St Francis Institute of Technology, Mumbai-400 103

Class: SE-ITA/ITB Semester: III; A.Y. 2020-2021
Subject: Java Labs

Title-9: Java Program to implement Event Handling using Swing Components.

1. **Aim:**
   i. Write a java program to store personal telephone directory in such a way that when user hits a character, the names which starts with the character and telephone numbers should appear.
   ii. Write a Java Program to simulate traffic signal light using AWT and Swing Components.

2. **Prerequisite:** Knowledge of AWT and Swing components in Java.

3. **Requirements:** Personal Computer (PC), Windows Operating System, Net beans 8.0.

4. **Pre-Experiment Exercise:**
   Theory:

   a. **Event and Listener:**
   Changing the state of an object is known as an event. For example, click on button, dragging mouse etc. The java.awt.event package provides many event classes and Listener interfaces for event handling.

   We can put the event handling code into one of the following places:

   1. Within class
   2. Other class
   3. Anonymous class

   b. **Registration Methods**
   - **Button**
     public void addActionListener(ActionListener a){}
   - **MenuItem**
     public void addActionListener(ActionListener a){}
   - **TextField**
     public void addActionListener(ActionListener a){}
     public void addTextListener(TextListener a){}
   - **TextArea**
     public void addTextListener(TextListener a){}
   - **Checkbox**
     public void addItemListener(ItemListener a){}
   - **Choice**

public void addItemListener(ItemListener a){}

- **List**

  public void addActionListener(ActionListener a){}
  public void addItemListener(ItemListener a){}

5. Laboratory Exercise

A. Procedure

i. Open Net beans for Java.
ii. Open File and Create New Java Project.
iii. Inside the Java Project rename give name to your Java Class.
iv. Click on Finish.
v. Type the Java Code in the opened class.
vi. Save the code by pressing Ctrl+S.
vii. Run the code by pressing Shift+F6.

B. Program code with comments:

Write and execute your program code to achieve the given aim and attach it **with your own comments with neat indentation**.

6. Post-Experiments Exercise

1. Extended Theory:

1. Explain the java Event classes and Listener Interfaces.

2. Results/Observations/Program output:

Present the program input/output results and comment on the same.

3. Questions/Programs:

1. Write a program to create a window with four text fields for the name, street, city and pincode with suitable labels. Also windows contains a button MyInfo. When the user types the name, his street, city and pincode and then clicks the button, the types details must appear in Arial Font with Size 32, Italics.

2. Conclusion:

1. Write what was performed in the experiment/program.
2. What is the significance of experiment/program?
3. Mention few applications of what was studied.

3. References

1. Balguruswamy, “Programming with java A primer”, Fifth edition, Tata McGraw Hill Publication.
2. Let Us Java-Yashwant Kanetkar.
3. Learn to Master JAVA, from Star EDU solutions , by ScriptDemics.
4. Java 8 Programming-Black Book,by-Dreamtech Publications.
5. www.programmingsimplified.com
6. www.javatpoint.com

Program 1:

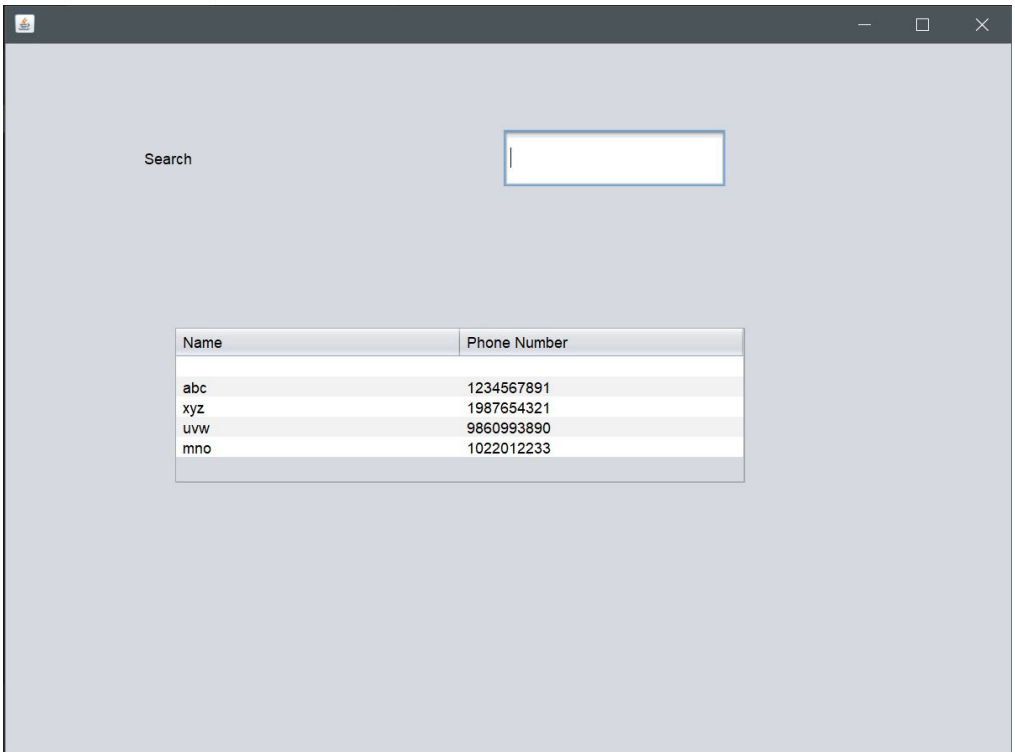
```
/*
Write a java program to store personal telephone directory in such a way that
when user hits a character, the names which starts with the character and
telephone numbers should appear.
*/

import javax.swing.RowFilter;
import javax.swing.table.DefaultTableModel;
import javax.swing.table.TableRowSorter;


public class telephone extends javax.swing.JFrame {

    private static final long serialVersionUID = 1L;

    public telephone() {
        initComponents();
    }

    private void initComponents() {

        search = new javax.swing.JLabel();
        tsearch = new javax.swing.JTextField();
        jScrollPane1 = new javax.swing.JScrollPane();
        dir = new javax.swing.JTable();

        setDefaultCloseOperation(javax.swing.WindowConstants.EXIT_ON_CLOSE);

        search.setText("Search");

        tsearch.addKeyListener(new java.awt.event.KeyAdapter() {
            public void keyReleased(java.awt.event.KeyEvent evt) {
                tsearchKeyReleased(evt);
            }
        });

        dir.setModel(new javax.swing.table.DefaultTableModel(
            new Object [][] {
```

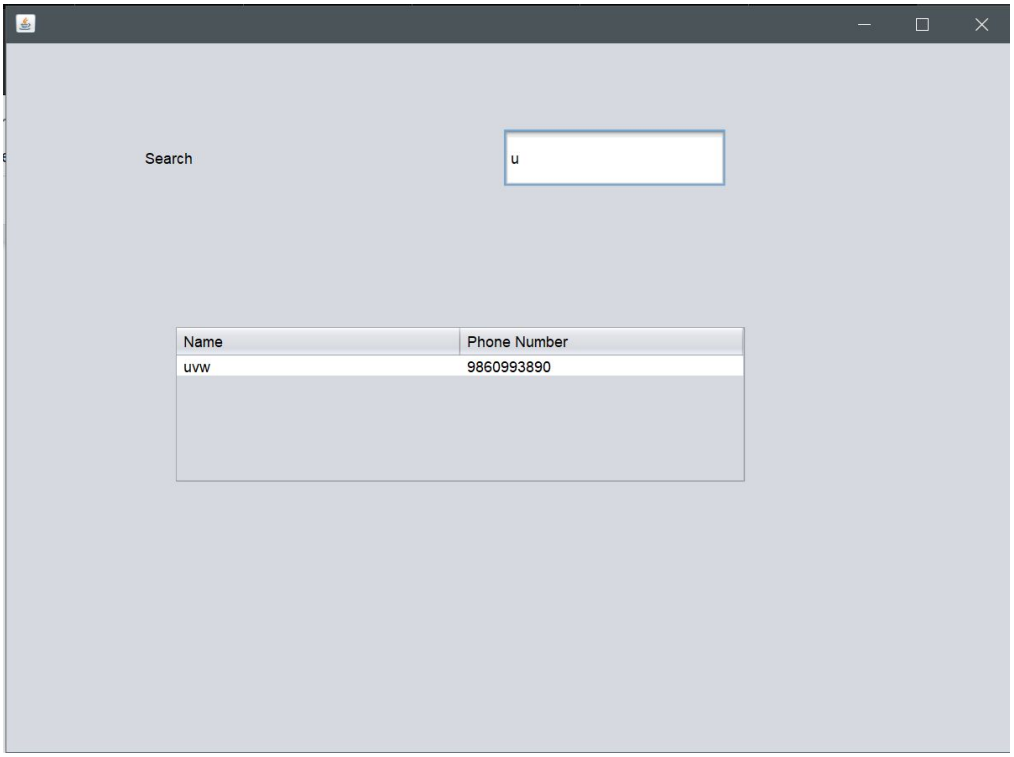
```
                {null, null},
                {"abc", "1234567891"},
                {"xyz", "1987654321"},
                {"uvw", "9860993890"},
                {"mno", "1022012233"}
            },
            new String [] {
                "Name", "Phone Number"
            }
        ));
        jScrollPane1.setViewportView(dir);

        javax.swing.GroupLayout layout = new
javax.swing.GroupLayout(getContentPane());
        getContentPane().setLayout(layout);
        layout.setHorizontalGroup(
            layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
            .addGroup(layout.createSequentialGroup()
                .addGap(110, 110, 110)
                .addComponent(search, javax.swing.GroupLayout.PREFERRED_SIZE,
102, javax.swing.GroupLayout.PREFERRED_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED, 183,
Short.MAX_VALUE)
                .addComponent(tsearch, javax.swing.GroupLayout.PREFERRED_SIZE,
177, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addGap(227, 227, 227))
            .addGroup(layout.createSequentialGroup()
                .addGap(133, 133, 133)
                .addComponent(jScrollPane1,
javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
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(68, 68, 68)
```

```
.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING,
false)
                    .addComponent(tsearch, javax.swing.GroupLayout.DEFAULT_SIZE,
46, Short.MAX_VALUE)
                    .addComponent(search, javax.swing.GroupLayout.DEFAULT_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE))

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED, 110,
Short.MAX_VALUE)
                .addComponent(jScrollPane1,
javax.swing.GroupLayout.PREFERRED_SIZE, 127,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addGap(214, 214, 214))
        );

        pack();
    }

    private void tsearchKeyReleased(java.awt.event.KeyEvent evt) {
        DefaultTableModel d=(DefaultTableModel)dir.getModel();
        String s=tsearch.getText();
        TableRowSorter<DefaultTableModel> tr=new
TableRowSorter<DefaultTableModel>(d);
        dir.setRowSorter(tr);
        tr.setRowFilter(RowFilter.regexFilter(s));

    }


    public static void main(String args[]) {
        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(telephone.class.getName()).log(java.util.loggi
ng.Level.SEVERE, null, ex);
        } catch (InstantiationException ex) {

java.util.logging.Logger.getLogger(telephone.class.getName()).log(java.util.loggi
ng.Level.SEVERE, null, ex);
        } catch (IllegalAccessException ex) {

java.util.logging.Logger.getLogger(telephone.class.getName()).log(java.util.loggi
ng.Level.SEVERE, null, ex);
        } catch (javax.swing.UnsupportedLookAndFeelException ex) {

java.util.logging.Logger.getLogger(telephone.class.getName()).log(java.util.loggi
ng.Level.SEVERE, null, ex);
        }


        /* Create and display the form */
        java.awt.EventQueue.invokeLater(new Runnable() {
            public void run() {
                new telephone().setVisible(true);
            }
        });
    }

    // Variables declaration - do not modify
    private javax.swing.JTable dir;
    private javax.swing.JScrollPane jScrollPane1;
    private javax.swing.JLabel search;
    private javax.swing.JTextField tsearch;
    // End of variables declaration
}
```

Output:


Search
Name
Phone Number
abc
1234567891
xyz
1987654321
uvw
9860993890
mno
1022012233


Search
u
Name
Phone Number
uvw
9860993890

Program 2:

Light.java

```
/*
Write a Java Program to simulate traffic signal light using AWT and Swing
Components.
*/
import java.awt.Color;
import java.awt.Graphics;
import javax.swing.JComponent;

public class Light extends JComponent{

    private static final long serialVersionUID = 1L;

    Color red = Color.red;
    Color yellow=Color.gray;
    Color green=Color.gray;
    String activelight="red";
    public void paintComponent(Graphics g){
        g.setColor(Color.yellow);
        g.fillRect(0, 0, 150, 250);
        g.setColor(Color.black);
        g.drawRect(0, 0, 150, 250);
        g.setColor(red);
        g.fillOval(50, 30, 50, 50);
        g.setColor(yellow);
        g.fillOval(50, 100, 50, 50);
        g.setColor(green);
        g.fillOval(50, 170, 50, 50);
    }
    public void changeColor(){
       red=Color.gray;
    yellow=Color.gray;
    green=Color.gray;
        if(activelight.equals("red"))
        {
            activelight="green";
            green=Color.green;
```

```
        }
        else if(activelight.equals("green"))
        {
            activelight="yellow";
            yellow=Color.orange;
        }
        else
        {
            activelight="red";
            red=Color.red;
        }
        repaint();
    }
}
```

LightPanel.java

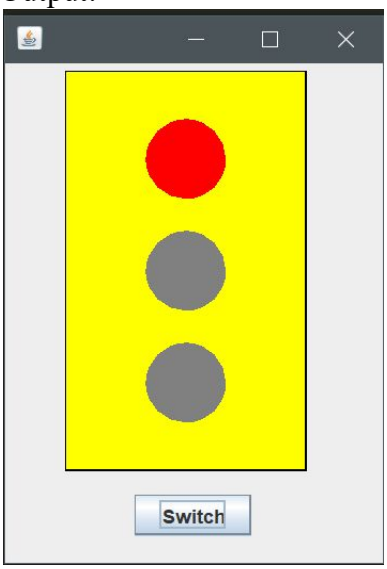
```
import java.awt.Dimension;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import javax.swing.JPanel;
import javax.swing.*;

public class LightPanel extends JPanel {

    private static final long serialVersionUID = 1L;
    Light l = new Light();
    public LightPanel(){
        JButton change=new JButton("Switch");
        l.setPreferredSize(new Dimension(160,260));
        buttonlistener bl=new buttonlistener();
        change.addActionListener(bl);
        add(l);
        add(change);
    }
    class buttonlistener implements ActionListener{
        @Override
        public void actionPerformed(ActionEvent e) {
            l.changeColor();
```

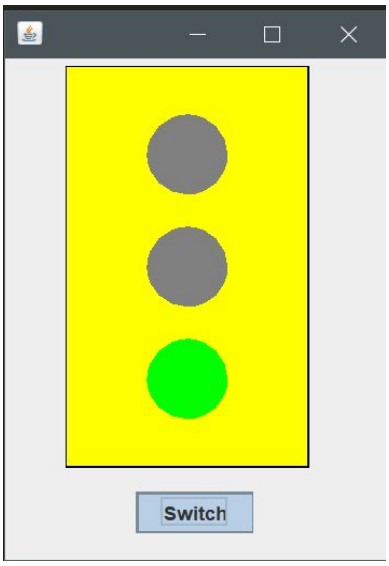
```
            throw new UnsupportedOperationException("Not supported yet."); //To
change body of generated methods, choose Tools | Templates.
        }
    }
}
```

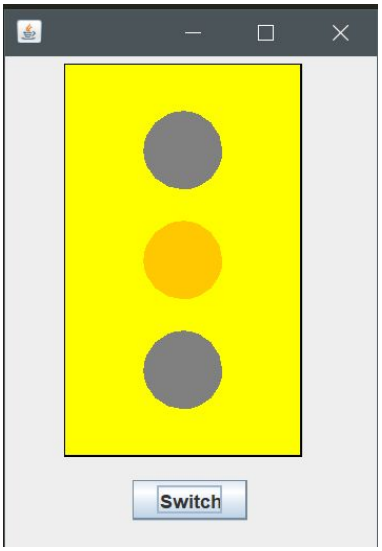
Traffic.java

```
import javax.swing.JFrame;
import javax.swing.*;

public class Traffic {
    public static void main(String[] args) {
        JFrame f=new JFrame();
        JPanel p=new LightPanel();
        f.add(p);
        f.setSize(250,350);
        f.setVisible(true);
        f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    }
}
```

Output:







Questions:

Question 1:

```
import java.awt.Font;
/**
1. Write a program to create a window with four text fields for the name, street, city
and pincode with suitable labels. Also windows contains a button MyInfo. When the user types the name, his street, city and pincode and then clicks the button, the types
details must appear in Arial Font with Size 32, Italics.
 */

public class Info extends javax.swing.JFrame {

    private static final long serialVersionUID = 1L;
    Font f = new Font("Arial", Font.BOLD, 32);

    public Info() {
        initComponents();
    }
    private void initComponents() {

        jLabel1 = new javax.swing.JLabel();
        jLabel2 = new javax.swing.JLabel();
        jLabel3 = new javax.swing.JLabel();
        jLabel4 = new javax.swing.JLabel();
        tname = new javax.swing.JTextField();
        tstreet = new javax.swing.JTextField();
        tcity = new javax.swing.JTextField();
        tpin = new javax.swing.JTextField();
        change = new javax.swing.JButton();
        reset = new javax.swing.JButton();

        setDefaultCloseOperation(javax.swing.WindowConstants.EXIT_ON_CLOSE);

        jLabel1.setText("Name");

        jLabel2.setText("Street");
```

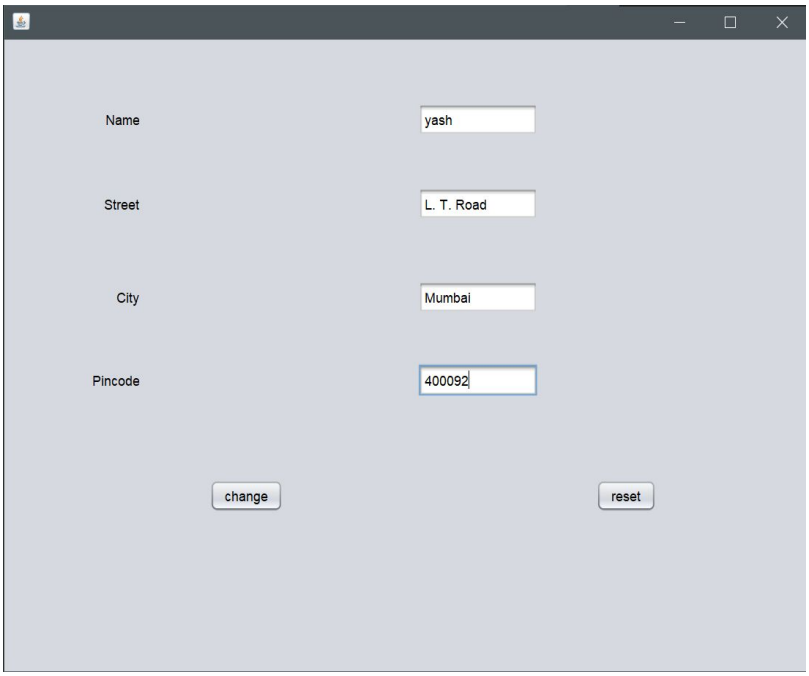
```
        jLabel3.setText("City");

        jLabel4.setText("Pincode");

        change.setText("change");
        change.addActionListener(new java.awt.event.ActionListener() {
            public void actionPerformed(java.awt.event.ActionEvent evt) {
                changeActionPerformed(evt);
            }
        });

        reset.setText("reset");
        reset.addActionListener(new java.awt.event.ActionListener() {
            public void actionPerformed(java.awt.event.ActionEvent evt) {
                resetActionPerformed(evt);
            }
        });

        javax.swing.GroupLayout layout = new
javax.swing.GroupLayout(getContentPane());
        getContentPane().setLayout(layout);
        layout.setHorizontalGroup(
            layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
            .addGroup(layout.createSequentialGroup()
                .addGap(80, 80, 80)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.TRAILING)
                    .addComponent(jLabel4)
                    .addComponent(jLabel3)
                    .addComponent(jLabel2)
                    .addComponent(jLabel1))

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED,
javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING,
false)
```

```
                    .addComponent(tname,
javax.swing.GroupLayout.Alignment.TRAILING, javax.swing.GroupLayout.DEFAULT_SIZE,
109, Short.MAX_VALUE)
                    .addComponent(tstreet,
javax.swing.GroupLayout.Alignment.TRAILING)
                    .addComponent(tcity,
javax.swing.GroupLayout.Alignment.TRAILING)
                    .addComponent(tpin,
javax.swing.GroupLayout.Alignment.TRAILING))
                .addGap(246, 246, 246))
            .addGroup(layout.createSequentialGroup()
                .addGap(187, 187, 187)
                .addComponent(change)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED, 285,
Short.MAX_VALUE)
                .addComponent(reset)
                .addGap(138, 138, 138))
        );
        layout.setVerticalGroup(
            layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
            .addGroup(layout.createSequentialGroup()
                .addGap(55, 55, 55)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                    .addComponent(jLabel1)
                    .addComponent(tname, javax.swing.GroupLayout.PREFERRED_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE))
                .addGap(45, 45, 45)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                    .addComponent(jLabel2)
                    .addComponent(tstreet,
javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
javax.swing.GroupLayout.PREFERRED_SIZE))
                .addGap(53, 53, 53)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                    .addComponent(jLabel3)
```

```
                    .addComponent(tcity, javax.swing.GroupLayout.PREFERRED_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE))
                .addGap(44, 44, 44)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                    .addComponent(jLabel4)
                    .addComponent(tpin, javax.swing.GroupLayout.PREFERRED_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE))
                .addGap(72, 72, 72)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                    .addComponent(change)
                    .addComponent(reset))
                .addContainerGap(139, Short.MAX_VALUE))
        );

        pack();
    }

    private void changeActionPerformed(java.awt.event.ActionEvent evt) {
           tname.setFont(f);
           tstreet.setFont(f);
           tcity.setFont(f);
           tpin.setFont(f);
    }

    private void resetActionPerformed(java.awt.event.ActionEvent evt) {
        tname.setText(" ");
        tstreet.setText(" ");
        tcity.setText(" ");
        tpin.setText(" ");
    }

    public static void main(String args[]) {
        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(Info.class.getName()).log(java.util.logging.Le
vel.SEVERE, null, ex);
        } catch (InstantiationException ex) {

java.util.logging.Logger.getLogger(Info.class.getName()).log(java.util.logging.Le
vel.SEVERE, null, ex);
        } catch (IllegalAccessException ex) {

java.util.logging.Logger.getLogger(Info.class.getName()).log(java.util.logging.Le
vel.SEVERE, null, ex);
        } catch (javax.swing.UnsupportedLookAndFeelException ex) {

java.util.logging.Logger.getLogger(Info.class.getName()).log(java.util.logging.Le
vel.SEVERE, null, ex);
        }

        /* Create and display the form */
        java.awt.EventQueue.invokeLater(new Runnable() {
            public void run() {
                new Info().setVisible(true);
            }
        });
    }
    private javax.swing.JButton change;
    private javax.swing.JLabel jLabel1;
    private javax.swing.JLabel jLabel2;
    private javax.swing.JLabel jLabel3;
    private javax.swing.JLabel jLabel4;
    private javax.swing.JButton reset;
    private javax.swing.JTextField tcity;
    private javax.swing.JTextField tname;
    private javax.swing.JTextField tpin;
    private javax.swing.JTextField tstreet;
}
```

Output:


Name
yash
Street
L. T. Road
City
Mumbai
Pincode
400092
change
reset


Name
yash
Street
L. T. Road
City
Mumbai
Pincode
400092
change
reset

Page No :
Date :

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6] Post - Experiment Exercise

A) Extended Theory :-

1) Explain java event class & listener interface
Changing the state of an object is known as an event. The event listener represents the interface responsible to handle events.
Java provides us various event listener classes but we will discuss those which are more frequently used.
Every method of the event listner has an single argument as an object which is subclass of Event Object class.
For eg, mouse event listener methods will accept instance of mouse event, where mouse event drives from Event Object.
Event listener Interface :-
It is a maker interface which every listener interface has to extend. This class is defined in java.util. package.
Following are the commonly used event listener :-
1) Action Listener :- This interface is used for recieving the action events.
2) Component Listener :- This interface is used for recieving the component events.
3) Item Listener :- This interface is used for recieving the item events.

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4) Key listener :- This interface is used for receiving the key events.

5) Mouse listener :- This interface is used for receiving the mouse events.

D) Conclusion :-

In this experiment we have implemented eventhandling using Swing components. We have written applications to study the how event handling is implemented in Swing.

Event handling in Java swing toolkit is very versitile & powerful. Java uses event delegation model.

All GUI based interface applications are event driven. Event handeling controls the event & decides what should happen if a particular event occurs.