PROGRAM 1

AIM:

Design a Login Form with username and password using LinearLayout and toast valid credentials.

| activity_main.xml | ```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="124dp"
        android:layout_height="41dp"
        android:text="UserName"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.163"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.301" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="124dp"
        android:layout_height="41dp"
        android:text="Password"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.163"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.4" />

    <EditText
        android:id="@+id/usr"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.925"
``` |

```xml
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
            app:layout_constraintVertical_bias="0.303" />

        <EditText
            android:id="@+id/pass"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:ems="10"
            android:inputType="textPassword"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.92"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
            app:layout_constraintVertical_bias="0.402" />

        <Button
            android:id="@+id/button"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Login"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.537"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
            app:layout_constraintVertical_bias="0.645" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java	package com.example.log;

	import androidx.annotation.RequiresApi;
	import androidx.appcompat.app.AppCompatActivity;
	
	import android.os.Build;
	import android.os.Bundle;
	import android.view.View;
	import android.widget.Button;
	import android.widget.EditText;
	import android.widget.Toast;
	
	import java.util.Objects;
	
	public class MainActivity extends AppCompatActivity {
	
	  EditText Username,Password;
	  Button LOGIN;
	  @Override
	  protected void onCreate(Bundle savedInstanceState) {
	    super.onCreate(savedInstanceState);
	    setContentView(R.layout.activity_main);
	    Username=findViewById(R.id.usr);
	    Password=findViewById(R.id.pass);
	    LOGIN=findViewById(R.id.button);
	    LOGIN.setOnClickListener(new View.OnClickListener() {
	      @Override
	      public void onClick(View view) {
	        if(Username.getText().toString().equals("admin") &&
	Password.getText().toString().equals("admin"))
	        {
	          Toast.makeText(MainActivity.this,"You have
	Authenticated Successfully",Toast.LENGTH_LONG).show();
	        }else
	        {
	          Toast.makeText(MainActivity.this,"Authentication
	Failed",Toast.LENGTH_LONG).show();
	        }
	      }
	    });
	  }
	}

OUTPUT:

RESULT:

Program has been successfully executed and output is obtained.

PROGRAM 2

AIM:

Write a program that demonstrates Activity Lifecycle.

activity_main.xml	`<?xml version="1.0" encoding="utf-8"?>`
	`<androidx.constraintlayout.widget.ConstraintLayout`
	`xmlns:android="http://schemas.android.com/apk/res/android"`
	`  xmlns:app="http://schemas.android.com/apk/res-auto"`
	`  xmlns:tools="http://schemas.android.com/tools"`
	`  android:layout_width="match_parent"`
	`  android:layout_height="match_parent"`
	`  android:background="#009688"`
	`  tools:context=".MainActivity">`
	
	`  <TextView`
	`    android:layout_width="170dp"`
	`    android:layout_height="60dp"`
	`    android:background="#009688"`
	`    android:shadowColor="#636262"`
	`    android:text="Hello World!"`
	`    android:textAlignment="center"`
	`    android:textColor="#E1DADA"`
	`    android:textColorHighlight="#F4FAF9"`
	`    android:textColorHint="#E8E0E0"`
	`    android:textSize="24sp"`
	`    app:layout_constraintBottom_toBottomOf="parent"`
	`    app:layout_constraintLeft_toLeftOf="parent"`
	`    app:layout_constraintRight_toRightOf="parent"`
	`    app:layout_constraintTop_toTopOf="parent" />`
	
	`</androidx.constraintlayout.widget.ConstraintLayout>`

| MainActivity.java | ```java
package com.example.lifecycle;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.util.Log;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Log.d("lifecycle","onCreate invoked");
    }
    @Override
    protected void onStart() {
        super.onStart();
        Log.d("lifecycle","onStart invoked");
    }
    @Override
    protected void onResume() {
        super.onResume();
        Log.d("lifecycle","onResume invoked");
    }
    @Override
    protected void onPause() {
        super.onPause();
        Log.d("lifecycle","onPause invoked");
    }
    @Override
    protected void onStop() {
        super.onStop();
        Log.d("lifecycle","onStop invoked");
    }
    @Override
    protected void onRestart() {
        super.onRestart();
        Log.d("lifecycle","onRestart invoked");
    }
    @Override
    protected void onDestroy() {
        super.onDestroy();
        Log.d("lifecycle","onDestroy invoked");
    }
}
``` |
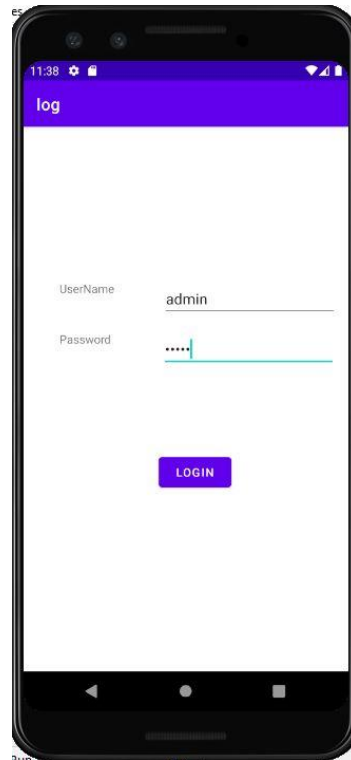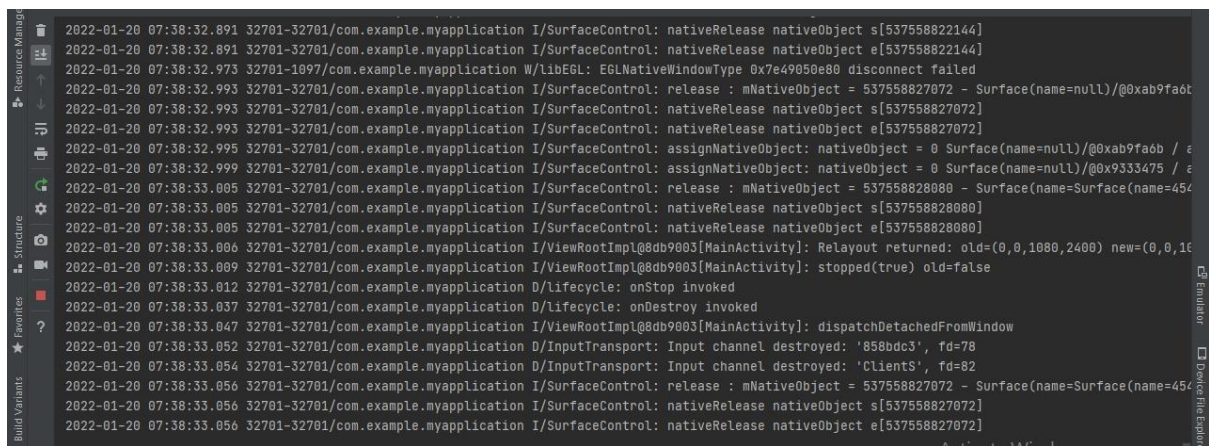
OUTPUT:

RESULT:

Program has been successfully executed and output is obtained.

PROGRAM 3

AIM:

Implementing basic arithmetic operations of a simple calculator.

activity_main.xml	
| | ```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#8BC34A"
    android:backgroundTint="@color/teal_700"
    tools:context=".MainActivity">

    <EditText
        android:id="@+id/num1"
        android:layout_width="191dp"
        android:layout_height="53dp"
        android:layout_marginStart="72dp"
        android:layout_marginTop="70dp"
        android:layout_marginEnd="71dp"
        android:layout_marginBottom="416dp"
        android:background="@android:color/white"
        android:ems="10"
        android:hint="Enter number 1"
        android:inputType="number"
        android:textColor="#02655C"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.493"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.33" />

    <EditText
        android:id="@+id/num2"
        android:layout_width="190dp"
        android:layout_height="53dp"
        android:layout_marginStart="72dp"
        android:layout_marginTop="112dp"
        android:layout_marginEnd="71dp"
        android:layout_marginBottom="374dp"
        android:background="@android:color/white"
        android:ems="10"
        android:hint="Enter number 2"
        android:inputType="number"
``` |

```xml
        android:textColor="#02655C"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.476"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.421" />

    <TextView
        android:id="@+id/result"
        android:layout_width="260dp"
        android:layout_height="41dp"
        android:layout_marginStart="41dp"
        android:layout_marginTop="151dp"
        android:layout_marginEnd="48dp"
        android:layout_marginBottom="287dp"
        android:background="@android:color/background_light"
        android:textColor="#02655C"
        android:textColorLink="@color/black"
        android:textSize="25sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.489"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.445" />

    <Button
        android:id="@+id/sum"
        android:layout_width="87dp"
        android:layout_height="47dp"
        android:background="#03574F"
        android:backgroundTint="@android:color/transparent"
        android:onClick="doSum"
        android:text="+"
        android:textSize="20sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.148"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/sub"
        android:layout_width="87dp"
        android:layout_height="45dp"
        android:layout_marginTop="292dp"
        android:layout_marginBottom="263dp"
        android:background="#03574F"
        android:backgroundTint="@android:color/transparent"
```

```xml
        android:onClick="doSub"
        android:text="-"
        android:textSize="20sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.456"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.389" />

    <Button
        android:id="@+id/div"
        android:layout_width="85dp"
        android:layout_height="42dp"
        android:background="#03574F"
        android:backgroundTint="@android:color/transparent"
        android:onClick="doDiv"
        android:text="/"
        android:textSize="20sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.757"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.6" />

    <Button
        android:id="@+id/mul"
        android:layout_width="83dp"
        android:layout_height="45dp"
        android:background="#03574F"
        android:backgroundTint="@android:color/transparent"
        android:onClick="doMul"
        android:text="x"
        android:textSize="18sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.757"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/button"
        android:layout_width="86dp"
        android:layout_height="47dp"
        android:background="#03574F"
        android:backgroundTint="@android:color/transparent"
        android:onClick="doMod"
        android:text="%"
        android:textSize="20sp"
```

	app:layout_constraintBottom_toBottomOf="parent"
	app:layout_constraintEnd_toEndOf="parent"
	app:layout_constraintHorizontal_bias="0.15"
	app:layout_constraintStart_toStartOf="parent"
	app:layout_constraintTop_toTopOf="parent"
	app:layout_constraintVertical_bias="0.597" />
	
	  <Button
	    android:id="@+id/pow"
	    android:layout_width="85dp"
	    android:layout_height="44dp"
	    android:background="#03574F"
	    android:backgroundTint="@android:color/transparent"
	    android:onClick="doPow"
	    android:text="n1^n2"
	    android:textSize="16sp"
	    app:layout_constraintBottom_toBottomOf="parent"
	    app:layout_constraintEnd_toEndOf="parent"
	    app:layout_constraintHorizontal_bias="0.453"
	    app:layout_constraintStart_toStartOf="parent"
	    app:layout_constraintTop_toTopOf="parent"
	    app:layout_constraintVertical_bias="0.598" />
	
	</androidx.constraintlayout.widget.ConstraintLayout>

MainActivity.java	package com.example.calculator;
	
	import androidx.appcompat.app.AppCompatActivity;
	
	import android.os.Bundle;
	import android.view.View;
	import android.widget.EditText;
	import android.widget.TextView;
	
	public class MainActivity extends AppCompatActivity {
	
	    EditText e1, e2;
	    TextView t1;
	    int num1, num2;
	
	    @Override
	    protected void onCreate(Bundle savedInstanceState) {
	      super.onCreate(savedInstanceState);
	      setContentView(R.layout.activity_main);
	    }
	
	    public boolean getNumbers() {
	
	      e1 = (EditText) findViewById(R.id.num1);

```java
            e2 = (EditText) findViewById(R.id.num2);

            t1 = (TextView) findViewById(R.id.result);

            String s1 = e1.getText().toString();

            String s2 = e2.getText().toString();

            if ((s1.equals(null) && s2.equals(null))
                  || (s1.equals("") && s2.equals(""))) {

               String result = "Please enter a value";
               t1.setText(result);
               return false;
            } else {
               num1 = Integer.parseInt(s1);
               num2 = Integer.parseInt(s2);
            }
            return true;
         }
         public void doSum(View v) {
            if (getNumbers()) {
               int sum = num1 + num2;
               t1.setText(Integer.toString(sum));
            }
         }
         public void doPow(View v) {
            if (getNumbers()) {
               double sum = Math.pow(num1, num2);
               t1.setText(Double.toString(sum));
            }
         }
         public void doSub(View v) {
            if (getNumbers()) {
               int sum = num1 - num2;
               t1.setText(Integer.toString(sum));
            }
         }
         public void doMul(View v) {
            if (getNumbers()) {
               int sum = num1 * num2;
               t1.setText(Integer.toString(sum));
            }
         }
         public void doDiv(View v) {
            if (getNumbers()) {
               double sum = num1 / (num2 * 1.0);
               t1.setText(Double.toString(sum));
            }
```

```
                      }
                 public void doMod(View v) {
                    if (getNumbers()) {
                       double sum = num1 % num2;
                       t1.setText(Double.toString(sum));
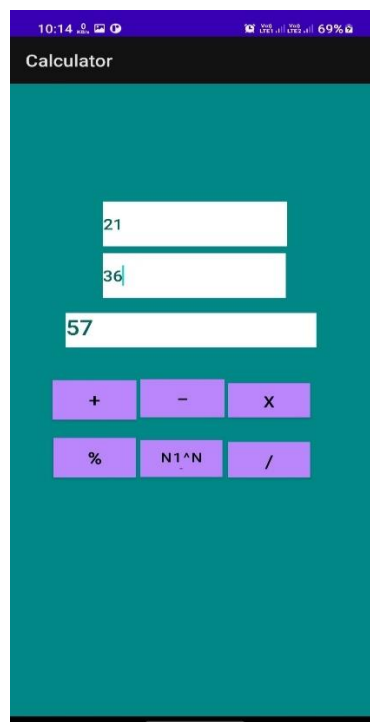                    }
                 }
              }
```

OUTPUT:

RESULT:

Program has been successfully executed and output is obtained.

PROGRAM 4

AIM:

Implement validations on various UI controls.

| activity_main.xml | ```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <androidx.constraintlayout.widget.ConstraintLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent">

        <EditText
            android:id="@+id/name"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:ems="10"
            android:hint="Name"
            android:inputType="textPersonName"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.482"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
            app:layout_constraintVertical_bias="0.086" />

        <EditText
            android:id="@+id/add"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:ems="10"
            android:hint="Address"
            android:inputType="textPersonName"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.497"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
``` |

```xml
                            app:layout_constraintVertical_bias="0.215" />

                        <EditText
                            android:id="@+id/email"
                            android:layout_width="wrap_content"
                            android:layout_height="wrap_content"
                            android:ems="10"
                            android:hint="Email"
                            android:inputType="textPersonName"
                            app:layout_constraintBottom_toBottomOf="parent"
                            app:layout_constraintEnd_toEndOf="parent"
                            app:layout_constraintHorizontal_bias="0.482"
                            app:layout_constraintStart_toStartOf="parent"
                            app:layout_constraintTop_toTopOf="parent"
                            app:layout_constraintVertical_bias="0.421" />

                        <EditText
                            android:id="@+id/pass"
                            android:layout_width="wrap_content"
                            android:layout_height="wrap_content"
                            android:ems="10"
                            android:hint="password"
                            android:inputType="textPersonName"
                            app:layout_constraintBottom_toBottomOf="parent"
                            app:layout_constraintEnd_toEndOf="parent"
                            app:layout_constraintHorizontal_bias="0.497"
                            app:layout_constraintStart_toStartOf="parent"
                            app:layout_constraintTop_toTopOf="parent"
                            app:layout_constraintVertical_bias="0.526" />

                        <Button
                            android:id="@+id/button"
                            android:layout_width="117dp"
                            android:layout_height="59dp"
                            android:text="Submit"
                            app:layout_constraintBottom_toBottomOf="parent"
                            app:layout_constraintEnd_toEndOf="parent"
                            app:layout_constraintStart_toStartOf="parent"
                            app:layout_constraintTop_toTopOf="parent"
                            app:layout_constraintVertical_bias="0.66" />

                        <EditText
                            android:id="@+id/ph"
                            android:layout_width="wrap_content"
                            android:layout_height="wrap_content"
                            android:ems="10"
                            android:hint="Phone no."
                            android:inputType="textPersonName"
                            app:layout_constraintBottom_toBottomOf="parent"
                            app:layout_constraintEnd_toEndOf="parent"
```

	app:layout_constraintHorizontal_bias="0.497" app:layout_constraintStart_toStartOf="parent" app:layout_constraintTop_toTopOf="parent" app:layout_constraintVertical_bias="0.322" /> </androidx.constraintlayout.widget.ConstraintLayout> </androidx.constraintlayout.widget.ConstraintLayout>

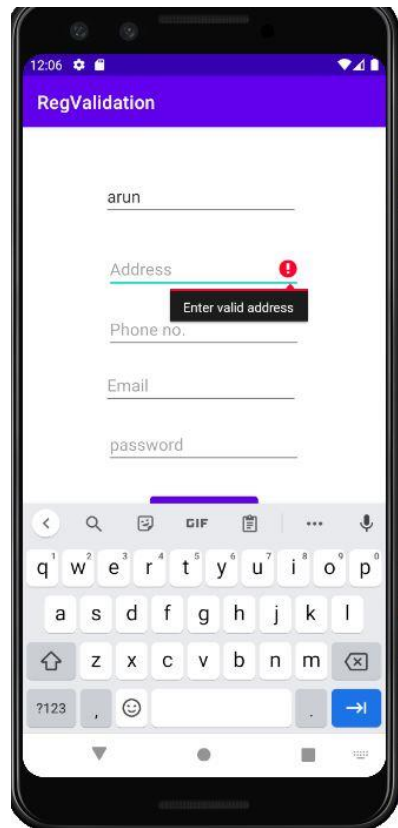|	

MainActivity.java	package com.example.regvalidation;
	
	import androidx.appcompat.app.AppCompatActivity;
	
	import android.content.Intent;
	import android.os.Bundle;
	import android.widget.Button;
	import android.widget.EditText;
	import android.view.View;
	import android.widget.Toast;
	import java.util.regex.Matcher;
	import java.util.regex.Pattern;
	
	public class MainActivity extends AppCompatActivity {
	   EditText name, add, phn, em,pass;
	   Button bts1;
	   Pattern patterns;
	   Matcher matches;
	   String emailPattern = "[a-zA-Z0-9._-]+@[a-z]+\\.+[a-z]+";
	
	   @Override
	   protected void onCreate(Bundle savedInstanceState) {
	     super.onCreate(savedInstanceState);
	     setContentView(R.layout.activity_main);
	     name = (EditText) findViewById(R.id.name);
	     add = (EditText) findViewById(R.id.add);
	     phn = (EditText) findViewById(R.id.add);
	     em = (EditText) findViewById(R.id.email);
	     pass = (EditText) findViewById(R.id.pass);
	     String emailPattern = "[a-zA-Z0-9._-]+@[a-z]+\\.+[a-z]+";
	     bts1 = (Button) findViewById(R.id.button);
	     bts1.setOnClickListener(new View.OnClickListener() {
	       @Override
	       public void onClick(View v) {
	         login();
	         Intent i = new
	Intent(getApplicationContext(),explicit.class);
	         startActivity(i);
	       }
	     });
	   }

```java
public void login() {
    String email = em.getText().toString().trim();
    String nm = name.getText().toString();
    if (name.getText().toString().length() == 0) {
        name.requestFocus();
        name.setError("Enter valid name");
        return;
    }
    String namePattern = "[0-9!@#$%^&*]";
    if (name.getText().toString().matches(namePattern)) {
        name.requestFocus();
        name.setError("Enter valid name");
        return;

    }
    if (add.getText().toString().length() == 0) {
        add.requestFocus();
        add.setError("Enter valid address");
        return;
    }
    if (phn.getText().toString().length() == 0) {
        phn.requestFocus();
        phn.setError("Enter valid Number");
        return;
    }
    if (em.getText().toString().length() == 0) {
        Toast.makeText(getApplicationContext(), "Invalid Email
Address", Toast.LENGTH_SHORT).show();
        em.requestFocus();
        em.setError("Enter valid email");
        return;
    }
    if (!email.matches(emailPattern)) {
        em.requestFocus();
        em.setError("Invalid email");

    } else {
        Toast.makeText(getApplicationContext(), "valid Email
Address", Toast.LENGTH_SHORT).show();
    }
    if (pass.getText().toString().length() == 0) {
        pass.requestFocus();
        pass.setError("Enter valid password");
        return;
    }
    if (pass.getText().toString().length() < 8) {
        pass.requestFocus();
        pass.setError("Enter minimum 8 digit password");
        return;
    } }}
```

OUTPUT:

RESULT:

Program has been successfully executed and output is obtained.