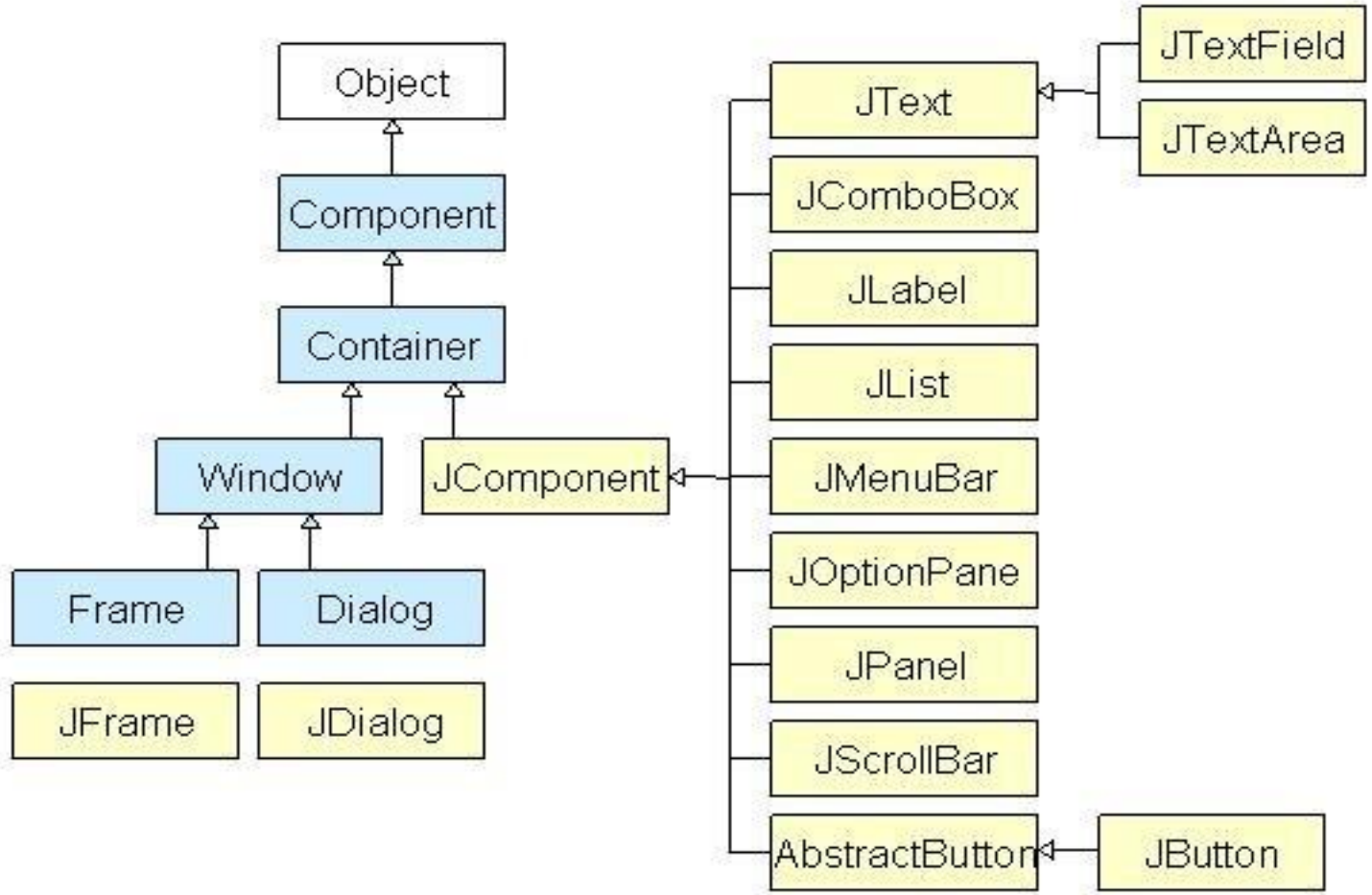
SWING COMPONENTS

What is Swing in Java?

- **Swing in Java** is a Graphical User Interface (GUI) toolkit that includes the GUI components.
- Swing provides a rich set of widgets and packages to make sophisticated GUI components for Java applications.
- Swing is a part of Java Foundation Classes(JFC), which is an API for Java GUI programing that provide GUI.
- The Java Swing library is built on top of the Java Abstract Widget Toolkit (**AWT**).
- All components in Java Swing are JComponent which can be added to container classes.

Java Swing class Hierarchy Diagram



What is a Container Class?

- Container classes are classes that can have other components on it.
- For creating a Java Swing GUI, we need at least one container object.

➢There are 3 types of Java Swing containers.

- **Panel**: It is a pure container and is not a window in itself. The sole purpose of a Panel is to organize the components on to a window.
- **Frame**: It is a fully functioning window with its title and icons.
- **Dialog**: It can be thought of like a pop-up window that pops out when a message has to be displayed. It is not a fully functioning window like the Frame.

What is GUI in Java?

- **GUI (Graphical User Interface) in Java** is an easy-to-use visual experience builder for Java applications.
- It is mainly made of graphical components like buttons, labels, windows, etc. through which the user can interact with an application.
- GUI plays an important role to build easy interfaces for Java applications.

Difference between AWT and Swing

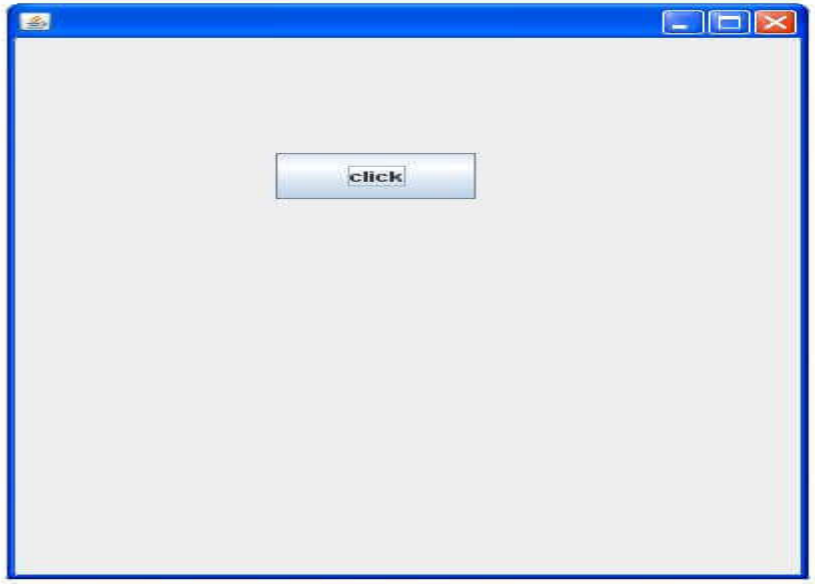
No.	Java AWT	Java Swing
1)	AWT components are **platform-dependent**.	Java swing components are **platform-independent**.
2)	AWT components are **heavyweight**.	Swing components are **lightweight**.
3)	AWT **doesn't support pluggable look and feel**.	Swing **supports pluggable look and feel**.
4)	AWT provides **less components** than Swing.	Swing provides **more powerful components** such as tables, lists, scrollpanes, colorchooser, tabbedpane etc.
5)	AWT **doesn't follows MVC**(Model View Controller) where model represents data, view represents presentation and controller acts as an interface between model and view.	Swing **follows MVC**.

Commonly used Methods of Component class

Method	Description
public void add(Component c)	add a component on another component.
public void setSize(int width,int height)	sets size of the component.
public void setLayout(LayoutManager m)	sets the layout manager for the component.
public void setVisible(boolean b)	sets the visibility of the component. It is by default false.

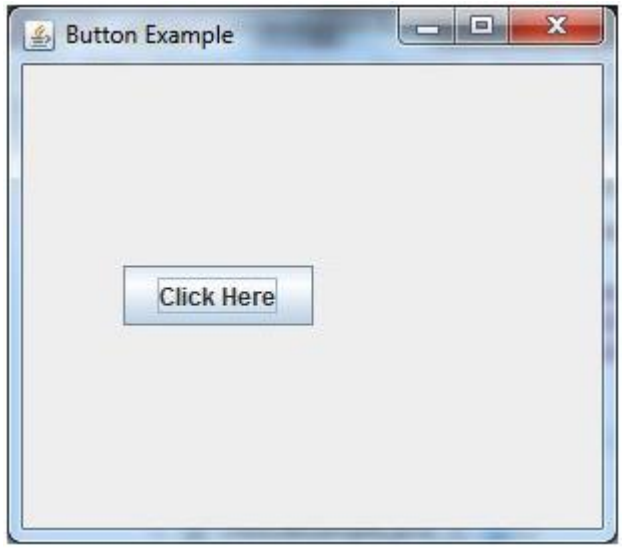
FirstSwingExample.java

```
import javax.swing.*;
public class FirstSwingExample {
public static void main(String[] args) {
JFrame f=new JFrame();//creating instance of JFrame

JButton b=new JButton("click");//creating instance of JButton
b.setBounds(130,100,100, 40);//x axis, y axis, width, height

f.add(b);//adding button in JFrame

f.setSize(400,500);//400 width and 500 height
f.setLayout(null);//using no layout managers
f.setVisible(true);//making the frame visible
}
}
```



Java JButton Example

```
import javax.swing.*;
public class ButtonExample {
public static void main(String[] args) {
    JFrame f=new JFrame("Button Example");
    JButton b=new JButton("Click Here");
    b.setBounds(50,100,95,30);
    f.add(b);
    f.setSize(400,400);
    f.setLayout(null);
    f.setVisible(true);
}
}
```



Java JButton Example with ActionListener

```
import java.awt.event.*;
import javax.swing.*;
public class ButtonExample {
public static void main(String[] args) {

    JFrame f=new JFrame("Button Example");
    final JTextField tf=new JTextField();
    tf.setBounds(50,50, 150,20);
    JButton b=new JButton("Click Here");
    b.setBounds(50,100,95,30);
    b.addActionListener(new ActionListener(){
public void actionPerformed(ActionEvent e){
            tf.setText("Welcome to Javatpoint.");
        }
    });
    f.add(b);f.add(tf);
    f.setSize(400,400);
    f.setLayout(null);
    f.setVisible(true);
}
}
```

Example of displaying image on the button:

```
import javax.swing.*;
public class ButtonExample{
ButtonExample(){
JFrame f=new JFrame("Button Example");
JButton b=new JButton(new ImageIcon("D:\\icon.png"));
b.setBounds(100,100,100, 40);
f.add(b);
f.setSize(300,400);
f.setLayout(null);
f.setVisible(true);
f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    }
public static void main(String[] args) {
    new ButtonExample();
}
}
```

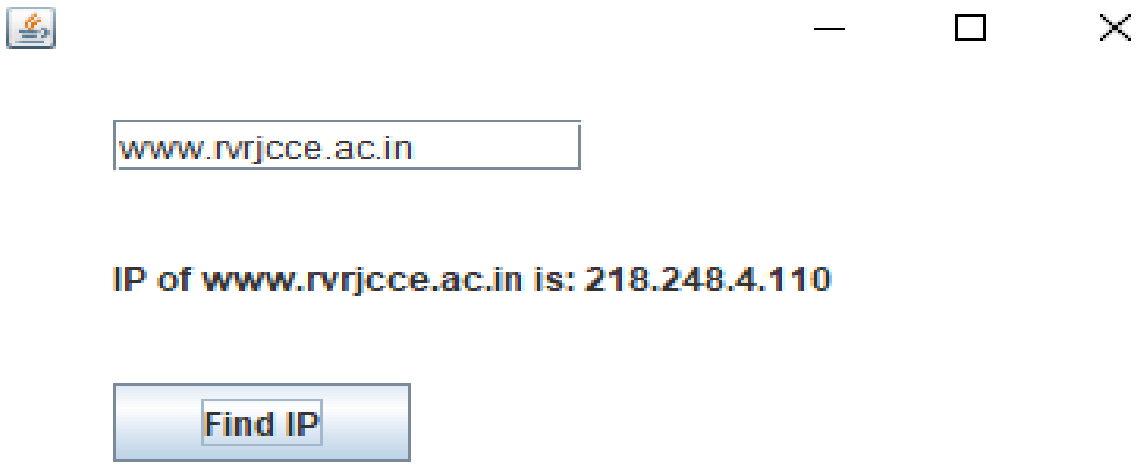
Java JLabel Example

```
import javax.swing.*;
class LabelExample
{
public static void main(String args[])
   {
   JFrame f= new JFrame("Label Example");
   JLabel l1,l2;
   l1=new JLabel("First Label.");
   l1.setBounds(50,50, 100,30);
   l2=new JLabel("Second Label.");
   l2.setBounds(50,100, 100,30);
   f.add(l1); f.add(l2);
   f.setSize(300,300);
   f.setLayout(null);
   f.setVisible(true);
   }
   }
```

Java JLabel Example with ActionListener

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
public class LabelExample extends Frame implements ActionListener{
    JTextField tf; JLabel l; JButton b;
    LabelExample(){
        tf=new JTextField();
        tf.setBounds(50,50, 150,20);
        l=new JLabel();
        l.setBounds(50,100, 250,20);
        b=new JButton("Find IP");
        b.setBounds(50,150,95,30);
        b.addActionListener(this);
        add(b);add(tf);add(l);
        setSize(400,400);
        setLayout(null);
        setVisible(true);
    }
    public void actionPerformed(ActionEvent e) {
        try{
        String host=tf.getText();
        String ip=java.net.InetAddress.getByName(host).getHostAddress();
        l.setText("IP of "+host+" is: "+ip);
        }catch(Exception ex){System.out.println(ex);}
    }
    public static void main(String[] args) {
        new LabelExample();
    } }
```

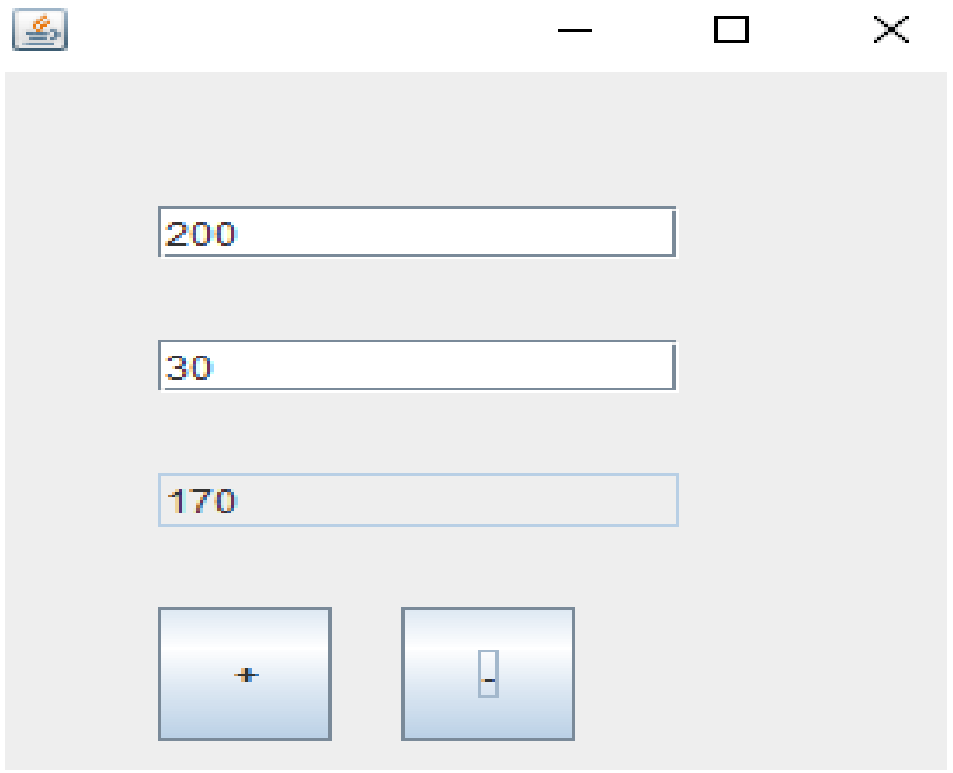
output


www.rvrjcce.ac.in
IP of www.rvrjcce.ac.in is: 218.248.4.110
Find IP

Java JTextField Example with ActionListener

```
import javax.swing.*;
import java.awt.event.*;
public class TextFieldExample implements ActionListener{
   JTextField tf1,tf2,tf3;
   JButton b1,b2;
   TextFieldExample(){
      JFrame f= new JFrame();
      tf1=new JTextField();
      tf1.setBounds(50,50,150,20);
      tf2=new JTextField();
      tf2.setBounds(50,100,150,20);
      tf3=new JTextField();
      tf3.setBounds(50,150,150,20);
      tf3.setEditable(false);
      b1=new JButton("+");
      b1.setBounds(50,200,50,50);
      b2=new JButton("-");
      b2.setBounds(120,200,50,50);
      b1.addActionListener(this);
      b2.addActionListener(this);
      f.add(tf1);f.add(tf2);f.add(tf3);f.add(b1);f.add(b2);
      f.setSize(300,300);
      f.setLayout(null);
      f.setVisible(true);
   }
   public void actionPerformed(ActionEvent e) {
      String s1=tf1.getText();
      String s2=tf2.getText();
      int a=Integer.parseInt(s1);
      int b=Integer.parseInt(s2);
      int c=0;
      if(e.getSource()==b1){
         c=a+b;
      }else if(e.getSource()==b2){
         c=a-b;
      }
      String result=String.valueOf(c);
      tf3.setText(result);
   }
public static void main(String[] args) {
   new TextFieldExample();
} }
```

output



Java JComboBox

- The object of Choice class is used to show popup menu of choices.
- Choice selected by user is shown on the top of a menu.
- It inherits JComponent class.

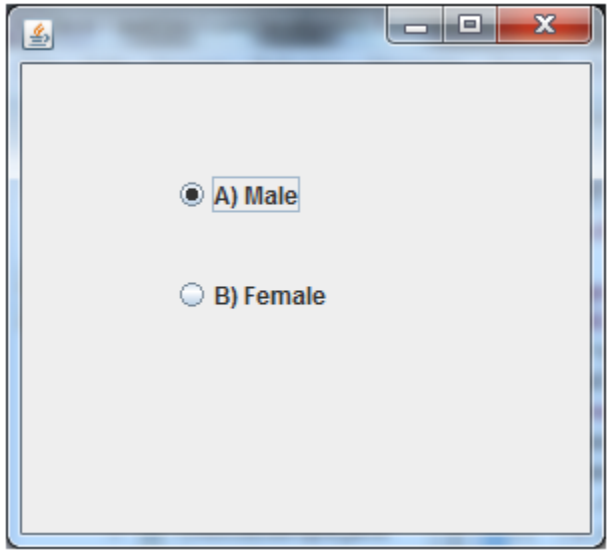
Java JComboBox Example

```
import javax.swing.*;
public class ComboBoxExample {
JFrame f;
ComboBoxExample(){
    f=new JFrame("ComboBox Example");
    String country[]={"India","Aus","U.S.A","England","Newzealand"};
    JComboBox cb=new JComboBox(country);
    cb.setBounds(50, 50,90,20);
    f.add(cb);
    f.setLayout(null);
    f.setSize(400,500);
    f.setVisible(true);
}
public static void main(String[] args) {
    new ComboBoxExample();
}
}
```

Java JRadioButton Example

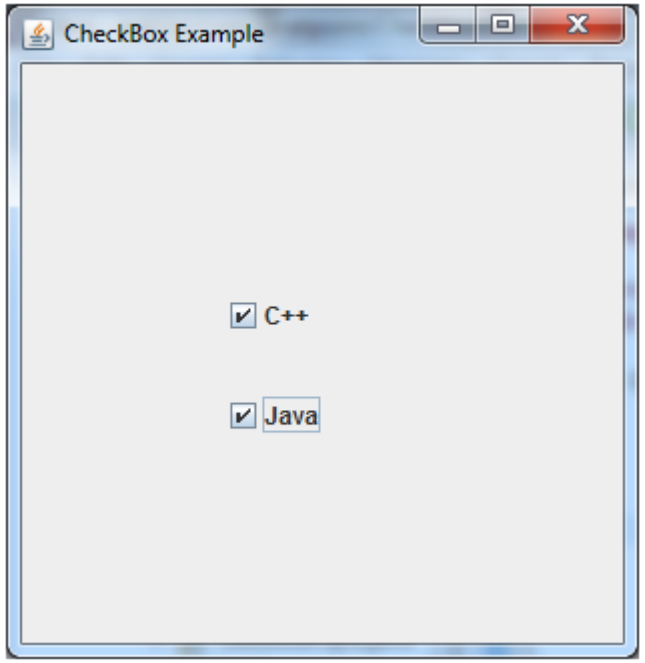
```
import javax.swing.*;
public class RadioButtonExample {
JFrame f;
RadioButtonExample(){
f=new JFrame();
JRadioButton r1=new JRadioButton("
A) Male");
JRadioButton r2=new JRadioButton("B
) Female");
r1.setBounds(75,50,100,30);
r2.setBounds(75,100,100,30);
ButtonGroup bg=new ButtonGroup();
bg.add(r1);bg.add(r2);
f.add(r1);f.add(r2);
f.setSize(300,300);
f.setLayout(null);
f.setVisible(true);
}
public static void main(String[] args) {

    new RadioButtonExample();
}
}
```

output



Java JCheckBox

```
import javax.swing.*;
public class CheckBoxExample
{
    CheckBoxExample(){
        JFrame f= new JFrame("CheckBox Example");
        JCheckBox checkBox1 = new JCheckBox("C++");
        checkBox1.setBounds(100,100, 50,50);
        JCheckBox checkBox2 = new JCheckBox("Java", tru
e);
        checkBox2.setBounds(100,150, 50,50);
        f.add(checkBox1);
        f.add(checkBox2);
        f.setSize(400,400);
        f.setLayout(null);
        f.setVisible(true);
    }
public static void main(String args[])
    {
    new CheckBoxExample();
    }}
```

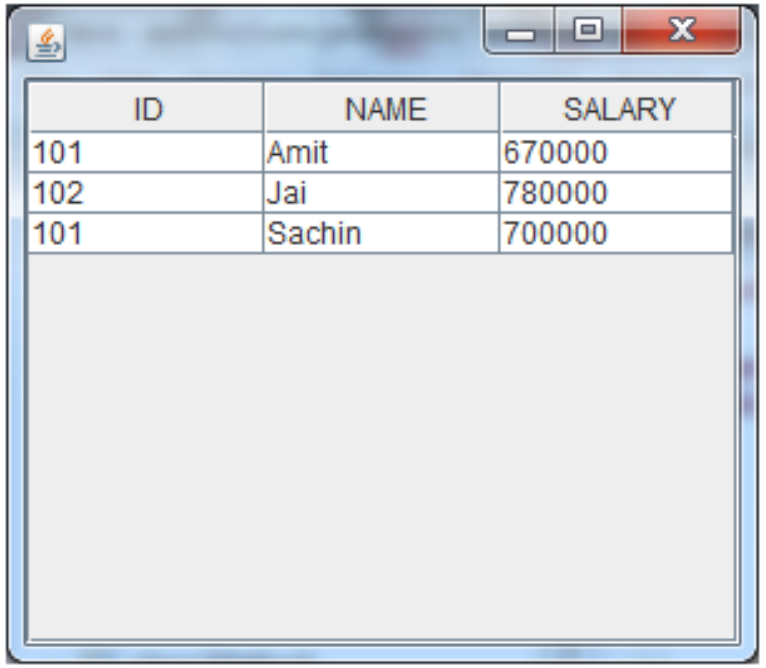


Java JTable

- The JTable class is used to display data in tabular form. It is composed of rows and columns.

Java JTable Example

```
import javax.swing.*;
public class TableExample {
    JFrame f;
    TableExample(){
    f=new JFrame();
    String data[][]={ {"101","Amit","670000"},
                      {"102","Jai","780000"},
                      {"101","Sachin","700000"}};
    String column[]={"ID","NAME","SALARY"};
    JTable jt=new JTable(data,column);
    jt.setBounds(30,40,200,300);
    JScrollPane sp=new JScrollPane(jt);
    f.add(sp);
    f.setSize(300,400);
    f.setVisible(true);
}
public static void main(String[] args) {
    new TableExample();
}
}
```



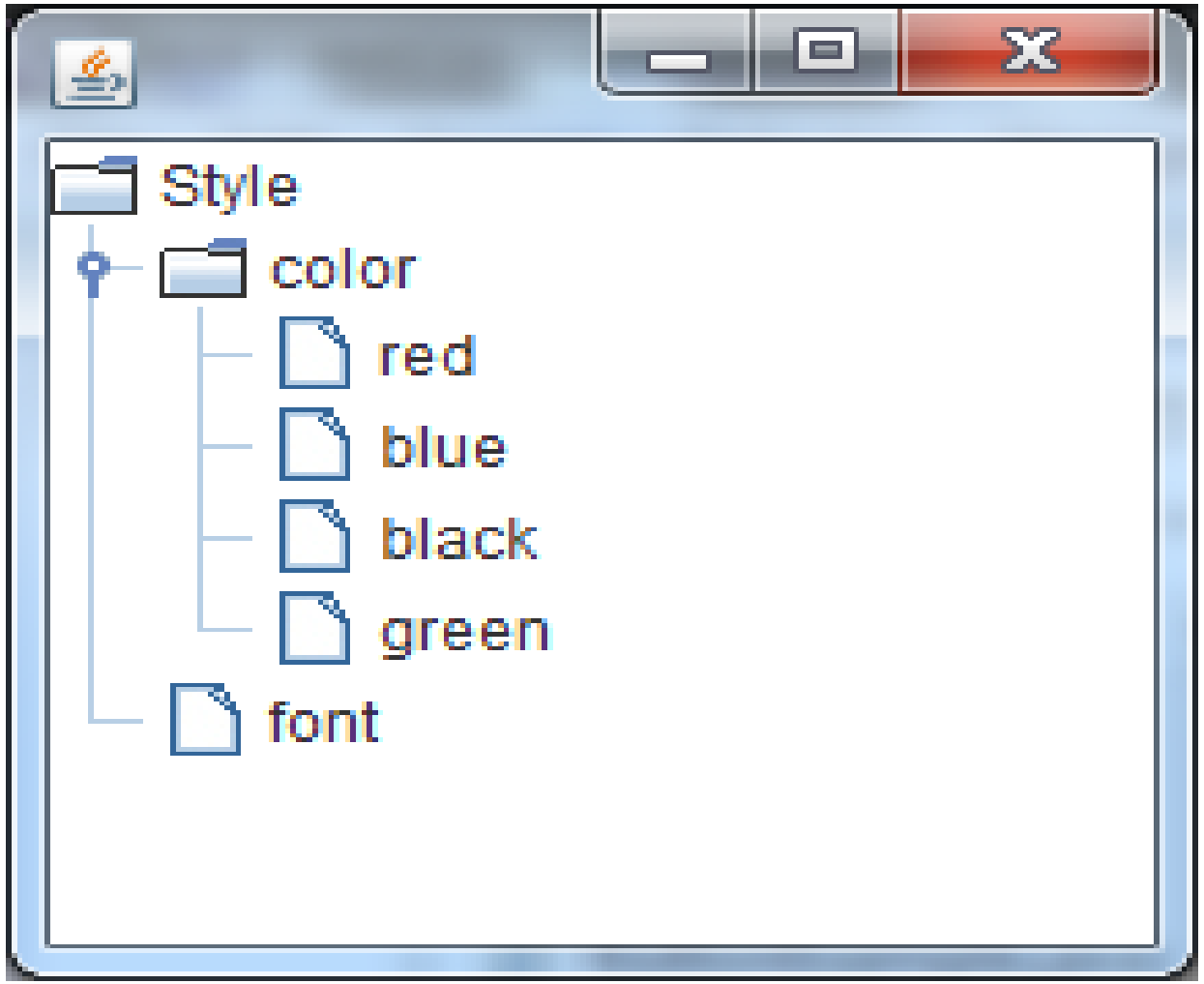
Java JTree

- The JTree class is used to display the tree structured data or hierarchical data.
- JTree is a complex component.
- It has a 'root node' at the top most which is a parent for all nodes in the tree.
- It inherits JComponent class.

Java JTree Example

```
import javax.swing.*;
import javax.swing.tree.DefaultMutableTreeNode;
public class TreeExample {
JFrame f;
TreeExample(){
    f=new JFrame();
    DefaultMutableTreeNode style=new DefaultMutableTreeNode("Style");
    DefaultMutableTreeNode color=new DefaultMutableTreeNode("color");
    DefaultMutableTreeNode font=new DefaultMutableTreeNode("font");
    style.add(color);
    style.add(font);
    DefaultMutableTreeNode red=new DefaultMutableTreeNode("red");
    DefaultMutableTreeNode blue=new DefaultMutableTreeNode("blue");
    DefaultMutableTreeNode black=new DefaultMutableTreeNode("black");
    DefaultMutableTreeNode green=new DefaultMutableTreeNode("green");
    color.add(red); color.add(blue); color.add(black); color.add(green);
    JTree jt=new JTree(style);
    f.add(jt);
    f.setSize(200,200);
    f.setVisible(true);
}
public static void main(String[] args) {
    new TreeExample();
}}
```

output

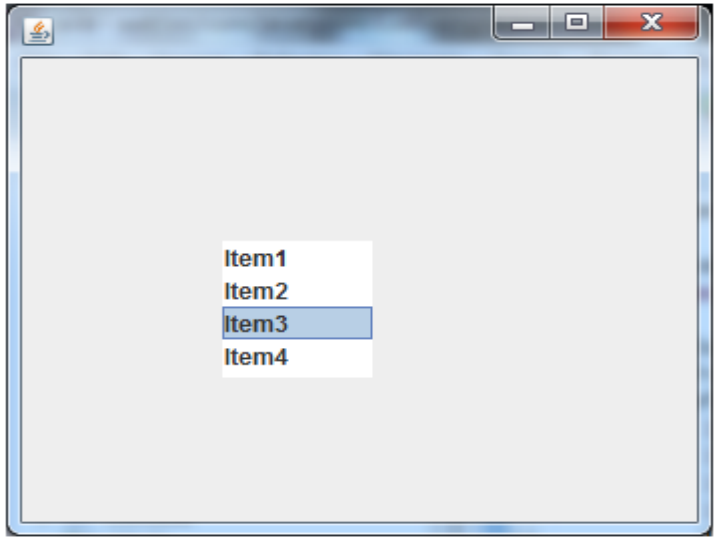


Java JList

- The object of JList class represents a list of text items.
- The list of text items can be set up so that the user can choose either one item or multiple items.
- It inherits JComponent class.

Java JList Example

```
import javax.swing.*;
public class ListExample
{
    ListExample(){
      JFrame f= new JFrame();
      DefaultListModel<String> l1 = new DefaultListMod
el<>();
        l1.addElement("Item1");
        l1.addElement("Item2");
        l1.addElement("Item3");
        l1.addElement("Item4");
        JList<String> list = new JList<>(l1);
        list.setBounds(100,100, 75,75);
        f.add(list);
        f.setSize(400,400);
        f.setLayout(null);
        f.setVisible(true);
    }
public static void main(String args[])
    {
  new ListExample();
 }}
```



Java JOptionPane

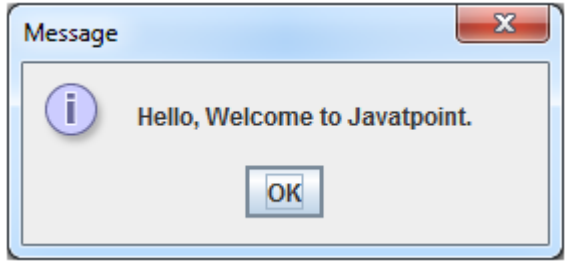
- The JOptionPane class is used to provide standard dialog boxes such as message dialog box, confirm dialog box and input dialog box.
- These dialog boxes are used to display information or get input from the user.
- The JOptionPane class inherits JComponent class.

Common Methods of JOptionPane class

Methods	Description
JDialog createDialog(String title)	It is used to create and return a new parentless JDialog with the specified title.
static void showMessageDialog(Component parentComponent, Object message)	It is used to create an information-message dialog titled "Message".
static void showMessageDialog(Component parentComponent, Object message, String title, int messageType)	It is used to create a message dialog with given title and messageType.
static int showConfirmDialog(Component parentComponent, Object message)	It is used to create a dialog with the options Yes, No and Cancel; with the title, Select an Option.
static String showInputDialog(Component parentComponent, Object message)	It is used to show a question-message dialog requesting input from the user parented to parentComponent.
void setInputValue(Object newValue)	It is used to set the input value that was selected or input by the user.

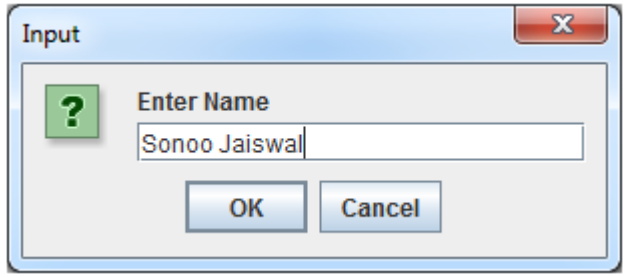
Java JOptionPane Example: showMessageDialog()

```
import javax.swing.*;
public class OptionPaneExample {
JFrame f;
OptionPaneExample(){
    f=new JFrame();
    JOptionPane.showMessageDialog(f,"Hello, Welcome to Javatpoint.");
}
public static void main(String[] args) {
    new OptionPaneExample();
}
}
```



Java JOptionPane Example: showInputDialog()

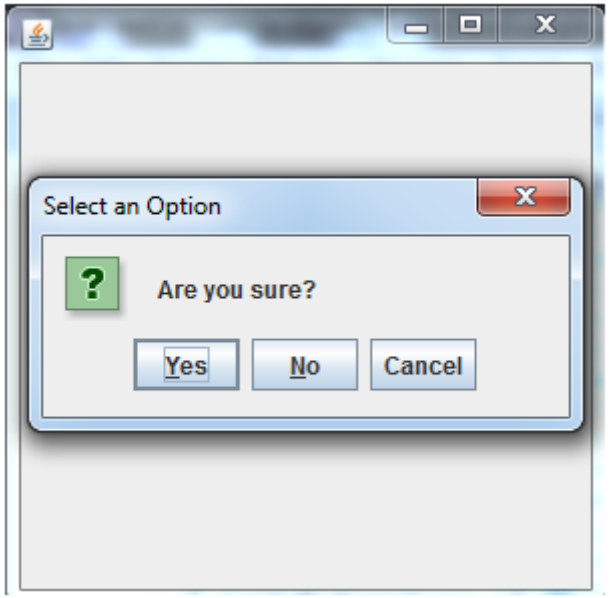
```
import javax.swing.*;
public class OptionPaneExample {
JFrame f;
OptionPaneExample(){
    f=new JFrame();
    String name=JOptionPane.showInputDialog(f,"Enter Name");
}
public static void main(String[] args) {
    new OptionPaneExample();
}
}
```



Java JOptionPane Example: showConfirmDialog()

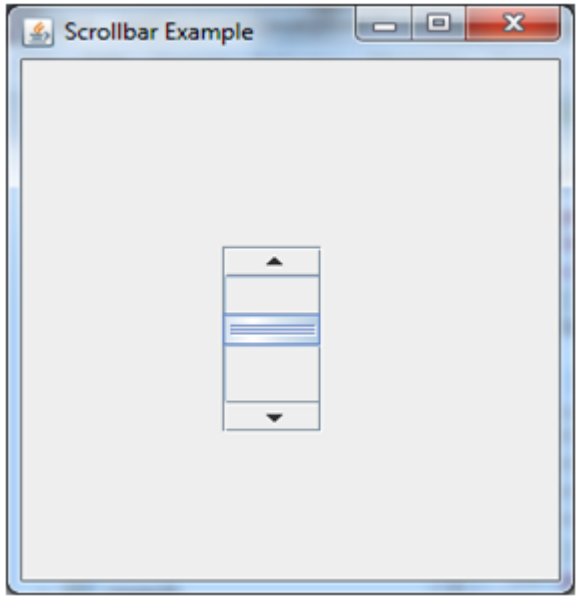
```
import javax.swing.*;
import java.awt.event.*;
public class OptionPaneExample extends WindowAdapter{
JFrame f;
OptionPaneExample(){
    f=new JFrame();
    f.addWindowListener(this);
    f.setSize(300, 300);
    f.setLayout(null);
    f.setDefaultCloseOperation(JFrame.DO_NOTHING_ON_CLOSE);
    f.setVisible(true);
}
public void windowClosing(WindowEvent e) {

    int a=JOptionPane.showConfirmDialog(f,"Are you sure?");
if(a==JOptionPane.YES_OPTION){
    f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
}
}
public static void main(String[] args) {
    new  OptionPaneExample();
}
}
```

output



Java JScrollBar Example

```
import javax.swing.*;
class ScrollBarExample
{
ScrollBarExample(){
    JFrame f= new JFrame("Scrollbar Example");
 JScrollBar s=new JScrollBar();
s.setBounds(100,100, 50,100);
f.add(s);
f.setSize(400,400);
f.setLayout(null);
f.setVisible(true);
}
public static void main(String args[])
{
new ScrollBarExample();
}}
```



Java JTabbedPane

- The JTabbedPane class is used to switch between a group of components by clicking on a tab with a given title or icon.
- It inherits JComponent class

Java JTabbedPane Example

```
import javax.swing.*;
public class TabbedPaneExample {
JFrame f;
TabbedPaneExample(){
    f=new JFrame();
    JTextArea ta=new JTextArea(200,200);
    JPanel p1=new JPanel();
    p1.add(ta);
    JPanel p2=new JPanel();
    JPanel p3=new JPanel();
    JTabbedPane tp=new JTabbedPane();
    tp.setBounds(50,50,200,200);
    tp.add("main",p1);
    tp.add("visit",p2);
    tp.add("help",p3);
    f.add(tp);
    f.setSize(400,400);
    f.setLayout(null);
    f.setVisible(true);
}
public static void main(String[] args) {
    new TabbedPaneExample();
}}
```

output