

Lab 06 – Input Validation, Loops

Introduction

In this lab, you will use loop statements to solve various problems such as drawing patterns of stars using print statements based on a user's input.

Lab Objectives

By the end of the lab, you should:

- validate user input and handle invalid user input
- use loops to repeatedly perform calculations to solve various problems
- use nested loops

Prerequisites

The lab deals mainly with concepts from the textbook chapter covering loops and concepts learned in previous chapters.

What to Submit

The file **Drawing.java** should be submitted to our course website.

Exercise – Drawing

Write a program called **Drawing.java** that asks the user for an integer greater than 1 and displays an inverted right triangle of stars whose sides have the specified number of stars. If the user enters an invalid integer, i.e., an integer less than or equal to 1, the program should display the error message, Invalid Input, and the program should terminate. Examples are shown below, and the I/O of your program must match these examples. Your program must use nested for loops to display the arrangements of stars properly. Be sure that you write the condition of the outer and inner for loops of the program correctly.

Example #1

Indicate the number of stars (>1): 8

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

Example #2

Indicate the number of stars (>1): 3

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

Now, modify the code you developed to make the program display a right triangle of stars after displaying an inverted right triangle of stars as shown in the next examples.

Example #3

Indicate the number of stars (>1): 8

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

Example #4

Indicate the number of stars (>1): 3

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

Test your program to make sure it is correct.

Modify your **Drawing.java** program further so it displays the two figures one after the other a certain number of times indicated by the user as follows:

1. Add a prompt to ask the user the number of times the drawing will be displayed and read that number from the keyboard. If the integer entered by the user is less than 1, the program should display the error message, Invalid Input, and then the program should terminate (as shown in

Example #6).

2. To repeat the drawing the indicated number of times, you need another outer for loop surrounding the for loops in the previous exercise code.
3. The final version of your program that you submit must duplicate the examples below and work correctly for any valid inputs. The I/O of the final version of your program must be exactly as shown in the examples below.

Example #5

How many times do you want to repeat the figure? 3
Indicate the number of stars (>1): 4

```
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```

Example #6

How many times do you want to repeat the figure? -1
Invalid Input

Compile, run, and test your program using many different inputs to ensure that your program is working correctly.

Submission and Grading

After you have completed and thoroughly tested **Drawing.java**, submit it to our course webpage in order to receive credit for the lab (if you have any questions about how to submit this assignment, then ask your lab instructor for help at least 24 hours before this assignment is due). Always double check that your submission was successful on our course website.

The lab will be graded according to the following guidelines.

- A score between 0 and 100 will be assigned.
- If the source file(s) are not submitted before the specified deadline, if they do not compile, or if the submitting student has an unexcused absence for a single lab period devoted to the assignment, then a grade of 0 will be assigned. (Note: students who show up to their first lab period and show their lab TA that they finished and submitted the week's lab assignment may be excused from their second lab period for that week.)
- If the required comment for all labs describing the program and the academic honesty statement is not included at the top of the file, then 10 points will be deducted. Note: this required comment can be found in Lab 02.
- If a (single) source file name is incorrect, then 10 points will be deducted.
- The program will be evaluated using some sample inputs shown in these instructions and other inputs not shown in these instructions. For each test case, the output must be correct in order to receive credit for that test case.