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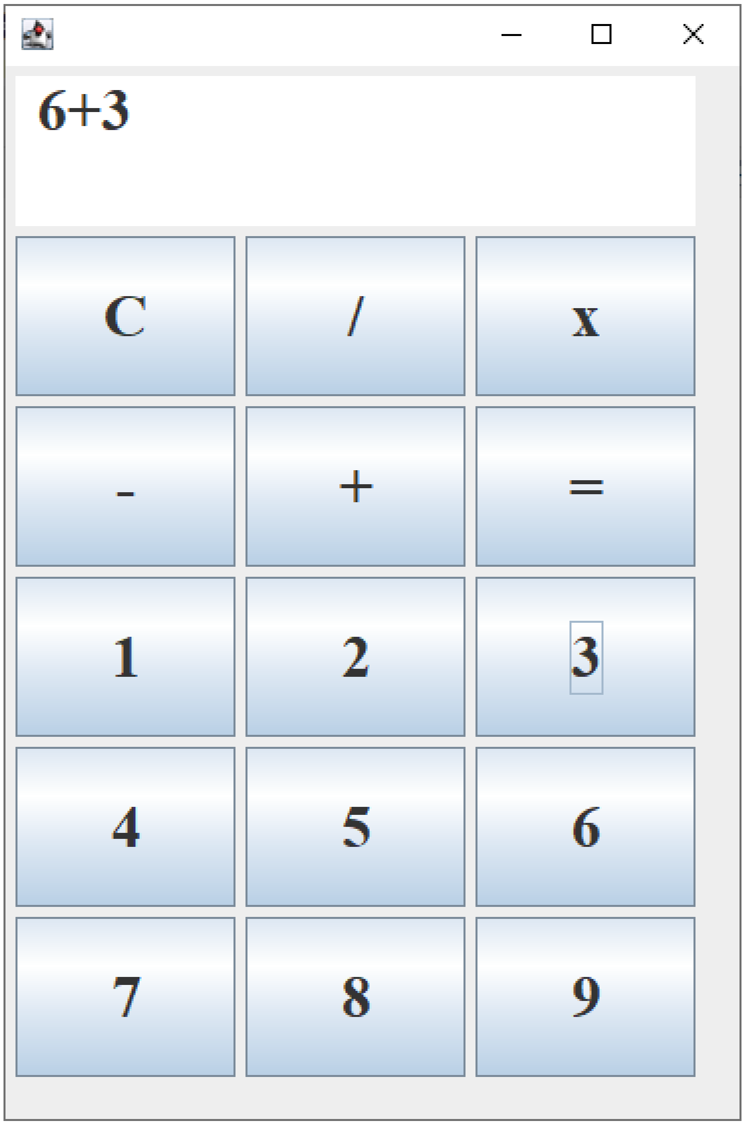
Assignment 9



6+3

```
import java.awt.*;

import java.awt.event.*;

import java.awt.geom.*;

import javax.swing.*;

import javax.swing.border.Border;


import java.util.*;
```

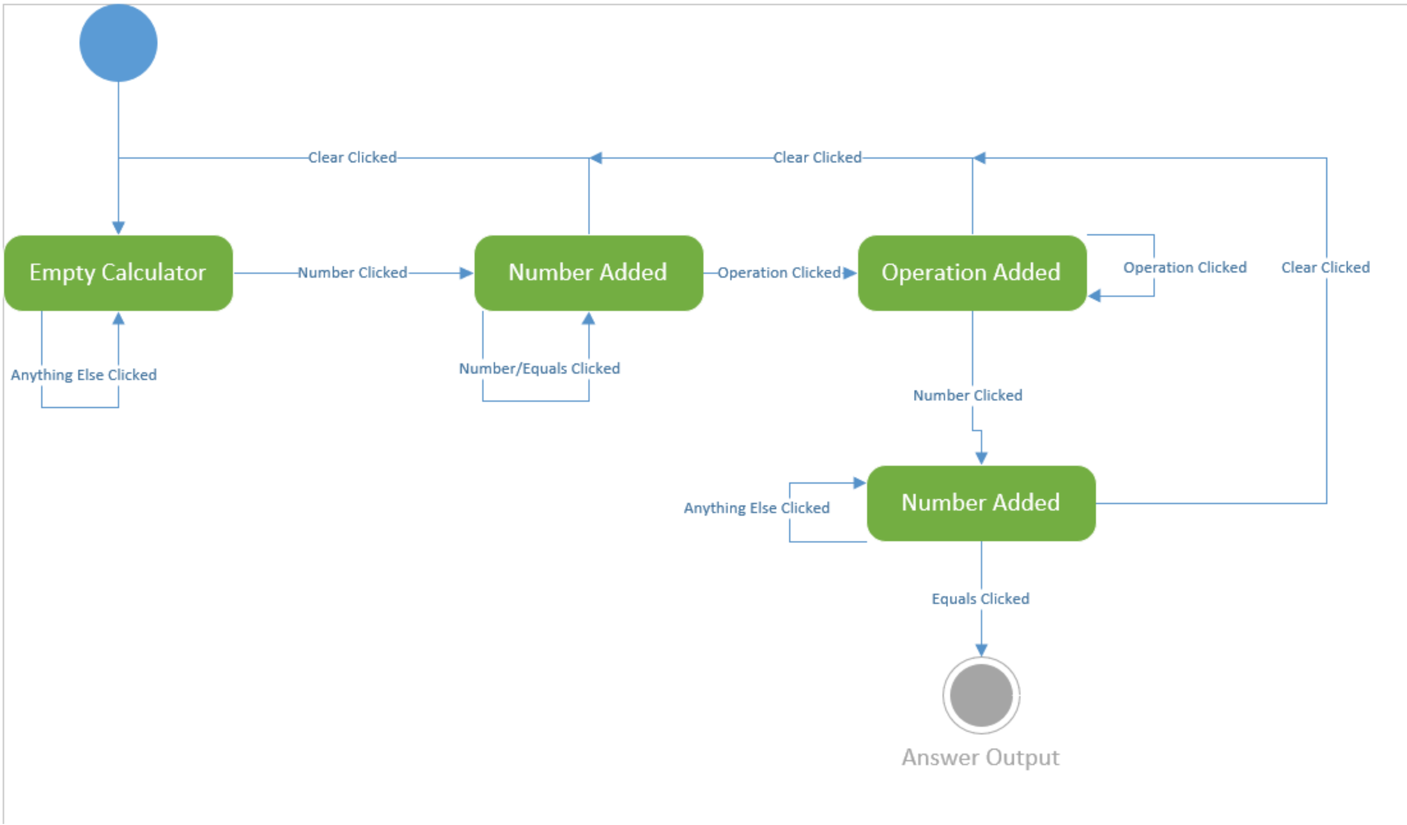
```
public interface FrameBuilder {
   JPanel buildButtonPanel();
   JPanel buildDisplayPanel();
   JFrame buildAppFrame(String title);
}

class Calculator implements FrameBuilder, ActionListener{
        String[] labels = {"C", "/", "x", "-", "+", "=", "1", "2", "3", "4", "5", "6", "7", "8", "9"};
        ArrayList<JButton> buttons = new ArrayList<JButton>();
        JTextArea output;
        IOp operation;
        ArrayList<Double> operands = new ArrayList<Double>();

        @Override
        public JPanel buildButtonPanel() {
                JPanel buttonPanel = new JPanel();
                buttonPanel.setBounds(0, 80, 350, 450);

                for(int i = 0; i < labels.length; i++) {
                        buttons.add(new JButton(labels[i]));
                        buttons.get(i).setPreferredSize(new Dimension(110,80));
                        buttons.get(i).addActionListener(this);
                        buttons.get(i).setFont(new Font("Times New Roman", Font.BOLD, 30));
                        buttonPanel.add(buttons.get(i));
                }
```

```
    return buttonPanel;
}

@Override
public JPanel buildDisplayPanel() {
    JPanel displayPanel = new JPanel();
    displayPanel.setBounds(5, 0, 340, 80);

    output = new JTextArea();
    output.setEditable(false);
    output.setPreferredSize(new Dimension(350, 80));
    output.setFont(new Font("Times New Roman", Font.BOLD, 30));
    output.setAlignmentX(JTextField.CENTER);
    output.setText("  ");

    displayPanel.add(output);
    return displayPanel;
}

@Override
public JFrame buildAppFrame(String title) {
    JFrame frame = new JFrame();
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setLayout(null);
    frame.setSize(400, 600);
    frame.setVisible(true);
    return frame;
```

```
}

@Override
public void actionPerformed(ActionEvent e) {
    String text = ((JButton) e.getSource()).getText();
    int index = -1;

    for(int i = 0; i < labels.length; i++) {
        if(labels[i].equalsIgnoreCase(text)) {
            index = i;
            break;
        }
    }

    if((index > 0) && (index < 5) && (operands.size() == 1)){//Operation
        operation = OpFactory(text);
        output.append(text);
    }
    else if(index == 0) {
        operation = null;
        output.setText("  ");
        operands.clear();
    }
    else if((index == 5) && (operands.size() == 2) && operation != null) {
        double total = operation.compute(operands.get(0), operands.get(1));
        String totalOutput = String.valueOf(total);
        output.setText("  " + totalOutput);
        }

        else if((index > 5) && (((operands.size() == 1) && (operation != null)) | |
(operands.size() == 0))){

            double num = NumFactory(text);

            if(operands.size() == 1) {

                operands.add(num);

            }

            else {

                operands.add(num);

            }

            output.append(text);

        }


    }


    static IOp OpFactory(String op) {

        if(op.equals("+")) {

            return new Plus();

        }

        else if(op.equals("-")) {

            return new Minus();

        }

        else if(op.equals("x")) {

            return new Multiply();

        }

        else if(op.equals("/")) {

            return new Divide();
        }
        return null;
    }

    static double NumFactory(String num) {
        return Double.parseDouble(num);
    }

}
```

```
import java.awt.*;
import java.awt.event.*;
import java.awt.geom.*;
import javax.swing.*;
import java.util.*;

public class FrameDriver{
    Calculator calc;

    public static void main(String[] args) {
        FrameDriver start = new FrameDriver();
    }


    FrameDriver(){

        calc = new Calculator();

        JFrame frame = calc.buildAppFrame("Calculator");

        JPanel buttons = calc.buildButtonPanel();

        JPanel display = calc.buildDisplayPanel();

        frame.add(display);

        frame.add(buttons);

    }

}
```

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

class Plus implements IOp{

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

}

class Minus implements IOp{

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

}

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

}

class Divide implements IOp{

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

}
```


Clear Clicked
Clear Clicked
Empty Calculator
Number Clicked
Number Added
Operation Clicked
Operation Added
Operation Clicked
Clear Clicked
Anything Else Clicked
Number/Equals Clicked
Number Clicked
Anything Else Clicked
Number Added
Equals Clicked
Answer Output