***Scientific Calculator in Java***

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Theory:

We have made an Scientific Calculator using Java Swing in which a user can find the solution from addition to functions like sin, cosine, tan and even exponential and logarithmic functions.

* Import Statements:

java.awt : Imports classes for creating GUI.

java.awt.event : Imports classes for handling events such as button clicks.

J

javax.swing : Imports classes for creating Swing Components used to build the GUI.

* Class Definition:

There is only one class “Calculato” defined and the whole program is written in it.

* Constructor:

public Calculato() is the constructor used and it contains a initialize() method

* Methods used:

**public static void main(String[] args)**

public static void main(String[] args) is the main method Which makes the calculator visible.

**private void initialize():**

This method initializes all the content of the frame like textField,Button and labels.

**public void actionPerformed(ActionEvent e):**

This method is used to describe the action to be performed after a button is pressed.

When you will first run the program, you will see that you can’t press any button except on/off and the screen is grey as the calculator is in off condition. But once you press on/off button , the screen turns Blue and all the buttons are enabled.

**Exception Handling:**

We have handled a run-time exception using **try and catch Block where if the user first presses the buttons like sin,cos,tan, log ,expo,+,-,\*,/ then user will get a text “Please Provide an Input”**

**Program :**

**import java.awt.Component;**

**import java.awt.EventQueue;**

**import javax.swing.JFrame;**

**import javax.swing.JTextArea;**

**import java.awt.Font;**

**import javax.swing.JLabel;**

**import javax.swing.JTextField;**

**import javax.swing.SwingUtilities;**

**import javax.swing.JButton;**

**import javax.swing.JComponent;**

**import java.awt.event.ActionListener;**

**import java.awt.event.ActionEvent;**

**import java.lang.Math;**

**import java.awt.Color;**

**public class Calculato {**

**private JFrame frame;**

**private JTextField textField;**

**double first,second,result;**

**String operation,answer;**

**double a;**

**boolean on = false;**

**/\*\***

**\* Launch the application.**

**\*/**

**public static void main(String[] args) {**

**EventQueue.invokeLater(new Runnable() {**

**public void run() {**

**try {**

**Calculato window = new Calculato();**

**window.frame.setVisible(true);**

**} catch (Exception e) {**

**e.printStackTrace();**

**}**

**}**

**});**

**}**

**/\*\***

**\* Create the application.**

**\*/**

**public Calculato() {**

**initialize();**

**}**

**/\*\***

**\* Initialize the contents of the frame.**

**\*/**

**private void initialize() {**

**frame = new JFrame("Scientific Calcualtor Project"); //Creating a frame for our calculator**

**frame.getContentPane().setBackground(Color.black);**

**frame.getContentPane().setFont(new Font("Tahoma", Font.PLAIN, 20));**

**frame.setBounds(100, 100, 478, 700);**

**frame.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);**

**frame.getContentPane().setLayout(null);**

**JLabel lblNewLabel = new JLabel(" Scientific Calculator");**

**lblNewLabel.setForeground(Color.YELLOW);**

**lblNewLabel.setFont(new Font("Stylus BT", Font.BOLD, 27));**

**lblNewLabel.setBounds(10, 10, 466, 49);**

**frame.getContentPane().add(lblNewLabel);**

**textField = new JTextField();**

**textField.setFont(new Font("Yu Gothic UI Semibold", Font.BOLD, 20)); // Shows the text we need to calculate**

**textField.setForeground(new Color(0, 0, 0));**

**textField.setBounds(20, 69, 413, 72);**

**frame.getContentPane().add(textField);**

**textField.setColumns(10);**

**textField.setBackground(new Color(27,27,27));**

**textField.setBorder(null);**

**textField.setEditable(false);**

**JButton Btnsin = new JButton("sin"); // Button for sin function**

**Btnsin.setEnabled(false);**

**Btnsin.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.sin(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnsin.setBackground(Color.orange);**

**Btnsin.setBorder(null);**

**Btnsin.setFont(new Font("Tahoma", Font.PLAIN, 15));**

**Btnsin.setBounds(24, 173, 64, 49);**

**Btnsin.setFocusable(false);**

**frame.getContentPane().add(Btnsin);**

**JButton Btnsin\_h = new JButton("sinh"); // Button for hyperbolic sin function**

**Btnsin\_h.setEnabled(false);**

**Btnsin\_h.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.sinh(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnsin\_h.setBackground(Color.orange);**

**Btnsin\_h.setBorder(null);**

**Btnsin\_h.setFont(new Font("Tahoma", Font.PLAIN, 16));**

**Btnsin\_h.setBounds(24, 242, 64, 49);**

**Btnsin\_h.setFocusable(false);**

**frame.getContentPane().add(Btnsin\_h);**

**JButton Btnfact = new JButton("n!"); // Button for factorial function**

**Btnfact.setEnabled(false);**

**Btnfact.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a=Double.parseDouble(textField.getText());**

**double fact=1;**

**while(a !=0) {**

**fact=fact\*a;**

**a--;**

**}**

**textField.setText(String.valueOf(fact));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnfact.setFocusable(false);**

**Btnfact.setBackground(Color.orange);**

**Btnfact.setBorder(null);**

**Btnfact.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btnfact.setBounds(24, 310, 64, 49);**

**frame.getContentPane().add(Btnfact);**

**JButton Btn\_7 = new JButton("7");**

**Btn\_7.setEnabled(false);**

**Btn\_7.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_7.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_7.setFocusable(false);**

**Btn\_7.setBackground(Color.orange);**

**Btn\_7.setBorder(null);**

**Btn\_7.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_7.setBounds(24, 380, 64, 49);**

**frame.getContentPane().add(Btn\_7);**

**JButton Btn\_4 = new JButton("4");**

**Btn\_4.setEnabled(false);**

**Btn\_4.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_4.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_4.setFocusable(false);**

**Btn\_4.setBackground(Color.orange);**

**Btn\_4.setBorder(null);**

**Btn\_4.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_4.setBounds(24, 444, 64, 49);**

**frame.getContentPane().add(Btn\_4);**

**JButton Btn\_1 = new JButton("1");**

**Btn\_1.setEnabled(false);**

**Btn\_1.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_1.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_1.setFocusable(false);**

**Btn\_1.setBackground(Color.orange);**

**Btn\_1.setBorder(null);**

**Btn\_1.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_1.setBounds(24, 514, 64, 49);**

**frame.getContentPane().add(Btn\_1);**

**JButton Btn\_0 = new JButton("0");**

**Btn\_0.setEnabled(false);**

**Btn\_0.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_0.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_0.setFocusable(false);**

**Btn\_0.setBackground(Color.orange);**

**Btn\_0.setBorder(null);**

**Btn\_0.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_0.setBounds(24, 581, 148, 49);**

**frame.getContentPane().add(Btn\_0);**

**JButton Btncos = new JButton("cos");**

**Btncos.setEnabled(false);**

**Btncos.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.cos(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btncos.setFocusable(false);**

**Btncos.setBackground(Color.orange);**

**Btncos.setBorder(null);**

**Btncos.setFont(new Font("Tahoma", Font.PLAIN, 16));**

**Btncos.setBounds(108, 173, 64, 49);**

**frame.getContentPane().add(Btncos);**

**JButton Btncos\_h = new JButton("cosh");**

**Btncos\_h.setEnabled(false);**

**Btncos\_h.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.cosh(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btncos\_h.setFocusable(false);**

**Btncos\_h.setBackground(Color.orange);**

**Btncos\_h.setBorder(null);**

**Btncos\_h.setFont(new Font("Tahoma", Font.PLAIN, 15));**

**Btncos\_h.setBounds(108, 242, 64, 49);**

**frame.getContentPane().add(Btncos\_h);**

**JButton Btnraise2 = new JButton("x^2"); // Button for calculating square**

**Btnraise2.setEnabled(false);**

**Btnraise2.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Double.parseDouble(textField.getText());**

**a=a\*a;**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnraise2.setFocusable(false);**

**Btnraise2.setBackground(Color.orange);**

**Btnraise2.setBorder(null);**

**Btnraise2.setFont(new Font("Tahoma", Font.PLAIN, 16));**

**Btnraise2.setBounds(108, 310, 64, 49);**

**frame.getContentPane().add(Btnraise2);**

**JButton Btn\_8 = new JButton("8");**

**Btn\_8.setEnabled(false);**

**Btn\_8.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_8.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_8.setFocusable(false);**

**Btn\_8.setBackground(Color.orange);**

**Btn\_8.setBorder(null);**

**Btn\_8.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_8.setBounds(108, 380, 64, 49);**

**frame.getContentPane().add(Btn\_8);**

**JButton Btn\_5 = new JButton("5");**

**Btn\_5.setEnabled(false);**

**Btn\_5.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_5.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_5.setFocusable(false);**

**Btn\_5.setBackground(Color.orange);**

**Btn\_5.setBorder(null);**

**Btn\_5.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_5.setBounds(108, 444, 64, 49);**

**frame.getContentPane().add(Btn\_5);**

**JButton Btn\_2 = new JButton("2");**

**Btn\_2.setEnabled(false);**

**Btn\_2.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_2.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_2.setFocusable(false);**

**Btn\_2.setBackground(Color.orange);**

**Btn\_2.setBorder(null);**

**Btn\_2.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_2.setBounds(108, 514, 64, 49);**

**frame.getContentPane().add(Btn\_2);**

**JButton Btntan = new JButton("tan");**

**Btntan.setEnabled(false);**

**Btntan.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.tan(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btntan.setFocusable(false);**

**Btntan.setBackground(Color.orange);**

**Btntan.setBorder(null);**

**Btntan.setFont(new Font("Tahoma", Font.PLAIN, 16));**

**Btntan.setBounds(192, 173, 64, 49);**

**frame.getContentPane().add(Btntan);**

**JButton Btntan\_h = new JButton("tanh");**

**Btntan\_h.setEnabled(false);**

**Btntan\_h.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.tanh(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btntan\_h.setFocusable(false);**

**Btntan\_h.setBackground(Color.orange);**

**Btntan\_h.setBorder(null);**

**Btntan\_h.setFont(new Font("Tahoma", Font.PLAIN, 15));**

**Btntan\_h.setBounds(192, 242, 64, 49);**

**frame.getContentPane().add(Btntan\_h);**

**JButton Btnraise3 = new JButton("x^3"); // Button for calculating cube of any number**

**Btnraise3.setEnabled(false);**

**Btnraise3.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Double.parseDouble(textField.getText());**

**a=a\*a\*a;**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnraise3.setFocusable(false);**

**Btnraise3.setBackground(Color.orange);**

**Btnraise3.setBorder(null);**

**Btnraise3.setFont(new Font("Tahoma", Font.PLAIN, 16));**

**Btnraise3.setBounds(192, 310, 64, 49);**

**frame.getContentPane().add(Btnraise3);**

**JButton Btn\_9 = new JButton("9");**

**Btn\_9.setEnabled(false);**

**Btn\_9.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_9.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_9.setFocusable(false);**

**Btn\_9.setBackground(Color.orange);**

**Btn\_9.setBorder(null);**

**Btn\_9.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_9.setBounds(192, 380, 64, 49);**

**frame.getContentPane().add(Btn\_9);**

**JButton Btn\_6 = new JButton("6");**

**Btn\_6.setEnabled(false);**

**Btn\_6.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_6.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_6.setFocusable(false);**

**Btn\_6.setBackground(Color.orange);**

**Btn\_6.setBorder(null);**

**Btn\_6.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_6.setBounds(192, 444, 64, 49);**

**frame.getContentPane().add(Btn\_6);**

**JButton Btn\_3 = new JButton("3");**

**Btn\_3.setEnabled(false);**

**Btn\_3.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Number=textField.getText()+Btn\_3.getText();**

**textField.setText(Number);**

**}**

**});**

**Btn\_3.setFocusable(false);**

**Btn\_3.setBackground(Color.orange);**

**Btn\_3.setBorder(null);**

**Btn\_3.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btn\_3.setBounds(192, 514, 64, 49);**

**frame.getContentPane().add(Btn\_3);**

**JButton Btndot = new JButton(".");**

**Btndot.setEnabled(false);**

**Btndot.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**String Number=textField.getText()+Btndot.getText();**

**textField.setText(Number);**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btndot.setFocusable(false);**

**Btndot.setBackground(Color.orange);**

**Btndot.setBorder(null);**

**Btndot.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btndot.setBounds(192, 581, 64, 49);**

**frame.getContentPane().add(Btndot);**

**JButton Btnroot = new JButton("√");**

**Btnroot.setEnabled(false);**

**Btnroot.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.sqrt(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnroot.setFocusable(false);**

**Btnroot.setBackground(Color.orange);**

**Btnroot.setBorder(null);**

**Btnroot.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btnroot.setBounds(276, 173, 64, 49);**

**frame.getContentPane().add(Btnroot);**

**JButton Btnlog = new JButton("log");**

**Btnlog.setEnabled(false);**

**Btnlog.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.log(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnlog.setFocusable(false);**

**Btnlog.setBackground(Color.orange);**

**Btnlog.setBorder(null);**

**Btnlog.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btnlog.setBounds(276, 242, 64, 49);**

**frame.getContentPane().add(Btnlog);**

**JButton Btnraise\_y = new JButton("x^y");**

**Btnraise\_y.setEnabled(false);**

**Btnraise\_y.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**first=Double.parseDouble(textField.getText());**

**textField.setText("");**

**operation="X^Y";**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnraise\_y.setFocusable(false);**

**Btnraise\_y.setBackground(Color.orange);**

**Btnraise\_y.setBorder(null);**

**Btnraise\_y.setFont(new Font("Tahoma", Font.PLAIN, 16));**

**Btnraise\_y.setBounds(276, 310, 64, 49);**

**frame.getContentPane().add(Btnraise\_y);**

**JButton Btndel = new JButton("DEL");**

**Btndel.setEnabled(false);**

**Btndel.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**String Del=null;**

**if(textField.getText().length()>0) {**

**StringBuilder st= new StringBuilder(textField.getText());**

**st.deleteCharAt(textField.getText().length()-1);**

**Del=st.toString();**

**textField.setText(Del);**

**}**

**}**

**});**

**Btndel.setFocusable(false);**

**Btndel.setBackground(new Color(128,0,32));**

**Btndel.setBorder(null);**

**Btndel.setFont(new Font("Tahoma", Font.PLAIN, 17));**

**Btndel.setBounds(276, 380, 64, 49);**

**frame.getContentPane().add(Btndel);**

**JButton Btndiv = new JButton("÷");**

**Btndiv.setEnabled(false);**

**Btndiv.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**first=Double.parseDouble(textField.getText());**

**textField.setText("");**

**operation="/";**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btndiv.setFocusable(false);**

**Btndiv.setBackground(Color.orange);**

**Btndiv.setBorder(null);**

**Btndiv.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btndiv.setBounds(276, 444, 64, 49);**

**frame.getContentPane().add(Btndiv);**

**JButton Btnsub = new JButton("-");**

**Btnsub.setEnabled(false);**

**Btnsub.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**first=Double.parseDouble(textField.getText());**

**textField.setText("");**

**operation="-";**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnsub.setFocusable(false);**

**Btnsub.setBackground(Color.orange);**

**Btnsub.setBorder(null);**

**Btnsub.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btnsub.setBounds(276, 514, 64, 49);**

**frame.getContentPane().add(Btnsub);**

**JButton Btnmod = new JButton("%");**

**Btnmod.setEnabled(false);**

**Btnmod.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**first=Double.parseDouble(textField.getText());**

**textField.setText("");**

**operation="%";**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnmod.setFocusable(false);**

**Btnmod.setBackground(Color.orange);**

**Btnmod.setBorder(null);**

**Btnmod.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btnmod.setBounds(276, 581, 64, 49);**

**frame.getContentPane().add(Btnmod);**

**JButton Btnex = new JButton("e^x");**

**Btnex.setEnabled(false);**

**Btnex.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= Math.exp(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnex.setFocusable(false);**

**Btnex.setBackground(Color.orange);**

**Btnex.setBorder(null);**

**Btnex.setFont(new Font("Tahoma", Font.PLAIN, 16));**

**Btnex.setBounds(369, 242, 64, 49);**

**frame.getContentPane().add(Btnex);**

**JButton Btnbyx = new JButton("1/x");**

**Btnbyx.setEnabled(false);**

**Btnbyx.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**double a= 1/(Double.parseDouble(textField.getText()));**

**textField.setText(String.valueOf(a));**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnbyx.setFocusable(false);**

**Btnbyx.setBackground(Color.orange);**

**Btnbyx.setBorder(null);**

**Btnbyx.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btnbyx.setBounds(369, 310, 64, 49);**

**frame.getContentPane().add(Btnbyx);**

**JButton Btnclear = new JButton("AC"); // AC button**

**Btnclear.setEnabled(false);**

**Btnclear.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**textField.setText(null);**

**}**

**});**

**Btnclear.setFocusable(false);**

**Btnclear.setBackground(new Color(128,0,32));**

**Btnclear.setBorder(null);**

**Btnclear.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btnclear.setBounds(369, 380, 64, 49);**

**frame.getContentPane().add(Btnclear);**

**JButton Btnmul = new JButton("\*");**

**Btnmul.setEnabled(false);**

**Btnmul.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**first=Double.parseDouble(textField.getText());**

**textField.setText("");**

**operation="\*";**

**}**

**});**

**Btnmul.setFocusable(false);**

**Btnmul.setBackground(Color.orange);**

**Btnmul.setBorder(null);**

**Btnmul.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btnmul.setBounds(369, 444, 64, 49);**

**frame.getContentPane().add(Btnmul);**

**JButton Btnadd = new JButton("+");**

**Btnadd.setEnabled(false);**

**Btnadd.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**try {**

**String input=textField.getText();**

**if(input.isEmpty()) {**

**throw new IllegalArgumentException("Please provide the input.");**

**}**

**first=Double.parseDouble(textField.getText());**

**textField.setText("");**

**operation="+";**

**}**

**catch(NumberFormatException ex){**

**textField.setText("Invalid input.");**

**}**

**catch (IllegalArgumentException ex) {**

**textField.setText(ex.getMessage());**

**}**

**}**

**});**

**Btnadd.setFocusable(false);**

**Btnadd.setBackground(Color.orange);**

**Btnadd.setBorder(null);**

**Btnadd.setFont(new Font("Tahoma", Font.PLAIN, 20));**

**Btnadd.setBounds(369, 514, 64, 49);**

**frame.getContentPane().add(Btnadd);**

**JButton Btnequal = new JButton("="); // Equal button**

**Btnequal.setEnabled(false);**

**Btnequal.setForeground(new Color(0, 0, 0));**

**Btnequal.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**second=Double.parseDouble(textField.getText());**

**if(operation=="+") {**

**result=first+second;**

**answer=String.format("%.2f", result);**

**textField.setText(answer);**

**}**

**else if(operation=="-") {**

**result=first-second;**

**answer=String.format("%.2f", result);**

**textField.setText(answer);**

**}**

**else if(operation=="\*") {**

**result=first\*second;**

**answer=String.format("%.2f", result);**

**textField.setText(answer);**

**}**

**else if(operation=="/") {**

**result=first/second;**

**answer=String.format("%.2f", result);**

**textField.setText(answer);**

**}**

**else if(operation=="%") {**

**result=first%second;**

**answer=String.format("%.2f", result);**

**textField.setText(answer);**

**}**

**else if(operation == "X^Y") {**

**result=Math.pow(first, second);**

**answer=String.format("%.5f", result);**

**textField.setText(answer);**

**}**

**}**

**});**

**Btnequal.setFocusable(false);**

**Btnequal.setBackground(Color.orange);**

**Btnequal.setBorder(null);**

**Btnequal.setFont(new Font("Tahoma", Font.BOLD, 20));**

**Btnequal.setBounds(369, 581, 64, 49);**

**frame.getContentPane().add(Btnequal);**

**JButton Btnonoff = new JButton("On/Off"); // Disable the button and textField by pressing this button**

**Btnonoff.addActionListener(new ActionListener() {**

**public void actionPerformed(ActionEvent e) {**

**on = !on; // Toggle the state**

**Btnsin.setEnabled(on);**

**Btnsin\_h.setEnabled(on);**

**Btnfact.setEnabled(on);**

**Btn\_7.setEnabled(on);**

**Btn\_4.setEnabled(on);**

**Btn\_1.setEnabled(on);**

**Btn\_0.setEnabled(on);**

**Btncos.setEnabled(on);**

**Btncos\_h.setEnabled(on);**

**Btnraise2.setEnabled(on);**

**Btn\_8.setEnabled(on);**

**Btn\_5.setEnabled(on);**

**Btn\_2.setEnabled(on);**

**Btntan.setEnabled(on);**

**Btntan\_h.setEnabled(on);**

**Btnraise3.setEnabled(on);**

**Btn\_9.setEnabled(on);**

**Btn\_6.setEnabled(on);**

**Btn\_3.setEnabled(on);**

**Btndot.setEnabled(on);**

**Btnroot.setEnabled(on);**

**Btnlog.setEnabled(on);**

**Btnraise\_y.setEnabled(on);**

**Btndel.setEnabled(on);**

**Btndiv.setEnabled(on);**

**Btnsub.setEnabled(on);**

**Btnmod.setEnabled(on);**

**Btnex.setEnabled(on);**

**Btnbyx.setEnabled(on);**

**Btnclear.setEnabled(on);**

**Btnmul.setEnabled(on);**

**Btnadd.setEnabled(on);**

**Btnequal.setEnabled(on);**

**if(on) {**

**textField.setBackground(Color.blue);**

**}**

**else {**

**textField.setBackground(new Color(27,27,27));**

**textField.setText(null);**

**}**

**}**

**});**

**Btnonoff.setFocusable(false);**

**Btnonoff.setBackground(Color.orange);**

**Btnonoff.setBorder(null);**

**Btnonoff.setFont(new Font("Tahoma", Font.PLAIN, 10));**

**Btnonoff.setBounds(369, 173, 64, 49);**

**frame.getContentPane().add(Btnonoff);**

**}**

**}**

**Output :**

**Off**

**A screenshot of a calculator

Description automatically generated**

On

**A screenshot of a calculator

Description automatically generated**

**Additon of 1+1**

**A screenshot of a calculator

Description automatically generated**

**Let’s check the value of 8 raise to 7:**

**A screenshot of a calculator

Description automatically generated**

**But there are all zeros after the decimal ,Let’s delete all the extra zeros by DEL button**

**A screenshot of a calculator

Description automatically generated**

**Let’s look at the sine of 90**

**A screenshot of a calculator

Description automatically generated**

**But don’t forget to give the input first**

**A screenshot of a calculator

Description automatically generated**

**What would be the root of 27777?**

**A screenshot of a calculator

Description automatically generated**

**I forgot what is log of 1 , let’s check that out on our calculator**

**A screenshot of a calculator

Description automatically generated**

**Conclusion : Hence , our Java Mini project has been successfully implemented in java swing.**