CS 5001 Intensive Foundation of CS
Homework 6: Repeating Shapes

Due: 5:59am on Thursday, February 21st

The goal of this lab is practice testing and using all of the different loops. **You should work individually on this assignment.**

1 Getting Started

You should start by creating a folder specifically for this assignment. Create a `README.txt` file including three things: your name, the course name, and the name of this assignment. You should also use it answer any questions that may be asked in this assignment along with including any comments that you want the grader to consider when grading your assignment. **You should not include any code in your `README.txt` file.**

2 Repeating Shapes

In this assignment, you are to write several functions in `repeatingShapes.py` that will complete a program that is capable of drawing shapes on the console. You will have already implemented some of these using `while` loops in previous assignments so you should be sure to use only `for` loops for this one.

Start by reading through the provided *driver program* found in `repreatingShapesDriver.py`. This file contains three functions:

1. `menu` displays a menu of options to the user and reads in the user's choice form the keyboard, and ensures that the option is valid. It is used in the `main` function.

2. `readInteger` is used to gather different integer values from the user and makes sure that the values entered by the user are all positive integers. It is used in the `main` function.

3. Finally, the `main` function is where the program begins by displaying the menu, and uses the option chosen by the user to required information from the user before calling a function in the `shapes` module. **You will implement these functions.**

Your submission will be evaluated against the original driver program so you should not change any of the function parameters.

3 Checkerboard

Design an algorithm that will draw a *checkerboard*. For example a checkerboard with a block size of 5, a width of 8, and a height of 7 should be:

```
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
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*****     *****     *****     *****
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*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
     *****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
*****     *****     *****     *****
```

4 Box Grid

Design an algorithm that will draw a $x \times x$ grid of boxes. For example a box grid with a block size of 5, a grid width of 6, and a grid height of 3 should be:

```
Enter block size: 5
Enter grid width: 6
Enter grid height: 3
*************************************
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*************************************
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*************************************
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*     *     *     *     *     *     *
*************************************
```

5 Triangle Pattern

Design an algorithm that will draw a grid of triangles. For example a triangle pattern with a size of 5, a width of 9, and a height of 4 should be:

```
*     *     *     *     *     *     *     *     *
**    **    **    **    **    **    **    **    **
***   ***   ***   ***   ***   ***   ***   ***   ***
****  ****  ****  ****  ****  ****  ****  ****  ****
***** ***** ***** ***** ***** ***** ***** ***** *****
*     *     *     *     *     *     *     *     *
**    **    **    **    **    **    **    **    **
***   ***   ***   ***   ***   ***   ***   ***   ***
****  ****  ****  ****  ****  ****  ****  ****  ****
***** ***** ***** ***** ***** ***** ***** ***** *****
*     *     *     *     *     *     *     *     *
**    **    **    **    **    **    **    **    **
***   ***   ***   ***   ***   ***   ***   ***   ***
****  ****  ****  ****  ****  ****  ****  ****  ****
***** ***** ***** ***** ***** ***** ***** ***** *****
*     *     *     *     *     *     *     *     *
**    **    **    **    **    **    **    **    **
***   ***   ***   ***   ***   ***   ***   ***   ***
****  ****  ****  ****  ****  ****  ****  ****  ****
***** ***** ***** ***** ***** ***** ***** ***** *****
```

6 Diamond Pattern

Design an algorithm that will draw a grid of diamonds. Just like the diamonds in the last homework assignment, diamond patterns can only have an odd size. For example a triangle pattern with a size of 5, a width of 8, and a height of 4 should be:

```
  *     *     *     *     *     *     *     *
 ***   ***   ***   ***   ***   ***   ***   ***
***** ***** ***** ***** ***** ***** ***** *****
 ***   ***   ***   ***   ***   ***   ***   ***
  *     *     *     *     *     *     *     *
 ***   ***   ***   ***   ***   ***   ***   ***
***** ***** ***** ***** ***** ***** ***** *****
 ***   ***   ***   ***   ***   ***   ***   ***
  *     *     *     *     *     *     *     *
 ***   ***   ***   ***   ***   ***   ***   ***
***** ***** ***** ***** ***** ***** ***** *****
 ***   ***   ***   ***   ***   ***   ***   ***
  *     *     *     *     *     *     *     *
 ***   ***   ***   ***   ***   ***   ***   ***
***** ***** ***** ***** ***** ***** ***** *****
 ***   ***   ***   ***   ***   ***   ***   ***
  *     *     *     *     *     *     *     *
```

7 Submit Files to Bottlenose

Before submitting, be sure that you have added a comment at the top of your source files that includes your name and the current date. Then create an archive of the folder that you created for this assignment containing all of the files that you have created and upload this archive to Bottlenose for grading. When you upload, be sure to check whether there are any auto-graders that evaluated your code and fix any issues pointed out by the auto-graders. After submitting your assignment, complete the Homework 6 Review.