```
                // Program written in java

                    /*--------cell_main.java--------*/

package cellphone_simulation;
import javax.swing.JFrame;
public class Cell_main
{
// mobile method that calls phone_display class and applet is started

 public static void mobile()
   {
            JFrame frame = new JFrame("Mobile_display");        // using JFrame to display the applet
            frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
            phone_display newContentPane = new phone_display();
            newContentPane.setOpaque(true);                     //content panes must be opaque
            frame.setContentPane(newContentPane);
            frame.setSize(250,400);                              //applet frame size
            frame.setResizable(false);                          // applet frame size
            frame.setLocation(10,10);                           // applet frame size
            frame.setVisible(true);                             // applet frame size
   }

// main class to run thread

public static void main(String[] args)
{
      javax.swing.SwingUtilities.invokeLater(new Runnable()
       {
                    public void run()
                      {
                        mobile();       // calling method mobile
                      }
                 });
             }
}
```

/*-------- phone_display.java--------*/

```java
package cellphone_simulation;
import javax.swing.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.awt.*;

public class phone_display extends JPanel implements ActionListener
{

//buttons
            JButton zero, one, two,three,four,five,six,seven,eight,nine,star, hash , erase , call ,  backspace;
            JTextField screen , screen1 , screen2;          //   textArea
            String str_phonenumber="";
            Thread thread_hang;

// Cellphone Display model

   public phone_display()
         {
//   Creation of TextArea

            screen = new JTextField(100);
            screen.setBorder(BorderFactory.createEmptyBorder(5, 5, 5, 5));
            add(screen);
            screen1 = new JTextField(100);
            screen1.setBorder(BorderFactory.createEmptyBorder(5, 5, 5, 5));
            add(screen1);
            screen2 = new JTextField(100);
            setBorder(BorderFactory.createEmptyBorder(5, 5, 5, 5));
            add(screen2);

//  layout

            setLayout(new GridLayout(6,3));

// Creation of buttons

//------   ONE BUTTON ----------//
            one = new JButton("1");
            one.setActionCommand("b_one");
            add(one);

//------   TWO BUTTON ----------//
            two = new JButton("2");
```

```java
                two.setActionCommand("b_two");
                add(two);


//------ THREE BUTTON ----------//
                three = new JButton("3");
                three.setActionCommand("b_three");
                add(three);


//------ FOUR BUTTON ----------//
                four = new JButton("4");
                four.setActionCommand("b_four");
                add(four);


//------  FIVE BUTTON ----------//
                five = new JButton("5");
                five.setActionCommand("b_five");
                add(five);


//------  SIX BUTTON ----------//
                six = new JButton("6");
                six.setActionCommand("b_six");
                add(six);


//------ SEVEN BUTTON ----------//
                seven = new JButton("7");
                seven.setActionCommand("b_seven");
                add(seven);


//------  EIGHT BUTTON ----------//
                eight = new JButton("8");
                eight.setActionCommand("b_eight");
                add(eight);


//------ NINE BUTTON ----------//
                nine = new JButton("9");
                nine.setActionCommand("b_nine");
                add(nine);


//------ STAR BUTTON ----------//
                star = new JButton("*");
                star.setActionCommand("b_star");
                add(star);


//------ ZERO BUTTON ----------//
                zero = new JButton("0");
                zero.setActionCommand("b_zero");
```

```java
                add(zero);

//------  HASH BUTTON ----------//
                hash = new JButton("#");
                hash.setActionCommand("b_hash");
                add(hash);

//------  ERASE BUTTON ----------//
                erase = new JButton("Erase");
                erase.setActionCommand("b_erase");
                add(erase);

//------  CALL BUTTON ----------//
                call = new JButton("Call");
                call.setActionCommand("b_call");
                add(call);

//------  BACKSPACE BUTTON ----------//
                backspace = new JButton("<=");
                backspace.setActionCommand("b_backspace");
                add(backspace);

//------ CREATION OF ACTIONlISTENER TO BUTTONS ----------//
                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);
                star.addActionListener(this);
                zero.addActionListener(this);
                hash.addActionListener(this);
                erase.addActionListener(this);
                call.addActionListener(this);
                backspace.addActionListener(this);
        }

 public void actionPerformed(ActionEvent e)
        {
//method for erase button to erase everything from the screen

                if ("b_erase".equals(e.getActionCommand()))
                    {
```

```java
                                    screen.removeAll();
                                    screen.setText("");
                        }
// method for backspace

 if ("b_backspace".equals(e.getActionCommand()))
        {
         if (str_phonenumber != null && str_phonenumber.length() > 0 )
                {
                        str_phonenumber = str_phonenumber.substring(0,str_phonenumber.length()-1);
                         screen.removeAll();
                         screen.setText(str_phonenumber);
                }
                          else
                             {
                                        screen.removeAll();
                                        screen.setText("");
                             }
                       }

// method for button one

                        if ("b_one".equals(e.getActionCommand()))
                        {
                                        screen.removeAll();
                                        str_phonenumber= screen.getText() + "1";
                                        screen.setText(formatting());
                        }

// method for button two

                        if ("b_two".equals(e.getActionCommand()))
                        {
                                        screen.removeAll();
                                        str_phonenumber= screen.getText() + "2";
                                        screen.setText(formatting());
                        }

// method for button three

                        if ("b_three".equals(e.getActionCommand()))
                        {
                                        screen.removeAll();
                                        str_phonenumber= screen.getText() + "3";
                                        screen.setText(formatting());
                        }
```

```java
// method for button four

                if ("b_four".equals(e.getActionCommand()))
                {
                                screen.removeAll();
                                str_phonenumber= screen.getText() + "4";
                                screen.setText(formatting());
                }

// method for button five

                if ("b_five".equals(e.getActionCommand()))
                {
                                screen.removeAll();
                                str_phonenumber= screen.getText() + "5";
                                screen.setText(formatting());
                }

// method for button six

                if ("b_six".equals(e.getActionCommand()))
                {
                                screen.removeAll();
                                str_phonenumber= screen.getText() + "6";
                                screen.setText(formatting());
                }

// method for button seven

              if ("b_seven".equals(e.getActionCommand()))
              {
                              screen.removeAll();
                              str_phonenumber= screen.getText() + "7";
                              screen.setText(formatting());
              }

// method for button eight

                if ("b_eight".equals(e.getActionCommand()))
                {
                                screen.removeAll();
                                str_phonenumber= screen.getText() + "8";
                                screen.setText(formatting());
                }
```

```java
// method for button nine

            if ("b_nine".equals(e.getActionCommand()))
            {
                        screen.removeAll();
                        str_phonenumber= screen.getText() + "9";
                        screen.setText(formatting());
            }

// method for button zero

            if ("b_zero".equals(e.getActionCommand()))
            {
                        screen.removeAll();
                        str_phonenumber= screen.getText() + "0";
                        screen.setText(formatting());
            }

// method for button star

            if ("b_star".equals(e.getActionCommand()))
            {
                        screen.removeAll();
                        str_phonenumber= screen.getText() + "*";
                        screen.setText(formatting());
            }

// method for button hash

            if ("b_hash".equals(e.getActionCommand()))
            {
                        screen.removeAll();
                        str_phonenumber= screen.getText() + "#";
                        screen.setText(formatting());
            }

 // method for button call

            if ("b_call".equals(e.getActionCommand()))
            {
// invalid number code


        if(str_phonenumber.contains("*")||str_phonenumber.contains("#"))
                    {
                                screen.removeAll();
```

```java
                            screen.setText("Invalid no.");
                    }
        else
                {
                        screen.setText("Calling..");
// disabling button while call is going on...
                        buttonEnable(false);
                        call.setActionCommand("b_EndCall");

                }
                }

// method for end call

                if ("b_EndCall".equals(e.getActionCommand()))
                {
// calling endCall function in Thread
                        thread_hang=new Thread(()->EndCall());
                          thread_hang.start();
                }
        }

// method for ending call

    void EndCall()
            {
                screen.setText("HangingUp..");
                        try
                            {
                                    Thread.sleep(5000);
                            }
                        catch (InterruptedException e1)
                            {
                                    e1.printStackTrace();
                            }
                        screen.removeAll();
                screen.setText("");
// Enabling button after call ends up...
                        buttonEnable(true);

            }

// method for formatting the str_phonenumber

    private String formatting()
            {
```

```
// removing white spaces
        String str_format = str_phonenumber.replaceAll("-", "").trim();


if(str_format.length()>10)
                        {
// to avoid more than 10 digits
                        str_phonenumber = str_phonenumber.substring(0, str_phonenumber.length()-1)  ;
                        }
        else if(str_format.length()>3 && str_format.length() <= 7)

                {
// format for phone number "###-####'
                        str_phonenumber = str_format.substring(0,3)+ "-" + str_format.substring(3);


                }
        else if(str_format.length() > 7)
                {
// format for phone number "###-###-####"
                        str_phonenumber = str_format.substring(0,3)+ "-" + str_format.substring(3,6) + "-" +
str_format.substring(6);
                }
                        return str_phonenumber;
                }

 // method for enabling or disabling the buttons during call

   void buttonEnable(boolean a)
   {
                                backspace.setEnabled(a);
                                star.setEnabled(a);
                                hash.setEnabled(a);
                                zero.setEnabled(a);
                                one.setEnabled(a);
                                two.setEnabled(a);
                                three.setEnabled(a);
                                four.setEnabled(a);
                                five.setEnabled(a);
                                six.setEnabled(a);
                                seven.setEnabled(a);
                                eight.setEnabled(a);
                                nine.setEnabled(a);
                                erase.setEnabled(a);
   }
 }
```
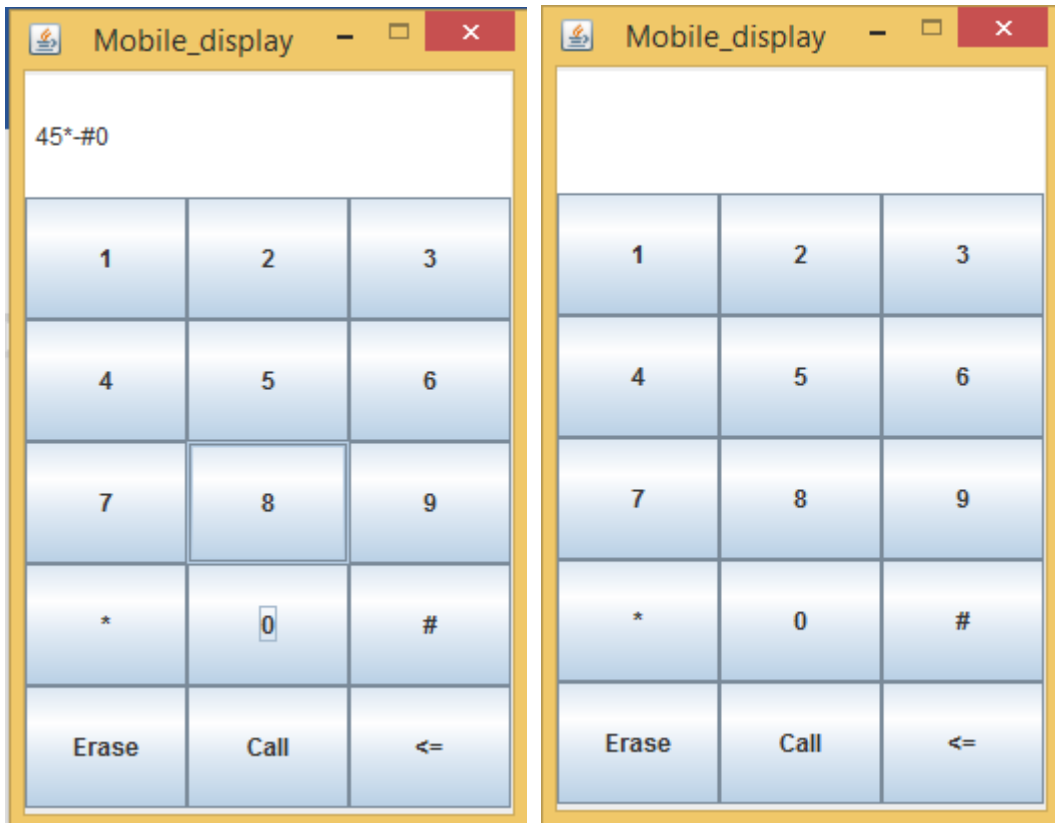
OUTPUT:

Phone display

Erase output:

Mobile_display	— ☐ ✕

45*-#0

1	2	3
4	5	6
7	8	9
*	0	#
Erase	Call	<=

Mobile_display	— ☐ ✕

1	2	3
4	5	6
7	8	9
*	0	#
Erase	Call	<=

Backspace

Invalid Number

Mobile_display	Mobile_display
478-*#95	Invalid no.

Left keypad:
1	2	3
4	5	6
7	8	9
*	0	#
Erase	Call	<=

Right keypad:
1	2	3
4	5	6
7	8	9
*	0	#
Erase	Call	<=

Calling function for valid format phone number and then Hanging up when call button is press again

Mobile_display	— ◻ ✕

456-3257

1	2	3
4	5	6
7	8	9
*	0	#
Erase	Call	<=

Mobile_display	— ◻ ✕

Calling..

1	2	3
4	5	6
7	8	9
*	0	#
Erase	Call	<=

Mobile_display	— ◻ ✕

HangingUp..

1	2	3
4	5	6
7	8	9
*	0	#
Erase	Call	<=