Lab 7

Objectives:
Practice switch statements and loops.

Preparation:
1. Make a copy of AllCaps.java from Lab 5 into your Lab 7 folder. Modify the code to: (a) Use a for-loop and (b) print the name backwards.

```
Please enter your name: Grace
Hello...
$ E *****
$ C *****
$ A *****
$ R *****
$ G *****
```

Upload and submit AllCaps.java through blackboard.

Part A
Modify AllCaps.java from the preparation.

1. Count the number of vowels in the name and display at the end.
   *Hint:* Set up an extra counter to count the vowels, initially zero. As you loop through the string, after printing each character, if it is a vowel (i.e., it equals ‘A’ or it equals ‘E’, etc.), increment the vowel counter.

2. In addition to inputting the name, input the number of asterisks to display. So, for example, if the user inputs 3, the result will be exactly as above, but if they input 5, it would look like this:

```
Please enter your name: Grace
Hello...
$ E ***
$ C ***
$ A ***
$ R ***
$ G ***
```

3. Instead of printing a numeric value, use a switch statement so that it prints the number of vowels as an English word. Alternatively, you can have it print ‘one’, ‘a few’, ‘several’, or ‘many’ (similar to an example we did in class). In the output above, instead of printing “Your name contains 2 vowels.” it should print: “Your name contains two vowels” or “Your name contains a few vowels”
   *Hint:* use a switch statement.
Part B
1. Write a program Box.java to input a number $n$ and have it print a grid of $n \times n$ asterisks. For example, if the input is 4, your program should display:

(This is similar to the example Stars.java.)

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

2. Modify Box.java so that it now includes line labels. For example, if the input is 4, the output should look like this:

```
a ****
b ****
c ****
d ****
```

3. Change the labels to letters, for example:

```
1 ****
2 ****
3 ****
4 ****
```

Part C
Add numeric labels to each line of output in Stars.java.
For example, if the input is 5, the program should display:

```
1 *
2 **
3 ***
4 ****
5 *****
```

Part D
Repeat the above exercise, modifying to create the upside down triangle:

```
5 *****
4 ****
3 ***
2 **
1 *
```

Part E
Repeat the above exercises with labels on BOTH SIDES. For example, with input 4:

```
1 **** 1
2 **** 2
3 **** 3
4 **** 4
```

```
1 *
2 **
3 ***
4 ****
4 **** 4
3 *** 3
2 ** 2
1 * 1
```

**Hint:** In order to get the numbers to line up on the right side, you need to add the correct number of spaces after the asterisks (DO NOT USE TABS – it only works for small inputs).
Your code needs to function correctly when the input is 10 or 20.
**Challenge:** Can you figure out how to print a WAVE?  
*(Hint: use a trig function)*
Lab 7 Comments

Comments on this lab, please:

What was the most valuable thing you learned in this lab?

What did you like best about this lab?

Was there any particular problem?

Do you have any suggestions for improving this lab as an effective learning experience?