**activity_main.xml**

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
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:orientation="vertical"
    tools:context=".MainActivity"
    android:layout_margin="10dp">

    <TextView
        android:id="@+id/textView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textAllCaps="true"
        android:textColor="@color/colorPrimaryDark"
        android:textSize="30sp"
        android:padding="10dp"
        android:layout_margin="5dp"
        android:text="Employee Database"
        android:gravity="center"/>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical"
        android:layout_margin="10dp">

    <Button
        android:id="@+id/bt_cre"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:padding="10dp"
        android:text="Create"
        android:layout_margin="5dp"
        android:layout_weight="1"/>

    <Button
        android:id="@+id/bt_ins"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:padding="10dp"
        android:text="Insert"
        android:layout_margin="5dp"
        android:layout_weight="1"/>

    <Button
        android:id="@+id/bt_upd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:padding="10dp"
        android:text="Update"
        android:layout_margin="5dp"
        android:layout_weight="1"/>
```

```xml
    <Button
        android:id="@+id/bt_del"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:padding="10dp"
        android:text="Delete"
        android:layout_margin="5dp"
        android:layout_weight="1"/>

    <Button
        android:id="@+id/bt_ret"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:padding="10dp"
        android:text="Retrieve by employee code"
        android:layout_margin="5dp"
        android:layout_weight="1"/>

    <Button
            android:id="@+id/bt_ret_dt"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:padding="10dp"
            android:text="Retrieve by department"
            android:layout_margin="5dp"
            android:layout_weight="1"/>

    </LinearLayout>
</LinearLayout>
```

**MainActivity.java**

```java
package com.example.ex5;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    Button bt_cre,bt_ins,bt_upd,bt_del,bt_ret,bt_ret_dt;
    SQLiteDatabase db;
    @Override
    protected void onCreate(Bundle savedInstanceState)
    {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        bt_cre = findViewById(R.id.bt_cre);
        bt_ins = findViewById(R.id.bt_ins);
        bt_upd = findViewById(R.id.bt_upd);
        bt_del = findViewById(R.id.bt_del);
```

```java
        bt_ret = findViewById(R.id.bt_ret);
        bt_ret_dt=findViewById(R.id.bt_ret_dt);

        bt_cre.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                db = openOrCreateDatabase("db", MODE_PRIVATE, null);
                //db.execSQL("DROP TABLE IF EXISTS EMPLOYEES;");
                db.execSQL("CREATE TABLE IF NOT EXISTS EMPLOYEES(NAME
VARCHAR(20) NOT NULL, GENDER VARCHAR(20) NOT NULL, E_CODE VARCHAR(20)
PRIMARY KEY NOT NULL, DEPT VARCHAR(20) NOT NULL, SALARY VARCHAR(20)
NOT NULL);");
                Toast.makeText(getApplicationContext(), "Created
table!", Toast.LENGTH_SHORT).show();
                if(db != null) { db.close(); }
            }
        });
        bt_ins.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent myIntent = new Intent(getApplicationContext(),
InsertActivity.class);
                MainActivity.this.startActivity(myIntent);
            }
        });
        bt_upd.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent myIntent = new Intent(getApplicationContext(),
UpdateActivity.class);
                MainActivity.this.startActivity(myIntent);
            }
        });
        bt_del.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent myIntent = new Intent(getApplicationContext(),
DeleteActivity.class);
                MainActivity.this.startActivity(myIntent);
            }
        });
        bt_ret.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent myIntent = new Intent(getApplicationContext(),
RetrieveActivity.class);
                MainActivity.this.startActivity(myIntent);
            }
        });
        bt_ret_dt.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent myIntent = new Intent(getApplicationContext(),
Retrieve2Activity.class);
                MainActivity.this.startActivity(myIntent);
            }
        });
```

```
        }
}


activity_insert.xml

<?xml version="1.0" encoding="utf-8"?>

<ScrollView
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:fillViewport="true"
    tools:context=".InsertActivity">

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

            <TextView
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_margin="5dp"
            android:gravity="center"
            android:padding="10dp"
            android:text="Insert Data"
            android:textAllCaps="true"
            android:textColor="@color/colorPrimaryDark"
            android:textSize="30sp" />

        <EditText
            android:id="@+id/et_name"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_margin="10dp"
            android:gravity="center"
            android:hint="Name"
            android:inputType="textPersonName"
            android:textSize="30sp" />

        <TextView
            android:id="@+id/tv_gd"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_margin="10dp"
            android:gravity="center"
            android:text="Gender"
            android:textColor="#000000"
            android:textSize="30sp" />

        <RadioGroup
            android:id="@+id/rg_gd"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical">
```

```xml
    <RadioButton
        android:id="@+id/rb_male"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:text="Male" />

    <RadioButton
        android:id="@+id/rb_female"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:text="Female" />

    <RadioButton
        android:id="@+id/rb_other"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:text="Other" />

</RadioGroup>


<EditText
    android:id="@+id/et_ec"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="10dp"
    android:gravity="center"
    android:hint="Employee Code"
    android:inputType="textVisiblePassword"
    android:textSize="30sp" />


<TextView
    android:id="@+id/tv_dt"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="10dp"
    android:gravity="center"
    android:text="Department"
    android:textColor="#000000"
    android:textSize="30sp" />

<Spinner
    android:id="@+id/sp_dt"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="10dp"
    android:entries="@array/dept"
    android:textAlignment="center" />

<EditText
    android:id="@+id/et_salary"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
```

```xml
            android:layout_margin="10dp"
            android:gravity="center"
            android:hint="Salary"
            android:inputType="number"
            android:textSize="30sp" />

        <Button
            android:id="@+id/bt_insert"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_gravity="center"
            android:layout_margin="10pt"
            android:text="Insert" />

</LinearLayout>
</ScrollView>
```

## InsertActivity.java

```java
package com.example.ex5;

import androidx.appcompat.app.AppCompatActivity;

import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.Spinner;
import android.widget.Toast;

public class InsertActivity extends AppCompatActivity {
    Button bt_insert;
    EditText et_ec, et_name, et_salary;
    RadioGroup rg_gd;
    RadioButton check_rb_gd;
    Spinner sp_dt;
    SQLiteDatabase db;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_insert);

        bt_insert = findViewById(R.id.bt_insert);
        et_ec = findViewById(R.id.et_ec);
        et_name = findViewById(R.id.et_name);
        et_salary = findViewById(R.id.et_salary);
        rg_gd = findViewById(R.id.rg_gd);
        sp_dt = findViewById(R.id.sp_dt);

        bt_insert.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
```

```java
            db = openOrCreateDatabase("db", MODE_PRIVATE, null);
            String msg = "";

            if(!et_name.getText().toString().matches("[A-Za-
z.]+"))
                msg += "Name error! ";

            if(rg_gd.getCheckedRadioButtonId() == -1)
                msg += "Gender not selected! ";
            else
                check_rb_gd =
findViewById(rg_gd.getCheckedRadioButtonId());

            if(!et_ec.getText().toString().matches("[A-Za-z0-
9]+"))
                msg += "Invalid employee code! ";

            if(!et_salary.getText().toString().matches("[0-9]+"))
                msg += "Salary error! ";

            try {
                if (msg.equals("")) {
                    db.execSQL("INSERT INTO EMPLOYEES VALUES(?,
?, ?, ?, ?);", new String[]{et_name.getText().toString(),
check_rb_gd.getText().toString(), et_ec.getText().toString(),
sp_dt.getSelectedItem().toString(), et_salary.getText().toString()});
                    msg = "Inserted!";
                }
            }catch(Exception ex){
                //msg=ex.toString();
                msg="Error inserting...Please enter correct
details";
            }
            finally {
                Toast.makeText(getApplicationContext(), msg,
Toast.LENGTH_LONG).show();
                if(db != null) { db.close(); }
            }
        }
    });
    }
}
```

**activity_update.xml**

```xml
<?xml version="1.0" encoding="utf-8"?>

<ScrollView
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:fillViewport="true"
    tools:context=".UpdateActivity">

    <LinearLayout
```

```xml
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="5dp"
        android:gravity="center"
        android:padding="10dp"
        android:text="Update Data"
        android:textAllCaps="true"
        android:textColor="@color/colorPrimaryDark"
        android:textSize="30sp" />

    <EditText
        android:id="@+id/et_name"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:gravity="center"
        android:hint="Name"
        android:inputType="textPersonName"
        android:textSize="30sp" />

    <TextView
        android:id="@+id/tv_gd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:gravity="center"
        android:text="Gender"
        android:textColor="#000000"
        android:textSize="30sp" />

    <RadioGroup
        android:id="@+id/rg_gd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical">

        <RadioButton
            android:id="@+id/rb_male"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginLeft="150dp"
            android:text="Male" />

        <RadioButton
            android:id="@+id/rb_female"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginLeft="150dp"
            android:text="Female" />

        <RadioButton
            android:id="@+id/rb_other"
            android:layout_width="match_parent"
```

```xml
            android:layout_height="wrap_content"
            android:layout_marginLeft="150dp"
            android:text="Other" />

    </RadioGroup>


    <EditText
        android:id="@+id/et_ec"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:gravity="center"
        android:hint="Employee Code"
        android:inputType="textVisiblePassword"
        android:textSize="30sp" />


    <TextView
        android:id="@+id/tv_dt"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:gravity="center"
        android:text="Department"
        android:textColor="#000000"
        android:textSize="30sp" />

    <Spinner
        android:id="@+id/sp_dt"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:entries="@array/dept"
        android:textAlignment="center" />

    <EditText
        android:id="@+id/et_salary"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:gravity="center"
        android:hint="Salary"
        android:inputType="number"
        android:textSize="30sp" />

    <Button
        android:id="@+id/bt_update"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:layout_margin="10pt"
        android:text="Update" />

    </LinearLayout>
</ScrollView>
```

**UpdateActivity.java**

```java
package com.example.ex5;

import androidx.appcompat.app.AppCompatActivity;

import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.Spinner;
import android.widget.Toast;

public class UpdateActivity extends AppCompatActivity {
    Button bt_update;
    EditText et_ec, et_name, et_salary;
    RadioGroup rg_gd;
    RadioButton check_rb_gd;
    Spinner sp_dt;
    SQLiteDatabase db;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_update);
        //db = openOrCreateDatabase("db", MODE_PRIVATE, null);

        bt_update = findViewById(R.id.bt_update);
        et_ec = findViewById(R.id.et_ec);
        et_name = findViewById(R.id.et_name);
        et_salary = findViewById(R.id.et_salary);
        rg_gd = findViewById(R.id.rg_gd);
        sp_dt = findViewById(R.id.sp_dt);

        bt_update.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {

                db = openOrCreateDatabase("db", MODE_PRIVATE, null);
                String msg = "";

                if(!et_name.getText().toString().matches("[A-Za-z.]+"))
                    msg += "Name error! ";

                if(rg_gd.getCheckedRadioButtonId() == -1)
                    msg += "Gender not selected! ";
                else
                    check_rb_gd =
findViewById(rg_gd.getCheckedRadioButtonId());

                if(!et_ec.getText().toString().matches("[A-Za-z0-9]+"))
```

```java
                msg += "Invalid employee code! ";

            if(!et_salary.getText().toString().matches("[0-9]+"))
                msg += "et_salary error! ";

            Cursor c = db.rawQuery("SELECT * FROM EMPLOYEES WHERE
E_CODE = ?;", new String[]{et_ec.getText().toString()});
            if(!c.moveToNext()) {
                msg = "Employee code doesn't exist!";
            }
            else if(msg.equals("")) {
                msg = "Updated!";
                db.execSQL("UPDATE EMPLOYEES SET NAME = ?, GENDER
= ?, DEPT = ?, SALARY = ? WHERE E_CODE = ?;", new
String[]{et_name.getText().toString(),
check_rb_gd.getText().toString(),sp_dt.getSelectedItem().toString(),
et_salary.getText().toString(),et_ec.getText().toString()});
            }
            Toast.makeText(getApplicationContext(), msg,
Toast.LENGTH_SHORT).show();
            if(db != null) { db.close(); }
        }
    });

    }
}
```

## activity_delete.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".DeleteActivity">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="20dp"
        android:gravity="center"
        android:text="Delete Employee Record"
        android:textAllCaps="true"
        android:textColor="@color/colorPrimaryDark"
        android:textSize="30sp" />

    <EditText
        android:id="@+id/editTextd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="15dp"
        android:textSize="30sp"
        android:gravity="center|center_horizontal|center_vertical"
        android:hint="Employee ID"
        android:inputType="textVisiblePassword" />
```

```xml
    <Button
        android:id="@+id/buttond"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="15dp"
        android:text="Delete"
        android:layout_gravity="center"/>

</LinearLayout>
```

## DeleteActivity.java

```java
package com.example.ex5;

import androidx.appcompat.app.AppCompatActivity;

import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

public class DeleteActivity extends AppCompatActivity {
    Button d;
    EditText e;
    SQLiteDatabase db;
    Cursor c;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_delete);

        d = findViewById(R.id.buttond);
        e = findViewById(R.id.editTextd);
        d.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {

                db = openOrCreateDatabase("db", MODE_PRIVATE, null);

                String id = e.getText().toString();
                c = db.rawQuery("SELECT * FROM EMPLOYEES WHERE E_CODE
= ?;", new String[]{id});
                if (!c.moveToNext())
                    Toast.makeText(getApplicationContext(), "Doesn't
exist!", Toast.LENGTH_SHORT).show();
                else {
                    db.execSQL("DELETE FROM EMPLOYEES WHERE E_CODE =
?;", new String[]{id});
                    Toast.makeText(getApplicationContext(), "Deleted
" + id, Toast.LENGTH_SHORT).show();
                }
```

```
                if(db != null) { db.close(); }
                if(c != null) { c.close(); }
            }
        });
    }
}
```

**activity_retrieve.xml**

```xml
<?xml version="1.0" encoding="utf-8"?>

<ScrollView
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:fillViewport="true"
    tools:context=".RetrieveActivity">

<LinearLayout
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical"
        android:layout_weight="1">

        <TextView
            android:layout_width="match_parent"
            android:layout_height="0dp"
            android:layout_weight="1"
            android:layout_margin="5dp"
            android:gravity="center"
            android:textAllCaps="true"
            android:textColor="@color/colorPrimaryDark"
            android:text="Retrieve by Employee Code"
            android:textSize="30sp"/>

        <EditText
            android:id="@+id/et_ec"
            android:layout_width="match_parent"
            android:layout_height="0dp"
            android:layout_weight="1"
            android:layout_margin="5dp"
            android:textSize="30sp"
            android:gravity="center|center_horizontal"
            android:hint="Enter Employee Code"
            android:inputType="textVisiblePassword" />

        <Button
            android:id="@+id/bt_ec"
            android:layout_width="match_parent"
            android:layout_height="0dp"
```

```xml
                android:layout_weight="1"
                android:layout_margin="5dp"
                android:text="Retrieve by employee code"/>

    </LinearLayout>

    <LinearLayout
        android:id="@+id/ll2"
        android:visibility="invisible"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical"
        android:layout_weight="1">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="EMPLOYEE DETAILS"
        android:textColor="@color/colorPrimaryDark"
        android:textSize="30sp"
        android:gravity="center"
        android:layout_margin="10dp"
        android:layout_weight="0"
        />

    <TableLayout
        android:layout_width="wrap_content"
        android:layout_height="0dp"
        android:layout_margin="5dp"
        android:layout_weight="1"
        >

        <TableRow
            android:layout_height="0dp"
            android:layout_weight="1">

            <TextView
                android:layout_width="wrap_content"
                android:layout_height="match_parent"
                android:text="Name"
                android:textSize="30sp"
                />
            <TextView
                android:id="@+id/name_tb"
                android:layout_width="wrap_content"
                android:layout_height="match_parent"
                android:textSize="30sp"
                />
        </TableRow>

        <TableRow
            android:layout_height="0dp"
            android:layout_weight="1">

            <TextView
                android:layout_width="wrap_content"
                android:layout_height="match_parent"
                android:text="Gender"
```

```xml
                    android:textSize="30sp"
                    />
            <TextView
                    android:id="@+id/gender_tb"
                    android:layout_width="wrap_content"
                    android:layout_height="match_parent"
                    android:textSize="30sp"
                    />
    </TableRow>

    <TableRow
            android:layout_height="0dp"
            android:layout_weight="1">

            <TextView
                    android:layout_width="wrap_content"
                    android:layout_height="match_parent"
                    android:text="Employee Code"
                    android:textSize="30sp"
                    />
            <TextView
                    android:id="@+id/ec_tb"
                    android:layout_width="wrap_content"
                    android:layout_height="match_parent"
                    android:textSize="30sp"
                    />
    </TableRow>

    <TableRow android:layout_height="0dp"
            android:layout_weight="1">

            <TextView
                    android:layout_width="wrap_content"
                    android:layout_height="match_parent"
                    android:text="Department"
                    android:textSize="30sp"
                    />
            <TextView
                    android:id="@+id/dept_tb"
                    android:layout_width="wrap_content"
                    android:layout_height="match_parent"
                    android:textSize="30sp"
                    />
    </TableRow>

    <TableRow android:layout_height="0dp"
            android:layout_weight="1" >

            <TextView
                    android:layout_width="wrap_content"
                    android:layout_height="match_parent"
                    android:text="Salary"
                    android:textSize="30sp"
                    />
            <TextView
                    android:id="@+id/sal_tb"
                    android:layout_width="wrap_content"
                    android:layout_height="match_parent"
```

```xml
                    android:textSize="30sp"
                    />
            </TableRow>
        </TableLayout>
    </LinearLayout>


</LinearLayout>

</ScrollView>
```

## RetrieveActivity.java

```java
package com.example.ex5;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.LinearLayout;
import android.widget.Spinner;
import android.widget.TextView;
import android.widget.Toast;

public class RetrieveActivity extends AppCompatActivity {
    Button bt_ec;
    EditText et_ec;
    TextView name,gender,ecode,dept,sal;
    SQLiteDatabase db;
    Cursor rs;
    String ec;
    LinearLayout ll2;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_retrieve);

        name = findViewById(R.id.name_tb);
        gender = findViewById(R.id.gender_tb);
        ecode = findViewById(R.id.ec_tb);
        dept = findViewById(R.id.dept_tb);
        sal = findViewById(R.id.sal_tb);
        ll2=findViewById(R.id.ll2);

        bt_ec = findViewById(R.id.bt_ec);
        et_ec = findViewById(R.id.et_ec);

        bt_ec.setOnClickListener(new View.OnClickListener() {
            @Override
```

```java
            public void onClick(View view) {

                /*name.setText("");
                gender.setText("");
                ecode.setText("");
                dept.setText("");
                sal.setText("");*/
                ll2.setVisibility(View.INVISIBLE);

                db = openOrCreateDatabase("db", MODE_PRIVATE, null);

                ec = et_ec.getText().toString();
                rs = db.rawQuery("SELECT * FROM EMPLOYEES WHERE
E_CODE = ?;", new String[]{ec});

                try {
                    rs.moveToFirst();
                    name.setText(rs.getString(0));
                    gender.setText(rs.getString(1));
                    ecode.setText(rs.getString(2));
                    dept.setText(rs.getString(3));
                    sal.setText(rs.getString(4));
                    ll2.setVisibility(View.VISIBLE);
                }catch (Exception ex)
                {
                    Toast.makeText(getApplicationContext(), "No such
Employee!", Toast.LENGTH_LONG).show();
                }
                finally {
                    if(rs != null) { rs.close(); }
                    if(db != null) { db.close(); }
                }

            }
        });
    }
}
```

**activity_retrieve2.xml**

```xml
<?xml version="1.0" encoding="utf-8"?>

    <LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
        xmlns:tools="http://schemas.android.com/tools"
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        tools:context=".Retrieve2Activity">

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="0dp"
            android:orientation="vertical"
            android:layout_weight="1">
```

```xml
        <TextView
            android:layout_width="match_parent"
            android:layout_height="0dp"
            android:layout_weight="1"
            android:layout_margin="5dp"
            android:padding="10dp"
            android:gravity="center"
            android:text="Retrieve By Department"
            android:textAllCaps="true"
            android:textColor="@color/colorPrimaryDark"
            android:textSize="30sp" />

        <Spinner
            android:id="@+id/sp_dt"
            android:layout_width="match_parent"
            android:layout_height="0dp"
            android:layout_margin="5dp"
            android:layout_weight="1"
            android:entries="@array/dept" />

        <Button
            android:id="@+id/bt_dt"
            android:layout_width="match_parent"
            android:layout_height="0dp"
            android:layout_margin="5dp"
            android:layout_weight="1"
            android:text="Retrieve By Dept" />

    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:orientation="vertical"
        android:layout_weight="1">

        <TextView
            android:id="@+id/tv1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="EMPLOYEE DETAILS"
            android:textColor="@color/colorPrimaryDark"
            android:textSize="30sp"
            android:gravity="center"
            android:layout_margin="10dp"
            android:layout_weight="0"
            android:visibility="gone"
            />

        <ScrollView
            android:layout_width="match_parent"
            android:layout_height="wrap_content">

            <TextView
                android:id="@+id/resultr"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_margin="10dp"
```

```xml
            android:gravity="center|center_horizontal|center_vertical"
                        android:textColor="@android:color/black"
                        android:textSize="25sp" />

            </ScrollView>

        </LinearLayout>

    </LinearLayout>
```

## Retrieve2Activity.java

```java
package com.example.ex5;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.Spinner;
import android.widget.TextView;
import android.widget.Toast;

public class Retrieve2Activity extends AppCompatActivity {

    Button bt_dt;
    Spinner sp_dt;
    Cursor rs;
    SQLiteDatabase db;
    TextView resultr,tv1;
    String dept,msg;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_retrieve2);

        bt_dt = findViewById(R.id.bt_dt);
        sp_dt = findViewById(R.id.sp_dt);
        resultr=findViewById(R.id.resultr);
        tv1=findViewById(R.id.tv1);

        bt_dt.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {

                tv1.setVisibility(View.GONE);
                db = openOrCreateDatabase("db", MODE_PRIVATE, null);
                dept = sp_dt.getSelectedItem().toString();

                rs = db.rawQuery("SELECT * FROM EMPLOYEES WHERE DEPT
= ?;", new String[]{dept});
                msg = "";
```
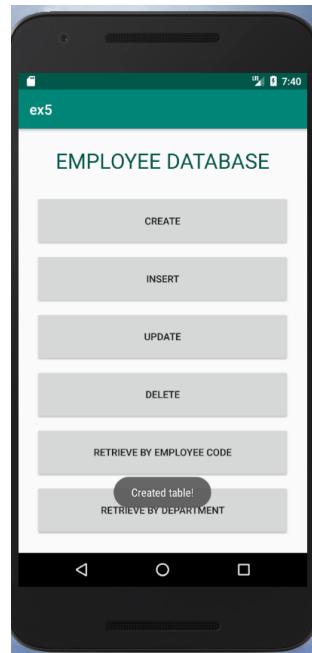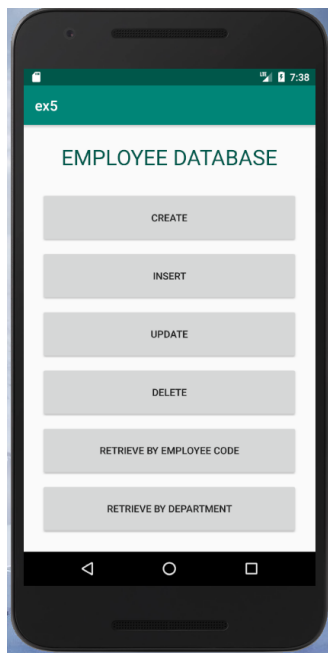
```
                while(rs.moveToNext()) {
                    msg += rs.getString(0) + "  " + rs.getString(1) +
"  " + rs.getString(2) + "  " + rs.getString(3) + " " +
rs.getString(4) + "\n";
                }
                if(msg.equals("")) {
                    resultr.setText("No employees in this
department");
                }
                else{
                    tv1.setVisibility(View.VISIBLE);
                    resultr.setText(msg);
                }

                if(rs != null) { rs.close(); }
                if(db != null) { db.close(); }
            }
        });
    }
}
```

**OUTPUT:**

**Screen 1 — DELETE EMPLOYEE RECORD**

ex5

DELETE EMPLOYEE RECORD

E100

DELETE

Deleted E100

**Screen 2 — DELETE EMPLOYEE RECORD**

ex5

DELETE EMPLOYEE RECORD

E300

DELETE

Doesn't exist!

**Screen 3 — RETRIEVE BY EMPLOYEE CODE**

ex5

RETRIEVE BY EMPLOYEE CODE

E101

RETRIEVE BY EMPLOYEE CODE

EMPLOYEE DETAILS

| Name | Vaishali |
|------|----------|
| Gender | Female |
| Employee Code | E101 |
| Department | CSE |
| Salary | 10000 |

**Screen 4 — RETRIEVE BY DEPARTMENT**

ex5

RETRIEVE BY DEPARTMENT

CSE

RETRIEVE BY DEPT

EMPLOYEE DETAILS

Vaishali  Female  E101  CSE  10000
Ashwin  Male  E102  CSE  50000
Raj  Male  E201  CSE  1234
Abi  Female  E500  CSE  15000

**Screen 5 — RETRIEVE BY DEPARTMENT**

ex5

RETRIEVE BY DEPARTMENT

HR

RETRIEVE BY DEPT

No employees in this department

**activity_main.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>

    <LinearLayout
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:layout_margin="10dp"
        android:orientation="vertical"
        tools:context=".MainActivity">

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Enter your email-id"
            android:textSize="30sp"
            android:textColor="#000000"/>

        <EditText
            android:id="@+id/editText"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:singleLine="true"
            android:textSize="30sp" />

        <Button
            android:id="@+id/button"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="30dp"
            android:layout_gravity="center"
            android:text="Notify"
            android:textSize="30sp"/>


    </LinearLayout>
```

**MainActivity.java:**

```java
package com.example.ex6notif;

import android.annotation.TargetApi;
import android.app.NotificationChannel;
import android.app.NotificationManager;
import android.app.PendingIntent;
import android.content.Context;
import android.content.Intent;
import android.os.Build;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
```

```java
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.NotificationCompat;

import java.util.Date;
import java.util.Random;

public class MainActivity extends AppCompatActivity {

    Button notify;
    EditText e;
    String channelId = "channelNotif";

    @Override
    @TargetApi(16)

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        notify = (Button) findViewById(R.id.button);
        e = (EditText) findViewById(R.id.editText);

        notify.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {

                int m = (int) ((new Date().getTime() / 1000L) %
Integer.MAX_VALUE);
                m += new Random().nextInt(100) + 1;
                Intent intent = new Intent(MainActivity.this,
SecondActivity.class);
                intent.putExtra("msg", e.getText().toString());
                PendingIntent pending =
PendingIntent.getActivity(MainActivity.this, m, intent, 0);

                NotificationCompat.Builder builder = new
NotificationCompat.Builder(MainActivity.this, channelId);
                builder.setSmallIcon(R.mipmap.ic_launcher_round);
                builder.setContentTitle("Thanks for registering");
                builder.setContentText("You've successfully
registered. Tap for more....");
                builder.setContentIntent(pending);
                builder.setAutoCancel(true);
                builder.setPriority(NotificationCompat.PRIORITY_MAX);
NotificationManager manager = (NotificationManager)
getSystemService(Context.NOTIFICATION_SERVICE);
                if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
NotificationChannel channel = new NotificationChannel(channelId,
"Notification channel", NotificationManager.IMPORTANCE_HIGH);
                    manager.createNotificationChannel(channel);
                }
                manager.notify(m, builder.build());

            }
        });
    }
}
```

**activity_second.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
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:orientation="vertical"
    tools:context=".SecondActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="DETAILS"
        android:textSize="30sp"
        android:textColor="@color/colorPrimaryDark"
        android:layout_gravity="center"/>

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/tv"
        android:textSize="30sp"
        android:layout_margin="10dp"
        android:layout_gravity="center"/>


</LinearLayout>
```

**SecondActivity.java:**

```java
package com.example.ex6notif;

import androidx.appcompat.app.AppCompatActivity;

import android.app.PendingIntent;
import android.content.Intent;
import android.os.Bundle;
import android.widget.TextView;

public class SecondActivity extends AppCompatActivity {

    TextView tv;

      protected void onPause() {
          super.onPause();
          finish();
      }


    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_second);
```
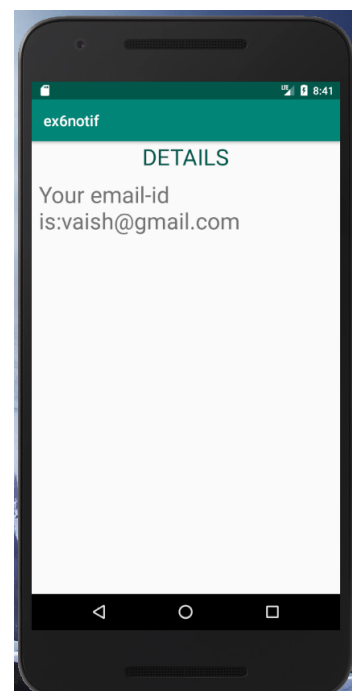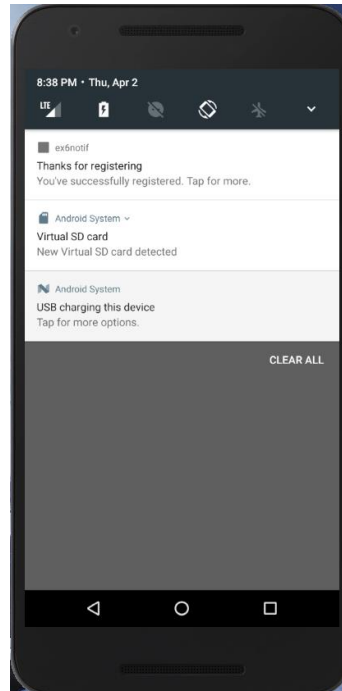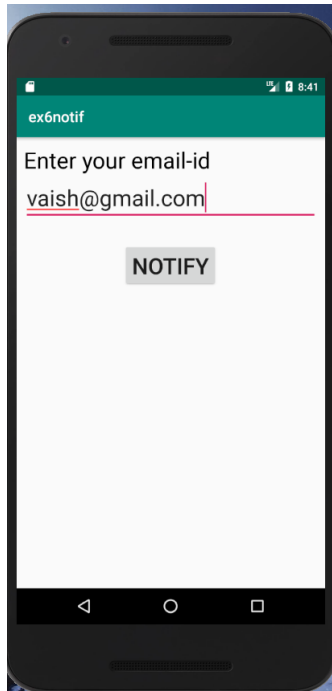
```
        tv=findViewById(R.id.tv);

        Intent myIntent = getIntent();
        String str=myIntent.getStringExtra("msg");
        tv.setText("Your email-id is:"+str);
    }
}
```

**OUTPUT:**

**activity_main.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>

<LinearLayout
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:orientation="vertical"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="50px"
        android:gravity="center"
        android:text="Multithreading"
        android:textColor="@android:color/black"
        android:textSize="30sp" />

    <TextView
        android:id="@+id/tv2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:gravity="center"
        android:text="Press START to view!" />

    <ProgressBar

        android:id="@+id/pbar"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10dp"
        android:layout_marginLeft="50dp"
        android:layout_marginRight="50dp"
        style="@style/Widget.AppCompat.ProgressBar.Horizontal"
        />

    <TextView
        android:id="@+id/tv4"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginBottom="20dp"
        android:gravity="center"
        android:textColor="@android:color/black" />

    <Button
        android:id="@+id/bt_start"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:text="START" />

    <TextView
```

```xml
        android:id="@+id/textView3"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="50dp"
        android:gravity="center"
        android:text="Enter value and press SLEEP to view!" />


    <EditText

        android:id="@+id/et_time"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10dp"
        android:gravity="center"
        android:hint="Enter duration (in secs)"
        android:inputType="number"
        android:backgroundTint="#000000" />

        <Button

        android:id="@+id/bt_sleep"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="SLEEP"
        android:layout_marginTop="20dp"
        android:layout_gravity="center"/>

</LinearLayout>
```

**MainActivity.java:**

```java
package com.example.multithread;

import androidx.annotation.RequiresApi;
import androidx.appcompat.app.AppCompatActivity;

import android.annotation.TargetApi;
import android.app.ProgressDialog;
import android.content.res.ColorStateList;
import android.graphics.Color;
import android.os.Build;
import android.os.Handler;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.ProgressBar;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {

    ProgressBar pbar;
    Handler handler;
    TextView tv4;
```

```java
    Button bt_sleep, bt_start;
    int i;
    EditText et_time;

    @Override
    @TargetApi(21)
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        bt_sleep = findViewById(R.id.bt_sleep);
        bt_start = findViewById(R.id.bt_start);
        pbar = findViewById(R.id.pbar);
        tv4=findViewById(R.id.tv4);
        et_time = findViewById(R.id.et_time);

        handler = new Handler();
        pbar.setProgress(0);

        bt_sleep.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                final int count =
Integer.parseInt(et_time.getText().toString());
                final ProgressDialog pd = new
ProgressDialog(MainActivity.this);
                //pd.setTitle("Sleep in Progress");
                //pd.setMessage("Sleep in Progress");
                pd.show();
                /*handler.postDelayed(new Runnable() {
                    @Override
                    public void run() {
                        pd.dismiss();
                    }
                }, count * 1000);*/
                new Thread(new Runnable() {
                    @Override
                    public void run() {
                        i=0;
                        while(i<=count){
                            handler.post(new Runnable() {
                                @Override
                                public void run() {
                                    pd.setMessage("Sleeping now for "
+(i)+" seconds...");

                                    i++;
                                }
                            });
                            try {
                                Thread.sleep(1000);
                            } catch (Exception e) {
                                e.printStackTrace();
                            }
                        }
                        pd.dismiss();
                    }
                }).start();
            }
```

```java
            });


        bt_start.setOnClickListener(new View.OnClickListener() {
            @Override
            @RequiresApi(29)
            public void onClick(View v) {

pbar.setProgressTintList(ColorStateList.valueOf(Color.RED));
                new Thread(new Runnable() {
                    @Override
                    public void run() {
                        i=0;
                        while(i<=100){
                            if (i == 100) {
                                pbar.post(new Runnable() {
                                    @Override
                                    public void run() {

pbar.setProgressTintList(ColorStateList.valueOf(Color.GREEN));
                                    }
                                });
                            }
                            pbar.setProgress(i);
                            pbar.post(new Runnable() {
                                @Override
                                public void run() {
                                    tv4.setText(String.valueOf(i) +
"%");

                                    i++;
                                }
                            });
                            try {
                                Thread.sleep(100);
                            } catch (Exception e) {
                                e.printStackTrace();
                            }
                        }
                    }
                }).start();
            }
        });
    }
}
```
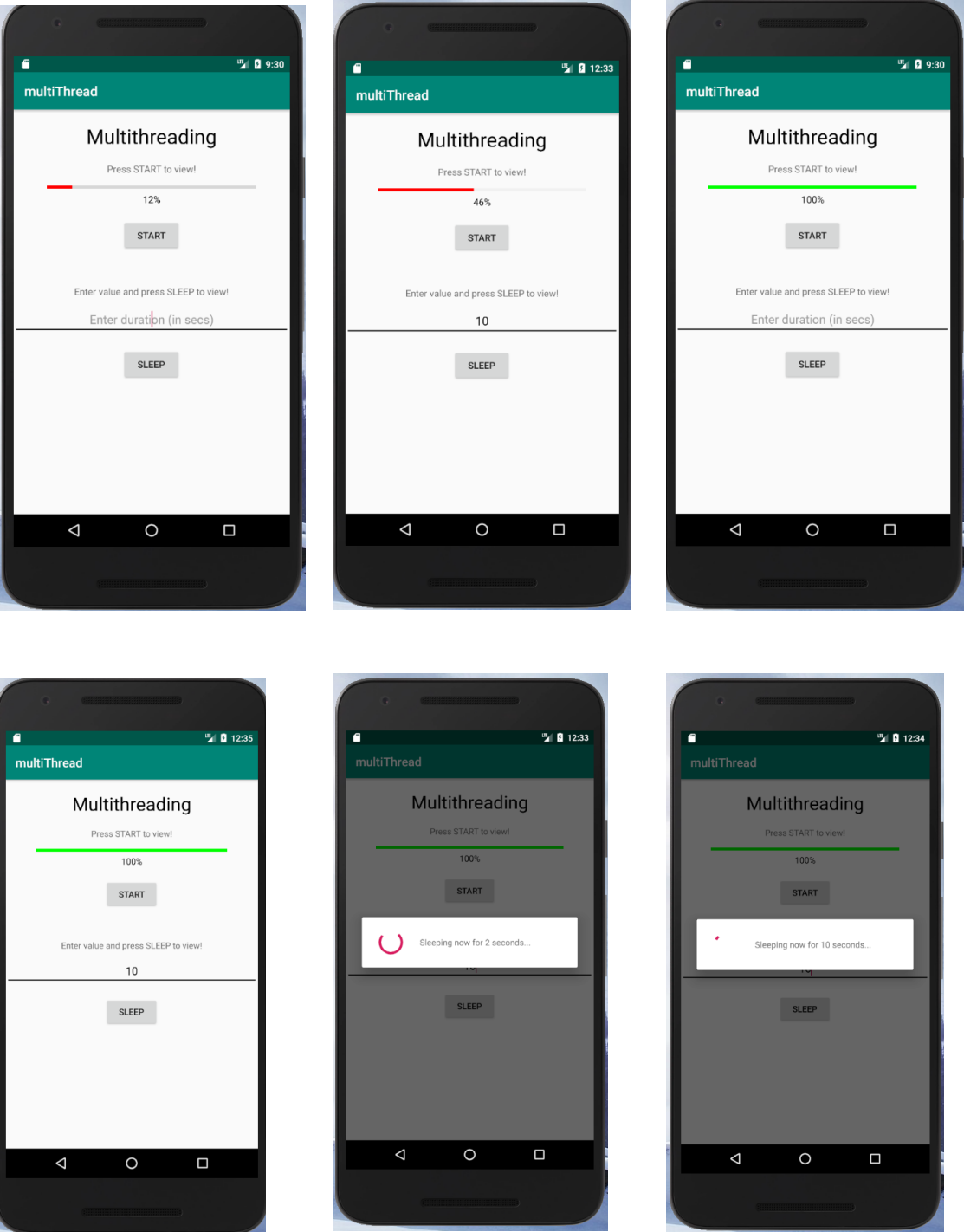
**OUTPUT:**

**activity_main.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
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:orientation="vertical"
    tools:context=".MainActivity">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="ALARM CLOCK"
        android:textAllCaps="true"
        android:textSize="36sp"
        android:textColor="#000000"
        android:gravity="center"/>

    <EditText
        android:id="@+id/et_time"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Click to select time"
        android:layout_margin="5dp"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="SET ALARM"
        android:id="@+id/bt_set"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="STOP ALARM"
        android:id="@+id/bt_stop"/>

</LinearLayout>
```

**MainActivity.java:**

```java
package com.example.alarmtrial;

import androidx.annotation.RequiresApi;
import androidx.appcompat.app.AppCompatActivity;

import android.app.AlarmManager;
import android.app.PendingIntent;
import android.app.TimePickerDialog;
import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
```

```java
import android.widget.Button;
import android.widget.EditText;
import android.widget.TimePicker;
import android.widget.Toast;

import java.util.Calendar;
import java.util.Date;

public class MainActivity extends AppCompatActivity {

    Calendar calObj,current;
    EditText et_time;
    Button bt_set,bt_stop;
    AlarmManager alarmManager;
    PendingIntent pending;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        et_time=findViewById(R.id.et_time);
        bt_set=findViewById(R.id.bt_set);
        bt_stop=findViewById(R.id.bt_stop);

        calObj =Calendar.getInstance();

        bt_stop.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                alarmManager.cancel(pending);
                et_time.setText("");
                if(alarmReceiver.ringtone!=null)
                    alarmReceiver.ringtone.stop();
            }
        });

        bt_set.setOnClickListener(new View.OnClickListener() {
            @Override
            @RequiresApi(19)
            public void onClick(View v) {

                if(!et_time.getText().toString().equals(""))
                {
                    //Log.i("TIME", " val1:
"+calObj.compareTo(Calendar.getInstance()));
                    //Log.i("TIME","set: "+calObj.getTime()+" cur:
"+Calendar.getInstance().getTime());

                    if (calObj.compareTo(Calendar.getInstance()) <=
0)
                        Toast.makeText(getApplicationContext(),
"Invalid Time !!!", Toast.LENGTH_LONG).show();
                    else
                    {
                        alarmManager = (AlarmManager)
getSystemService(ALARM_SERVICE);
                        Intent myIntent = new
```

```java
                    Intent(MainActivity.this, alarmReceiver.class);
                                pending =
PendingIntent.getBroadcast(MainActivity.this, 0, myIntent, 0);

alarmManager.setExact(AlarmManager.RTC_WAKEUP,
calObj.getTimeInMillis(), pending);
                                double time=calObj.getTimeInMillis()-
Calendar.getInstance().getTimeInMillis();
                                time=Math.ceil(time/(60*1000));
                                Toast.makeText(MainActivity.this, "Alarm set
for "+(int)time+" minutes from now!",
                                        Toast.LENGTH_LONG).show();
                    }
                }
                else
                    Toast.makeText(MainActivity.this, "Please select
the time",Toast.LENGTH_LONG).show();
            }
        });

        et_time.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {

                TimePickerDialog timePickerDialog = new
TimePickerDialog(MainActivity.this,
                        new TimePickerDialog.OnTimeSetListener() {
                            @Override
                            public void onTimeSet(TimePicker view,
int hourOfDay, int minute) {


et_time.setText(Integer.toString(hourOfDay) + ":" +
Integer.toString(minute));

                                    calObj.set(Calendar.HOUR_OF_DAY,
hourOfDay);

                                    calObj.set(Calendar.MINUTE, minute);
                                    calObj.set(Calendar.SECOND,0);

                            }
                        },
Calendar.getInstance().get(Calendar.HOUR_OF_DAY),
Calendar.getInstance().get(Calendar.MINUTE), false);
                timePickerDialog.show();
            }
        });
    }
}
```

**alarmReceiver.java**

```java
package com.example.alarmtrial;

import android.app.NotificationManager;
import android.app.PendingIntent;
```

```java
import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.media.Ringtone;
import android.media.RingtoneManager;
import android.net.Uri;
import java.util.Calendar;
import androidx.annotation.RequiresApi;
import androidx.core.app.NotificationCompat;

public class alarmReceiver extends BroadcastReceiver {

    Uri uri;
    static Ringtone ringtone;

    @RequiresApi(16)
    public void onReceive(Context context, Intent intent) {

        uri =
RingtoneManager.getDefaultUri(RingtoneManager.TYPE_ALARM);
        ringtone = RingtoneManager.getRingtone(context, uri);
        ringtone.play();

        Intent i1 = new Intent(context, MainActivity.class);
        // i1.setFlags(Intent.FLAG_ACTIVITY_REORDER_TO_FRONT);
        PendingIntent pd = PendingIntent.getActivity(context, 0, i1,
PendingIntent.FLAG_UPDATE_CURRENT);
        NotificationCompat.Builder builder = new
NotificationCompat.Builder(context);
        builder.setSmallIcon(R.mipmap.ic_launcher_round);
        builder.setContentIntent(pd);
        builder.setContentTitle("Alarm");
        builder.setContentText("Wake up!!It's "
+Calendar.getInstance().get(Calendar.HOUR_OF_DAY)+":"+Calendar.getIns
tance().get(Calendar.MINUTE));
        builder.setAutoCancel(true);

        NotificationManager manager = (NotificationManager)
context.getSystemService(Context.NOTIFICATION_SERVICE);
        manager.notify(1, builder.build());
    }
}
```

**AndroidManifest.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.alarmtrial">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
```
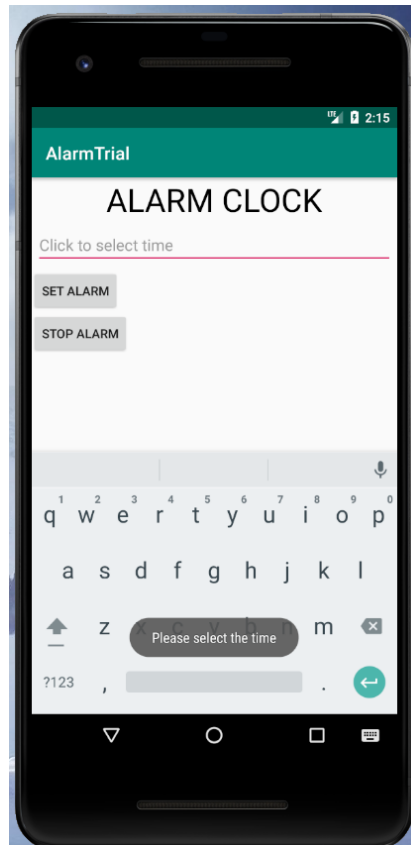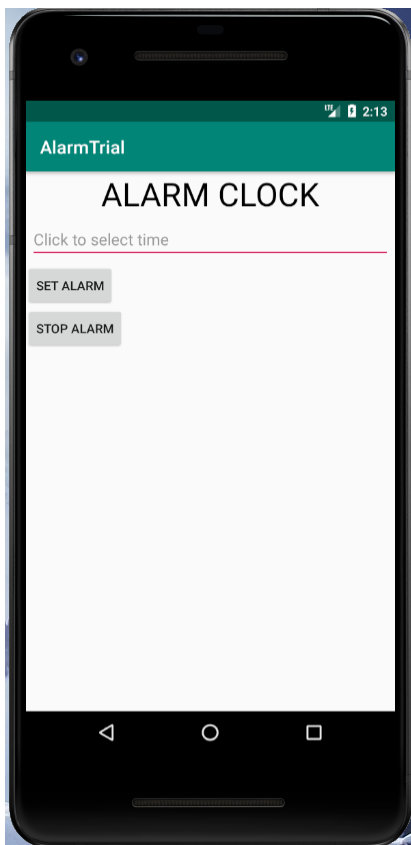
```xml
        <activity android:name=".MainActivity"
android:launchMode="singleInstance">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category
android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>

        <receiver android:name=".alarmReceiver" />
    </application>

</manifest>
```
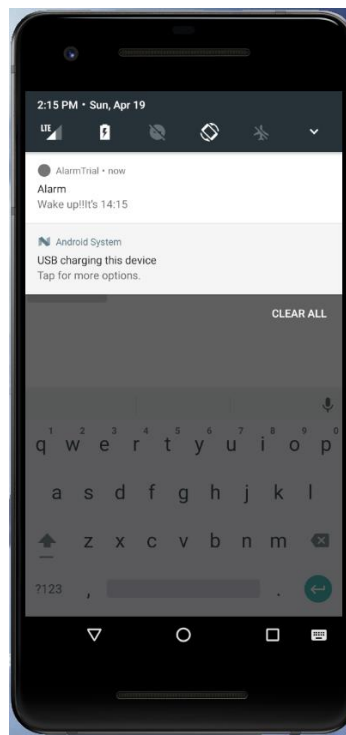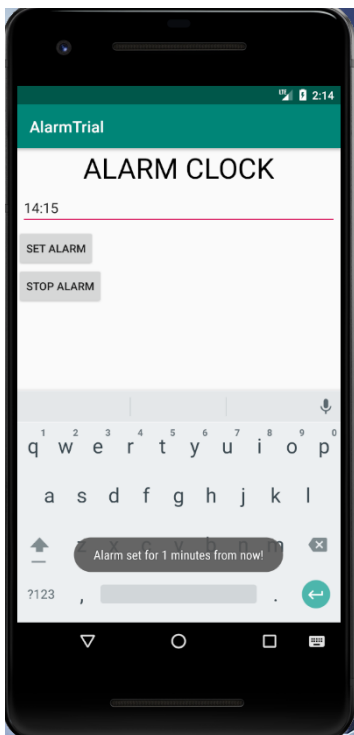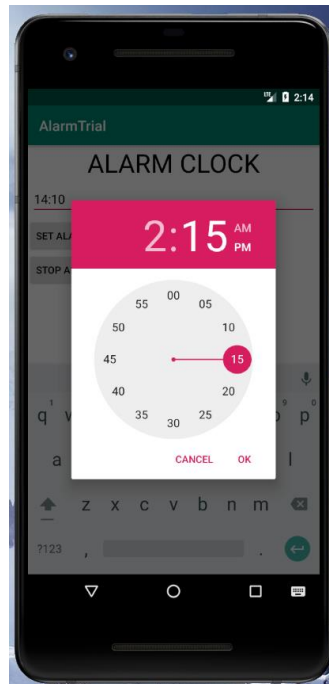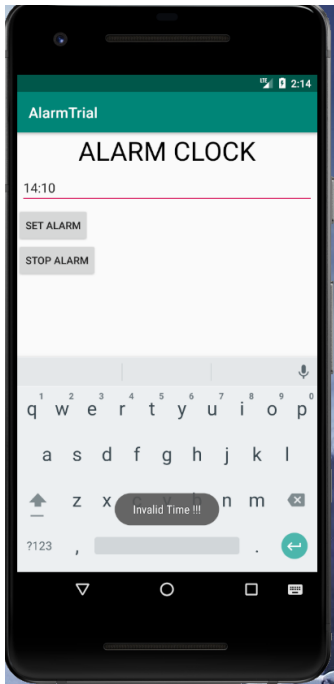
**OUTPUT:**

**activity_main.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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:layout_margin="10dp"
    android:orientation="vertical"
    tools:context=".MainActivity">

    <RelativeLayout
        android:id="@+id/container"
        android:layout_width="match_parent"
        android:layout_height="wrap_content">

        <TextView
            android:id="@+id/title1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="25sp"
            android:textStyle="bold"
            android:text="CURRENT COORDINATES"
            android:gravity="center"/>

        <TextView
            android:id="@+id/tv_lat"
            android:layout_below="@+id/title1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="10pt"
            android:textSize="25sp"
            android:text="Latitude:" />

        <TextView
            android:id="@+id/tv_latVal"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@+id/title1"
            android:layout_margin="10pt"
            android:layout_toRightOf="@id/tv_lat"
            android:text="00.00"
            android:textSize="25sp"
            android:textStyle="bold" />

        <TextView
            android:id="@+id/tv_long"
            android:layout_below="@+id/tv_lat"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginBottom="10pt"
            android:layout_marginLeft="10pt"
            android:layout_marginRight="10pt"
            android:textSize="25sp"
            android:text="Longitude:" />

        <TextView
            android:id="@+id/tv_longVal"
            android:layout_below="@+id/tv_latVal"
```

```xml
            android:layout_toRightOf="@id/tv_long"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginBottom="10pt"
            android:layout_marginLeft="10pt"
            android:layout_marginRight="10pt"
            android:text="00.00"
            android:textSize="25sp"
            android:textStyle="bold" />

        <Button
            android:id="@+id/getCurrent"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@id/tv_long"
            android:layout_marginBottom="10pt"
            android:layout_marginLeft="10pt"
            android:layout_marginRight="10pt"
            android:text="Get Current coordinates"
            android:layout_centerHorizontal="true"/>

    </RelativeLayout>

    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content">

        <TextView
            android:id="@+id/title2"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="25sp"
            android:textStyle="bold"
            android:text="COORDINATES OF A PLACE"
            android:gravity="center"/>

        <EditText
            android:id="@+id/addressText"
            android:layout_below="@+id/title2"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginBottom="10pt"
            android:layout_marginLeft="10pt"
            android:layout_marginRight="10pt"
            android:textSize="25sp"
            android:hint="Enter location" />

        <Button
            android:id="@+id/getCoordinates"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@id/addressText"
            android:layout_marginBottom="10pt"
            android:layout_centerHorizontal="true"
            android:text="Get Coordinates" />

        <TextView
            android:id="@+id/tv_lat1"
            android:layout_below="@+id/getCoordinates"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
```

```xml
            android:layout_marginBottom="10pt"
            android:layout_marginLeft="10pt"
            android:layout_marginRight="10pt"
            android:textSize="25sp"
            android:text="Latitude:" />

        <TextView
            android:id="@+id/tv_latVal1"
            android:layout_below="@+id/getCoordinates"
            android:layout_toRightOf="@id/tv_lat1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginBottom="10pt"
            android:layout_marginLeft="10pt"
            android:layout_marginRight="10pt"
            android:text="00.00"
            android:textSize="25sp"
            android:textStyle="bold" />

        <TextView
            android:id="@+id/tv_long1"
            android:layout_below="@+id/tv_lat1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginBottom="10pt"
            android:layout_marginLeft="10pt"
            android:layout_marginRight="10pt"
            android:textSize="25sp"
            android:text="Longitude:" />

        <TextView
            android:id="@+id/tv_longVal1"
            android:layout_below="@+id/tv_latVal1"
            android:layout_toRightOf="@id/tv_long1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginBottom="10pt"
            android:layout_marginLeft="10pt"
            android:layout_marginRight="10pt"
            android:text="00.00"
            android:textSize="25sp"
            android:textStyle="bold" />

    </RelativeLayout>

</LinearLayout>
```

**MainActivity.java:**

```java
package com.example.gps;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;

import android.Manifest;
import android.location.Address;
import android.location.Geocoder;
import android.location.Location;
import android.os.Bundle;
```

```java
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import java.io.IOException;
import java.util.ArrayList;

public class MainActivity extends AppCompatActivity {

    Button getCurrent,getCoordinates;
    TextView latView,longView,lat2,long2;
    EditText addressText;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        getCurrent=findViewById(R.id.getCurrent);
        latView=findViewById(R.id.tv_latVal);
        longView=findViewById(R.id.tv_longVal);

        getCoordinates=findViewById(R.id.getCoordinates);
        addressText=findViewById(R.id.addressText);
        lat2=findViewById(R.id.tv_latVal1);
        long2=findViewById(R.id.tv_longVal1);

        ActivityCompat.requestPermissions(MainActivity.this, new String[]
{Manifest.permission.ACCESS_FINE_LOCATION}, 123);

        getCurrent.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {

                GPSTracker tracker=new
GPSTracker(getApplicationContext());
                Location l=tracker.getLocation();

                if(l != null) {
                    Double lng = (double) Math.round(l.getLongitude() *
100) / 100;
                    Double lat = (double) Math.round(l.getLatitude() *
100) / 100;
                    latView.setText(lat.toString());
                    longView.setText(lng.toString());
                }
                else
                {
                    latView.setText("00.00");
                    longView.setText("00.00");
                }
            }
        });

        getCoordinates.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Geocoder coder = new Geocoder(getApplicationContext());
```

```java
                    ArrayList<Address> addresses = null;
                    try {
                        String address = addressText.getText().toString();
                        addresses = (ArrayList<Address>)
coder.getFromLocationName(address, 1);
                        for(Address add: addresses){
                            Double lng = (double)
Math.round(add.getLongitude() * 100) / 100;
                            Double lat = (double)
Math.round(add.getLatitude() * 100) / 100;
                            lat2.setText(lat.toString());
                            long2.setText(lng.toString());
                        }
                    }
                    catch (IOException e) {
                        Toast.makeText(getApplicationContext(),"Can't get
coordinates!\nNetwork problem",Toast.LENGTH_LONG);
                    }
                }
            });
        }
}
```

**GPSTracker.java:**

```java
package com.example.gps;

import android.Manifest;
import android.content.Context;
import android.content.pm.PackageManager;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.os.Bundle;
import android.util.Log;
import android.widget.Toast;

import androidx.core.content.ContextCompat;

import static android.content.Context.LOCATION_SERVICE;

public class GPSTracker implements LocationListener {

    Context context;

    public GPSTracker(Context context) {
        this.context = context;
    }

    public Location getLocation(){
        if (ContextCompat.checkSelfPermission( context,
Manifest.permission.ACCESS_FINE_LOCATION ) !=
PackageManager.PERMISSION_GRANTED) {
            Toast.makeText(context,"Location Permission not
granted",Toast.LENGTH_LONG).show();
            return null;
        }

        LocationManager lm = (LocationManager)
context.getSystemService(LOCATION_SERVICE);
        boolean isGPSEnabled =
```

```java
lm.isProviderEnabled(LocationManager.GPS_PROVIDER);
        if(!isGPSEnabled){
            Toast.makeText(context,"GPS not enabled!!!\nPlease enable
it",Toast.LENGTH_LONG).show();
            return null;
        }

        lm.requestLocationUpdates(LocationManager.GPS_PROVIDER,
5000,10,this);
        Location loc =
lm.getLastKnownLocation(LocationManager.GPS_PROVIDER);
        return loc;
    }

    @Override
    public void onLocationChanged(Location location) {
    }

    @Override
    public void onStatusChanged(String provider, int status, Bundle
extras) {
    }

    @Override
    public void onProviderEnabled(String provider) {
    }

    @Override
    public void onProviderDisabled(String provider) {
    }
}
```

**AndroidManifest.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.gps">
    <uses-permission
android:name="android.permission.ACCESS_FINE_LOCATION" />
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER"
/>
            </intent-filter>
        </activity>
    </application>

</manifest>
```
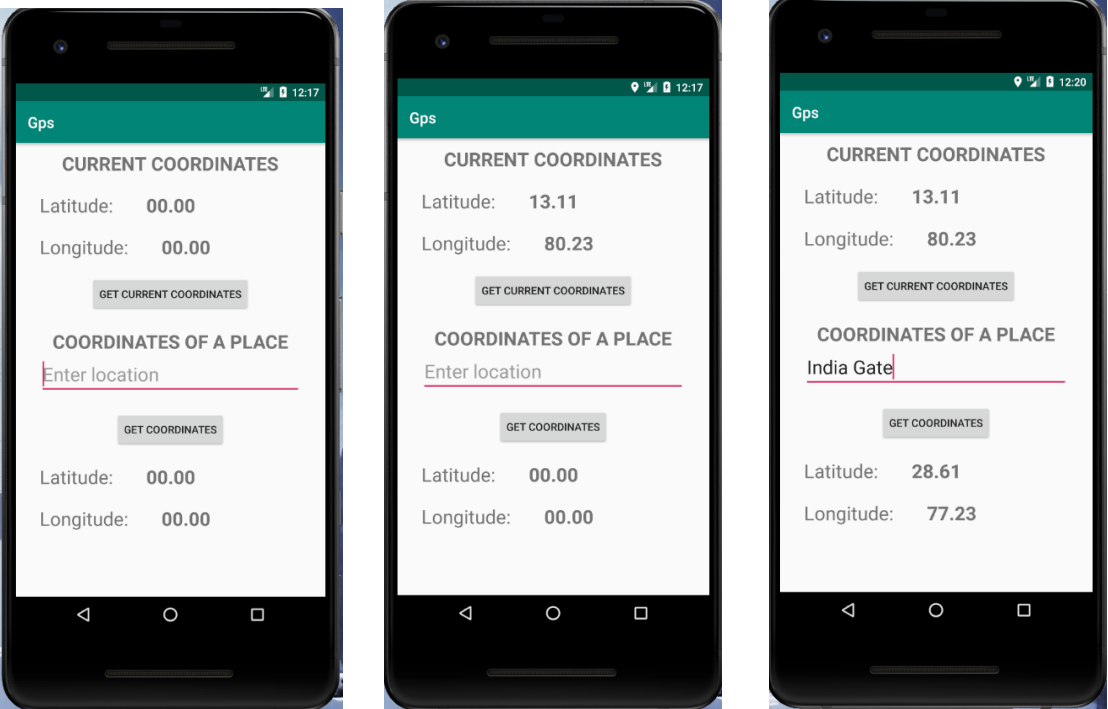
**OUTPUT:**

**activity_main.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_margin="10dp"
    android:orientation="vertical"
    tools:context=".MainActivity">

    <TextView
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_margin="5dp"
        android:text="Reading and Writing to External Storage"
        android:textAlignment="center"
        android:textAllCaps="true"
        android:textSize="24sp" />

    <EditText
        android:id="@+id/et_name"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="5dp"
        android:hint="Enter the file name"
        android:textSize="20sp">
        <requestFocus />
    </EditText>

    <EditText
        android:id="@+id/et_content"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="5dp"
        android:hint="Enter content"
        android:inputType="textMultiLine"
        android:textSize="20sp" />

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

        <Button
            android:id="@+id/bt_read"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_margin="5dp"
            android:layout_weight="1"
            android:text="READ" />

        <Button
            android:id="@+id/bt_write"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_margin="5dp"
            android:layout_weight="1"
            android:text="WRITE" />
```

```xml
        </LinearLayout>

        <TextView
            android:id="@+id/tv_info"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_margin="10dp"
            android:textSize="30sp"/>

</LinearLayout>
```

**MainActivity.java:**

```java
package com.example.ex9_sdcard;

package com.example.ex9_sdcard;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;

import android.annotation.TargetApi;
import android.os.Build;
import android.os.Bundle;
import android.os.Environment;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import java.io.BufferedReader;
import java.io.File;
import java.io.FileOutputStream;
import java.io.FileReader;

public class MainActivity extends AppCompatActivity implements
ActivityCompat.OnRequestPermissionsResultCallback {
    EditText et_content,et_name;
    Button bt_write,bt_read;
    TextView tv_info;
    String fileName,content;
    File myFile;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        tv_info=findViewById(R.id.tv_info);
        et_name=findViewById(R.id.et_name);
        et_content=findViewById(R.id.et_content);

        bt_write=findViewById(R.id.bt_write);
        bt_read=findViewById(R.id.bt_read);

        if (!isExternalStorageMounted()) {
            bt_read.setEnabled(false);
            bt_write.setEnabled(false);
```

```java
                    tv_info.setText("External Strorage not mounted");
            } else if (isExternalStorageReadOnly()) {
                bt_write.setEnabled(false);
                tv_info.setText("External Strorage is read-only! Can't write
data to SD Card");
            }

        bt_write.setOnClickListener(new View.OnClickListener() {
            @Override
            @TargetApi(21)
            public void onClick(View v) {
                fileName=et_name.getText().toString().trim();
                content=et_content.getText().toString().trim();
                tv_info.setText("");
                if(fileName.equals(""))
                {
                    Toast.makeText(MainActivity.this, "Please enter file
name", Toast.LENGTH_SHORT).show();
                    return;
                }
                try {
                    File[] farr =
ContextCompat.getExternalFilesDirs(getApplicationContext(), null);

if(Build.VERSION.SDK_INT<=Build.VERSION_CODES.KITKAT_WATCH) {
                        myFile = new File(farr[0], fileName);
                    }
                    else {
                        for(File file:farr)

if(Environment.isExternalStorageRemovable(file)) {
                            myFile = new File(file, fileName);
                            break;
                        }
                    }
                    FileOutputStream fos = new FileOutputStream(myFile);
                    fos.write(content.getBytes());
                    fos.close();
                    Toast.makeText(MainActivity.this, "File "+fileName+"
written to SD card", Toast.LENGTH_LONG).show();
                } catch (Exception e) {
                    Toast.makeText(MainActivity.this, "Error writing
"+fileName+" to SD card", Toast.LENGTH_LONG).show();
                }
                finally {
                    et_name.setText("");
                    et_content.setText("");
                }
            }
        });

        bt_read.setOnClickListener(new View.OnClickListener() {
            @Override
            @TargetApi(21)
            public void onClick(View v) {
                tv_info.setText("");
                et_content.setText("");
                fileName=et_name.getText().toString().trim();
                if(fileName.equals(""))
                {
                    Toast.makeText(MainActivity.this, "Please enter file
```

```java
name", Toast.LENGTH_LONG).show();
                    return;
                }

            try {
                File[] farr =
ContextCompat.getExternalFilesDirs(getApplicationContext(), null);

if(Build.VERSION.SDK_INT<=Build.VERSION_CODES.KITKAT_WATCH) {  //api 18
                    myFile = new File(farr[0], fileName);
                }
                else {
                    for(File file:farr)

if(Environment.isExternalStorageRemovable(file)) {
                            myFile = new File(file, fileName);
                            break;
                        }
                }
                BufferedReader br = new BufferedReader(new
FileReader(myFile));
                String input, text = "";
                while ((input = br.readLine()) != null)
                    text = text+input+"\n";
                br.close();

                tv_info.setText("Content read from file "+fileName+":
\n"+text);
                Toast.makeText(MainActivity.this, "File "+fileName+"
read", Toast.LENGTH_LONG).show();

            }catch (Exception e){
                Toast.makeText(MainActivity.this, "Error reading
"+fileName+" from SD card: No such file", Toast.LENGTH_LONG).show();
            }
        }
    });
    }


    private boolean isExternalStorageMounted() {
            return
(Environment.getExternalStorageState().equals(Environment.MEDIA_MOUNTED)
) ||

(Environment.getExternalStorageState().equals(Environment.MEDIA_MOUNTED_R
EAD_ONLY ));
    }

    private boolean isExternalStorageReadOnly() {
        return
Environment.getExternalStorageState().equals(Environment.MEDIA_MOUNTED_RE
AD_ONLY);
    }

}
```
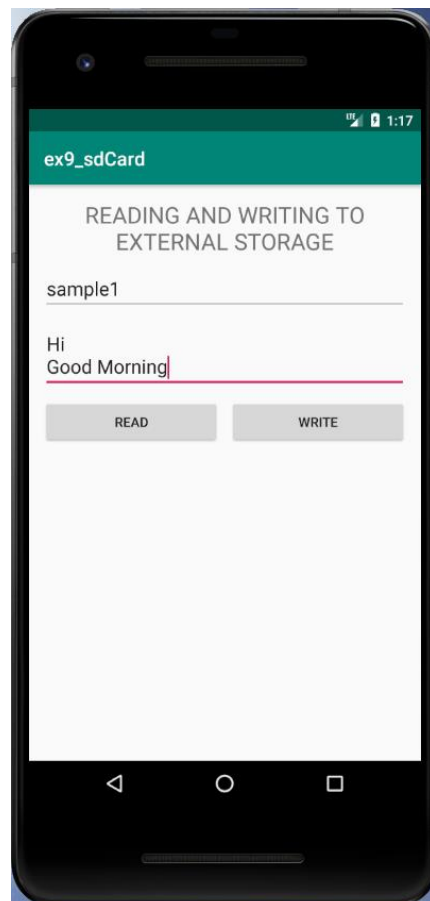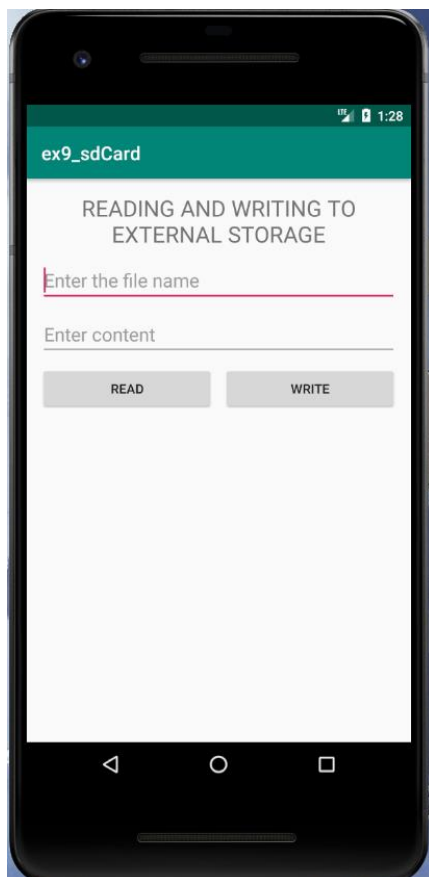
**AndroidManifest.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.ex9_sdcard">

    <uses-permission
        android:name="android.permission.WRITE_EXTERNAL_STORAGE"
        android:maxSdkVersion="18"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER"
/>
            </intent-filter>
        </activity>
    </application>

</manifest>
```
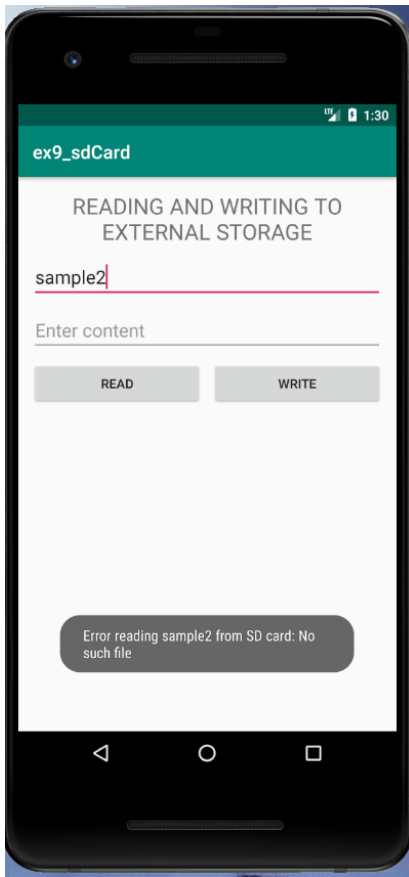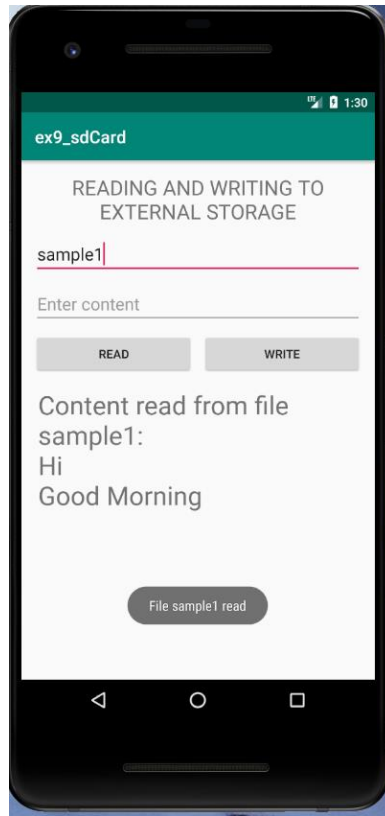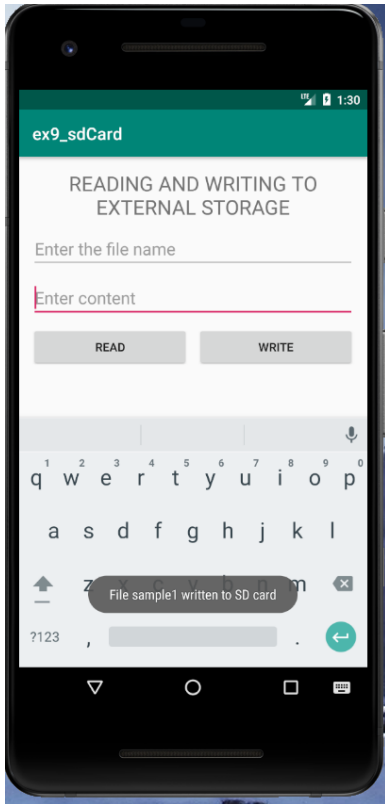
**OUTPUT:**

**Screen 1:**

ex9_sdCard

READING AND WRITING TO
EXTERNAL STORAGE

Enter the file name

Enter content

READ          WRITE

File sample1 written to SD card

**Screen 2:**

ex9_sdCard

READING AND WRITING TO
EXTERNAL STORAGE

sample1

Enter content

READ          WRITE

Content read from file
sample1:
Hi
Good Morning

File sample1 read

**Screen 3:**

ex9_sdCard

READING AND WRITING TO
EXTERNAL STORAGE

sample2

Enter content

READ          WRITE

Error reading sample2 from SD card: No
such file

**activity_main.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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:orientation="vertical"
    android:layout_margin="10dp"
    tools:context=".MainActivity">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="SMS APP"
        android:textSize="30sp"
        android:gravity="center"
        android:textStyle="bold"
        android:layout_margin="20dp"/>

    <Button
        android:id="@+id/bt_send"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="SEND SMS"
        android:layout_gravity="center"
        android:onClick="launchSend"/>

    <Button
        android:id="@+id/bt_view"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="VIEW RECEIVED SMS"
        android:layout_gravity="center"
        android:onClick="launchInbox"/>

    <TextView
        android:id="@+id/tv_err"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:layout_margin="25dp"/>
</LinearLayout>
```

**activity_compose.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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:orientation="vertical"
    android:layout_margin="20dp"
    tools:context=".MainActivity">
```

```xml
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="SEND SMS"
        android:textSize="30sp"
        android:textStyle="bold"
        android:layout_gravity="center"
        android:layout_margin="10dp"/>

    <EditText
        android:id="@+id/et_ph"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:textSize="20sp"
        android:hint="Please enter the phone number"
        android:inputType="phone" />

    <EditText
        android:id="@+id/et_msg"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:textSize="20sp"
        android:hint="Enter the message"
        android:inputType="textMultiLine" />

    <Button
    android:id="@+id/bt_send"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="100px"
    android:text="Send" />

    </LinearLayout>
```

## activity_inbox.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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:orientation="vertical"
    tools:context=".InboxActivity">

    <ScrollView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:fillViewport="true">

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical">
```

```xml
        <TextView
            android:id="@+id/msgs"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_margin="50px" />

    </LinearLayout>

</ScrollView>
</LinearLayout>
```

## MainActivty.java

```java
package com.example.ex10_smsalert;

import android.Manifest;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;

public class MainActivity extends AppCompatActivity {

    Button bt_send, bt_view;
    TextView tv_err;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        bt_send = findViewById(R.id.bt_send);
        bt_view = findViewById(R.id.bt_view);
        tv_err = findViewById(R.id.tv_err);

        ActivityCompat.requestPermissions(MainActivity.this, new
String[]{Manifest.permission.SEND_SMS, Manifest.permission.READ_SMS,
Manifest.permission.RECEIVE_SMS}, 101);
    }

    @Override
    public void onRequestPermissionsResult(int requestCode, String[]
permissions, int[] grantResults) {
        String info_text = "";
        switch (requestCode) {
            case 101: {
                if (grantResults.length > 0) {
                    if (grantResults[0] ==
PackageManager.PERMISSION_DENIED) {
                        bt_send.setEnabled(false);
                        info_text = "Permission required to send sms\n";
                    }
                    if (grantResults[1] ==
PackageManager.PERMISSION_DENIED) {
                        bt_view.setEnabled(false);
```

```java
                        info_text += "Permission required to read sms\n";
                    }
                    if (grantResults[2] ==
PackageManager.PERMISSION_DENIED) {
                        bt_view.setEnabled(false);
                        info_text += "Permission required to receive
sms\n";
                    }
                    if (!info_text.equals(""))
                        info_text += "Please provide the required
permissions!!\n";
                    tv_err.setText(info_text);
                }
            }
        }
    }

    public void launchSend(View view) {
        Intent intent = new Intent(MainActivity.this,
ComposeActivity.class);
        startActivity(intent);
    }

    public void launchInbox(View view) {
        Intent intent = new Intent(MainActivity.this,
InboxActivity.class);
        intent.putExtra("from", "main");
        startActivity(intent);
    }
}
```

**ComposeActivty.java:**

```java
package com.example.ex10_smsalert;

import android.os.Bundle;
import android.telephony.SmsManager;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

public class ComposeActivity extends AppCompatActivity {

    public static boolean active = false;
    Button bt_send;
    EditText et_ph, et_msg;

    protected void onStart() {
        super.onStart();
        active = true;  //active in background
    }

    @Override
    protected void onDestroy() {
        super.onDestroy();
```

```java
            active = false;
    }

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_compose);

        bt_send = findViewById(R.id.bt_send);
        et_ph = findViewById(R.id.et_ph);
        et_msg = findViewById(R.id.et_msg);

        bt_send.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                SmsManager smsManager = SmsManager.getDefault();
                //smsManager.sendTextMessage(destinationAddress,
scAddress, smsMessage,sentIntent, deliveryIntent);
                smsManager.sendTextMessage(et_ph.getText().toString(),
null, et_msg.getText().toString(), null, null);
                Toast.makeText(getApplicationContext(), "Message Sent!",
Toast.LENGTH_SHORT).show();
            }
        });
    }
}
```

**InboxActivity.java:**

```java
package com.example.ex10_smsalert;

import android.content.ContentResolver;
import android.content.Intent;
import android.database.Cursor;
import android.net.Uri;
import android.os.Bundle;
import android.widget.TextView;

import androidx.appcompat.app.AppCompatActivity;

public class InboxActivity extends AppCompatActivity {

    public static boolean active = false;
    public static InboxActivity inst;
    TextView msgs;

    public static InboxActivity instance() {
        return inst;
    }

    @Override
    protected void onStart() {
        super.onStart();
        active = true;
        inst = this;
    }

    @Override
    protected void onStop() {
```

```java
            super.onStop();
            active = false;
            inst = null;
    }

    public void onBackPressed() {
        Intent myIntent = getIntent();
        String str = myIntent.getStringExtra("from");
        if (str != null && str.equals("receiver")) {
            if (ComposeActivity.active) {
                finish();
                this.startActivity(new Intent(InboxActivity.this,
ComposeActivity.class));
            } else {
                finish();
                this.startActivity(new Intent(InboxActivity.this,
MainActivity.class));
            }
        } else
            super.onBackPressed();
    }

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        //setContentView(R.layout.activity inbox);
        inst = this;
        refreshInbox();
    }

    void refreshInbox() {
        this.runOnUiThread(new Runnable() {
            @Override
            public void run() {
                setContentView(R.layout.activity_inbox);
                msgs = findViewById(R.id.msgs);
                String msg = "";
                ContentResolver cr = getContentResolver();
                Cursor i = cr.query(Uri.parse("content://sms/inbox"), new
String[]{"address", "body"}, null, null, null);
                if (!i.moveToFirst()) {
                    return;
                } else {
                    do {
                        msg = msg + "From: " +
i.getString(i.getColumnIndex("address")) + "\nMessage: " +
i.getString(i.getColumnIndex("body")) + "\n\n";
                    } while (i.moveToNext());
                    msgs.setText(msg);
                }
            }
        });
    }
}
```

### Receiver.java:

```java
package com.example.ex10_smsalert;

import android.app.NotificationChannel;
import android.app.NotificationManager;
import android.app.PendingIntent;
import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.os.Build;
import android.os.Bundle;
import android.provider.Telephony;
import android.telephony.SmsMessage;
import android.util.Log;

import androidx.core.app.NotificationCompat;
import androidx.core.app.Person;

import java.util.Date;
import java.util.Random;

public class Receiver extends BroadcastReceiver {
    String channelId = "channelAlarm";
    SmsMessage smsMessage;

    @Override

    public void onReceive(Context context, Intent intent) {

        String no = null, msg = null;
        long time = 0;
        Person p = new
Person.Builder().setKey("123").setName("You").build(); //receiver
        Person sender = null;
        Bundle b;

        if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.KITKAT) {
//KITKAT
            SmsMessage[] msgs =
Telephony.Sms.Intents.getMessagesFromIntent(intent);
            smsMessage = msgs[0];
        }
        else {  //intent has extras: "pdus" - An Object[] of byte[]s
containing the PDUs that make up the message.
            b = intent.getExtras();
            if (b != null) {
                Object pdus[] = (Object[]) b.get("pdus");
                smsMessage = SmsMessage.createFromPdu((byte[]) pdus[0]);

            }
            else
                return;
        }

        no =smsMessage.getOriginatingAddress();
        msg = smsMessage.getMessageBody();
        time = smsMessage.getTimestampMillis();
        //sm.getUserData();
        sender = new Person.Builder().setKey(no).setName(no).build();
```

```java
        if(InboxActivity.active) {
            try {
                Thread.sleep(1000);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }
            InboxActivity.instance().refreshInbox();
        }
            sendNotification(context, p, msg, sender, time);
    }

    public void sendNotification(Context context,Person p, String msg,
Person sender,long time) {

        int m = (int) ((new Date().getTime() / 1000L) %
Integer.MAX_VALUE);  //1000L -L denotes long
//System.currentTimeMillis()%10000 can also be done
        //The above line only works with diff seconds. So if you have
multiple notifications at the same second, this will not work.
        m += new Random().nextInt(100) + 1;  //hence add this line

        Intent i1 = new Intent(context,InboxActivity.class);    //
        i1.putExtra("from","receiver");
        PendingIntent pd = PendingIntent.getActivity(context, m, i1, 0);
//

        NotificationCompat.Builder builder = new
NotificationCompat.Builder(context, channelId);
        builder.setSmallIcon(R.mipmap.ic_launcher_round);
        //builder.setContentTitle("Message!!"); //from name //  title and
text will be ignored if style is messaging
        //builder.setContentText("FROM: " + no + "\n" + msg); //subject
\n won't work to display multi line text in notif use big style
        builder.setContentIntent(pd);
        builder.setAutoCancel(true);
        builder.setStyle(new
NotificationCompat.MessagingStyle(p).addMessage(msg, time, sender));
        //builder.setStyle(new
NotificationCompat.BigTextStyle().bigText("Much longer text that cannot
fit one line..."));
        builder.setPriority(NotificationCompat.PRIORITY_MAX);

        NotificationManager manager = (NotificationManager)
context.getSystemService(Context.NOTIFICATION_SERVICE);

        if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {    //
Create the NotificationChannel, but only on API 26+ because
            // the NotificationChannel class is new and not in the
support library
            NotificationChannel channel = new
NotificationChannel(channelId, "Notification channel",
NotificationManager.IMPORTANCE_HIGH);
            manager.createNotificationChannel(channel);
            //setChannelid
        }
        manager.notify(m, builder.build());
//NotificationCompat.Builder.build() returns a Notification
    }

}
```
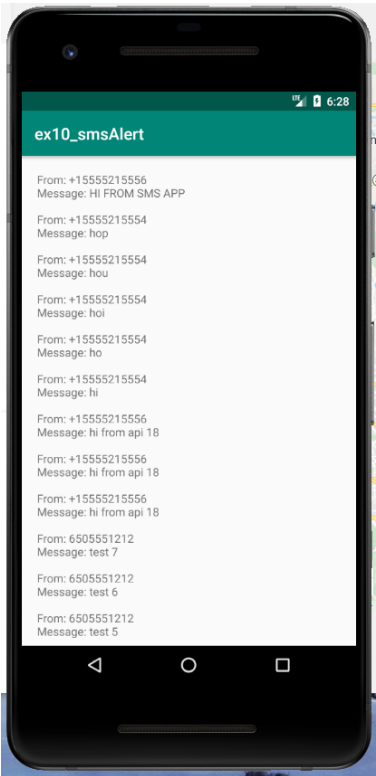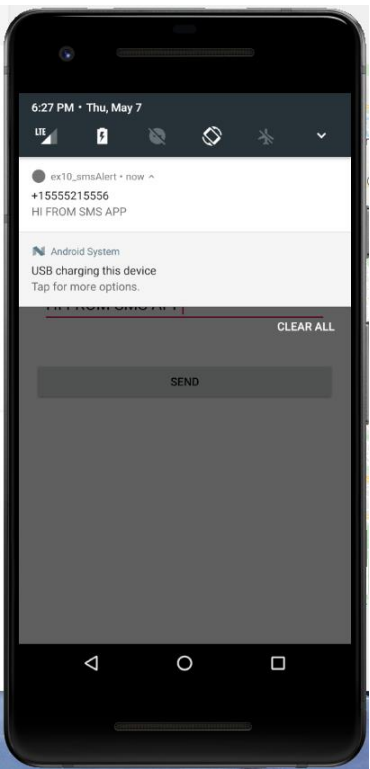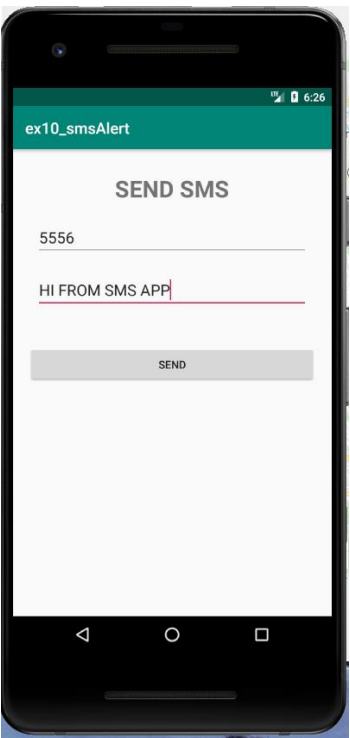
**OUTPUT**

## activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_margin="20dp"
    android:orientation="vertical"
    tools:context=".MainActivity">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:gravity="center"
        android:text="RSS Reader"
        android:textColor="#000000"
        android:textSize="30sp" />

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:gravity="center"
        android:text="Please enter the URL else default URL will be used"
        android:textColor="#000000"
        android:textSize="25sp"
        android:textStyle="italic" />

    <EditText
        android:id="@+id/et_url"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:hint="URL"
        android:inputType="textMultiLine"
        android:textSize="25sp" />

    <Button
        android:id="@+id/bt_fetch"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="Fetch" />

    <TextView
        android:id="@+id/textview"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="20dp"
        android:gravity="center" />

</LinearLayout>
```

## activity_second.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/relativeLayout"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_margin="20dp"
    android:orientation="vertical"
    tools:context=".SecondActivity">

    <ListView
        android:id="@+id/lv"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:divider="#000000"
        android:dividerHeight="1dp" />

</LinearLayout>
```

## MainActivity.java

```java
package com.example.final_ex6;

import android.app.Activity;
import android.content.Context;
import android.content.Intent;
import android.net.ConnectivityManager;
import android.net.NetworkInfo;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import java.util.ArrayList;


public class MainActivity extends Activity {
    TextView tv;
    EditText et_url;
    Button bt_fetch;
    String finalUrl =
"https://www.thehindu.com/news/national/feeder/default.rss";
    //String finalUrl =
"https://tutorialspoint.com/android/sampleXML.xml";
    HandleXML obj;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        tv = (TextView) findViewById(R.id.textview);
        et_url = (EditText) findViewById(R.id.et_url);
        bt_fetch = (Button) findViewById(R.id.bt_fetch);
```

```java
        //Internet permission is a normal one not dangerous hence will be
granted automatically during install time

        bt_fetch.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (!haveNetworkConnection()) {
                    Toast.makeText(MainActivity.this, "Internet
connection not available\nPlease connect to internet!!",
Toast.LENGTH_LONG).show();
                    return;
                }
                if (!et_url.getText().toString().equals(""))
                    finalUrl = et_url.getText().toString();
                obj = new HandleXML(finalUrl, MainActivity.this);
                obj.fetchXML();
                while (!obj.parsingComplete) ;
                ArrayList<RssItem> list = obj.getList();
                Intent myIntent = new Intent(MainActivity.this,
SecondActivity.class);
                myIntent.putExtra("feed", list);
                startActivity(myIntent);
            }
        });
    }

    private boolean haveNetworkConnection() {
        boolean haveConnectedWifi = false;
        boolean haveConnectedMobile = false;

        ConnectivityManager cm = (ConnectivityManager)
getSystemService(Context.CONNECTIVITY_SERVICE);
        NetworkInfo[] netInfo = cm.getAllNetworkInfo();
        for (NetworkInfo ni : netInfo) {
            if (ni.getTypeName().equalsIgnoreCase("WIFI"))
                if (ni.isConnected())
                    haveConnectedWifi = true;
            if (ni.getTypeName().equalsIgnoreCase("MOBILE"))
                if (ni.isConnected())
                    haveConnectedMobile = true;
        }
        return haveConnectedWifi || haveConnectedMobile;
    }
}
```

## SecondActivity.java

```java
package com.example.final_ex6;

import android.content.Intent;
import android.os.Bundle;
import android.widget.ArrayAdapter;
import android.widget.ListView;

import androidx.appcompat.app.AppCompatActivity;

import java.util.ArrayList;
```

```java
public class SecondActivity extends AppCompatActivity {

    ArrayList<RssItem> list;
    ListView lv;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_second);

        lv = findViewById(R.id.lv);

        Intent i1 = getIntent();
        list = (ArrayList<RssItem>) i1.getSerializableExtra("feed");

        ArrayAdapter adapter = new ArrayAdapter<RssItem>(this,
R.layout.list_view, list);
        lv.setAdapter(adapter);


    }
}
```

## HandleXML.java

```java
package com.example.final_ex6;

import android.content.Context;

import org.xmlpull.v1.XmlPullParser;
import org.xmlpull.v1.XmlPullParserException;
import org.xmlpull.v1.XmlPullParserFactory;

import java.io.IOException;
import java.net.HttpURLConnection;
import java.net.MalformedURLException;
import java.net.SocketTimeoutException;
import java.net.URL;
import java.util.ArrayList;

public class HandleXML {
    public volatile boolean parsingComplete = false;
    Context context;
    ArrayList<RssItem> list = new ArrayList<RssItem>();
    private String urlString = null;

    public HandleXML(String url, Context context) {
        this.urlString = url;
        this.context = context;
    }

    public ArrayList<RssItem> getList() {
        return list;
    }

    public void parseXMLAndStoreIt(XmlPullParser myParser) {

        String DESCRIPTION = "description";
        String CHANNEL = "channel";
```

```java
            String LINK = "link";
            String TITLE = "title";
            String ITEM = "item";

            String text = null;

            int eventType, start = 0;
            boolean done = false;
            RssItem item = null;

            try {
                eventType = myParser.getEventType();
                while (eventType != XmlPullParser.END_DOCUMENT && !done) {
                    String name = null;

                    switch (eventType) {

                        case XmlPullParser.START_DOCUMENT:
                            break;

                        case XmlPullParser.START_TAG:
                            name = myParser.getName();
                            if (name.equalsIgnoreCase(CHANNEL)) {
                                item = new RssItem();
                                start = 1;
                            }
                            if (name.equalsIgnoreCase(ITEM)) {
                                if (start == 1)
                                    list.add(item);
                                item = new RssItem();
                                start = -1;
                            } else if (item != null && start == -1) {
                                if (name.equalsIgnoreCase(LINK))
                                    item.setLink(myParser.nextText());
                                else if (name.equalsIgnoreCase(DESCRIPTION))
item.setDescription(myParser.nextText().trim());
                                else if (name.equalsIgnoreCase(TITLE))
item.setTitle(myParser.nextText().trim());
                            }
                            break;

                        case XmlPullParser.TEXT:
                            text = myParser.getText();
                            break;

                        case XmlPullParser.END_TAG:
                            name = myParser.getName();
                            if (name.equalsIgnoreCase(TITLE)) {
                                item.setTitle(text);
                            } else if (name.equalsIgnoreCase(LINK)) {
                                item.setLink(text);
                            } else if (name.equalsIgnoreCase(DESCRIPTION)) {
                                item.setDescription(text);
                            }

                            if (name.equalsIgnoreCase(ITEM) && item != null)
                                list.add(item);
                            else if (name.equalsIgnoreCase(CHANNEL)) {
                                if (start == 1) {
```

```java
                                list.add(item);
                            }
                            done = true;
                        }
                        break;
                }
                eventType = myParser.next();
            }
            parsingComplete = true;
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    public void fetchXML() {
        Thread thread = new Thread(new Runnable() {
            @Override
            public void run() {
                try {
                    URL url = new URL(urlString);
                    HttpURLConnection conn = (HttpURLConnection)
url.openConnection();

                    XmlPullParser myparser =
XmlPullParserFactory.newInstance().newPullParser();

myparser.setFeature(XmlPullParser.FEATURE_PROCESS_NAMESPACES, false);
                    myparser.setInput(conn.getInputStream(), null);
                    parseXMLAndStoreIt(myparser);

                    /*XmlPullParser myparser2
=context.getResources().getXml(R.xml.sample);
                    parseXMLAndStoreIt(myparser2);*/          //to obtain
xml from file ---file is stored in r=xml directory of res folder.

                } catch (SocketTimeoutException e) {
                    e.printStackTrace();         //due to connectTimeout
and readtimeout
                } catch (XmlPullParserException e) {
                    e.printStackTrace();
                } catch (MalformedURLException e) {
                    e.printStackTrace();
                } catch (IOException e) {
                    e.printStackTrace();
                }
            }
        });
        thread.start();
    }
}
```

## RssItem.java

```java
package com.example.final_ex6;

import java.io.Serializable;

public class RssItem implements Serializable {
    private String description;
```

```java
    private String link;
    private String title;


    public void setDescription(String description) {
        this.description = description;
    }

    public void setLink(String link) {
        this.link = link;
    }

    public void setTitle(String title) {
        this.title = title;
    }

    @Override
    public String toString() {
        return title+"\n"+description;
    }

}
```

## AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.final_ex6">
    <uses-permission android:name="android.permission.INTERNET"/>
    <uses-permission
android:name="android.permission.ACCESS_NETWORK_STATE" />

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".SecondActivity"></activity>
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER"
/>
            </intent-filter>
        </activity>
    </application>

</manifest>
```
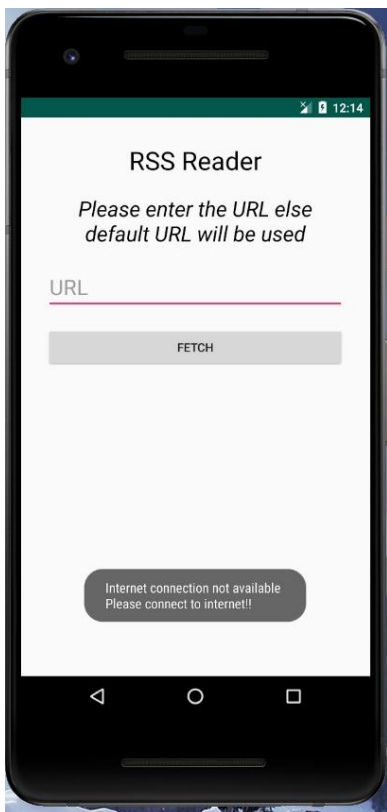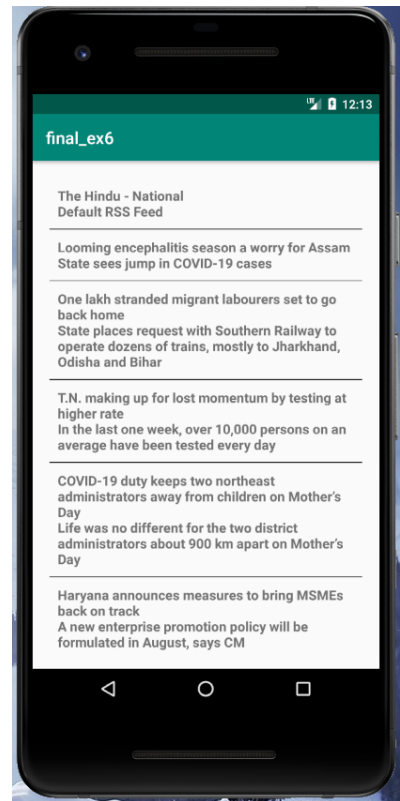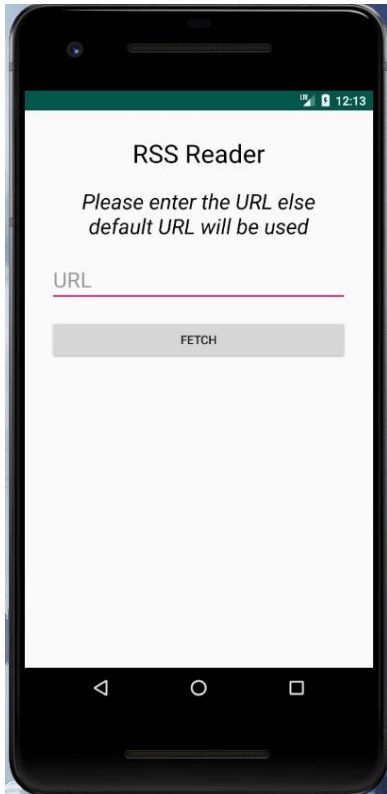
**OUTPUT:**

**activity_main.xml:**

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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:orientation="vertical"
    android:layout_margin="20dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:gravity="center"
        android:text="Email Application"
        android:textAllCaps="true"
        android:textColor="@android:color/black"
        android:layout_margin="20dp"
        android:textSize="24sp" />

    <EditText
        android:id="@+id/recipient"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:textSize="20sp"
        android:hint="Recipient Email"
        android:inputType="textEmailAddress" />

    <EditText
        android:id="@+id/subject"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:textSize="20sp"
        android:hint="Subject"
        android:inputType="textMultiLine" />

    <EditText
        android:id="@+id/body"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:textSize="20sp"
        android:hint="Compose email"
        android:inputType="textMultiLine" />

    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp">

        <TextView
            android:id="@+id/tvAttachment"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:drawableStart="@drawable/attach_symbol"
```

```xml
            android:drawableLeft="@drawable/attach_symbol"
            android:layout_alignParentLeft="true"
            android:layout_margin="10dp"
            android:visibility="gone" />

        <Button
            android:id="@+id/bt_attach"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="10dp"
            android:layout_alignParentRight="true"
            android:text="Add Attachment"/>

    </RelativeLayout>


    <Button
        android:id="@+id/b"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="Send Email"
        android:layout_gravity="center"/>

</LinearLayout>
```

## MainActivity.java:

```java
package com.example.ex12_email;

import android.content.Intent;
import android.net.Uri;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
    Button b, bt_attach;
    EditText recipient, subject, body;
    TextView tvAttachment;
    Uri URI = null;
    private static final int PICK_FROM_GALLERY = 101;
    int columnIndex;
    String attachmentFile;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        b = findViewById(R.id.b);
        bt_attach = findViewById(R.id.bt_attach);
        recipient = findViewById(R.id.recipient);
```

```java
            subject = findViewById(R.id.subject);
            body = findViewById(R.id.body);
            tvAttachment = findViewById(R.id.tvAttachment);

            b.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View view) {
                    Intent emailIntent = new Intent(Intent.ACTION_SEND);
//ACTION_SENDTO w/o setType can also be used
                    emailIntent.setData(Uri.parse("mailto:"));
                    emailIntent.setType("text/plain");
                    emailIntent.putExtra(Intent.EXTRA_EMAIL, new
String[]{recipient.getText().toString()});
                    emailIntent.putExtra(Intent.EXTRA_SUBJECT,
subject.getText().toString());
                    emailIntent.putExtra(Intent.EXTRA_TEXT,
body.getText().toString());

                    if (URI != null) {
                        emailIntent.putExtra(Intent.EXTRA_STREAM, URI);
                    }

                    try {
                        startActivity(Intent.createChooser(emailIntent, "Send
Email"));
                    } catch (android.content.ActivityNotFoundException ex) {
                        Toast.makeText(MainActivity.this, "There is no email
client installed.", Toast.LENGTH_LONG).show();
                    }
                }
            });

            bt_attach.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View v) {
                    Intent intent = new Intent();
                    intent.setType("*/*");
                    intent.setAction(Intent.ACTION_GET_CONTENT);
                    intent.putExtra("return-data", true);
                    startActivityForResult(Intent.createChooser(intent,
"Complete action using"), PICK_FROM_GALLERY);
                }
            });
    }


    protected void onActivityResult(int requestCode, int resultCode,
Intent data) {
        super.onActivityResult(requestCode, resultCode, data);
        Log.i("mail", "" + requestCode);
        if (requestCode == PICK_FROM_GALLERY && resultCode == RESULT_OK)
{
            URI = data.getData();
            tvAttachment.setText(URI.getLastPathSegment());
            tvAttachment.setVisibility(View.VISIBLE);
        }
    }

}
```

**OUTPUT:**