MAD Part B - Mobile application development

Computer Science (RNS Institute of Technology)

Program 1
Medicine Database

1. **Write a program to enter Medicine Name, Date and Time of the Day as input from the user and store it in the SQLite database. Input for Time of the Day should be either Morning or Afternoon or Evening or Night. Trigger an alarm based on the Date and Time of the Day and display the Medicine Name.**

Java Code:

```java
package com.example.medicinedb;

import androidx.appcompat.app.AppCompatActivity;
import android.annotation.SuppressLint;
import android.database.Cursor;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.CompoundButton;
import android.widget.EditText;
import android.widget.Spinner;
import android.widget.Switch;
import android.widget.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    EditText medicineName,medicineDate;
    TextView textViewMed;
    Button insertButton, fetchButton;
    Spinner dayTimeSpinner;
    Switch swtch;
    DbConnection dbConnection;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        dbConnection = new DbConnection(this);
        textViewMed = findViewById(R.id.txtViewMed);
        medicineName = findViewById(R.id.edtTxtMed);
        medicineDate = findViewById(R.id.edtTxtDate);
        insertButton = findViewById(R.id.btnInsert);
        fetchButton = findViewById(R.id.btnFetch);
        fetchButton.setVisibility(View.INVISIBLE);
        dayTimeSpinner = findViewById(R.id.spinner);
        swtch = findViewById(R.id.switcher);
        swtch.setOnCheckedChangeListener(new
```

```java
CompoundButton.OnCheckedChangeListener() {
    @Override
    public void onCheckedChanged(CompoundButton buttonView, boolean isChecked) {
        if(!isChecked){
            fetchButton.setVisibility(View.INVISIBLE);
            insertButton.setVisibility(View.VISIBLE);
            medicineName.setVisibility(View.VISIBLE);
            textViewMed.setVisibility(View.VISIBLE);
        }
        else{
            medicineName.setVisibility(View.INVISIBLE);
            insertButton.setVisibility(View.INVISIBLE);
            textViewMed.setVisibility(View.INVISIBLE);
            fetchButton.setVisibility(View.VISIBLE);
        }
    }
});
    insertButton.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        String name = medicineName.getText().toString();
        String date = medicineDate.getText().toString();
        String time = dayTimeSpinner.getSelectedItem().toString();
        boolean insert = dbConnection.insertValues(name,date,time);
        if(insert==true){
            Toast.makeText(getApplicationContext(),"Data inserted Successfully",
Toast.LENGTH_SHORT).show();
            medicineName.setText(null);
            medicineDate.setText(null);
        else
            Toast.makeText(getApplicationContext(), "Data insertion unsuccessful",
Toast.LENGTH_SHORT).show();
    }
});
    fetchButton.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        String date = medicineDate.getText().toString();
        String time = dayTimeSpinner.getSelectedItem().toString();
        String med = "";
        Cursor cu = dbConnection.RetrieveData(date, time);
        cu.moveToFirst();
        do{
            med = med+
(String.valueOf(cu.getString(cu.getColumnIndex("medicineName"))));
            med+="\n";
        }while (cu.moveToNext());
        Toast.makeText(getApplicationContext(), med, Toast.LENGTH_LONG).show();
    }
});
    }
}
```

DbConnection.java

```java
package com.example.medicinedb;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;

import androidx.annotation.Nullable;

public class DbConnection extends SQLiteOpenHelper {
    public DbConnection(Context context) {
        super(context, "MedicineDBase", null, 1);
    }

    @Override
    public void onCreate(SQLiteDatabase dbase) {
        dbase.execSQL("create Table MedTable(medicineName TEXT primary key, date TEXT,
time TEXT)");//Creates the table
    }

    @Override
    public void onUpgrade(SQLiteDatabase dbase, int i, int i1) {
    }
    public boolean insertValues(String medName, String medDate, String medTime){
        SQLiteDatabase database = this.getWritableDatabase();
        ContentValues contentValues = new ContentValues();
        contentValues.put("medicineName",medName);
        contentValues.put("date",medDate);
        contentValues.put("time",medTime);
        long result = database.insert("MedTable",null,contentValues);
        if(result==-1)
            return false;
        else
            return true    }
    public Cursor RetrieveData(String date, String time){
        SQLiteDatabase database = this.getReadableDatabase();
        Cursor cursor = database.rawQuery("Select * from MedTable where date= '"+date+"'
AND time='"+time+"'", null);
        return cursor;
    }
}
```

XML Code:

```
<?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="MEDICINE DATABASE"
        android:textAlignment="center"
        android:textColor="@color/black"
        android:textSize="30dp"
        android:textStyle="bold"/>

    <LinearLayout

        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:layout_marginLeft="10dp"
        android:layout_marginRight="10dp"
        android:orientation="horizontal">
        <TextView
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Insert Data"/>
        <Switch
            android:id="@+id/switcher"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
         />
        <TextView
            android:layout_width="wrap_content"
            android:layout_height="match_parent"
            android:text="Fetch Data"/>
    </LinearLayout>
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="10dp"
        android:layout_marginLeft="10dp"
        android:layout_marginRight="10dp"
        android:orientation="horizontal">

        <TextView
            android:id="@+id/txtViewMed"
```

```xml
        android:layout_width="100dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Medicine Name:" />

    <EditText
        android:id="@+id/edtTxtMed"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:ems="10"
        android:inputType="textPersonName"
        android:hint="Enter Medicine Name Here" />

</LinearLayout>

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="10dp"
    android:layout_marginLeft="10dp"
    android:layout_marginRight="10dp"
    android:orientation="horizontal">


    <TextView
        android:id="@+id/txtViewDate"
        android:layout_width="100dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Date:" />

    <EditText
        android:id="@+id/edtTxtDate"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:ems="10"
        android:inputType="date"
        android:hint="Eg. DD/MM/YYYY" />

</LinearLayout>

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="10dp"
    android:layout_marginLeft="10dp"
    android:layout_marginRight="10dp"
    android:orientation="horizontal">

    <TextView
        android:id="@+id/txtViewDayTime"
```

```xml
        android:layout_width="100dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Time of the Day" />

    <Spinner
        android:id="@+id/spinner"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:ems="10"
        android:entries="@array/timeOfDay"
      />

</LinearLayout>

<Button
    android:id="@+id/btnInsert"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="60dp"
    android:text="Insert Data" />

<Button
    android:id="@+id/btnFetch"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="30dp"
    android:text="Retrieve Data" />


</LinearLayout>
```
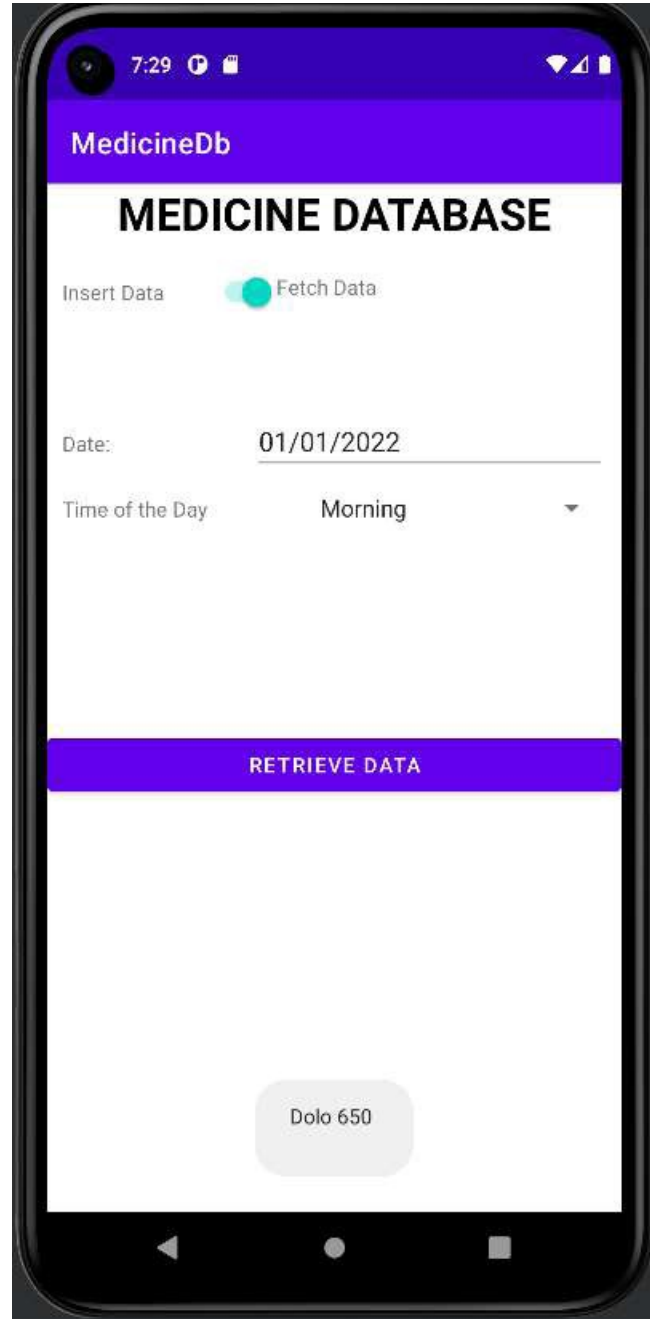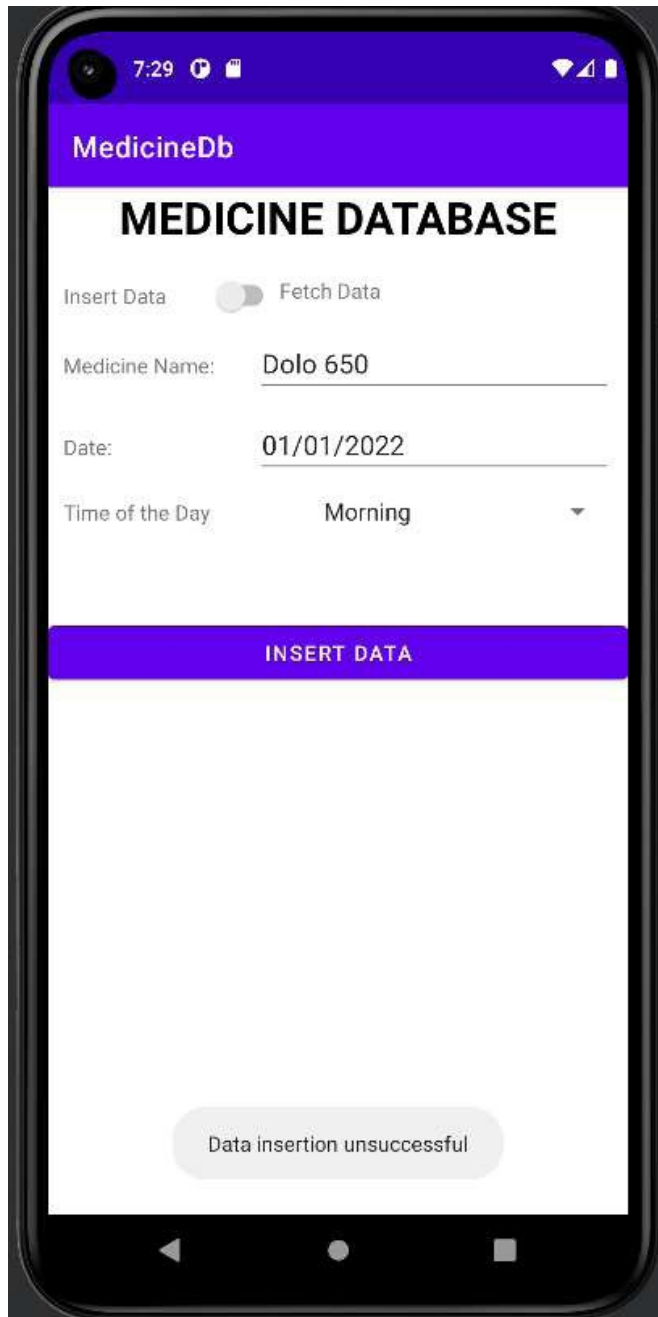
Output:

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Program 2
Meeting Schedule

2. **Develop a content provider application with an activity called "Meeting Schedule" which takes Date, Time and Meeting Agenda as input from the user and store this information into the SQLite database. Create another application with an activity called "Meeting Info" having DatePicker control, which on the selection of a date should display the Meeting Agenda information for that particular date, else it should display a toast message saying "No Meeting on this Date".**

Java Code:

```
package com.example.meetinginfo;

import android.os.Bundle;
import com.google.android.material.floatingactionbutton.FloatingActionButton;
import com.google.android.material.snackbar.Snackbar;
import com.google.android.material.tabs.TabLayout;
import androidx.viewpager.widget.ViewPager;
import androidx.appcompat.app.AppCompatActivity;
import android.view.Menu;
import android.view.MenuItem;
import android.view.View;
import com.example.meetinginfo.ui.main.SectionsPagerAdapter;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        SectionsPagerAdapter sectionsPagerAdapter = new SectionsPagerAdapter(this,
getSupportFragmentManager());
        ViewPager viewPager = findViewById(R.id.view_pager);
        viewPager.setAdapter(sectionsPagerAdapter);
        TabLayout tabs = findViewById(R.id.tabs);
        tabs.setupWithViewPager(viewPager);
    }
}
```

DataBaseConn.java:

package com.example.meetinginfo;

import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;

import androidx.annotation.Nullable;
import androidx.fragment.app.FragmentActivity;

```java
public class DataBaseConn extends SQLiteOpenHelper {
    public DataBaseConn(Context context) {
        super(context,"MeetingDB.db",null,1);
    }

    @Override
    public void onCreate(SQLiteDatabase db) {
        db.execSQL("create Table meetingTbl(date TEXT,time TEXT, agenda TEXT)");

    }

    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
        db.execSQL("drop Table if exists meetingTbl");

    }
    public boolean insertvalue(String d, String t, String agd){
        SQLiteDatabase DB=this.getWritableDatabase();
        ContentValues cv = new ContentValues();
        cv.put("date",d);
        cv.put("time",t);
        cv.put("agenda",agd);
        long res=DB.insert("meetingTbl",null,cv);
        if(res==-1){
            return  false;
        }
        else
            return true;
    }
    public Cursor fetch(String d){

        SQLiteDatabase DB=this.getReadableDatabase();
        Cursor c = DB.rawQuery("Select time,agenda from meetingTbl where date='"+d+"'
",null);
        return c;
    }
}
```

DBMS.java:

package com.example.meetinginfo;

import android.content.Context;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import androidx.annotation.Nullable;

```
public class DBMS extends SQLiteOpenHelper {
    public DBMS(@Nullable Context context, @Nullable String name, @Nullable
SQLiteDatabase.CursorFactory factory, int version) {
        super(context, name, factory, version);
    }
    @Override
    public void onCreate(SQLiteDatabase db) {
    }
    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
    }
}
```

Fragment1.java:

package com.example.meetinginfo;

import android.content.Context;
import android.os.Bundle;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.view.inputmethod.InputMethodManager;
import android.widget.Button;
import android.widget.CalendarView;
import android.widget.EditText;
import android.widget.Toast;
import androidx.annotation.NonNull;
import androidx.annotation.Nullable;
import androidx.fragment.app.Fragment;
import static androidx.core.content.ContextCompat.*getSystemService*;
```
public class Fragment1 extends Fragment {
    EditText date,time,agenda;
    DataBaseConn dbc;
    CalendarView calendarView;
    Button btn;
    @Nullable
    @Override
    public View onCreateView(@NonNull LayoutInflater inflater, @Nullable ViewGroup
container, @Nullable Bundle savedInstanceState) {
        View view=inflater.inflate(R.layout.*fragment_layout1*,container,false);
```

```java
        date=view.findViewById(R.id.txtDate);
        time=view.findViewById(R.id.txtTime);
        agenda=view.findViewById(R.id.txtAgenda);
        btn=view.findViewById(R.id.btn1);
        calendarView=view.findViewById(R.id.mCal);
        dbc=new DataBaseConn(getActivity());
        calendarView.setVisibility(View.INVISIBLE);
        date.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                closeKeyBoard();
                calendarView.setVisibility(View.VISIBLE);
                calendarView.setOnDateChangeListener(new
CalendarView.OnDateChangeListener() {
                    @Override
                    public void onSelectedDayChange(@NonNull CalendarView view, int year, int
month, int dayOfMonth) {
                        String d=dayOfMonth+"/"+(month+1)+"/"+year;
                        date.setText(d);
                        calendarView.setVisibility(View.INVISIBLE);
                    }
                });
            }
        });
        btn.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String mdate,mTime,mAgenda;
                mdate=date.getText().toString();
                mTime=time.getText().toString();
                mAgenda=agenda.getText().toString();

                Boolean insert=dbc.insertvalue(mdate,mTime,mAgenda);
                if(insert==true){
                    Toast.makeText(getActivity(),"Data Inserted",Toast.LENGTH_SHORT).show();
                }
                else
                    Toast.makeText(getActivity(),"Data NOT
Inserted",Toast.LENGTH_SHORT).show();
            }
        });
        return view;
    }
    private void closeKeyBoard(){
        View  view = getActivity().getCurrentFocus();
        if (view != null) {
            InputMethodManager imm = (InputMethodManager)
                getActivity().getSystemService(Context.INPUT_METHOD_SERVICE);
            imm.hideSoftInputFromWindow(view.getWindowToken(), 0);
        }}}
    }
```

Fragment2.java:

package com.example.meetinginfo;

import android.database.Cursor;
import android.os.Bundle;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.Button;
import android.widget.CalendarView;
import android.widget.DatePicker;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;
import androidx.annotation.NonNull;
import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatDialogFragment;
import androidx.fragment.app.Fragment;
import com.example.meetinginfo.R;
import java.util.Calendar;

```java
public class Fragment2 extends Fragment {
    EditText date;
    CalendarView cal;
    Button btn1;
    DataBaseConn dbc;
    TextView t;
      @Nullable
    @Override
    public View onCreateView(@NonNull LayoutInflater inflater, @Nullable ViewGroup container, @Nullable Bundle savedInstanceState) {
        View view=inflater.inflate(R.layout.fragment2_layout,container,false);
        date=view.findViewById(R.id.editTextDate);
        cal=view.findViewById(R.id.calendarView);
        btn1=view.findViewById(R.id.btn2);
        dbc=new DataBaseConn(getActivity());
        cal.setOnDateChangeListener(new CalendarView.OnDateChangeListener() {
            @Override
            public void onSelectedDayChange(@NonNull CalendarView view, int year, int month, int dayOfMonth) {
                String d=dayOfMonth+"/"+(month+1)+"/"+year;
                date.setText(d);
            }
        });
        btn1.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String d1=date.getText().toString();
                StringBuffer res=new StringBuffer();
                Cursor c=dbc.fetch(d1);
                int count=c.getCount();
                c.moveToFirst();
```

```
        if(count>0) {
            do {
res.append(c.getString(c.getColumnIndex("agenda"))
+"\t"+"at"+"\t"+c.getString(c.getColumnIndex("time")));
            res.append("\n");
            }while (c.moveToNext());
            Toast.makeText(getActivity(), res, Toast.LENGTH_LONG).show();
        }
        else
        {
            Toast.makeText(getActivity(), "No Meeting on This Day....",
Toast.LENGTH_LONG).show();
        }
    }
    });
    return view;
}
@Override
public void onCreate(@Nullable Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
}
}
```

XML Code:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.coordinatorlayout.widget.CoordinatorLayout
xmlns:android="http://schemas.android.com/apk/res/android"
  xmlns:app="http://schemas.android.com/apk/res-auto"
  xmlns:tools="http://schemas.android.com/tools"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity">
  <com.google.android.material.appbar.AppBarLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:background="@color/design_default_color_error"
    android:theme="@style/Theme.MeetingInfo.AppBarOverlay">
    <TextView
      android:id="@+id/title"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_gravity="center"
      android:background="@color/purple_500"
      android:gravity="center"
      android:minHeight="?actionBarSize"
      android:padding="@dimen/appbar_padding"
      android:text="Meeting Details"
      android:textAlignment="center"

android:textAppearance="@style/TextAppearance.Widget.AppCompat.Toolbar.Title" />
```

```
        <com.google.android.material.tabs.TabLayout
            android:id="@+id/tabs"
            android:layout_width="match_parent"
            android:layout_height="37dp"
            android:background="#FFEB3B"
            app:tabIndicatorColor="#00E5FF" />
    </com.google.android.material.appbar.AppBarLayout>
    <androidx.viewpager.widget.ViewPager
        android:id="@+id/view_pager"
        android:layout_width="match_parent"
        android:layout_height="499dp"
        app:layout_behavior="@string/appbar_scrolling_view_behavior">
        <TextView
            android:id="@+id/textView"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="TextView" />
    </androidx.viewpager.widget.ViewPager>
</androidx.coordinatorlayout.widget.CoordinatorLayout>
```

Fragment_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/constraintLayout"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".ui.main.PlaceholderFragment">

    <TextView
        android:id="@+id/section_label"
        android:text="Schedule Meeting"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="@dimen/activity_horizontal_margin"
        android:layout_marginTop="@dimen/activity_vertical_margin"
        android:layout_marginEnd="@dimen/activity_horizontal_margin"
        android:layout_marginBottom="@dimen/activity_vertical_margin"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintTop_toTopOf="@+id/constraintLayout"
        tools:layout_constraintLeft_creator="1"
        tools:layout_constraintTop_creator="1" />

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

Fragment_layout1.xml

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

    <EditText
        android:id="@+id/txtDate"
        android:layout_width="212dp"
        android:layout_height="50dp"
        android:layout_marginTop="16dp"
        android:ems="10"
        android:hint="DD/MM/YYYY"
        android:inputType="textPersonName"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toEndOf="@+id/mDate"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/txtTime"
        android:layout_width="212dp"
        android:layout_height="54dp"
        android:layout_marginTop="64dp"
        android:layout_marginEnd="8dp"
        android:ems="10"
        android:hint="hh:mm"
        android:inputType="textPersonName"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toTopOf="@+id/txtDate" />

    <TextView
        android:id="@+id/mDate"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginTop="20dp"
        android:text="Date:"
        android:textAppearance="@style/TextAppearance.AppCompat.Large"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <TextView
        android:id="@+id/txt2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="32dp"
```

```xml
        android:text="Time:"
        android:textAppearance="@style/TextAppearance.AppCompat.Large"
        app:layout_constraintEnd_toStartOf="@+id/txtTime"
        app:layout_constraintHorizontal_bias="0.117"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/mDate" />
    <TextView
        android:id="@+id/txt3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="4dp"
        android:text="Meeting Agenda:"
        android:textAppearance="@style/TextAppearance.AppCompat.Large"
        app:layout_constraintBottom_toTopOf="@+id/btn1"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/txt2"
        app:layout_constraintVertical_bias="0.131" />
    <Button
        android:id="@+id/btn1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Add Meeting Schedule"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.331"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/txtAgenda"
        app:layout_constraintVertical_bias="0.782" />
    <EditText
        android:id="@+id/txtAgenda"
        android:layout_width="212dp"
        android:layout_height="50dp"
        android:layout_marginTop="16dp"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toEndOf="@+id/txt3"
        app:layout_constraintTop_toBottomOf="@+id/txtTime" />
    <CalendarView
        android:id="@+id/mCal"
        android:layout_width="385dp"
        android:layout_height="305dp"
        android:background="#AFB42B"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.575" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Fragment_layout2.xml

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

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="32dp"
        android:text="Select Date to get Meeting Details"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/editTextDate"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="text"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.535"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView2"
        app:layout_constraintVertical_bias="0.047" />
    <CalendarView
        android:id="@+id/calendarView"
        android:layout_width="263dp"
        android:layout_height="249dp"
        android:layout_marginTop="8dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.679"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/editTextDate" />
    <Button
        android:id="@+id/btn2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Search to get Meeting Details"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/calendarView"
        app:layout_constraintVertical_bias="0.0" />
</androidx.constraintlayout.widget.ConstraintLayout>
```
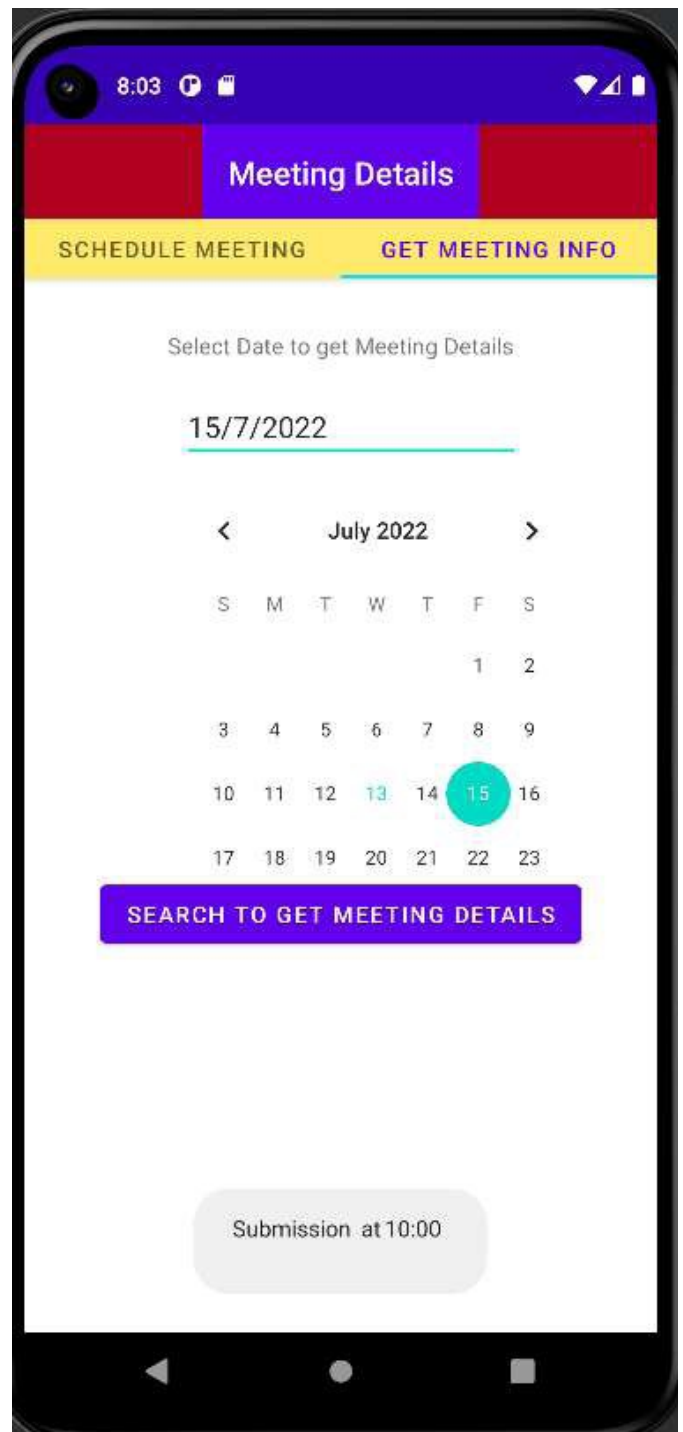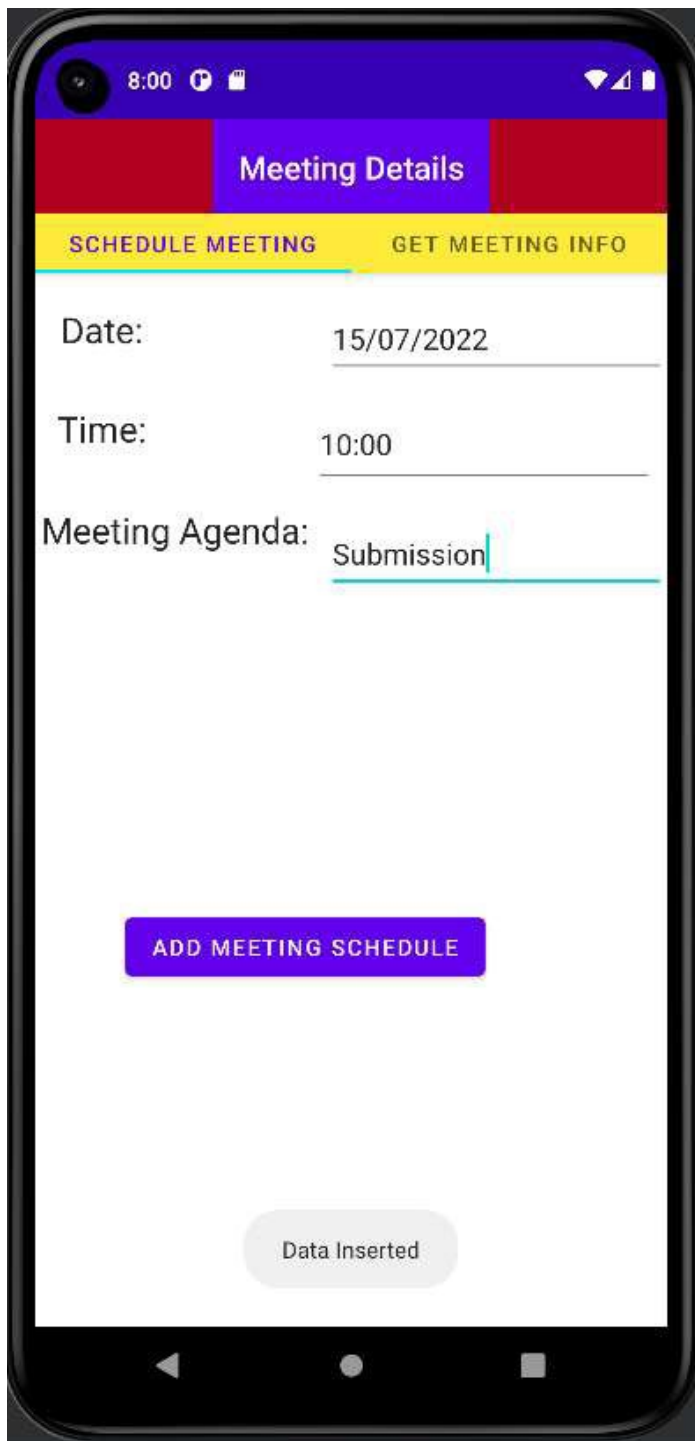
Output:

Program 3
SMS Application

3. **Create an application to receive an incoming SMS that is notified to the user. On clicking this SMS notification, the message content and the number should be displayed on the screen. Use appropriate emulator control to send the SMS message to your application.**

Java Code:

```
package `in`.edu.rec.smsapplication

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle

class MainActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }
}
```

XML Code:

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

    <com.google.android.material.button.MaterialButton
        android:id="@+id/display_number"
        android:layout_width="wrap_content"
        android:layout_height="54dp"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        android:layout_marginBottom="8dp"
        android:text="Display SMS Number"
        app:layout_constraintBottom_toTopOf="@+id/display_message"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.26"
```

```
    app:layout_constraintVertical_chainStyle="packed" />

<com.google.android.material.button.MaterialButton
    android:id="@+id/display_message"
    android:layout_width="wrap_content"
    android:layout_height="54dp"
    android:layout_marginStart="8dp"
    android:layout_marginTop="8dp"
    android:layout_marginEnd="8dp"
    android:layout_marginBottom="8dp"
    android:text="Display SMS Message"
    app:layout_constraintBottom_toTopOf="@+id/textbox"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.5"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/display_number" />

<com.google.android.material.textview.MaterialTextView
    android:id="@+id/textbox"
    android:layout_width="match_parent"
    android:layout_height="100sp"
    android:layout_marginStart="8dp"
    android:layout_marginTop="8dp"
    android:layout_marginEnd="8dp"
    android:layout_marginBottom="8dp"
    android:textSize="20sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.5"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/display_message" />

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

Output:

Program 4
File Application

4. **Write a program to create an activity having a Text box, and also Save, Open and Create buttons. The user has to write some text in the Text box. On pressing the Create button the text should be saved as a text file in MkSDcard. On subsequent changes to the text, the Save button should be pressed to store the latest content to the same file. On pressing the Open button, it should display the contents from the previously stored files in the Text box. If the user tries to save the contents in the Textbox to a file without creating it, then a toast message has to be displayed saying "First Create a File".**

Java Code:

```java
package com.example.fileapplication;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.os.Environment;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import java.io.File;
import java.io.FileInputStream;
import java.io.FileOutputStream;
import java.io.IOException;

public class MainActivity extends AppCompatActivity implements View.OnClickListener {
    Button b1, b2, b3;
    EditText t1;
    boolean fileCreated=false;
    String createFileName=null;
    String previousFileName=null;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        b1 = (Button)findViewById(R.id.btnCreate);
        b1.setOnClickListener(this);
        b2 = (Button)findViewById(R.id.btnOpen);
        b2.setOnClickListener(this);
        b3 = (Button)findViewById(R.id.btnSave);
        b3.setOnClickListener(this);
        t1 = (EditText)findViewById(R.id.txtResult);

    }
```

```java
    public void writeToFile(String filename,String content)
    {
       try {
          FileOutputStream fos= new
FileOutputStream(Environment.getExternalStorageDirectory().getAbsolutePath()
+"/"+filename);
          fos.write(content.getBytes());
          fos.close();
       }
       catch(Exception e){
          Toast.makeText(getBaseContext(),"Write error"+e.getLocalizedMessage(),
Toast.LENGTH_LONG).show();
       }
    }
    public String readFromFile(String filename)
    {
       try {
          FileInputStream fis= new
FileInputStream(Environment.getExternalStorageDirectory().getAbsolutePath()
+"/"+filename);
          byte[] data= new byte[fis.available()];
          fis.read(data);
          t1.setText(data.toString());
          fis.close();
          return new String(data);
       }
       catch(Exception e)
       {
          Toast.makeText(getBaseContext(),"Read error"+e.getLocalizedMessage(),
Toast.LENGTH_LONG).show();
       }
       return null;
    }
 public void onClick(View v)
    {
       if(v.equals(b1))
       {
          createFileName="pqr.txt";
          File f = new File(Environment.getExternalStorageDirectory().getAbsolutePath()
+"/"+createFileName);
          if (!f.exists()) {
             try {

                f.createNewFile();
                t1.setText(f.getAbsolutePath().toString());
             } catch (IOException e) {
                Toast.makeText(getBaseContext(),"Create error",
Toast.LENGTH_LONG).show();
             }
          }
          fileCreated=true;t1.setText(f.getAbsolutePath().toString());
       }
```

```
   else if(v.equals(b2))
   {
      if(previousFileName!=null){
         String data= readFromFile(previousFileName);
         t1.setText(data);
      }
      else
         t1.setText(previousFileName);
   }
   else if(v.equals(b3))
   {
      if(fileCreated){
         writeToFile(createFileName,t1.getText().toString());
         t1.setText("");
         previousFileName=createFileName;
         createFileName=null;
         Toast.makeText(getBaseContext(),"Data saved", Toast.LENGTH_LONG).show();
      }
      else
      {
         Toast.makeText(getBaseContext(),"first create a file",
Toast.LENGTH_LONG).show();
      }
   }
 }
}
```

XML Code:

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

   android:layout_width="match_parent"
   android:layout_height="match_parent"
   tools:context=".MainActivity">

   <TextView
      android:id="@+id/textView"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_marginTop="28dp"
      android:text="FILE APPLICATION"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.498"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent" />
```
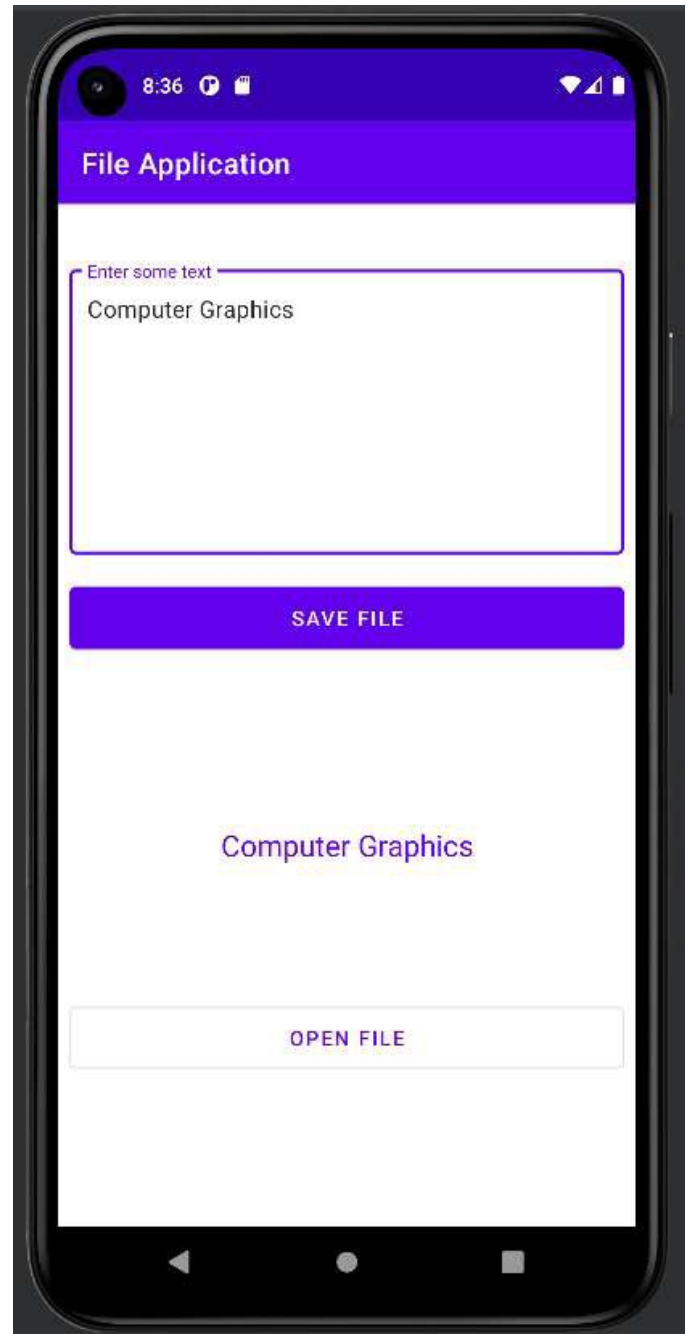
```xml
<Button
    android:id="@+id/btnCreate"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="56dp"
    android:layout_marginTop="36dp"
    android:text="CREATE"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView" />

<Button
    android:id="@+id/btnOpen"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="96dp"
    android:layout_marginTop="36dp"
    android:text="OPEN"
    app:layout_constraintStart_toEndOf="@+id/btnCreate"
    app:layout_constraintTop_toBottomOf="@+id/textView" />

<Button
    android:id="@+id/btnSave"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="176dp"
    android:layout_marginTop="44dp"
    android:text="SAVE"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/txtResult" />

<EditText
    android:id="@+id/txtResult"
    android:layout_width="236dp"
    android:layout_height="135dp"
    android:layout_marginStart="96dp"
    android:layout_marginTop="40dp"
    android:ems="10"
    android:inputType="textPersonName"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/btnCreate" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Output:

Program 5
Media Player Application

5. Create an application to demonstrate a basic media playerthat allows the user to Forward, Backward, Play and Pause an audio. Also, make use of the indicator in the seek bar to move the audio forward or backward as required.

Java Code:

```java
package com.example.mediaappl;

import androidx.appcompat.app.AppCompatActivity;


import android.media.MediaMetadata;
import android.media.MediaMetadataRetriever;
import android.media.MediaPlayer;
import android.os.Bundle;
import android.os.Handler;
import android.provider.ContactsContract;
import android.view.MotionEvent;
import android.view.View;
import android.widget.ImageButton;
import android.widget.ImageView;
import android.widget.SeekBar;
import android.widget.TextView;
import android.widget.Toast;

import java.io.IOException;

public class MainActivity extends AppCompatActivity {
    ImageButton btnPlay, btnFwd, btnBwd;

    ImageView img;
    SeekBar seekBar;
    Handler mHandler = new Handler();
    Runnable mRunnable;
    MediaPlayer mediaPlayer;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        img = (ImageView) findViewById(R.id.imageView);
        btnPlay = (ImageButton) findViewById(R.id.btnPlay);
        btnFwd = (ImageButton) findViewById(R.id.btnFwd);
        btnBwd = (ImageButton) findViewById(R.id.btnBwd);
        btnPlay = (ImageButton) findViewById(R.id.btnPlay);
```

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```java
        btnPlay.setImageResource(R.drawable.play);
        btnBwd.setImageResource(R.drawable.rewind);
        btnFwd.setImageResource(R.drawable.forward);
        img.setImageResource(R.drawable.media1);

    mediaPlayer = MediaPlayer.create(this, R.raw.song1);
    seekBar = findViewById(R.id.seekBar1);

    btnPlay.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
          Toast.LENGTH_SHORT).show();
          if (!mediaPlayer.isPlaying()) {
            mediaPlayer.start();
            getAudioStats();
Stitle.setText(mn.extractMetadata(MediaMetadataRetriever.METADATA_KEY_TITLE));
            btnPlay.setImageResource(R.drawable.pause);
            updateSeekBar();
          } else {
            mediaPlayer.pause();
            btnPlay.setImageResource(R.drawable.play);
          }
        }
    });

    seekBar.setOnTouchListener((v, event) -> {
        SeekBar s = (SeekBar) v;
        int position = (mediaPlayer.getDuration() / 100) * s.getProgress();
        mediaPlayer.seekTo(position);
        return false;
    });

    btnFwd.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
          if (mediaPlayer.getDuration() > mediaPlayer.getCurrentPosition() + 10000) {
            mediaPlayer.seekTo(mediaPlayer.getCurrentPosition() + 10000);
            updateSeekBar();
          }
        }
    });
    btnBwd.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
          if (mediaPlayer.getCurrentPosition() > 10000) {
            mediaPlayer.seekTo(mediaPlayer.getCurrentPosition() - 10000);
            updateSeekBar();
            getAudioStats();

          }
        }
    });
  }
```

```java
    private void updateSeekBar(){
        if(mediaPlayer.isPlaying()){
seekBar.setProgress((int)
((float)mediaPlayer.getCurrentPosition()/mediaPlayer.getDuration()*100));
            mHandler.postDelayed(updater,1000);
        }
    }
     protected void getAudioStats(){
            int duration  = mediaPlayer.getDuration()/1000; // In milliseconds
            int due = (mediaPlayer.getDuration() - mediaPlayer.getCurrentPosition())/1000;
        }
    private Runnable updater = new Runnable() {
        @Override
        public void run() {
            updateSeekBar();
        }
    };
    private void stopPlaying () {
        // If media player is not null then try to stop it
        if (mediaPlayer != null) {
            mediaPlayer.stop();
            mediaPlayer.release();
            mediaPlayer = null;
            Toast.makeText(this, "Stop playing.", Toast.LENGTH_SHORT).show();
            if (mHandler != null) {
                mHandler.removeCallbacks(mRunnable);
            }
        }
    }
}}
```

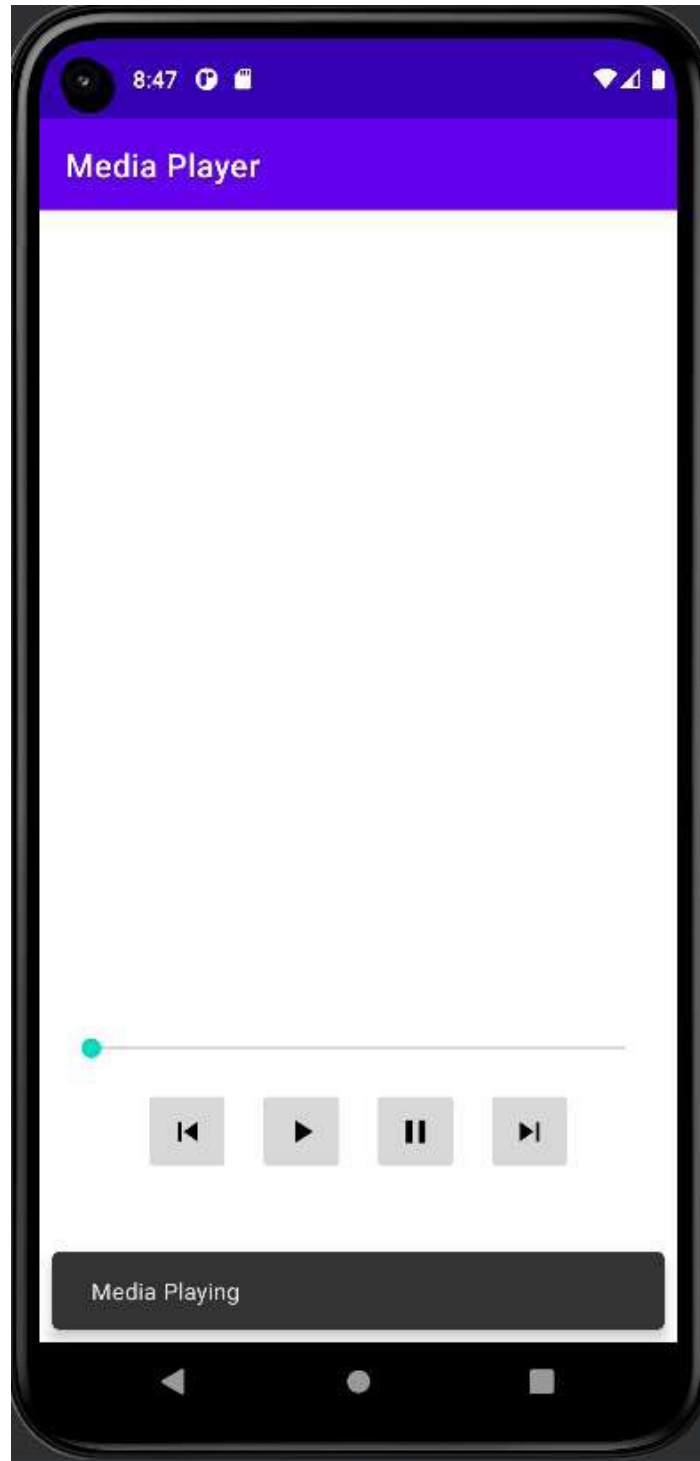## XML Code:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <SeekBar
        android:id="@+id/seekBar1"
        android:layout_width="296dp"
        android:layout_height="16dp"
        android:layout_marginTop="50dp"
        android:progressBackgroundTint="@color/design_default_color_on_secondary"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.495"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/imageView" />
```

```xml
<ImageButton
    android:id="@+id/btnFwd"
    android:layout_width="60dp"
    android:layout_height="60dp"
    android:layout_marginEnd="56dp"
    android:background="@drawable/pause"
    android:backgroundTint="#FFFFFF"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/seekBar1"
    app:layout_constraintVertical_bias="0.195"
    tools:src="@drawable/ic_fwd"
    tools:srcCompat="@tools:sample/avatars" />
<ImageButton
    android:id="@+id/btnBwd"
    android:layout_width="60dp"
    android:layout_height="60dp"
    android:layout_marginBottom="24dp"
    android:backgroundTint="#FFFFFF"
    android:src="@drawable/ic_bwd"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toStartOf="@+id/btnPlay"
    app:layout_constraintHorizontal_bias="0.854"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/seekBar1"
    app:layout_constraintVertical_bias="0.209"
    tools:src="@drawable/ic_bwd"
    tools:srcCompat="@tools:sample/avatars" />
<ImageButton
    android:id="@+id/btnPlay"
    android:layout_width="60dp"
    android:layout_height="60dp"
    android:layout_marginEnd="24dp"
    android:backgroundTint="#FFFFFF"
    android:src="@drawable/play"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toStartOf="@+id/btnFwd"
    app:layout_constraintTop_toBottomOf="@+id/seekBar1"
    app:layout_constraintVertical_bias="0.195"
    tools:src="@drawable/play"
    tools:srcCompat="@tools:sample/avatars" />
<ImageView
    android:id="@+id/imageView"
    android:layout_width="198dp"
    android:layout_height="193dp"
    android:layout_marginTop="24dp"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.497"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    tools:srcCompat="@tools:sample/avatars" />

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

Program 6
Asynchronous Task

6. Develop an application to demonstrate the use of Asynchronous tasks in android. The asynchronous task should implement the functionality of a simple moving banner. On pressing the Start Task button, the banner message should scroll from right to left. On pressing the Stop Task button, the banner message should stop. Let the banner message be "Demonstration of Asynchronous Task".

Java Code:

```java
package com.example.asynctask;

import androidx.appcompat.app.AppCompatActivity;

import android.os.AsyncTask;
import android.os.Bundle;
import android.text.TextUtils;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
private Button btn1,btn2;
TextView txt;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
         txt=findViewById(R.id.txtView);
         AsyncClass asyncClass=new AsyncClass();
        btn1=findViewById(R.id.btnStart);
        btn2=findViewById(R.id.btnStop);

btn1.setOnClickListener(new View.OnClickListener() {
   @Override
   public void onClick(View v) {
      asyncClass.doInBackground();
      asyncClass.onProgressUpdate();

   }
});

        btn2.setOnClickListener(new View.OnClickListener() {
```

```java
        @Override
        public void onClick(View v) {
            txt.setSelected(false);
            asyncClass.onPostExecute("AsyncTask Completed");
        }
    });
}

private class AsyncClass extends AsyncTask<String,String,String>{
    @Override
    protected void onPreExecute() {
        super.onPreExecute();
    }

    @Override
    protected void onProgressUpdate(String... values) {
        super.onProgressUpdate(values);
        Toast.makeText(getApplicationContext(),"Banner is
Moving",Toast.LENGTH_SHORT).show();
    }

    @Override
    protected String doInBackground(String... strings) {
        txt.setEllipsize(TextUtils.TruncateAt.MARQUEE);
        txt.setSelected(true);
        return null;
    }

    @Override
    protected void onPostExecute(String s) {
        super.onPostExecute(s);
        Toast.makeText(getApplicationContext(),s,Toast.LENGTH_SHORT).show();
    }
    }
}
```

XML Code:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#FDEBD0"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/txtView"
        android:layout_width="wrap_content"
```

```
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"
        android:background="#D35400 "
        android:scrollHorizontally="true"
        android:singleLine="true"
        android:text="RURAL COLLEGE OF ENGINEERING, HULKOTI"
        android:textColor="#FFFFFF"
        android:textSize="30sp"
        android:textStyle="bold"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btnStart"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="144dp"
        android:text="START"
        android:textAppearance="@style/TextAppearance.AppCompat.Large"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.498"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/txtView" />

    <Button
        android:id="@+id/btnStop"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="STOP"
        android:textAppearance="@style/TextAppearance.AppCompat.Large"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.498"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/btnStart"
        app:layout_constraintVertical_bias="0.186" />

</androidx.constraintlayout.widget.ConstraintLayout>
```
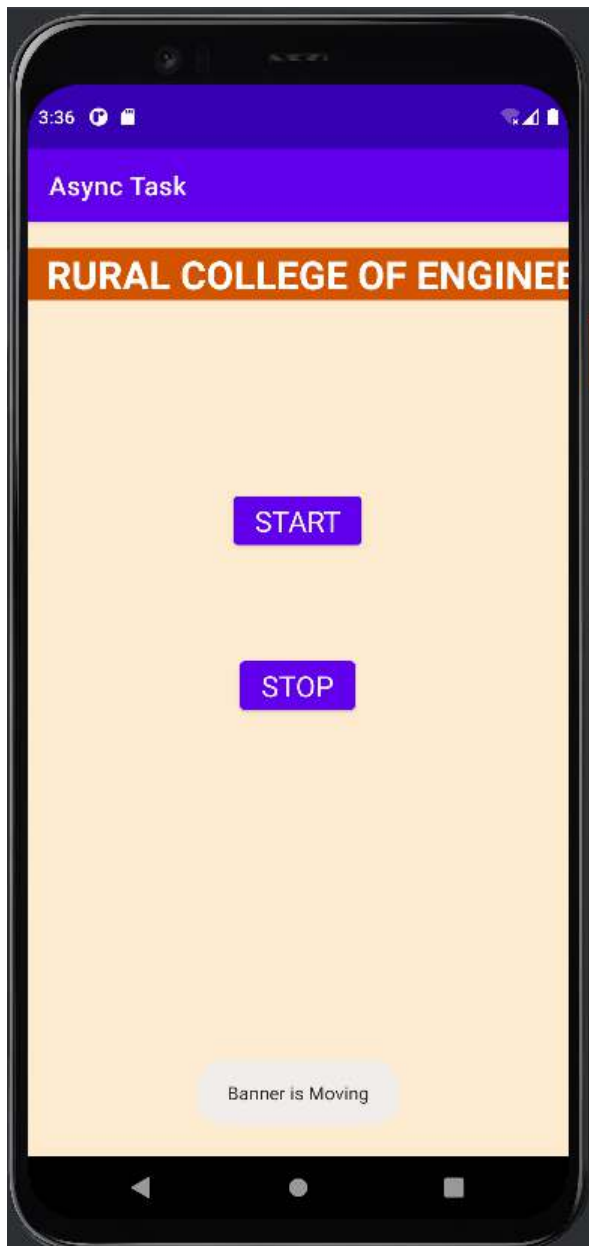
Program 7
Clipboard Activity

7. Develop an application that makes use of the clipboard framework for copying and pasting of the text. The activity consists of two Edit Text controls and two Buttons to trigger the copy and paste functionality.

Java Code:

```java
package com.example.clipboard;

import androidx.appcompat.app.AppCompatActivity;
import android.content.ClipData;
import android.content.ClipboardManager;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
public class MainActivity extends AppCompatActivity implements View.OnClickListener{
Button b1,b2;
EditText t1,t2;
    ClipboardManager myClipboard;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        t1=findViewById(R.id.TxtCopy);
        t2=findViewById(R.id.TxtPaste);
        b1=findViewById(R.id.BtnCopy);
        b1.setOnClickListener(this);
        b2=findViewById(R.id.BtnPaste);
        b2.setOnClickListener(this);
        myClipboard= (ClipboardManager)getSystemService(CLIPBOARD_SERVICE);
    }
    public void onClick(View v)
    {
      if(v.equals(b1))
      {
        ClipData myClip;
        String data = t1.getText().toString();
        myClip = ClipData.newPlainText("text", data);
        myClipboard.setPrimaryClip(myClip);
        Toast.makeText(getBaseContext(),"Copied..",Toast.LENGTH_LONG).show();
      } else if(v.equals(b2)) {
        ClipData abc = myClipboard.getPrimaryClip();
    ClipData.Item item = abc.getItemAt(0);
```

t2.setText(item.getText().toString()); }}}

XML Code:

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

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="104dp"
        android:layout_marginTop="52dp"
        android:text="ClipBoard Activity"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/TxtCopy"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="48dp"
        android:layout_marginTop="40dp"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView" />

    <EditText
        android:id="@+id/TxtPaste"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="48dp"
        android:layout_marginTop="28dp"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/TxtCopy" />

    <Button
        android:id="@+id/BtnCopy"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="48dp"
        android:layout_marginTop="60dp"
        android:text="Copy"
```
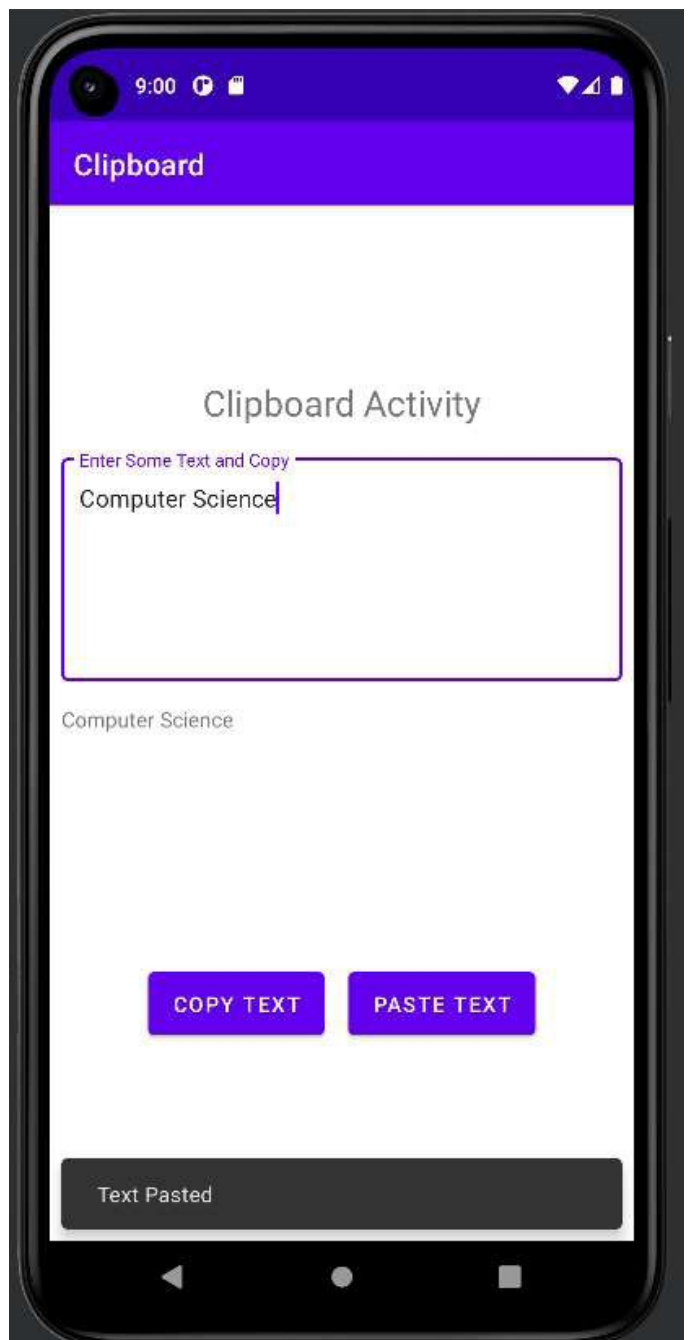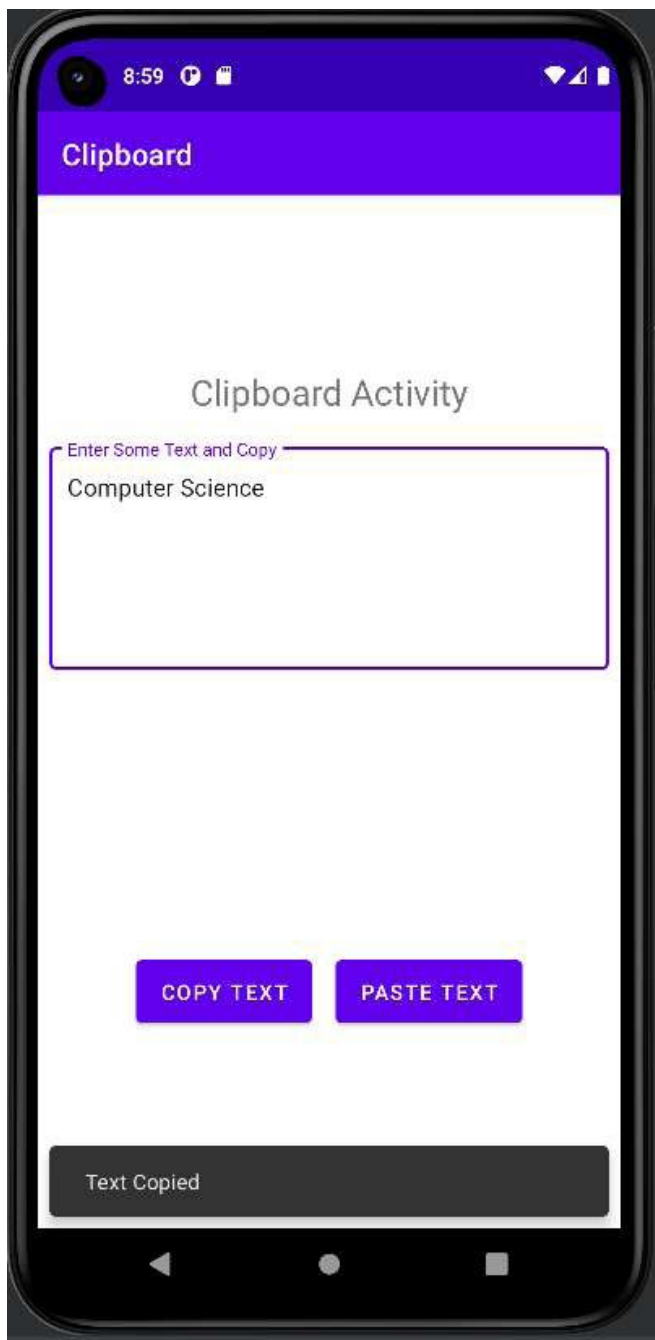
```
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/TxtPaste" />


    <Button
        android:id="@+id/BtnPaste"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="76dp"
        android:layout_marginTop="64dp"
        android:text="Paste"
        app:layout_constraintStart_toEndOf="@+id/BtnCopy"
        app:layout_constraintTop_toBottomOf="@+id/TxtPaste" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Output:

Program 8
Car EMI Calculator

8. **Create an AIDL service that calculates Car Loan EMI. The formula to calculate EMI is E = P * (r(1+r)n)/((1+r)n-1) where E = The EMI payable on the car loan amount P = The Car loan Principal Amount r = The interest rate value computed on a monthly basis n = The loan tenure in the form of months The down payment amount has to be deducted from the principal amount paid towards buying the Car. Develop an application that makes use of this AIDL service to calculate the EMI. This application should have four EditText to read the PrincipalAmount, Down Payment, Interest Rate, Loan Term (in months) and a button named as "Calculate Monthly EMI". On click of this button, the result should be shown in a TextView. Also, calculate the EMI by varying the Loan Term and Interest Rate values. Laboratory Outcomes: After studying theselaboratory programs, students will be able to:**

- Create, test and debug Android application by setting up Android development environment.
- Implement adaptive, responsive user interfaces that work across a wide range of devices.
- Infer long running tasks and background work in Android applications.
- Demonstrate methods in storing, sharing and retrieving data in Android applications.
- Infer the role of permissions and security for Android applications.

Java Code:

```
package com.example.caremicalcu;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity implements View.OnClickListener{
Button b1;
EditText t1,t2,t3,t4;
TextView tt1;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
```

```java
        setContentView(R.layout.activity_main);
        b1=(Button)findViewById(R.id.b1);
        b1.setOnClickListener(this);
        t1=(EditText)findViewById(R.id.pa);
        t2=(EditText)findViewById(R.id.dp);
        t3=(EditText)findViewById(R.id.ir);
        t4=(EditText)findViewById(R.id.lt);
        tt1=(TextView)findViewById(R.id.emi);
    }

    public void onClick(View v){
        double p,r,n,d,emi;
        p=Double.parseDouble(t1.getText().toString());
        d=Double.parseDouble(t2.getText().toString());
        p=p-d;
        r=Double.parseDouble(t3.getText().toString());
        r=r/(12*100);
        n=Double.parseDouble(t4.getText().toString());

        emi=p*(r*Math.pow((1+r),n))/(Math.pow((1+r),n)-1);
        emi=emi/12;
       // double emi = principleAmount * (interestRate * Math.pow((1 + interestRate),
loanTerm)) / (Math.pow((1 + interestRate), loanTerm) - 1);
        tt1.setText(String.valueOf(emi));

    }
}
```

XML Code:

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

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="128dp"
        android:layout_marginTop="28dp"
        android:text="car emi calculator"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <TextView
```

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```
    android:id="@+id/textView2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="20dp"
    android:layout_marginTop="77dp"
    android:text="principal amt"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView" />

<TextView
    android:id="@+id/textView3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="20dp"
    android:layout_marginTop="44dp"
    android:text="down payment"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView2" />

<TextView
    android:id="@+id/textView4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="20dp"
    android:layout_marginTop="44dp"
    android:text="interest rate"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView3" />

<TextView
    android:id="@+id/textView5"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="40dp"
    android:layout_marginTop="72dp"
    android:text="loan term"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView4" />

<TextView
    android:id="@+id/emi"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="92dp"
    android:layout_marginTop="52dp"
    android:text="emi"
    app:layout_constraintStart_toEndOf="@+id/b1"
    app:layout_constraintTop_toBottomOf="@+id/lt" />

<Button
    android:id="@+id/b1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
```

```xml
        android:layout_marginTop="32dp"
        android:text="calculate monthly emi"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/lt" />

    <EditText
        android:id="@+id/pa"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="60dp"
        android:layout_marginTop="52dp"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintStart_toEndOf="@+id/textView2"
        app:layout_constraintTop_toBottomOf="@+id/textView" />

    <EditText
        android:id="@+id/dp"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="56dp"
        android:layout_marginTop="20dp"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintBottom_toBottomOf="@+id/textView3"
        app:layout_constraintStart_toEndOf="@+id/textView3"
        app:layout_constraintTop_toTopOf="@+id/textView3"
        app:layout_constraintVertical_bias="0.434" />
    <EditText
        android:id="@+id/ir"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="72dp"
        android:layout_marginTop="20dp"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintBottom_toBottomOf="@+id/textView4"
        app:layout_constraintStart_toEndOf="@+id/textView4"
        app:layout_constraintTop_toTopOf="@+id/textView4"
        app:layout_constraintVertical_bias="0.021" />
    <EditText
        android:id="@+id/lt"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="60dp"
        android:layout_marginTop="40dp"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintBottom_toBottomOf="@+id/textView5"
        app:layout_constraintStart_toEndOf="@+id/textView5"
        app:layout_constraintTop_toTopOf="@+id/textView5"
        app:layout_constraintVertical_bias="0.439" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Output: