IT 168

Fall, 2024

Programming Assignment 3

**Due Date:** 11:59 pm, Friday, October 6, 2024

## This assignment is worth 100 programming points.

## The Problem:

A program is needed that draws ASCII art. It presents the user with 3 shapes to choose from and draw. The user can keep drawing these shapes until they quit.

Your program will first display a welcome message and the following menu to choose from:

* 1 - draw a rectangle shape
* 2 - draw an X shape
* 3 – draw a square shape
* 0 - quit

The rectangle shape should ask the user about the character that the rectangle will be drawn with as well as the number of height and width that it should have. You should validate the user input to ensure that they enter an integer to get the height and width of the rectangle and a character data type to get the ASCII character. The program must not crash if they enter an incorrect data type.

The X shape should ask the user about the character that the X shape will be drawn with, as well as the number of characters it will contain. You should validate the user input to ensure that they enter an odd integer between 9 and 25 and a character data type to get the character. The program must not crash if they enter an incorrect data type.

The square shape should ask the user about the character that the square will be drawn with as well as the length of a side. You should adjust the width to display a square, not a rectangle (Hint: roughly twice as many characters). The square should be filled and not hollow. You should validate the user input to ensure that they enter an integer to get the side of the square and a character data type to get the ASCII character. The program must not crash if they enter an incorrect data type.

Note: **You CANNOT hardcode the entire shapes using print statements**.

The menu will continuously be displayed to the user until they quit the application. Once they quit, a “**Goodbye!**” message will be displayed.

Sample input and output (user input is in bold):

Welcome to the drawing application!

Please choose one of the following:

1 – draw a rectangle shape

2 – draw an X shape

3 – draw a square shape

0 - quit

Enter your choice: **1**

Enter the height: **5**

Enter the width: **10**

Enter the character of your choice: **#**

##########

# #

# #

# #

##########

Please choose one of the following:

1 – draw a rectangle shape

2 – draw an X shape

3 – draw a square shape

0 - quit

Enter your choice: **2**

Enter the number of characters: **9**

Enter the character of your choice: **X**

X X

X X

X

X X

X X

Please choose one of the following:

1 – draw a rectangle shape

2 – draw an X shape

3 – draw a square shape

0 - quit

Enter your choice: **3**

Enter the length of a side: 5

Enter the character of your choice: **s**

ssssssssss

ssssssssss

ssssssssss

ssssssssss

ssssssssss

Please choose one of the following:

1 – draw a rectangle shape

2 – draw an X shape

3 – draw a square shape

0 - quit

Enter your choice: **0**

Goodbye!

In the file Program 3 Test Data.docx, enter three sets of inputs and the correct output for each. Make sure your program works correctly for each of your test cases.

**General Instructions:**

Your files must start with beginning comment blocks as specified in the coding guidelines for this course. The code should be well commented.

Make sure you use meaningful variable names that follow the Java naming conventions.

Once you have filled in your TestData table, export it to a PDF file. You will attach the PDF file to your Programming Assignment 3 submission in Canvas.

**Submission:**

You will attach two files to the assignment in Canvas. One will be a .zip file containing your .java file. The other will be the completed Program 3 Test Data.pdf (exported from Program 3 Test Data.docx).

Program Grading Criteria

***Style and Organization - Follows Coding Guidelines (25 points)***

(4) Well written beginning comment block

(4) Well written class comment block

(4) Properly spaced and indented

(4) Correct use of uppercase and lowercase letters

* Classes start with uppercase letters
* Variables start with lowercase letters
* Multi-word identifiers start each word after the first with uppercase letter
* Constants all uppercase with words separated with underscores

(4) Uses meaningful variable names

(5) Variables declared with the appropriate data types

***Processing Logic (75 points)***

(15) Prompts for and correctly reads all input

(45) Generates correct shape in the console (15 points for each)

(10) Appropriate use of Random

(5) Exits appropriately or continues depending on selection

*Other Deductions*

Late (10% per calendar day - 3 days max)

Syntax Errors (-40)

Runtime Errors (-30)

Using material not covered in class yet (-100)