

INTRODUCTION TO COMPUTER SCIENCE I

PROJECT 1

Printing Pretty Patterns

1 A program that prints pretty patterns

Our goal is to allow the user to choose a set of patterns to be printed, enter the size of the patterns, and then, of course, **print those patterns**. Specifically, there are four patterns that we want the program to be able to print:

1. **Square:** For a request of size n , print an $n \times n$ grid of plus-signs (+). For example, a square of size 4 looks like this:

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

2. **Left-aligned triangle:** A grid that forms a right triangle that is flat on its left side. A size-4 triangle of this kind looks like this:

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

3. **Right-aligned triangle:** The vertically-reflected image of the left-aligned triangle, like so:

```

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

4. **Tree:** An isosceles triangle with a trunk (represented with an absolute-value bar (|)). A size-4 example of this one is:

```

+
  +++
   +++++
    ++++++
     |
```

Selecting a set: In this program, the user will be able to choose any combination of these patterns to be printed. Specifically, here is the menu of options, as well as the prompt to the user:

```
MENU:
(  1) Square
( 10) Left-aligned triangle
( 100) Right-aligned triangle
(1000) Tree
Enter the sum of the patterns you want to see:
```

If the user enters just 10, then only the left-aligned triangle will be shown. However, if the user enters 1101, then **all** three of the square, the right-aligned triangle, and the tree will be displayed. Here is an example run:

```
$ java Patterns
MENU:
(  1) Square
( 10) Left-aligned triangle
( 100) Right-aligned triangle
(1000) Tree
Enter the sum of the patterns you want to see: 101
Enter the size of the patterns: 5

+++++
+++++
+++++
+++++
+++++

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

Getting started: Create a new folder/directory for `project-1`, and open/change into it. Then go to the following link for the starting code:

bit.ly/COSC-111-project-1-source

You should save this file into your `project-1` directory with the name `Patterns.java`. Then open the code into *Emacs/Aquamacs*.

Your tasks: You will see that the presentation of the menu, the prompts, and the code for the (initial) inputs are already written. Two comments marks the work that you must do:

Require a non-negative size: If the value provided by the user sets `size` to something negative, then the user must be prompted again to enter a non-negative value. The program should not advance past this point until `size` is non-negative.

Print the patterns: By appropriately testing the value entered by the user for `patternSum`, determine which patterns should be printed and, for those selected, print them.

2 Submitting your work

Submit your completed `Patterns.java` source code file with the CS submission system, using one of the two methods:

- **Web-based:** Visit the CS submission systems web page at `www.cs.amherst.edu/submit`.
- **Command-line based:** Use the `cssubmit` command at your shell prompt. (WARNING: This method works only on `remus/romulus`.)

This assignment is due on Monday, Mar-04, 11:59 pm.