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CMSC 335

Project 2 – Shapes GUI

**Lessons Learned:**

This is the Shapes GUI program, it contains nine classes: Circle\_, Rectangle\_, Triangle, Cone, Cube, Cylinder, Sphere, Torus, and Main. All the classes are contained in the same package, application, and can be compiled all together and initiated from the Main class. This program leverages the JavaFX library to display a GUI with shapes as desired. The 2D shapes (Circle\_, Rectangle\_, Triangle, and Square, which is just a perfect Rectangle) are built using the native JavaFX classes and can be any size the user would like. The 3D shapes (Cone, Cube, Cylinder, Sphere, and Torus) will be displayed as images from png files. These images will have three sizes to them: small, medium, and large. The displayed size depends on the input from the user and adjusts accordingly. The GUI itself consists of a ComboBox, a Button, a Label, 11 TextFields, and HBoxes and a VBox to store the objects in. The TextFields, save the bottom most one for output messages, are all set to not be visible until a selection of a shape is made from the ComboBox. Once the shape is selected, the necessary TextFields will be made visible for the user (through an event handler on the ComboBox) to input the dimensions of the desired shape. All TextFields are passed to a helper method to ensure the input is in valid numeric form (ints or doubles that are greater than zero).

This program was not especially challenging in terms of the coding but rather the structuring. The first version of my program contained only the Main class, leveraging the JavaFX libraries to create the shapes, however, I found the rubric wanted the classes of all the shapes and had to refactor my code. I added all the classes (save the Square class which uses the Rectangle\_ class), but found that I added very little utility to the classes. I feel, although the program works in every functional way it should, that this was fairly unsatisfactory in terms of using classes and their relationships to the fullest extent. Potentially adding more methods to the classes would have given them more utility but as far as the functionality of the program was concerned, I could think of no methods that would improve functionality without redundancy. The classes are also not linked together in a hierarchy like the last project, where the Shape, TwoDimensionShape, and ThreeDimensionalShape classes formed more of a connection between the shape classes. Rather, they are individual classes that the Main class utilizes and in this I think I could also improve. With all that being said, the program still performs as it should and passes all tests and I am content with the final product even with its flaws and potential for more.

**Figure 1:**

**A screenshot of a computer program

Description automatically generated**

**Table 1:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test #** | **Description** | **Screenshot** | **Pass/Fail** |
| **1** | Initiate program, select Circle from drop down box, input -10, 0, and 100 for radius (tests validation method for TextField input), click submit | Figures 2.1, 2.2, 2.3 | Pass |
| **2** | Select Rectangle from drop down, input 100.5 for length, and 50.75 for width, click submit. | Figure 3 | Pass |
| **3** | Select Square from drop down, input 200.34, submit. | Figure 4 | Pass |
| **4** | Select Triangle from drop down, input 100, 300, 1000, and submit. Invalid legs error displayed in output field. Input 100, 200, 250, and submit. | Figures 5.1, 5.2 | Pass |
| **5** | Select Cone, input 99.9 for radius and 100 for height, submit. Input 199 for radius and 100 for height, submit. Input 200 for radius and 100 for height, submit. | Figures 6.1, 6.2, 6.3 | Pass |
| **6** | Select Cube, input 99.99 for side, submit. Input 101 for side, submit, input 1000 for side, submit | Figures 7.1, 7.2, 7.3 | Pass |
| **7** | Select Cylinder, input 99.9 for radius 100 for height, submit. Input 100 for radius 100 for height, submit. Input 1000 for radius 100 for height, submit. | Figures 8.1, 8.2, 8.3 | Pass |
| **8** | Select Sphere, input 99.99 for radius, submit. Input 100 for radius, submit. Input 1000 for radius, submit. | Figures 9.1, 9.2, 9.3 | Pass |
| **9** | Select Torus, input 90 for major radius 99 for minor radius, submit. Error message displayed in output. Input 99.9 for major radius and 90 for minor radius, submit. Input 101 for major and 100 for minor, submit. Input 1000 for major and 100 for minor, submit. | Figures 10.1, 10.2, 10.3, 10.4 |  |

**Figure 2.1:**

A screenshot of a computer

Description automatically generated

**Figure 2.2:**

A screenshot of a computer

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**Figure 2.3:**

A screenshot of a computer

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**Figure 3:**

A screenshot of a computer

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**Figure 4:**

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**Figure 5.1:**

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**Figure 5.2:**

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**Figure 6.1:**

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**Figure 6.2:**

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**Figure 6.3:**

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**Figure 7.1:**

A screenshot of a computer

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**Figure 7.2:**

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**Figure 7.3:**

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**Figure 8.1:**

A screenshot of a computer

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**Figure 8.2:**

A screenshot of a computer

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**Figure 8.3:**

A screenshot of a computer

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**Figure 9.1:**

A screenshot of a computer

Description automatically generated

**Figure 9.2:**

A screenshot of a computer

Description automatically generated

**Figure 9.3:**

A screenshot of a computer

Description automatically generated

**Figure 10.1:**

A screenshot of a computer

Description automatically generated

**Figure 10.2:**

A computer screen shot of a blue circle

Description automatically generated

**Figure 10.3:**

A screenshot of a computer

Description automatically generated

**Figure 10.4:**

A screenshot of a computer

Description automatically generated