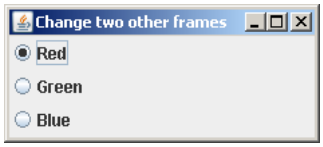
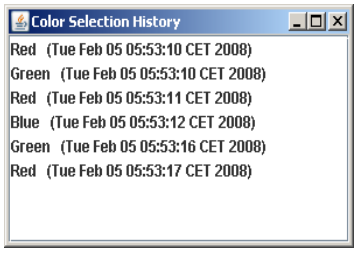
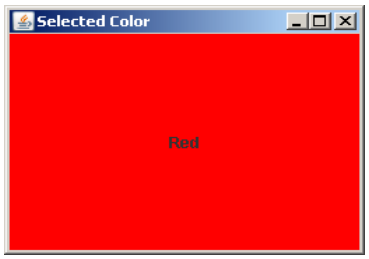
Name:_____**Registration-Nb.:**_____

Task 1 Design Pattern

Following screenshots show the result of an executed program – code attached







1.a Which Design Pattern was used? **[1 Point]**

1.b Design a UML-Diagram describing this system.
Which class takes which role? **[3 points]**

```
//-------------------------------------------------------------------------
// Remark: This code was originally developed by Volker Wurst
//-------------------------------------------------------------------------

import java.util.Observable;
import java.util.Vector;

public class ValidColors extends Observable {

     private Vector<String> colors = new Vector<String>();

     public Vector<String> getColors() {
          return colors;
     }

     public void setColors(Vector<String> colors) {
          this.colors = colors;
          select(colors.firstElement());
     }

     public void addColor(String colorname) {
          this.colors.add(colorname);
          select(colorname);
     }

     public void select(String colorname) {
          setChanged();
          notifyObservers(colorname);
     }

}
```


```
//---------------------------------------------------------------------
import java.awt.*;
import java.awt.event.*;
import java.util.Iterator;
import javax.swing.*;

public class Watch2Lists extends JFrame implements ItemListener {
     private static final long serialVersionUID = 1L;
     ValidColors colors = new ValidColors();

     public Watch2Lists() {
          super("Change two other frames");
          colors.addColor("Red");
          colors.addColor("Green");
          colors.addColor("Blue");

          JPanel p = new JPanel(true);
          p.setLayout(new BorderLayout());
          getContentPane().add("Center", p);
          Box box = new Box(BoxLayout.Y_AXIS);
          p.add("Center", box);

          ButtonGroup bgr = new ButtonGroup();
          Iterator<String> elements = colors.getColors().iterator();
          while (elements.hasNext()) {
               JRadioButton button;
               box.add(button = new JRadioButton((String) elements.next()));
               button.addItemListener(this);
               bgr.add(button);
          }

          WindowListener l = new WindowAdapter() {
               public void windowClosing(WindowEvent e) {
                    System.exit(0);
               }
          };
          addWindowListener(l);

          setBounds(150, 250, 100, 100);
          setVisible(true);
     }

     public void itemStateChanged(ItemEvent e) {
          if (e.getStateChange() == ItemEvent.SELECTED)
               colors.select(((JRadioButton) e.getSource()).getText());
          }

     public ValidColors getSubject() {
          return colors;
     }

     public static void main(String[] args) {
          Watch2Lists main = new Watch2Lists();     // Create window for Subject
          ValidColors subjectcolors = main.getSubject();   // Get the subject
          new ColorFrame(subjectcolors);         // Create visualization Observer
          new ListFrame(subjectcolors);          // Create textual Observer
     }
}
```


```
//---------------------------------------------------------------------
import java.awt.*;
import javax.swing.*;
import java.util.Observable;
import java.util.Observer;


public class ColorFrame extends JFrame implements Observer {

     private static final long serialVersionUID = 1L;
     Color color;
     String color_name;
     JPanel p;
     JLabel l;

     public ColorFrame(ValidColors colors) {
          super("Selected Color");

          setBounds(100, 100, 100, 100);
          getContentPane().setBackground(Color.gray);
          setVisible(true);

          l = new JLabel(color_name,JLabel.CENTER);
          getContentPane().add(l);

          colors.addObserver(this);
     }

     public void update(Observable o, Object arg) {

          color_name = (String) arg;
          if (color_name.toUpperCase().equals("RED"))
               color = Color.red;
          if (color_name.toUpperCase().equals("BLUE"))
               color = Color.blue;
          if (color_name.toUpperCase().equals("GREEN"))
               color = Color.green;

          getContentPane().setBackground(color);
          l.setText(color_name);
     }
}
```

```
//---------------------------------------------------------------------
import java.awt.*;
import java.util.Date;
import java.util.Observable;
import java.util.Observer;
import java.util.Vector;

import javax.swing.*;

public class ListFrame extends JFrame implements Observer {

     private static final long serialVersionUID = 1L;
     JList list;
     JPanel p;
     JScrollPane lsp;
     Vector<String> listData;

     public ListFrame(ValidColors colors) {
          super("Color Selection History");

          p = new JPanel(true);
          getContentPane().add("Center", p);
          p.setLayout(new BorderLayout());

          listData = new Vector<String>();
          list = new JList(listData);
          lsp = new JScrollPane();
          lsp.getViewport().add(list);

          p.add("Center", lsp);
          setBounds(250, 100, 300, 100);
          setVisible(true);

          colors.addObserver(this);
     }

     public void update(Observable o, Object arg) {
          listData.addElement(
               (String) arg + "   (" + new Date().toString() + ")");
          list.setListData( listData );
          lsp.revalidate();
          lsp.repaint();
     }
}
```