Joseph Julian
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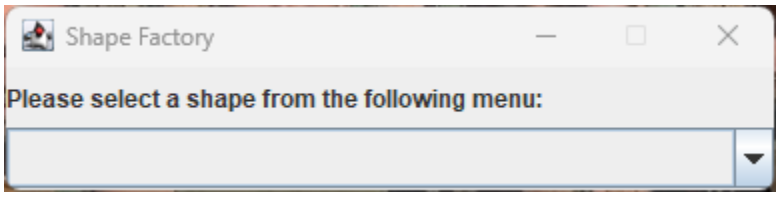
Week 4 Project 2 - "Shape Factory"

Project Description: Building off of my first project, ***Shapes***, I designed a Java Swing GUI that replaced the console-based menu, allowing users to select a desired shape from a combo box, enter the appropriate dimensions, and then have the shape drawn inside of a JFrame. As recommended in the project rubric, I elected to display an image of the respective 3D shape, while still providing the calculated volume. This project was created using Intellij IDEA.

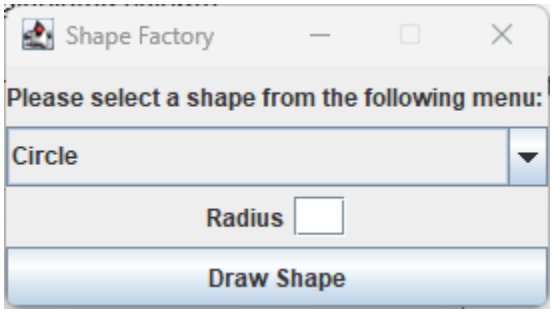
User's Guide: To use **Shape Factory**, please navigate to the project directory and use ***Main.class*** as the entry point for the program. **Follow the directions** on the GUI, and be sure to read any error messages that arise in order to achieve the desired results. Images are stored locally within the project directory, under ***ShapeFactory/src/img***.

Here are some screenshots of my program running, and notes that described the intended and actual outcomes.

Example 1:



*This is the main GUI for my program, titled **Shape Factory**. From this menu, the user is first expected to select a shape from the combo box (see below):*



*In this example, I selected **Circle** as my desired shape, which prompted the other GUI components to become visible. From here, I can enter a preferred radius for my circle, then click **Draw Shape** to construct it within a new frame.*

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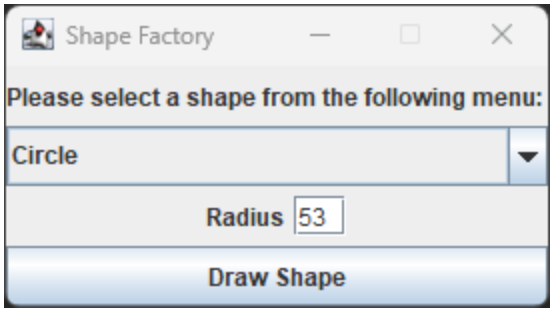
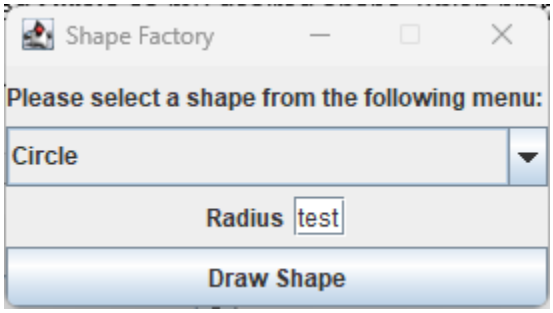
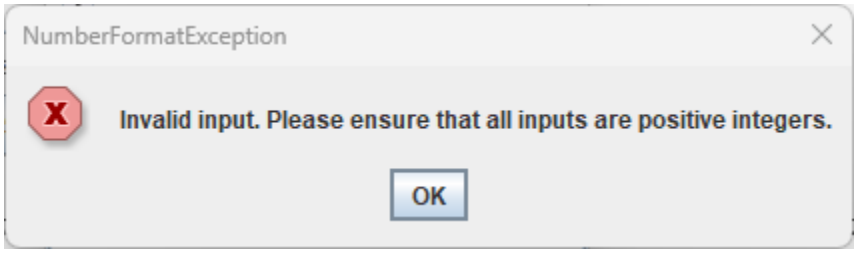


*For this example, I entered the integer **"53"** as my desired radius for my circle. Please note, my program will attempt to catch invalid input, such as non-positive / non-number entries.*



*When attempting to enter **"test"** as my radius value, I was prompted with the following message, and returned to the main GUI.*



*Upon entering the correct radius format, and clicking **Draw Shape**, a new frame appears on top of my main GUI, detailing the radius for my circle, the calculated area, and a painted shape.*

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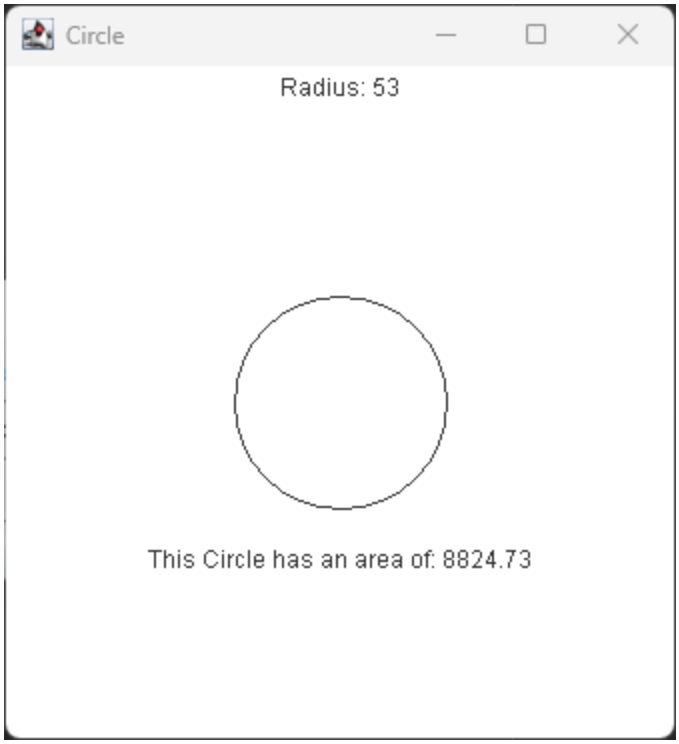
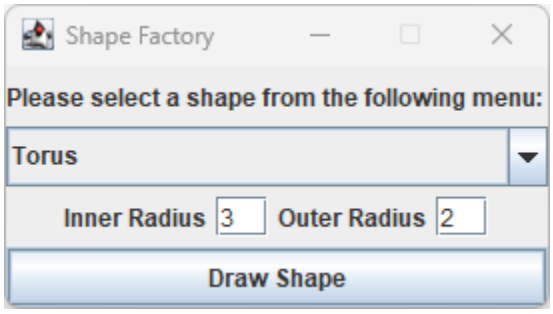


*To return to the main GUI, I can simply click the **X** in the top-right of the window, triggering the default **DISPOSE_ON_CLOSE** operation.*

Example 2:

*For my next example, I chose the 3D shape Torus from the menu, and entered an appropriate inner and outer radius of **"3"** and **"2"**, respectively.*



Clicking Draw Shape for this example displayed a local image of a torus, along with the entered dimensions and calculated volume.

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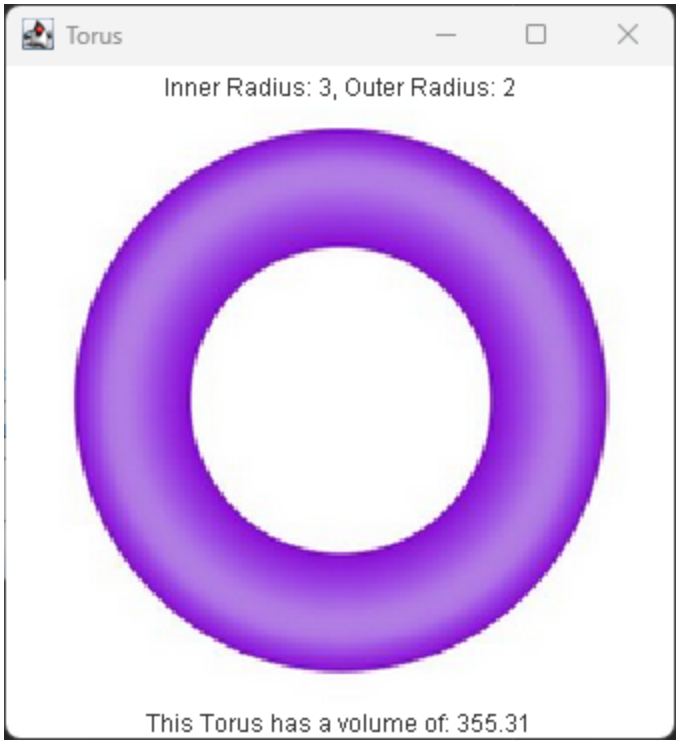
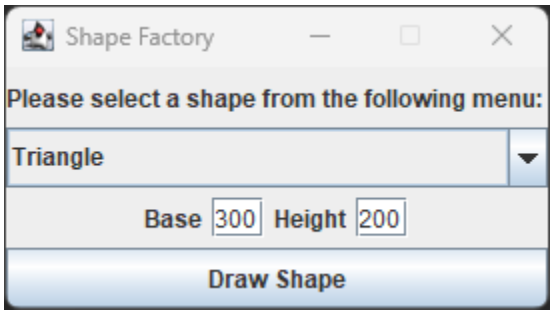


As expected, these calculations were correct, and the appropriate image was displayed inside of the frame.

Example 3:

*For my last example, I chose **Triangle** as my desired shape, in order to demonstrate the **Area** calculations of my program.*



*I purposefully entered a rather large **Base** and **Height** for my triangle, wanting to see how it would be drawn in the frame, knowing it would be too large to display by default.*

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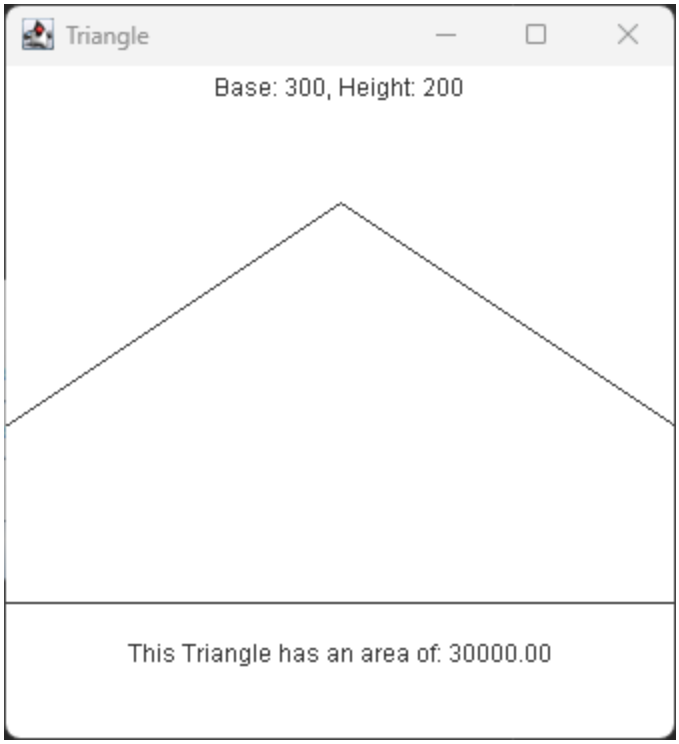

As expected, the dimensions and area of my triangle are calculated correctly - however - the triangle was not fully displayed.

Expanding the window manually by dragging the sides produced the following result, correctly painting the full size of my triangle.

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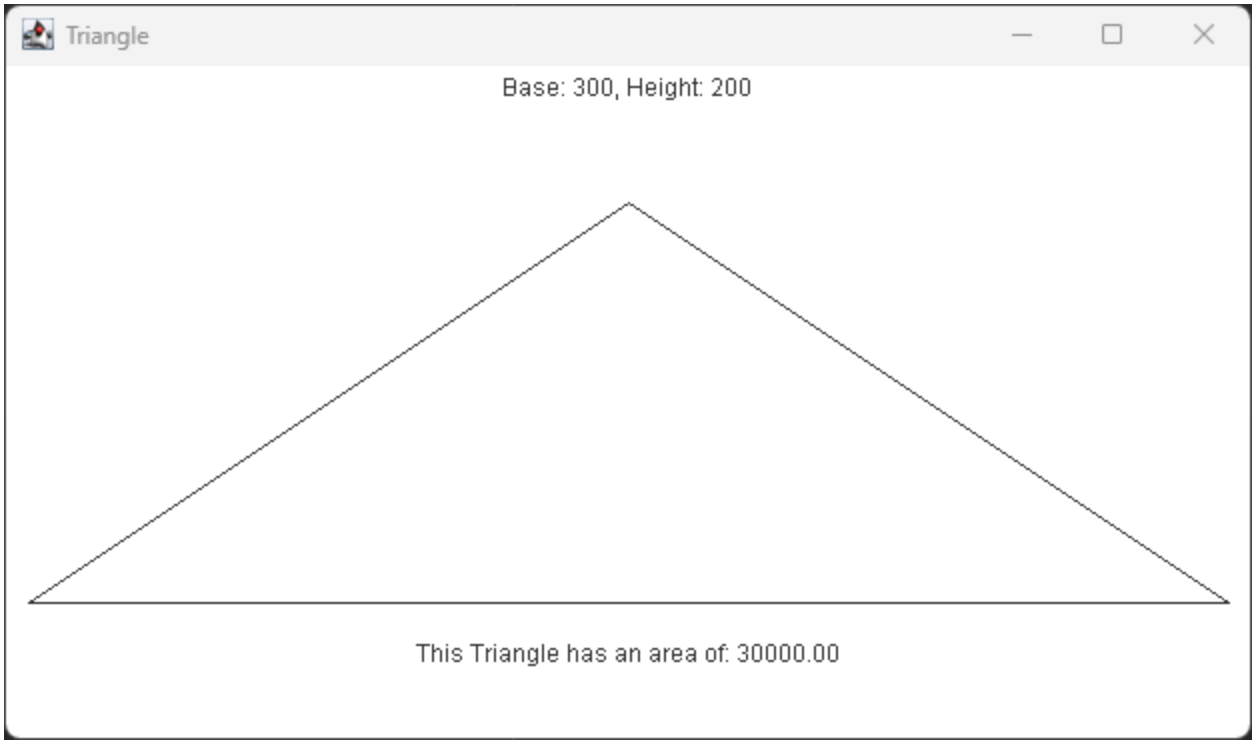

It's worth noting that maximizing the window would not allow me to capture my screen using ***Windows Snipping Tool****, due to my code explicitly keeping this window on top of all others.*

Lessons Learned:

This project was a little difficult to overcome for a few reasons. I wanted to reuse as much code from my first project as possible, however, I was struggling to maintain proper inheritance when implementing the GUI for this program. I ended up keeping my ***Main*** *class, which essentially initialized the major component of this program,* ***Shape Factory****. Additionally, I struggled a lot with the overall design of my GUI. I wanted to improve the functionality by dynamically resizing windows, but I elected to maintain the simplicity of my program. As I become more familiar with Java and all of its GUI components, I hope to master all of the minor details in order to make my program as interactive as possible and provide the best user experience.*