 2 and 10 to use for the length and width of a rectangle. If the numbers are different, the larger of the two numbers should be used for the length and smaller for the width. The program should then display a rectangle of this size on the screen using the character 'X'. For example, if the user enters either 3   8 or 8 3, the program should display the following:

```
XXXXXXXX
XXXXXXXX
XXXXXXXX
```

2. **Diamond Display**

Write a C++ program that inputs an integer and a character. The output should be a diamond composed of the character and extending the width specified by the integer. For example, if the integer is 7 and the character is an asterisk (+), the diamond should look like this:

```
   +
  + + +
 + + + + +
+ + + + + ++
 + + + + +
  + + +
   +
```
If the input integer is an even number. It should be increased to the next odd number. In addition, include code to make sure the diamond will fit on a standard laptop screen Use meaningful variable names, proper indentation, appropriate comments, and good prompting messages (adapted from Dale text 2nd edition as well as in the current Gaddis textbook).
What of loops did you use?

3. **Triangle1 Display**

   Write a C++ program that uses nested loops to display the fixed-size triangle pattern shown below.

   ```
   +
   + + +
   + + + + +
   + + + + +++
   ```

4. **Triangle2 Display**

   Write a C++ program that uses nested loops to display the fixed-size triangle pattern shown below.

   ```
   +++++++++
   + + +++
   + + +
   +
   ```

5. **Triangle3 Display**

   Write a C++ program that uses nested loops to display the fixed-size triangle pattern shown below.

   ```
   +
   + + +
   + + + + +
   + + + + +++
   + + + + +
   + + +
   +
   ```

6. **Triangle4 Display**

   Write a C++ program that uses nested loops to display the fixed-size triangle pattern shown below.

   ```
            +
          + + +
        + + + + +
      + + + + + + +
        + + + + +
          + + +
            +
   ```

7. **Arrowhead1 Display**

   Write a C++ program that uses nested loops to display the fixed-size arrowhead pattern shown below.

   ```
               +
               + + +
               + + + + +
   + + + + + +++ + + + + ++
               + + + + +
                + + +
               +
   ```

8. **Arrowhead2 Display**

   Write a C++ program that uses nested loops to display the fixed-size arrowhead pattern shown below.

   ```
               +
             + + +
           + + + + +
   + + + + + + ++ + + + + ++
             + + + + +
               + + +
                 +
   ```