PROGRAM TO DRAW A DIAMOND IN THE CONSOLE

This exercise is about using loops. The following program will be a challenge at first. Try to break the problem into simpler pieces.

Write a program that displays a diamond of the given odd length (an odd integer size less than or equal to 21). Your program should accept as input from the keyboard the character used to form the diamond, and the value for the length of the diamond. (See examples below.)

Out of range input values should result in an informative error message (if it does not meet the specifications of this assignment).

Your program should process only one input case, legal or not. Termination occurs after either the error message is printed or the diamond is drawn.

It is necessary that the program be written using loops.

You should use a named constant (using const in the declaration of MAX_DIAMOND) to define and refer to the diamond size limit. This will make it easy to modify the program at a later date if the size restriction is changed.

Part of learning how to program is learning how to make a big problem simpler by solving one problem at a time. Write a function for each piece and test it out before going on to solve the rest. The first problem is to output a specified number of spaces, one after the other. The second problem is to write a line that has a specified number of spaces on the left, and a specified number of spaces between the two characters. You can use the first solution for outputting spaces. Finally, use two variables for the spaces before and the spaces between. Set them to the appropriate initial values and draw the first line (that has only one character). Then use the second solution, the one that does spaces on the left and between, to write out each line up to the middle line (which is the widest), adjusting the two variables for each successive line (the left gets smaller by 1, the middle gets bigger by 2). (Hint: the loop stops when the left reaches zero, or the middle reaches the size. Then create the shrinking lower part of the diamond in similar fashion, but getting smaller instead of bigger. Finally, print the single character at the bottom. You will need a loop for the increasing upper part and a loop for the decreasing lower part.

Here is what the three functions might look like:

void outputSpaces(int iCount) …

void outputDiamondLine(char cLetter, int iNumLeftSpaces, int iNumMidSpaces) …

void outputDiamond(char cLetter, int iSize) …

Sample runs:

```
Diamond drawing program
Enter the character, and length (eg. x 7): A 7
   A
  A A
 A   A
A     A
 A   A
  A A
   A
```

```
Diamond drawing program
Enter the character, and length (eg. x 7): R 17
        R
       R R
      R   R
     R     R
    R       R
   R         R
  R           R
 R             R
R               R
 R             R
  R           R
   R         R
    R       R
     R     R
      R   R
       R R
        R
```

```
Diamond drawing program
Enter the character, and length (eg. x 7): A 27
You have entered an illegal value for the length.  It must be
between 1 and 21.
```