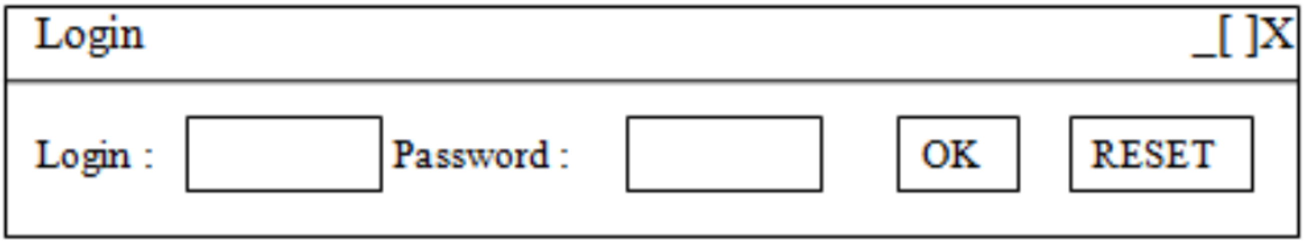
GROUP MEMBERS
Kanaad Deshpande – 60004190058 – SE A3 COMPS
Junaid Girkar – 60004190057 – SE A3 COMPS
Hrithik Mistry – 60004190046 – SE A3 COMPS

JAVA EXPERIMENT 15

AIM:

Designing Graphical User Interfaces in Java using AWT and Event handling
i. Write java program to create a registration form using AWT.
ii. On Applet: Take a Login and Password from the user and display it on the third Text Field which appears only on clicking OK button and clear both the Text Fields on clicking RESET button.



THEORY

What is AWT in Java?

Abstract Window Toolkit as AWT is a toolkit of classes in Java which helps a programmer to develop Graphics and Graphical User Interface components. It is a part of JFC (Java Foundation Classes) developed by Sun Microsystems. The AWT API in Java primarily consists of a comprehensive set of classes and methods that are required for creating and managing the Graphical User Interface (GUI) in a simplified manner. It was developed for providing a common set of tools for designing the cross-platform GUIs. One of the important features of AWT is that it is platform dependent. This means that the AWT tools use the native toolkits of the platforms they are being implemented. This approach helps in preserving the look and feel of each platform. There is a major drawback of this approach, though. When executed on various platforms because of platform dependency it will look different on each platform. This hampers the consistency and aesthetics of an application.

Features of AWT in Java

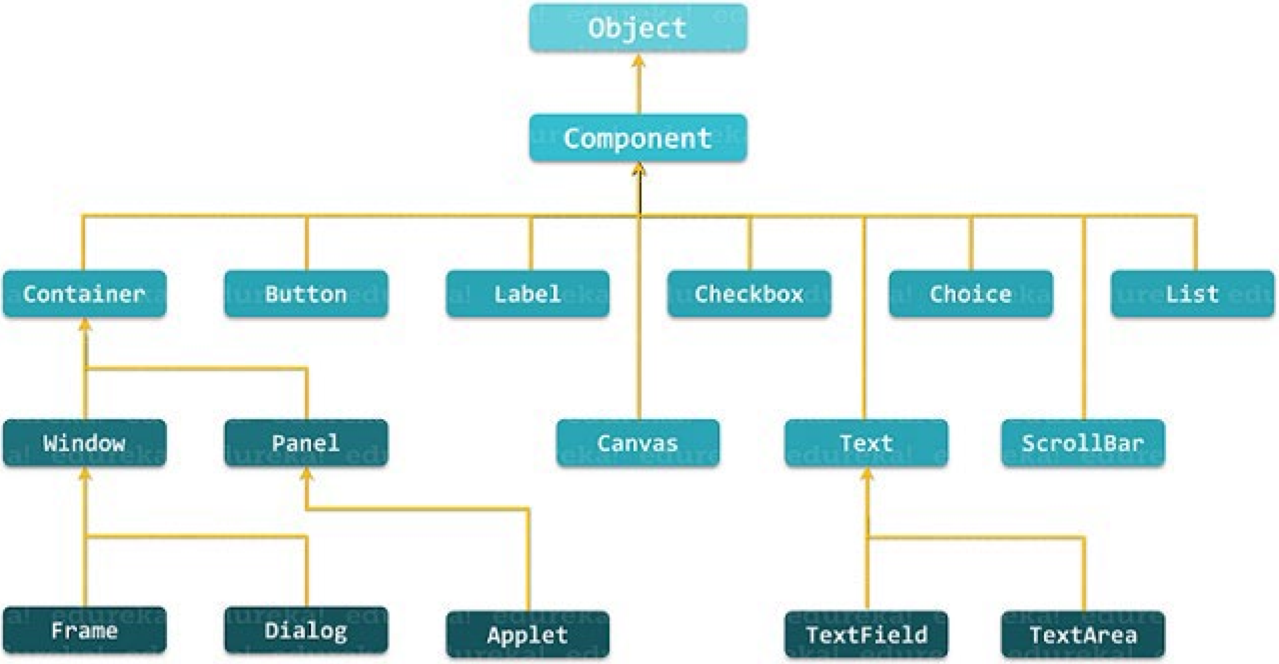
- AWT is a set of native user interface components
- It is based upon a robust event-handling model
- It provides Graphics and imaging tools, such as shape, color, and font classes
- AWT also avails layout managers which helps in increasing the flexibility of the window layouts
- Data transfer classes are also a part of AWT that helps in cut-and-paste through the native platform clipboard
- Supports a wide range of libraries that are necessary for creating graphics for gaming products, banking services, educational purposes, etc.

AWT UI Aspects

Any UI will be made of three entities:

- UI elements: These refers to the core visual elements which are visible to the user and used for interacting with the application. AWT in Java provides a comprehensive list of widely used and common elements.
- Layouts: These define how UI elements will be organized on the screen and provide the final look and feel to the GUI.
- Behavior: These define the events which should occur when a user interacts with UI elements.

Hierarchy Of AWT



AWT Components

1. Containers

Container in Java AWT is a component that is used to hold other components such as text fields, buttons, etc. It is a subclass of java.awt.Component and is responsible for keeping a track of components being added. There are four types of containers provided by AWT in Java.

Types of Containers

- Window: It is an instance of the Window class having neither border nor title. It is used for creating a top-level window.
- Frame: Frame is a subclass of Window and contains title, border and menu bars. It comes with a resizing canvas and is the most widely used container for developing AWT applications. It is capable of holding various components such as buttons, text fields, scrollbars, etc. You can create a Java AWT Frame in two ways:
- By Instantiating Frame class
- By extending Frame class
- Dialog: Dialog class is also a subclass of Window and comes with the border as well as the title. Dialog class's instance always needs an associated Frame class instance to exist.
- Panel: Panel is the concrete subclass of Container and doesn't contain any title bar, menu bar or border. Panel class is a generic container for holding the GUI components. You need the instance of the Panel class in order to add the components.

2. Button

java.awt.Button class is used to create a labeled button. GUI component that triggers a certain programmed action upon clicking it. The Button class has two constructors:

```
//Construct a button with the given label
public Button (String btnLabel);

//Construct a button with empty label
public Button ();
```

A few of the methods provided by this class have been listed below:

```
//Get the label of this Button instance
public String getLabel();

//Set the label of this Button instance
public void setLabel(String btnLabel);

//Enable or disable this Button. Disabled Button cannot be clicked
public void setEnable(boolean enable);
```

3. Text Field

A java.awt.TextField class creates a single-line text box for users to enter texts. The TextField class has three constructors which are:

```
//Construct a TextField instance with the given initial text string with the number of columns.
public TextField(String initialText, int columns);

//Construct a TextField instance with the given initial text string.
public TextField(String initialText);

//Construct a TextField instance with the number of columns.
public TextField(int columns);
```

A few of the methods provided by TextField class are:

```
// Get the current text on this TextField instance
public String getText();

// Set the display text on this TextField instance
public void setText(String strText);

//Set this TextField to editable (read/write) or non-editable (read-only)
public void setEditable(boolean editable);
```

4. Label

The java.awt.Label class provides a descriptive text string that is visible on GUI. An AWT Label object is a component for placing text in a container. Label class has three constructors which are:

```
// Construct a Label with the given text String, of the text alignment
public Label(String strLabel, int alignment);

//Construct a Label with the given text String
public Label(String strLabel);

//Construct an initially empty Label
public Label();
```

This class also provides 3 constants which are:

```
public static final LEFT; // Label.LEFT
public static final RIGHT; // Label.RIGHT
public static final CENTER; // Label.CENTER
```

Below are listed down, the public methods provided by this class:

```
public String getText();
public void setText(String strLabel);
public int getAlignment();
```

```
//Label.LEFT, Label.RIGHT, Label.CENTER
public void setAlignment(int alignment);
```

CODE AND OUTPUT

(i)

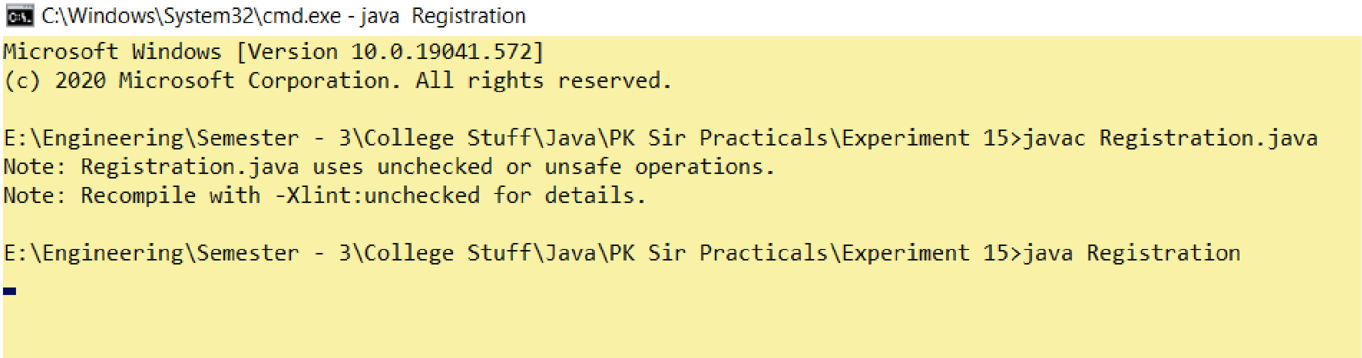
```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
class MyFrame
extends JFrame
implements ActionListener {
private Container c;
private JLabel title;
private JLabel name;
private JTextField tname;
private JLabel mno;
private JTextField tmno;
private JLabel gender;
private JRadioButton male;
private JRadioButton female;
private ButtonGroup gengp;
private JLabel dob;
private JComboBox date;
private JComboBox month;
private JComboBox year;
private JLabel add;
private JTextArea tadd;
private JLabel email;
private JTextField temail;
private JLabel username;
private JTextField tusername;
private JLabel password;
private JPasswordField tpassword;
private JLabel rpassword;
private JPasswordField trpassword;
private JCheckBox term;
private JLabel tpromo;
private JRadioButton yesh;
private JRadioButton naw;
private ButtonGroup gengp2;
private JButton sub;
private JButton reset;
private JLabel res;

private String dates[] = {
    "1", "2", "3", "4", "5",
    "6", "7", "8", "9", "10",
    "11", "12", "13", "14", "15",
    "16", "17", "18", "19", "20",
    "21", "22", "23", "24", "25",
    "26", "27", "28", "29", "30",
    "31" };
private String months[] = {
    "Jan", "feb", "Mar", "Apr",
    "May", "Jun", "July", "Aug",
    "Sup", "Oct", "Nov", "Dec" };

private String years[]= {
    "1935", "1936", "1937", "1938",
    "1939", "1940", "1941", "1942",
    "1943", "1944", "1945", "1946",
    "1947", "1948", "1949", "1950",
    "1951", "1952", "1953", "1954",
    "1955", "1956", "1957", "1958",
    "1959", "1960", "1961", "1962",
    "1963", "1964", "1965", "1966",
    "1967", "1968", "1969", "1970",
    "1971", "1972", "1973", "1974",
    "1975", "1976", "1977", "1978",
    "1979", "1980", "1981", "1982",
    "1983", "1984", "1985", "1986",
    "1987", "1988", "1989", "1990",
    "1991", "1992", "1993", "1994",
    "1995", "1996", "1997", "1998",
    "1999", "2000", "2001", "2002",
    "2003", "2004", "2005", "2006",
    "2007", "2008", "2009", "2010",
    "2011", "2012", "2013", "2014",
    "2015", "2016", "2017", "2018",
    "2019", "2020"};

public MyFrame() {
    setTitle("Registration Form");
    setBounds(0, 0, 1000, 800);
    setDefaultCloseOperation(EXIT_ON_CLOSE);
    setResizable(true);
    c = getContentPane();
    c.setLayout(null);
    c.setBackground(Color.yellow);
```

```
title = new JLabel("Registration Form");
title.setFont(new Font("Serif", Font.BOLD|Font.ITALIC, 30));
title.setSize(300, 35);
title.setLocation(100, 30);
c.add(title);

name = new JLabel("Name");
name.setFont(new Font("Arial", Font.PLAIN, 20));
name.setSize(100, 20);
name.setLocation(100, 100);
c.add(name);

tname = new JTextField();
tname.setFont(new Font("Arial", Font.PLAIN, 15));
tname.setSize(250, 25);
tname.setLocation(200, 100);
c.add(tname);

mno = new JLabel("Mobile");
mno.setFont(new Font("Arial", Font.PLAIN, 20));
mno.setSize(100, 20);
mno.setLocation(100, 150);
c.add(mno);

tmno = new JTextField();
tmno.setFont(new Font("Arial", Font.PLAIN, 15));
tmno.setSize(250, 25);
tmno.setLocation(200, 150);
c.add(tmno);

gender = new JLabel("Gender");
gender.setFont(new Font("Arial", Font.PLAIN, 20));
gender.setSize(100, 20);
gender.setLocation(100, 200);
c.add(gender);

male = new JRadioButton("Male");
male.setFont(new Font("Arial", Font.PLAIN, 15));
male.setSelected(true);
male.setSize(75, 20);
male.setLocation(200, 200);
c.add(male);

female = new JRadioButton("Female");
female.setFont(new Font("Arial", Font.PLAIN, 15));
female.setSelected(false);
female.setSize(80, 20);
female.setLocation(275, 200);
c.add(female);
```

```java
        gengp = new ButtonGroup();
        gengp.add(male);
        gengp.add(female);

        dob = new JLabel("DOB");
        dob.setFont(new Font("Arial", Font.PLAIN, 20));
        dob.setSize(100, 20);
        dob.setLocation(100, 250);
        c.add(dob);

        date = new JComboBox(dates);
        date.setFont(new Font("Arial", Font.PLAIN, 15));
        date.setSize(50, 20);
        date.setLocation(200, 250);
        c.add(date);

        month = new JComboBox(months);
        month.setFont(new Font("Arial", Font.PLAIN, 15));
        month.setSize(60, 20);
        month.setLocation(250, 250);
        c.add(month);

        year = new JComboBox(years);
        year.setFont(new Font("Arial", Font.PLAIN, 15));
        year.setSize(60, 20);
        year.setLocation(320, 250);
        c.add(year);

        email = new JLabel("Email");
        email.setFont(new Font("Arial", Font.PLAIN, 20));
        email.setSize(100, 20);
        email.setLocation(100, 300);
        c.add(email);

        temail = new JTextField();
        temail.setFont(new Font("Arial", Font.PLAIN, 15));
        temail.setSize(250, 25);
        temail.setLocation(200, 300);
        c.add(temail);

        username = new JLabel("Create Username");
        username.setFont(new Font("Arial", Font.PLAIN, 20));
        username.setSize(200, 20);
        username.setLocation(500, 100);
        c.add(username);

        tusername = new JTextField();
        tusername.setFont(new Font("Arial", Font.PLAIN, 15));
        tusername.setSize(250, 25);
        tusername.setLocation(500, 150);
        c.add(tusername);
```

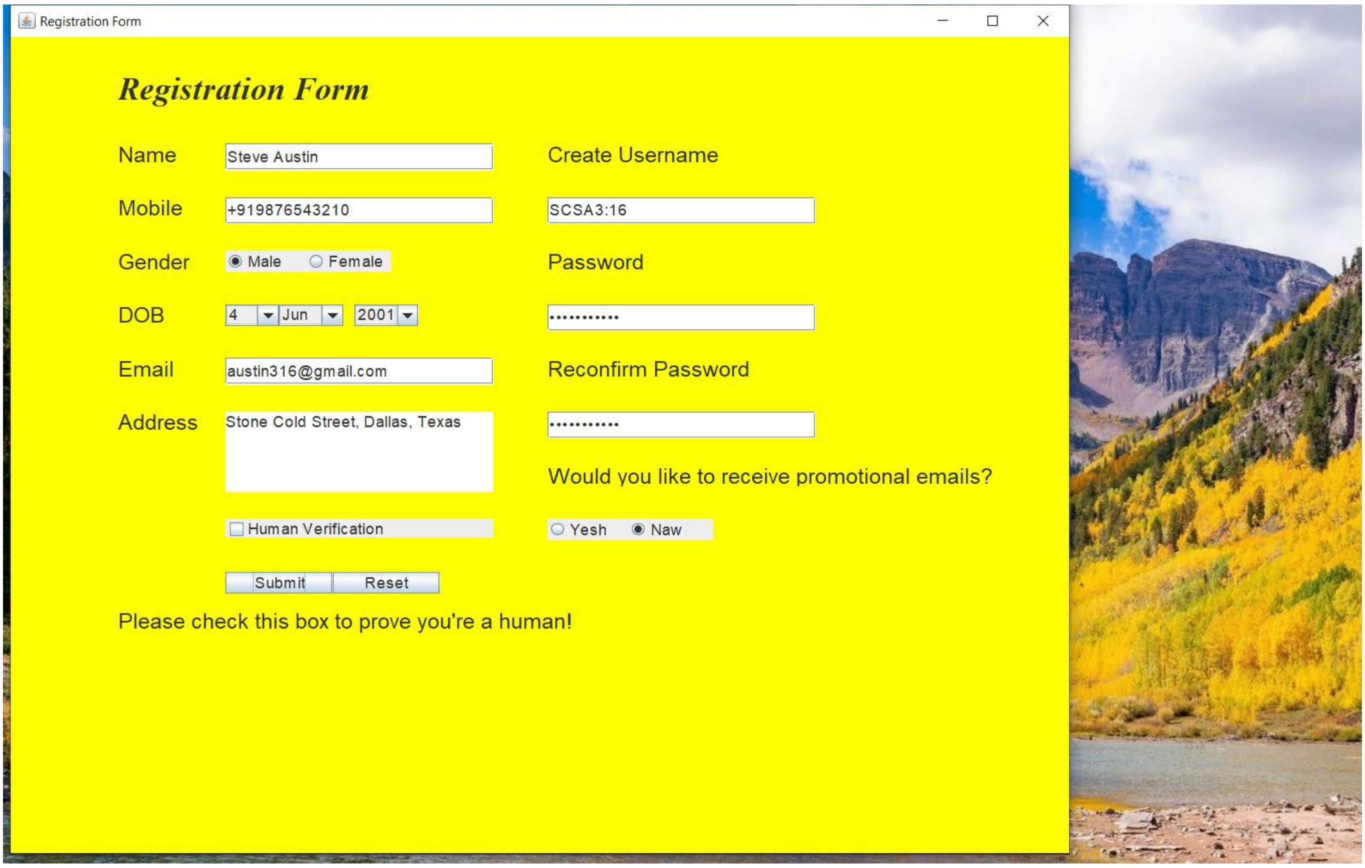
```java
password = new JLabel("Password");
password.setFont(new Font("Arial", Font.PLAIN, 20));
password.setSize(100, 20);
password.setLocation(500, 200);
c.add(password);

tpassword = new JPasswordField();
tpassword.setFont(new Font("Arial", Font.PLAIN, 15));
tpassword.setSize(250, 25);
tpassword.setLocation(500, 250);
c.add(tpassword);

rpassword = new JLabel("Reconfirm Password");
rpassword.setFont(new Font("Arial", Font.PLAIN, 20));
rpassword.setSize(200, 20);
rpassword.setLocation(500, 300);
c.add(rpassword);

trpassword = new JPasswordField();
trpassword.setFont(new Font("Arial", Font.PLAIN, 15));
trpassword.setSize(250, 25);
trpassword.setLocation(500, 350);
c.add(trpassword);

tpromo = new JLabel("Would you like to receive promotional emails?");
tpromo.setFont(new Font("Arial", Font.PLAIN, 20));
tpromo.setSize(500, 20);
tpromo.setLocation(500, 400);
c.add(tpromo);

yesh = new JRadioButton("Yesh");
yesh.setFont(new Font("Arial", Font.PLAIN, 15));
yesh.setSelected(true);
yesh.setSize(75, 20);
yesh.setLocation(500, 450);
c.add(yesh);

naw = new JRadioButton("Naw");
naw.setFont(new Font("Arial", Font.PLAIN, 15));
naw.setSelected(false);
naw.setSize(80, 20);
naw.setLocation(575, 450);
c.add(naw);

gengp2 = new ButtonGroup();
gengp2.add(yesh);
gengp2.add(naw);

add = new JLabel("Address");
add.setFont(new Font("Arial", Font.PLAIN, 20));
```

```
    add.setSize(100, 20);
    add.setLocation(100, 350);
    c.add(add);

    tadd = new JTextArea();
    tadd.setFont(new Font("Arial", Font.PLAIN, 15));
    tadd.setSize(250, 75);
    tadd.setLocation(200, 350);
    tadd.setLineWrap(true);
    c.add(tadd);

    term = new JCheckBox("Human Verification");
    term.setFont(new Font("Arial", Font.PLAIN, 15));
    term.setSize(250, 18);
    term.setLocation(200, 450);
    c.add(term);

    sub = new JButton("Submit");
    sub.setFont(new Font("Arial", Font.PLAIN, 15));
    sub.setSize(100, 20);
    sub.setLocation(200, 500);
    sub.addActionListener(this);
    c.add(sub);

    reset = new JButton("Reset");
    reset.setFont(new Font("Arial", Font.PLAIN, 15));
    reset.setSize(100, 20);
    reset.setLocation(300, 500);
    reset.addActionListener(this);
    c.add(reset);

    res = new JLabel("");
    res.setFont(new Font("Arial", Font.PLAIN, 20));
    res.setSize(500, 250);
    res.setLocation(100, 420);
    c.add(res);
    setVisible(true);
}

public void actionPerformed(ActionEvent e) {
    if (e.getSource() == sub) {
        if (term.isSelected()) {
            res.setText("User Registered!");
        }

        else {
            res.setText("Please check this box to prove you're a human
        }
    }

    else if (e.getSource() == reset) {
        String def = "";
        tname.setText(def);
        tadd.setText(def);
        tmno.setText(def);
        res.setText(def);
        tusername.setText(def);
        tpassword.setText(def);
        term.setSelected(false);
        date.setSelectedIndex(0);
        month.setSelectedIndex(0);
        year.setSelectedIndex(0);
        }
    }
}

// Driver Code
class Registration {
public static void main(String[] args) throws Exception{
MyFrame f = new MyFrame();
}
}
```



C:\Windows\System32\cmd.exe - java Registration

```
Microsoft Windows [Version 10.0.19041.572]
(c) 2020 Microsoft Corporation. All rights reserved.

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>javac Registration.java
Note: Registration.java uses unchecked or unsafe operations.
Note: Recompile with -Xlint:unchecked for details.

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>java Registration
_
```



Registration Form

Registration Form

Name: Steve Austin

Mobile: +919876543210

Gender: ● Male ○ Female

DOB: 4 ▾ Jun ▾ 2001 ▾

Email: austin316@gmail.com

Address: Stone Cold Street, Dallas, Texas

Create Username: SCSA3:16

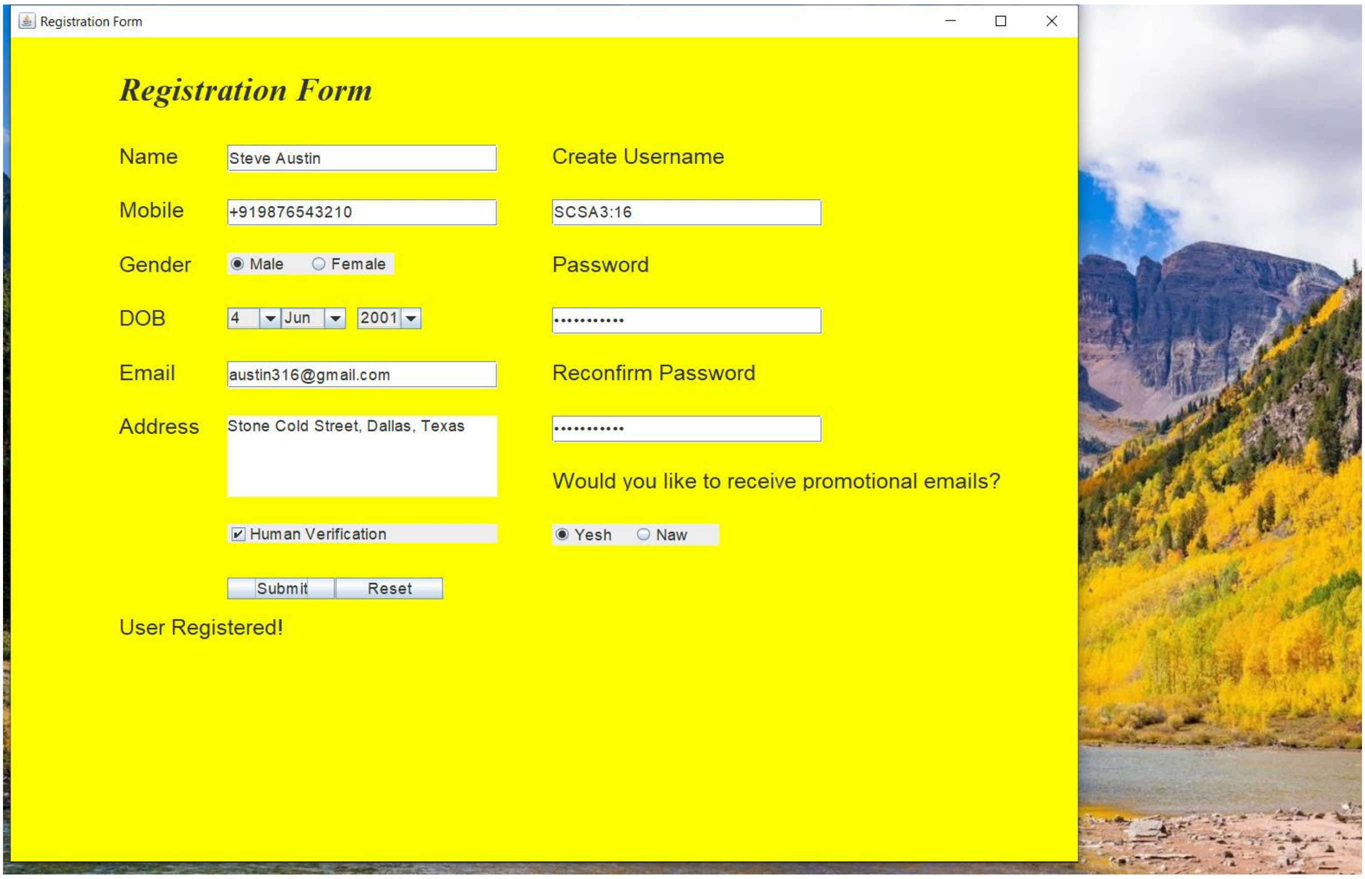
Password: •••••••••••

Reconfirm Password: •••••••••••

Would you like to receive promotional emails? ○ Yesh ● Naw

□ Human Verification

Please check this box to prove you're a human!



Registration Form

Registration Form

Name: Steve Austin

Mobile: +919876543210

Gender: ● Male ○ Female

DOB: 4 ▾ Jun ▾ 2001 ▾

Email: austin316@gmail.com

Address: Stone Cold Street, Dallas, Texas

Create Username: SCSA3:16

Password: •••••••••••

Reconfirm Password: •••••••••••

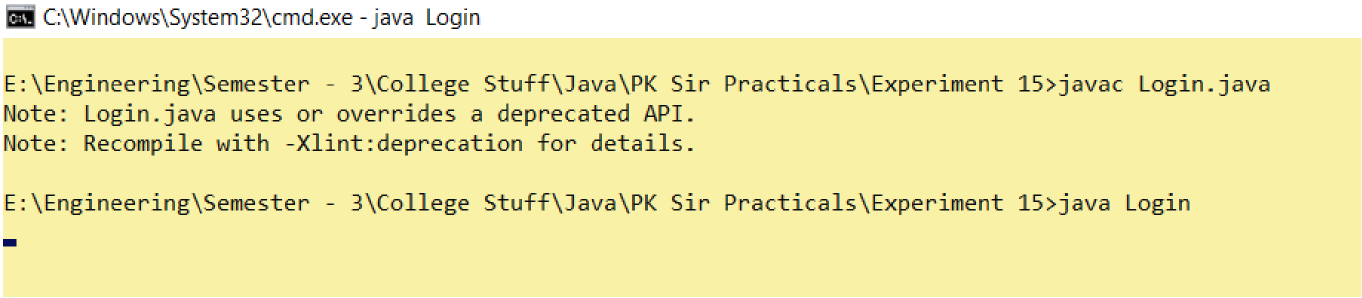
Would you like to receive promotional emails? ● Yesh ○ Naw

☑ Human Verification

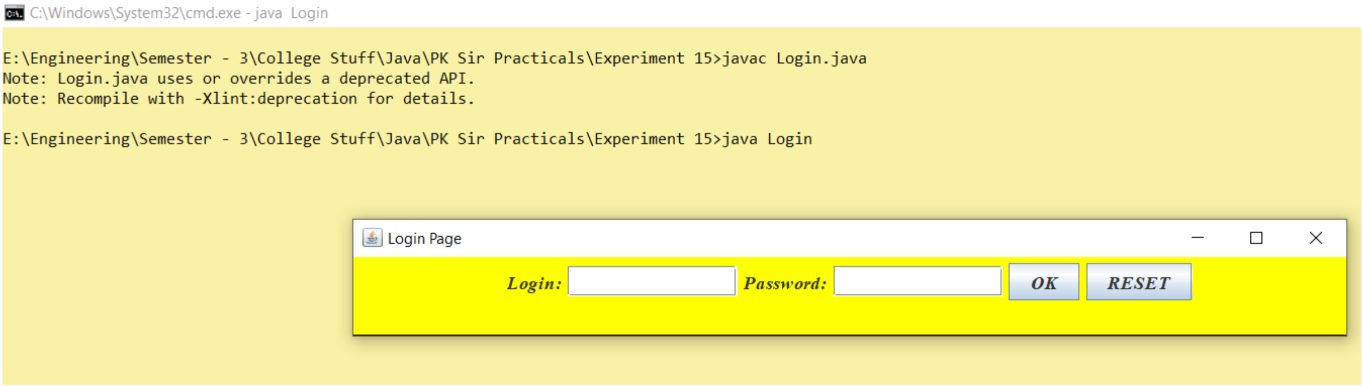
User Registered!

(ii)

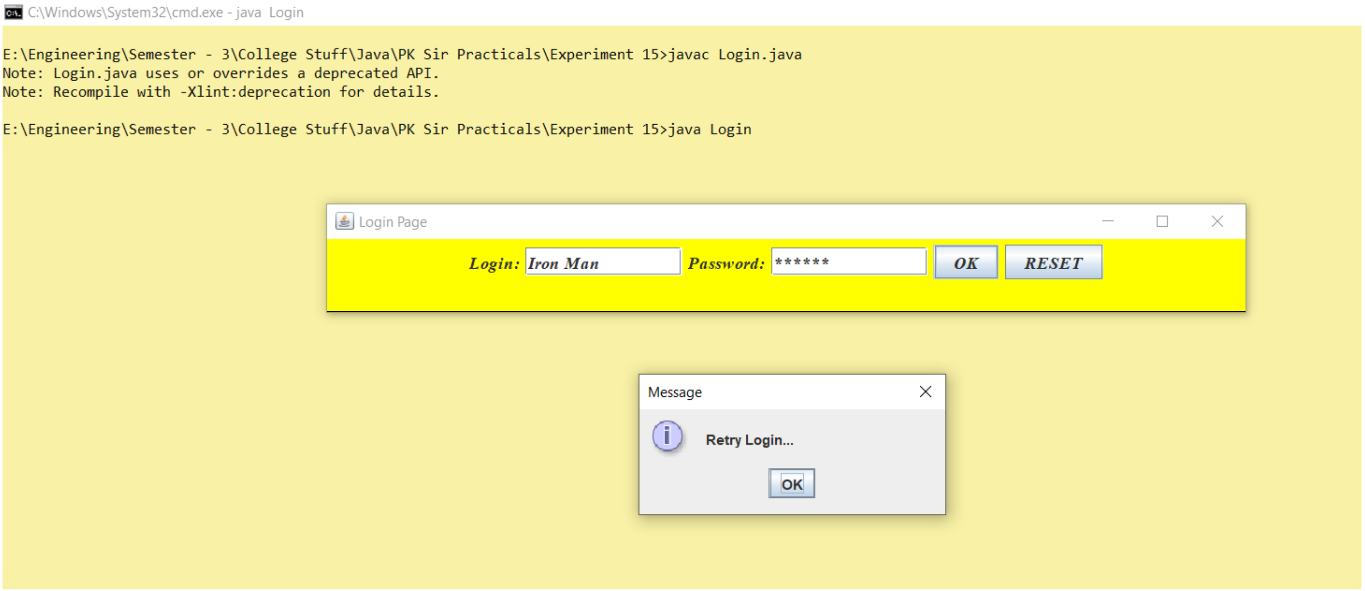
```
import java.awt.*;
import javax.swing.*;
import java.awt.event.*;


class Login extends JFrame implements ActionListener{
    private Container c;
    private JLabel Login;
    private JLabel Password;
    private JTextField tLogin;
    private JPasswordField tPassword;
    private JButton Submit;
    private JButton Clear;
    private String strLogin;
    private String strPassword;

    public Login(){
        c=getContentPane();
        c.setLayout(new FlowLayout());
        c.setBackground(Color.yellow);

        Login = new JLabel("Login:");
        Login.setFont(new Font("Serif", Font.BOLD|Font.ITALIC, 15));
        c.add(Login);

        tLogin = new JTextField(10);
        tLogin.setFont(new Font("Serif", Font.BOLD|Font.ITALIC, 15));
        c.add(tLogin);

        Password = new JLabel("Password:");
        Password.setFont(new Font("Serif", Font.BOLD|Font.ITALIC, 15));
        c.add(Password);

        tPassword = new JPasswordField(10);
        tPassword.setFont(new Font("Serif", Font.BOLD|Font.ITALIC, 15));
        tPassword.setEchoChar('*');
        c.add(tPassword);

        Submit = new JButton("OK");
        Submit.setFont(new Font("Serif", Font.BOLD|Font.ITALIC, 15));
        c.add(Submit);

        Submit.addActionListener(this);
        Clear = new JButton("RESET");
        Clear.setFont(new Font("Serif", Font.BOLD|Font.ITALIC, 15));
        c.add(Clear);
        Clear.addActionListener(this);
    }
    public void actionPerformed(ActionEvent ae){
        if(ae.getSource()==Submit){
            strLogin = tLogin.getText();
            strPassword = tPassword.getText();
            if(strLogin.equals("Batman") && strPassword.equals("264316")){
                JOptionPane.showMessageDialog(c,"Login Success!");
                System.exit(0);
        }
            else{
                JOptionPane.showMessageDialog(c,"Retry Login...");
                tLogin.setText("");
                tPassword.setText("");
                tLogin.requestFocus();
            }
        }
    else if(ae.getSource()==Clear){
        tLogin.setText("");
        tPassword.setText("");
        tLogin.requestFocus();
    }
    else{
        System.exit(0);
    }
}

    public static void main(String z[]){
        Login frm = new Login();
        frm.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frm.setBounds(0,0,800,100);
        frm.setVisible(true);
        frm.setTitle("Login Page");
    }
}
```



```
C:\Windows\System32\cmd.exe - java  Login

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>javac Login.java
Note: Login.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>java Login
```



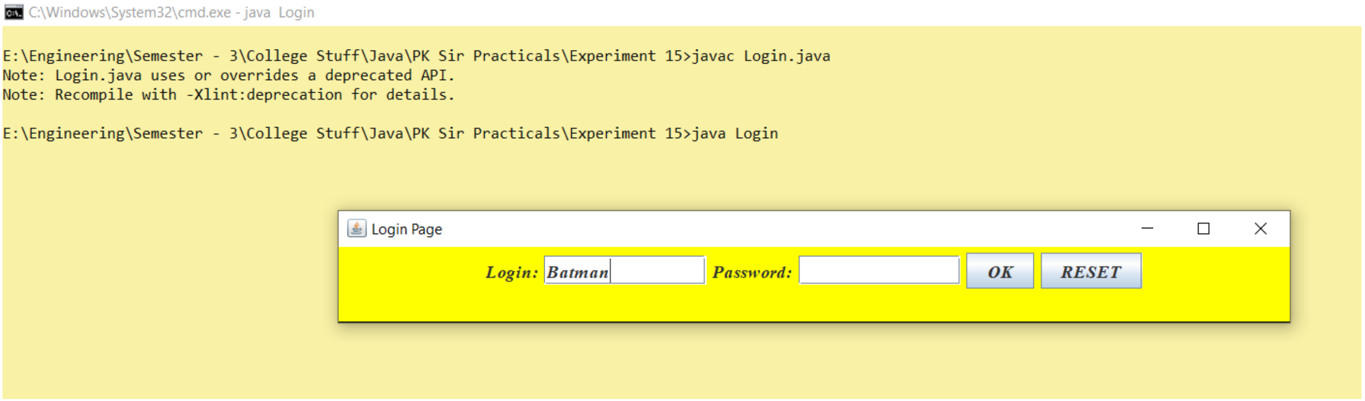
```
C:\Windows\System32\cmd.exe - java  Login

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>javac Login.java
Note: Login.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>java Login
```



```
E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>javac Login.java
Note: Login.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>java Login
```

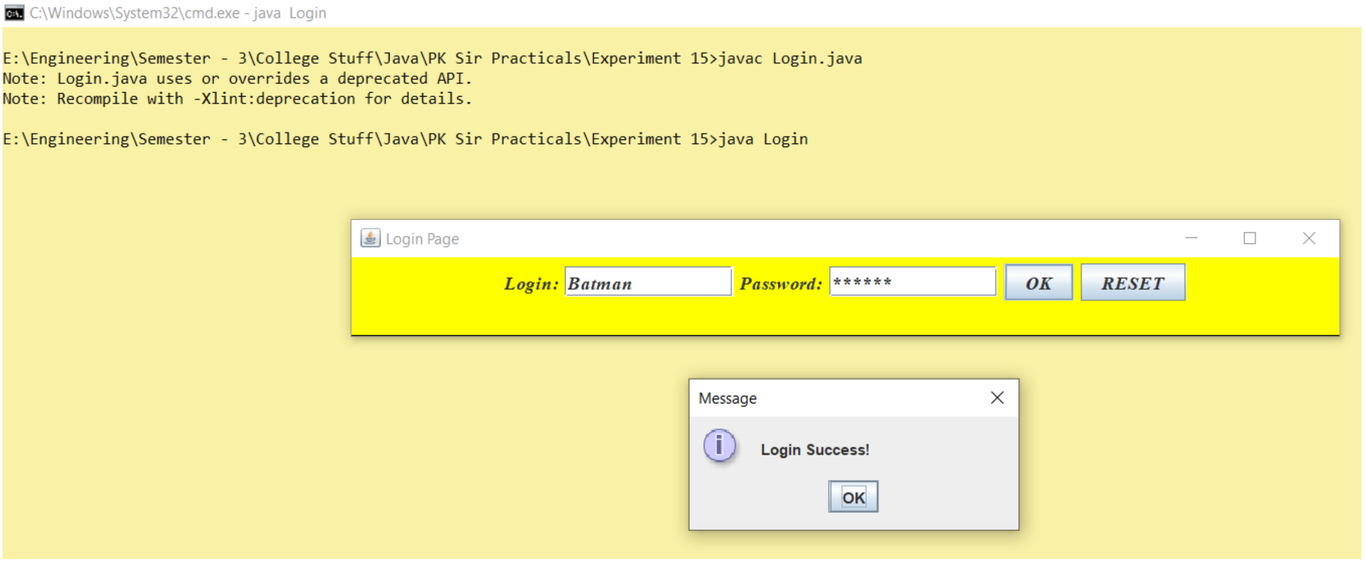
Login: Iron Man Password: ******

Retry Login...



```
E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>javac Login.java
Note: Login.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>java Login
```

Login: Batman Password:



```
E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>javac Login.java
Note: Login.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

E:\Engineering\Semester - 3\College Stuff\Java\PK Sir Practicals\Experiment 15>java Login
```

Login: Batman Password: ******

Login Success!