**Bangladesh University of Business and Technology (BUBT)**

Department of Computer Science and Engineering



Project Report on

Software design pattern

**Calculator Using OOP**

**Submitted To**

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**Submitted By**

|  |  |
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Calculator.java

package calculator;

public class Calculator {

/\*\*

\* @param args the command line arguments

\*/

public static void main(String[] args) {

// TODO code application logic here

}

}

Calculator2.java:

package calculator;

public class calculator2 extends javax.swing.JFrame {

static int flag=0; public calculator2() { initComponents();

}

/\*\*

\* This method is called from within the constructor to initialize the form. \* WARNING: Do NOT modify this code. The content of this method is always \* regenerated by the Form Editor.

\*/

@SuppressWarnings("unchecked")

// <editor-fold defaultstate="collapsed" desc="Generated Code"> private void initComponents() {

area = new javax.swing.JTextField(); jButton1 = new javax.swing.JButton(); jButton2 = new javax.swing.JButton(); jButton3 = new javax.swing.JButton(); jButton4 = new javax.swing.JButton(); jButton5 = new javax.swing.JButton(); jButton6 = new javax.swing.JButton(); jButton7 = new javax.swing.JButton(); jButton8 = new javax.swing.JButton(); jButton9 = new javax.swing.JButton(); jButton10 = new javax.swing.JButton(); jButton11 = new javax.swing.JButton(); jButton12 = new javax.swing.JButton(); jButton13 = new javax.swing.JButton(); jButton14 = new javax.swing.JButton(); jButton15 = new javax.swing.JButton(); jButton16 = new javax.swing.JButton(); jButton18 = new javax.swing.JButton(); jButton19 = new javax.swing.JButton();

setDefaultCloseOperation(javax.swing.WindowConstants.EXIT\_ON\_CLOSE);

area.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N area.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { areaActionPerformed(evt);

}

});

jButton1.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton1.setText("-");

jButton1.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton1ActionPerformed(evt);

}

});

jButton2.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton2.setText("/");

jButton2.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton2ActionPerformed(evt);

}

});

jButton3.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton3.setText("+");

jButton3.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton3ActionPerformed(evt);

}

});

jButton4.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton4.setText("1");

jButton4.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton4ActionPerformed(evt);

}

});

jButton5.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton5.setText("\*");

jButton5.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton5ActionPerformed(evt);

}

});

jButton6.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton6.setText("2");

jButton6.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton6ActionPerformed(evt);

}

});

jButton7.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton7.setText("3");

jButton7.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton7ActionPerformed(evt);

}

});

jButton8.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton8.setText("%");

jButton8.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton8ActionPerformed(evt);

}

});

jButton9.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton9.setText("5");

jButton9.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton9ActionPerformed(evt);

}

});

jButton10.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton10.setText("4");

jButton10.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton10ActionPerformed(evt);

}

});

jButton11.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton11.setText("6");

jButton11.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton11ActionPerformed(evt);

}

});

jButton12.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton12.setText("7");

jButton12.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton12ActionPerformed(evt);

}

});

jButton13.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton13.setText("9");

jButton13.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton13ActionPerformed(evt);

}

});

jButton14.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton14.setText("8");

jButton14.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton14ActionPerformed(evt);

}

});

jButton15.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton15.setText("0");

jButton15.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton15ActionPerformed(evt);

}

});

jButton16.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton16.setText(".");

jButton16.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton16ActionPerformed(evt);

}

});

jButton18.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton18.setText("Reset");

jButton18.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton18ActionPerformed(evt);

}

});

jButton19.setFont(new java.awt.Font("Times New Roman", 0, 24)); // NOI18N jButton19.setText("=");

jButton19.addActionListener(new java.awt.event.ActionListener() { public void actionPerformed(java.awt.event.ActionEvent evt) { jButton19ActionPerformed(evt);

}

});

javax.swing.GroupLayout layout = new javax.swing.GroupLayout(getContentPane()); getContentPane().setLayout(layout); layout.setHorizontalGroup(

layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addGroup(javax.swing.GroupLayout.Alignment.TRAILING, layout.createSequentialGroup() .addGap(47, 47, 47)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addGroup(layout.createSequentialGroup()

.addComponent(jButton16, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addGroup(layout.createSequentialGroup()

.addComponent(jButton15, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED)

.addComponent(jButton18, javax.swing.GroupLayout.PREFERRED\_SIZE, 167, javax.swing.GroupLayout.PREFERRED\_SIZE))

.addGroup(layout.createSequentialGroup()

.addGap(237, 237, 237)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addGroup(layout.createSequentialGroup()

.addComponent(jButton5, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)

.addComponent(jButton2, javax.swing.GroupLayout.PREFERRED\_SIZE, 62, javax.swing.GroupLayout.PREFERRED\_SIZE))

.addGroup(layout.createSequentialGroup()

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addComponent(jButton8, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton1, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton19, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE))

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED) .addComponent(jButton3, javax.swing.GroupLayout.PREFERRED\_SIZE, 62, javax.swing.GroupLayout.PREFERRED\_SIZE))))))

.addGroup(layout.createSequentialGroup()

.addComponent(jButton4, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)

.addComponent(jButton6, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED)

.addComponent(jButton7, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE))

.addComponent(area, javax.swing.GroupLayout.PREFERRED\_SIZE, 428, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addGroup(layout.createSequentialGroup()

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addComponent(jButton10, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton12, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE))

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addGroup(layout.createSequentialGroup()

.addComponent(jButton9, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)

.addComponent(jButton11, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE))

.addGroup(layout.createSequentialGroup()

.addComponent(jButton14, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)

.addComponent(jButton13, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)))))

.addContainerGap(javax.swing.GroupLayout.DEFAULT\_SIZE, Short.MAX\_VALUE))

);

layout.setVerticalGroup(

layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addGroup(layout.createSequentialGroup()

.addGap(33, 33, 33)

.addComponent(area, javax.swing.GroupLayout.PREFERRED\_SIZE, 54, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addGap(18, 18, 18)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addComponent(jButton2, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)

.addComponent(jButton4, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton6, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton7, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton5, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)))

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

.addGroup(layout.createSequentialGroup()

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)

.addComponent(jButton11, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton10, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton9, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton1, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE))

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)

.addComponent(jButton8, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton12, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton13, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton14, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE))

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED, javax.swing.GroupLayout.DEFAULT\_SIZE, Short.MAX\_VALUE)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)

.addComponent(jButton16, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton15, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton19, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)

.addComponent(jButton18, javax.swing.GroupLayout.PREFERRED\_SIZE, 42, javax.swing.GroupLayout.PREFERRED\_SIZE)))

.addComponent(jButton3, javax.swing.GroupLayout.DEFAULT\_SIZE, javax.swing.GroupLayout.DEFAULT\_SIZE, Short.MAX\_VALUE))

.addContainerGap())

);

pack();

}// </editor-fold>

private void jButton5ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here: area.setText(area.getText()+" \* "); flag=1;

}

private void jButton4ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"1");

}

private void jButton6ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"2");

}

private void jButton7ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"3");

}

private void jButton8ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+" % "); flag=5;

}

private void jButton9ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"5");

}

private void jButton10ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"4");

}

private void jButton11ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"6");

}

private void jButton12ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"7");

}

private void jButton13ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"9");

}

private void jButton14ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"8");

}

private void jButton15ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+"0");

}

private void jButton16ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+".");

}

private void jButton18ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(""); flag=0;

}

private void jButton19ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here: area.setText(area.getText()+" = "); String str = area.getText();

String[] substr = str.split("\\s+");

float num1 = Float.parseFloat(substr[0]); float num2 = Float.parseFloat(substr[2]);

if(flag==1)

{

area.setText(area.getText()+" "+(num1\*num2));

}

if(flag==2)

{

area.setText(area.getText()+" "+(num1/num2));

}

if(flag==3)

{ area.setText(area.getText()+" "+(num1-num2));

}

if(flag==4)

{

area.setText(area.getText()+" "+(num1+num2));

}

if(flag==5)

{

area.setText(area.getText()+" "+(num1%num2));

}

}

private void jButton2ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here:

area.setText(area.getText()+" / "); flag=2;

}

private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here: area.setText(area.getText()+" - "); flag=3;

}

private void jButton3ActionPerformed(java.awt.event.ActionEvent evt) { // TODO add your handling code here: area.setText(area.getText()+" + "); flag=4;

}

private void areaActionPerformed(java.awt.event.ActionEvent evt) {

// TODO add your handling code here:

}

/\*\*

* @param args the command line arguments

\*/

public static void main(String args[]) {

/\* Set the Nimbus look and feel \*/

//<editor-fold defaultstate="collapsed" desc=" Look and feel setting code (optional) ">

/\* If Nimbus (introduced in Java SE 6) is not available, stay with the default look and feel.

* For details see http://download.oracle.com/javase/tutorial/uiswing/lookandfeel/plaf.html

\*/ try {

for (javax.swing.UIManager.LookAndFeelInfo info : javax.swing.UIManager.getInstalledLookAndFeels()) { if ("Nimbus".equals(info.getName())) {

javax.swing.UIManager.setLookAndFeel(info.getClassName()); break;

}

}

} catch (ClassNotFoundException ex) {

java.util.logging.Logger.getLogger(calculator2.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);

} catch (InstantiationException ex) {

java.util.logging.Logger.getLogger(calculator2.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);

} catch (IllegalAccessException ex) {

java.util.logging.Logger.getLogger(calculator2.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);

} catch (javax.swing.UnsupportedLookAndFeelException ex) {

java.util.logging.Logger.getLogger(calculator2.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);

}

//</editor-fold>

/\* Create and display the form \*/

java.awt.EventQueue.invokeLater(new Runnable() { public void run() {

new calculator2().setVisible(true);

}

});

}

// Variables declaration - do not modify private javax.swing.JTextField area; private javax.swing.JButton jButton1; private javax.swing.JButton jButton10; private javax.swing.JButton jButton11; private javax.swing.JButton jButton12; private javax.swing.JButton jButton13; private javax.swing.JButton jButton14; private javax.swing.JButton jButton15; private javax.swing.JButton jButton16; private javax.swing.JButton jButton18; private javax.swing.JButton jButton19; private javax.swing.JButton jButton2; private javax.swing.JButton jButton3; private javax.swing.JButton jButton4; private javax.swing.JButton jButton5; private javax.swing.JButton jButton6; private javax.swing.JButton jButton7; private javax.swing.JButton jButton8; private javax.swing.JButton jButton9;

// End of variables declaration

}

Code Smell:

Inappropriate Naming:

Sometimes, when we reading code that looks nice and clean but which doesn’t quite make sense, the problem lies in the naming. Naming smells are code smells that come from bad names.

A code smell indicates where you can improve your code, and often points to some deeper problem. A particular code smell often has a corresponding refactoring that removes that particular smell, improving the code.

Comments:

The idea behind comments seems pretty straightforward. We can add information about code that the code itself doesn’t give. It may be a comment about the purpose of the code. It may be a warning about changing the code in what seems like an obvious way, but would have a negative consequence. Or it may be an explanation of a strange performance optimization. Whatever the reason, comments are code smells.

Applicable Design Pattern:

1. Factory Design pattern: We try to add factory design pattern for taking input from user,
2. Adapter design pattern: We try to add adapter design pattern when user perform operation one buttons.
3. Singleton Design pattern: To handle individuals buttons .

## 