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CSC 341

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Homework 9 Reflection:

I first finished this assignment very quickly without using the framework and design hints you suggested.

It took me a little more time to figure out the design, but it was still fun to create and definitely helps that I can visualize what a calculator does and what it works like.

In my design I made separate classes for all the methods like subtraction and addition etc. My question is would it be faster to put them all in one class or does it not effect the speed of the overall program to have them all in separate classes.

Class Subtraction:

```
package homework9;

public class Subtraction implements IOp
{

	@Override
	public double compute(double leftOperand, double rightOperand)
	{
		return leftOperand - rightOperand;
	}

}
```

Class Addition

```
package homework9;

public class Addition implements IOp
{

	@Override
	public double compute(double leftOperand, double rightOperand)
	{
		return leftOperand + rightOperand;
	}

}
```

Class Multiplication:

```
package homework9;

public class Multiplication implements IOp
{

	@Override
	public double compute(double leftOperand, double rightOperand)
	{
		return leftOperand * rightOperand;
	}

}
```

Class Division:

```
package homework9;

public class Division implements IOp
{
	@Override
	public double compute(double leftOperand, double rightOperand)
	{
		return leftOperand / rightOperand;
	}

}
```

Class ComputingFactory:

```
package homework9;

public class ComputingFactory
{

	static IOp Compute(String op)
	{
		if (op.equals("+"))
		{
			return new Addition();
		}
		else if(op.equals("-"))
		{
			return new Subtraction();
		}
		else if(op.equals("%"))
		{
			return new Division();
```

```
		}
		else if (op.equals("*"))
		{
			return new Multiplication();
		}
		else
		{
			return null;
		}
	}
}
```

Interface FrameBuilder:

```
package homework9;

import javax.swing.JFrame;
import javax.swing.JPanel;

public interface FrameBuilder
{
	JPanel buildButtonPanel();
	JPanel buildDisplayPanel();
	JFrame buildAppFrame(String title);
}
```

Interface IOp:

```
package homework9;

public interface IOp
{
	double compute(double leftOperand, double rightOperand);
}
```

Class Main:

```
package homework9;

import java.awt.BorderLayout;

public class Main
{

	public static void main(String[] args)
	{
		new Window();
	}

}
```

Class Window:

```
package homework9;

import java.awt.Dimension;
import java.awt.GridLayout;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JPanel;
import javax.swing.JTextArea;

public class Window implements FrameBuilder
{

	public Window()
	{
		String title = "Calculator";
		buildAppFrame(title);
	}

	JPanel buttonPanel = new JPanel(new GridLayout(0,3));
	JTextArea displayArea = new JTextArea();
	JPanel display = new JPanel();
	String names[] = {"C", "%", "*", "-", "+", "=", "1","2","3","4","5","6","7","8","9"};
	String operand;
	String value1;
	String value2;
```

```
@Override
public JPanel buildButtonPanel()
{

	for (int i = 0; i < names.length; i++)
	{
		JButton newButton = new JButton(names[i]);
		newButton.addActionListener(new ActionListener()
		{
			public void actionPerformed(ActionEvent e)
			{
				String buttonValue = newButton.getText();
				if (buttonValue == "C")
				{
					displayArea.setText(" ");
				}
				else if(buttonValue == "=")
				{
					ComputingFactory computer = new
ComputingFactory();
					IOp calculation = computer.Compute(operand);
					double num1 =
calculation.compute(Double.parseDouble(value1), Double.parseDouble(value2));
					displayArea.setText(value1 + " " + " " + operand + " "  + "
" + value2 + " " + " = " + " " + num1);
				}
				else if(buttonValue == "+")
				{
					operand = buttonValue;
```

```
        }
        else if(buttonValue == "*")
        {
                operand = buttonValue;
        }
        else if(buttonValue == "%")
        {
                operand = buttonValue;
        }
        else if(buttonValue == "-")
        {
                operand = buttonValue;
        }
        else
        {
                if (operand == null)
                {
                        value1 = buttonValue;
                }
                else if (operand != null)
                {
                        value2 = buttonValue;
                }
                displayArea.setText(buttonValue);
                //System.out.println("Value1 = " + value1);
                //System.out.println("Operand = " + operand);
                //System.out.println("Value2 = " + value2);
        }
}
```

```
                });

                buttonPanel.add(newButton);
        }

        return buttonPanel;
}

@Override
public JPanel buildDisplayPanel()
{
        display.add(displayArea);
        display.setPreferredSize(new Dimension(100,50));
        return display;
}

@Override
public JFrame buildAppFrame(String title)
{
        JFrame frame = new JFrame(title);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setLocationRelativeTo(null);
        frame.setPreferredSize(new Dimension(250,300));
        frame.setExtendedState(JFrame.MAXIMIZED_BOTH);
        frame.setVisible(true);

        frame.add(buildDisplayPanel(), "North");
        frame.add(buildButtonPanel());
        frame.pack();
```

```
        return frame;

    }

}
```

Output:

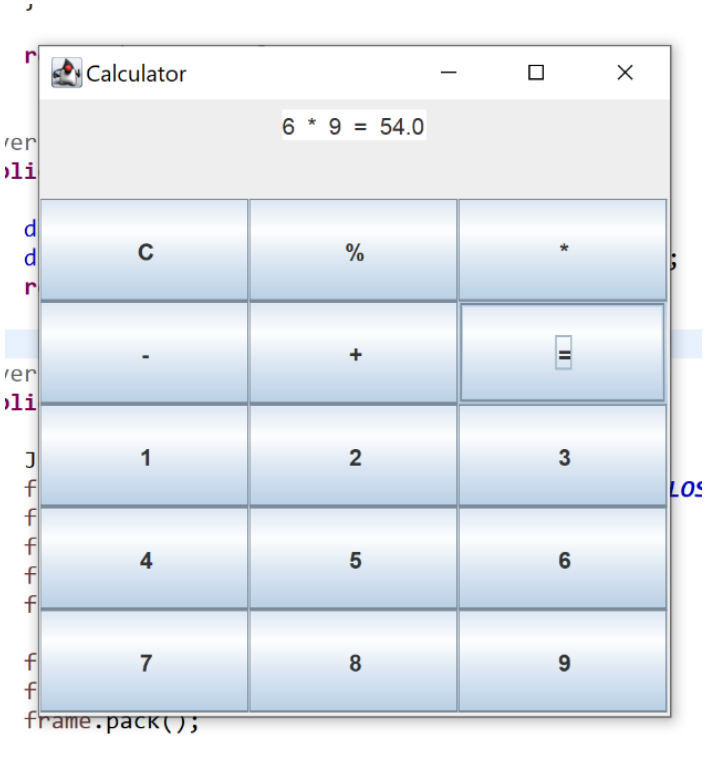
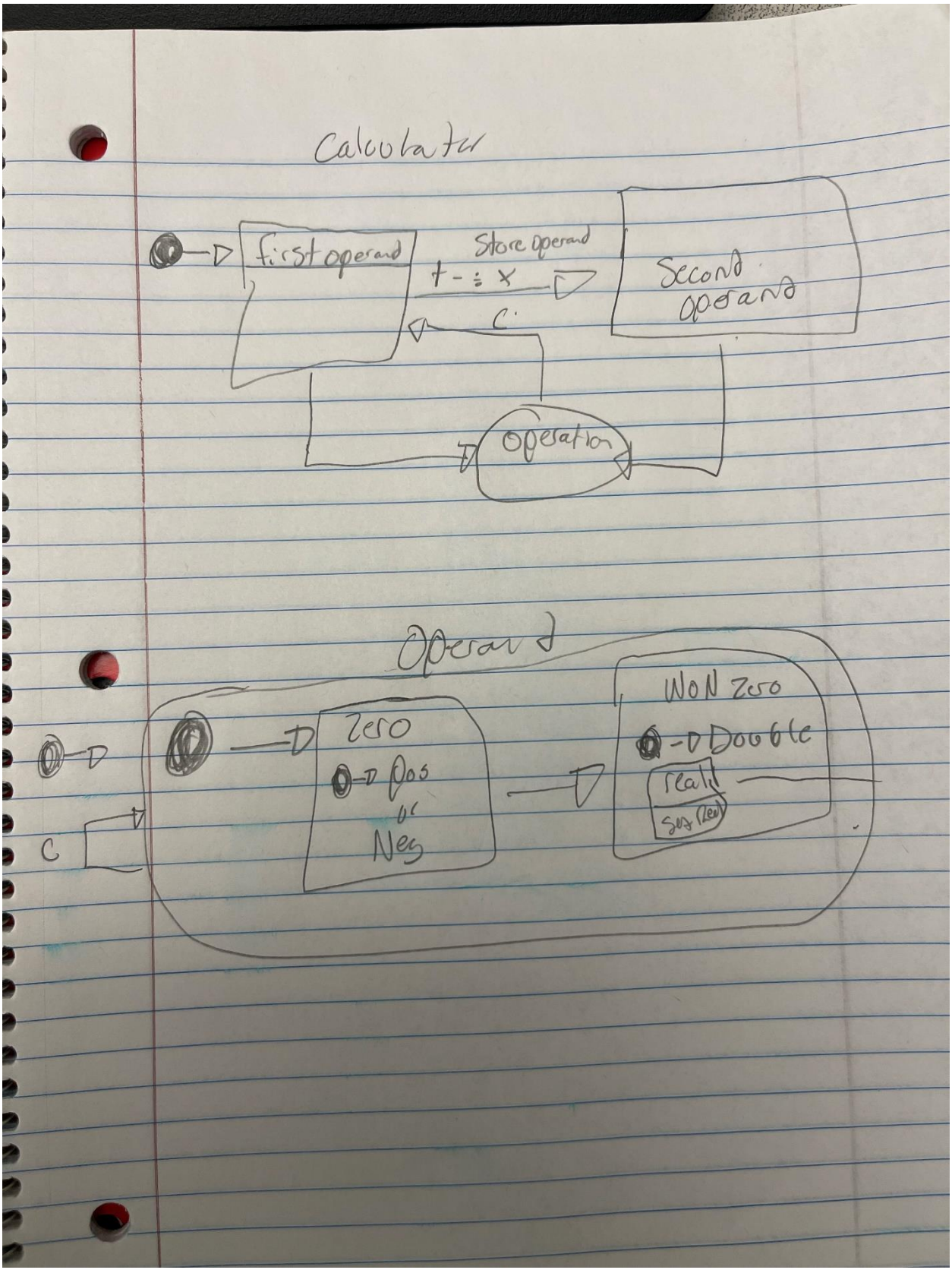


Diagram:


Calculator
first operand
Store operand
+ - ÷ x
C
Second operand
operation
Operand
Zero
Pos
or
Neg
Non Zero
Double
real
set real
C