**Tutorial No. 4**

**Problem statement:**

**Design Assumptions:**

**Design Diagrams:**

**Code:**

**Controller\_calc.java**

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\*/

package Controller;

import Model.Model\_calc;

import View.View\_calc;

import calculator.\*;

import java.util.Scanner;

/\*

\* @author Jatin

\*/

public class Controller\_calc extends Thread {

private Model\_calc m;

private View\_calc v;

private Calculator c;

private volatile String c\_input = "";

private Scanner scn = new Scanner(System.in);

public Controller\_calc(Model\_calc m, View\_calc v){

this.m = m;

this.v = v;

c = new Calculator();

}

public String get\_input(){

while(v.a!=true)

{

if(!"".equals(c\_input)){

String to\_send = c\_input;

c\_input="";

return to\_send;

}

}

if(v.a==true){

v.a = false;

return v.s1;

}

return null; //will never execute

}

public void update\_model(String st, String ans){

m.update\_data(st,ans);

}

public String calculate\_result(){

return c.evaluate(m.export\_data());

}

public void display\_result(){

v.view\_jframe(m.export\_result());

v.view\_cmdline(m.export\_data(),m.export\_result());

}

@Override

public void run() {

c\_input = scn.next();

v.b=true;

}

}

**main.java**

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\*/

package Main;

import Model.Model\_calc;

import View.View\_calc;

import Controller.Controller\_calc;

/\*\*

\*

\* @author Jatin

\*/

public class Main {

/\*\*

\* @param args the command line arguments

\*/

public static void main(String[] args) {

Controller\_calc c = new Controller\_calc(new Model\_calc(), new View\_calc());

c.start();

String st ="";

st = c.get\_input();

while(true){

String re = "0";

c.update\_model(st, re);

re = c.calculate\_result();

c.update\_model(st, re);

c.display\_result();

st = c.get\_input();

}

}

}

**Model\_calc.java**

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package Model;

/\*\*

\*

\* @author Jatin

\*/

public class Model\_calc {

private static String expr;

private static String ans;

public void update\_data(String st, String result){

expr = st;

ans = result;

}

public String export\_data(){

return expr;

}

public String export\_result(){

return ans;

}

}

**View\_calc.java**

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package View;

import javax.swing.\*;

import java.awt.event.ActionEvent;

import java.awt.event.ActionListener;

/\*\*

\*

\* @author Jatin

\*/

public class View\_calc implements ActionListener{

JTextField t;

JButton dec;

JButton equal;

JButton zero;

JButton one;

JButton two;

JButton three;

JButton four;

JButton five;

JButton six;

JButton seven;

JButton eight;

JButton nine;

JButton plus;

JButton minus;

JButton multiply;

JButton divide;

JButton clear;

private JFrame th;

public boolean a=false;

public boolean b=true;

public String s1;

public View\_calc() {

th = new JFrame("Basic Math calculator");

t = new JTextField();

t.setBounds(45,45,245,40);

one = new JButton("1");

one.setBounds(45,110,50,50);

four = new JButton("4");

four.setBounds(45,175,50,50);

seven = new JButton("7");

seven.setBounds(45,240,50,50);

dec = new JButton(".");

dec.setBounds(45,305,50,50);

two = new JButton("2");

two.setBounds(110,110,50,50);

five = new JButton("5");

five.setBounds(110,175,50,50);

eight = new JButton("8");

eight.setBounds(110,240,50,50);

zero = new JButton("0");

zero.setBounds(110,305,50,50);

three = new JButton("3");

three.setBounds(175,110,50,50);

six = new JButton("6");

six.setBounds(175,175,50,50);

nine = new JButton("9");

nine.setBounds(175,240,50,50);

equal = new JButton("=");

equal.setBounds(175,305,50,50);

plus = new JButton("+");

plus.setBounds(240,110,50,50);

minus = new JButton("-");

minus.setBounds(240,175,50,50);

multiply = new JButton("\*");

multiply.setBounds(240,240,50,50);

divide = new JButton("/");

divide.setBounds(240,305,50,50);

clear = new JButton("clear");

clear.setBounds(110,370,100,50);

th.setSize(350, 470);

th.add(one);

th.add(two);

th.add(three);

th.add(four);

th.add(five);

th.add(six);

th.add(seven);

th.add(eight);

th.add(nine);

th.add(dec);

th.add(zero);

th.add(equal);

th.add(plus);

th.add(multiply);

th.add(divide);

th.add(minus);

th.add(t);

th.add(clear);

th.setLayout(null);

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

th.setVisible(true);

one.addActionListener(this);

two.addActionListener(this);

three.addActionListener(this);

four.addActionListener(this);

five.addActionListener(this);

six.addActionListener(this);

seven.addActionListener(this);

eight.addActionListener(this);

nine.addActionListener(this);

zero.addActionListener(this);

equal.addActionListener(this);

plus.addActionListener(this);

multiply.addActionListener(this);

divide.addActionListener(this);

minus.addActionListener(this);

dec.addActionListener(this);

clear.addActionListener(this);

}

public void actionPerformed(ActionEvent e)

{

if(e.getSource()==one){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("1"));

}

if(e.getSource()==two){

{

if(this.b==true){

this.b=false;

t.setText("");

}t.setText(t.getText().concat("2"));

}

}

if(e.getSource()==three){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("3"));

}

if(e.getSource()==four){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("4"));

}

if(e.getSource()==five){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("5"));

}

if(e.getSource()==six){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("6"));

}

if(e.getSource()==seven){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("7"));

}

if(e.getSource()==eight){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("8"));

}

if(e.getSource()==nine){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("9"));

}

if(e.getSource()==zero){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("0"));

}

if(e.getSource()==dec){

if(this.b==true){

this.b=false;

t.setText("");

}

t.setText(t.getText().concat("."));

}

if(e.getSource()==plus)

t.setText(t.getText().concat("+"));

if(e.getSource()==multiply)

t.setText(t.getText().concat("\*"));

if(e.getSource()==divide)

t.setText(t.getText().concat("/"));

if(e.getSource()==minus)

t.setText(t.getText().concat("-"));

if(e.getSource()==clear)

{

t.setText("");

a=false;

}

if(e.getSource()==equal)

{

this.s1=t.getText();

if("".equals(s1))

{

JOptionPane.showMessageDialog(th, "Please enter expression");

}

else {

this.a=true;

this.b=true;

}

}

}

public void view\_jframe(String ans){

t.setText(ans);

}

public void view\_cmdline(String exp, String ans){

System.out.println(exp+" = "+ans);

}

}

**Observation:**