1. Installing the Java Development Kit

The Android SDK was developed using the Java programming language. Similarly, Android applications are also developed using Java. As a result, the Java Development Kit (JDK) is the first component that must be installed. Android development requires the installation of either version 6 or 7 of the Standard Edition of the Java Platform Development Kit. Java is provided in both development (JDK) and runtime (JRE) packages. For the purposes of Android development, the JDK must be installed.

2. Downloading the Android Studio Package

Most of the work involved in developing applications for Android will be performed using the Android Studio environment. Android Studio may be downloaded from the following web page:

http://developer.android.com/sdk/index.html

From this page, either click on the download button if it lists the correct platform (for example on a Windows based web browser the button will read “Download Android Studio for Windows”), or select the “Other Download Options” link to manually select the appropriate package for your platform and operating system. On the subsequent screen, accept the terms and conditions to initiate the download.

3. Installing Android Studio

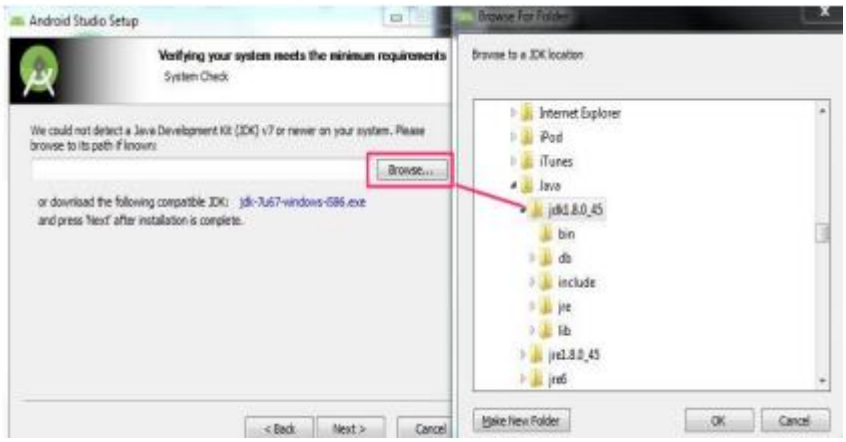
Locate the downloaded Android Studio installation executable file (named android-studio-bundle-<version>.exe) in a Windows Explorer window and double click on it to start the installation process, clicking the Yes button in the User Account Control dialog if it appears.

Once the Android Studio setup wizard appears, work through the various screens to configure the installation to meet your requirements in terms of the file system location into which Android Studio should

be installed and whether or not it should be made available to other users of the system. Although there are

no strict rules on where Android Studio should be installed on the system, the remainder of this book will

assume that the installation was performed into a sub-folder of the user's home directory named androidstudio. Once the options have been configured, click on the Install button to begin the installation process.


4. The Android Studio Setup Wizard

The first time that Android Studio is launched after being installed, a dialog will appear providing the

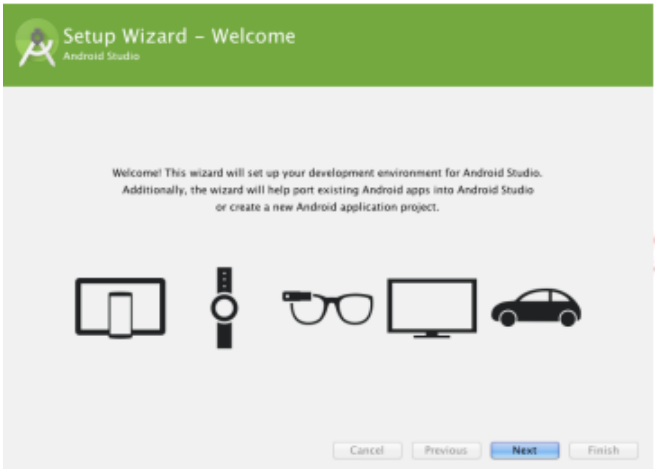
option to import settings from a previous Android Studio version. If you have settings from a previous

version and would like to import them into the latest installation, select the appropriate option and location.

Alternatively, indicate that you do not need to import any previous settings and click on the OK button to

proceed.

After Android Studio has finished loading, the setup wizard will appear as shown



Click on the Next button, choose the Standard installation option and click on Next once again. On the

license agreement screen, select and accept each of the licenses listed before clicking on Finish to complete

the setup process. The Welcome to Android Studio screen should then appear:


5. Installing the Latest Android SDK Packages

The steps performed so far have installed Java, the Android Studio IDE and the current set of default

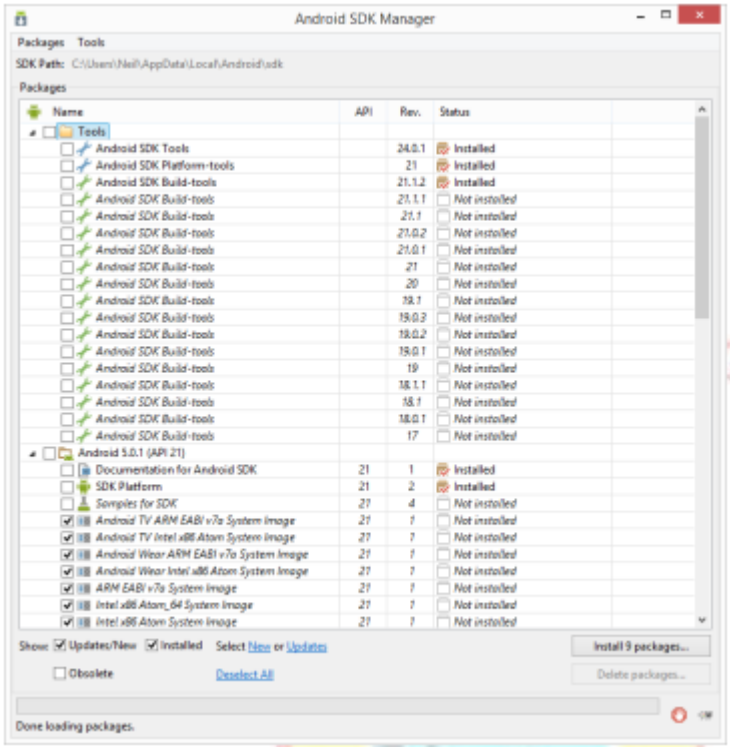
Android SDK packages. Before proceeding, it is worth taking some time to verify which packages are

installed and to install any missing packages.

This task can be performed using the Android SDK Manager, which may be launched from within

the Android Studio tool by selecting the Configure -> SDK Manager option from within the Android Studio

welcome dialog. Once invoked, the SDK Manager tool will appear as illustrated in Figure




Within the Android SDK Manager, make sure that the following packages are listed as Installed in the

Status column:

- Tools > Android SDK Tools
- Tools > Android SDK Platform-tools
- Tools > Android SDK Build-tools
- SDK Platform (most recent version) > SDK Platform
- SDK Platform (most recent version) > ARM EABI v7a System Image
- Extras > Android Support Repository
- Extras > Android Support Library
- Extras > Google Repository
- Extras > Google USB Driver (Required on Windows systems only)
- Extras > Intel x86 Emulator Accelerator (HAXM installer)

In the event that any of the above packages are listed as Not Installed, simply select the checkboxes

next to those packages and click on the Install packages button to initiate the installation process. In the

resulting dialog, accept the license agreements before clicking on the Install button. The SDK Manager

will then begin to download and install the designated packages. As the installation proceeds, a progress

bar will appear at the bottom of the manager window indicating the status of the installation.

Once the installation is complete, review the package list and make sure that the selected packages

are now listed as Installedin the Status column. If any are listed as Not installed, make sure they are selected

and click on the Install packages… button again.

6. Creating a New Android Project

The first step in the application development process is to create a new project within the Android

Studio environment. Begin, therefore, by launching Android Studio so that the “Welcome to Android

Studio” screen appears as illustrated in Figure

Once this window appears, Android Studio is ready for a new project to be created. To create the new

project, simply click on the Start a new Android Studio project option to display the first screen of the New

Project wizard as shown in Figure

7. Defining the Project and SDK Settings

In the New Project window, set the Application name field to EXNO1. The application name is the

name by which the application will be referenced and identified within Android Studio and is also the name

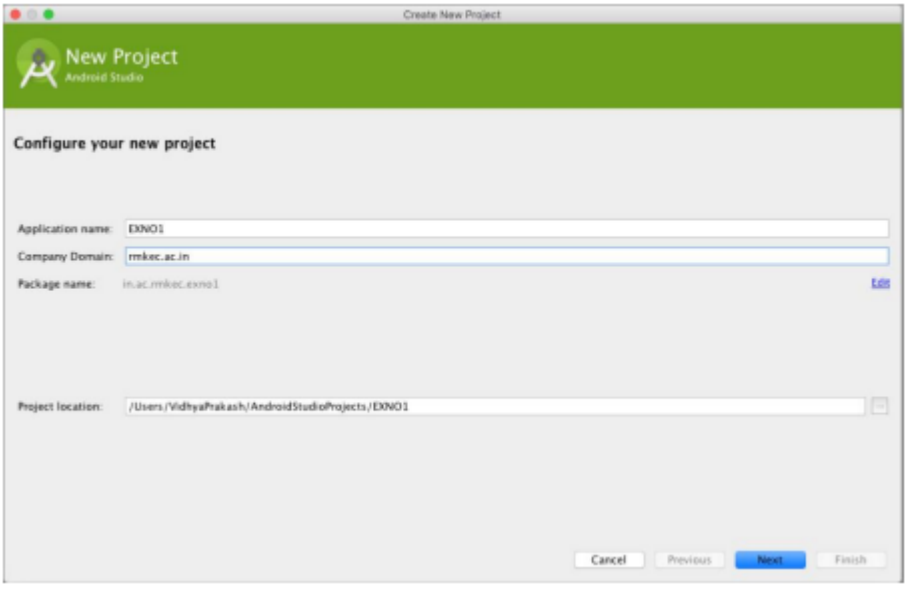
that will be used when the completed application goes on sale in the Google Play store.

The Package Name is used to uniquely identify the application within the Android application

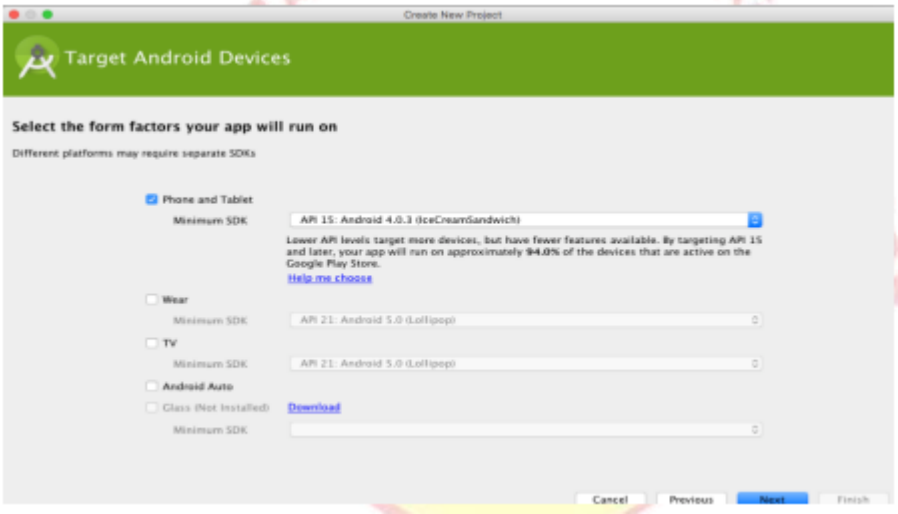
ecosystem. It should be based on the reversed URL of your domain name followed by the name of the

application. For example, if your domain is rmkec.ac.in, and the application has been named EXNO1, then

the package name might be specified as follows:




Next select Android package SDK we need to build


Create New Project
Target Android Devices
Select the form factors your app will run on
Different platforms may require separate SDKs
Phone and Tablet
Minimum SDK
API 15: Android 4.0.3 (IceCreamSandwich)
Lower API levels target more devices, but have fewer features available. By targeting API 15 and later, your app will run on approximately 94.0% of the devices that are active on the Google Play Store.
Help me choose
Wear
Minimum SDK
API 21: Android 5.0 (Lollipop)
TV
Minimum SDK
API 21: Android 5.0 (Lollipop)
Android Auto
Glass (Not Installed)
Download
Minimum SDK
Cancel
Previous
Next
Finish

## PROGRAM 2

## Main_Activity.java:

```
package com.example.fontcolorapp;

import android.graphics.Color;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

    TextView textView;
    Button sizeBtn, colorBtn;
    float fontSize = 20f;
    int colorIndex = 0;
    int[] colors = {Color.BLUE, Color.GREEN, Color.RED, Color.MAGENTA};

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

        textView = findViewById(R.id.textView);
        sizeBtn = findViewById(R.id.sizeButton);
        colorBtn = findViewById(R.id.colorButton);
```

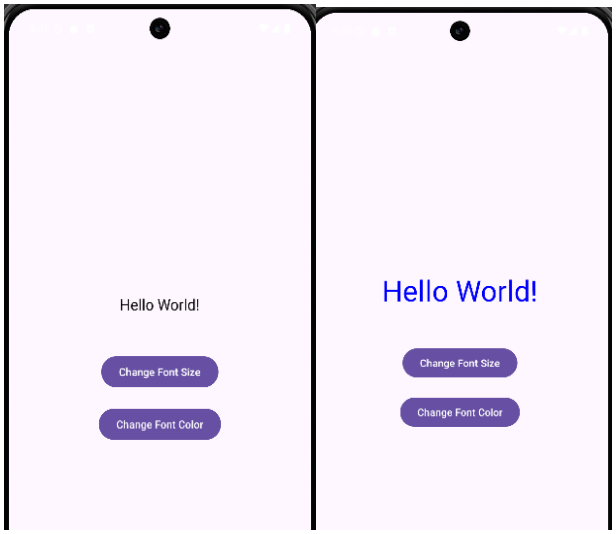
```
        sizeBtn.setOnClickListener(v -> {
            textView.setTextSize(fontSize);
            fontSize += 4;
            if (fontSize > 40) fontSize = 20;
        });

        colorBtn.setOnClickListener(v -> {
            textView.setTextColor(colors[colorIndex]);
            colorIndex = (colorIndex + 1) % colors.length;
        });
    }
}
```

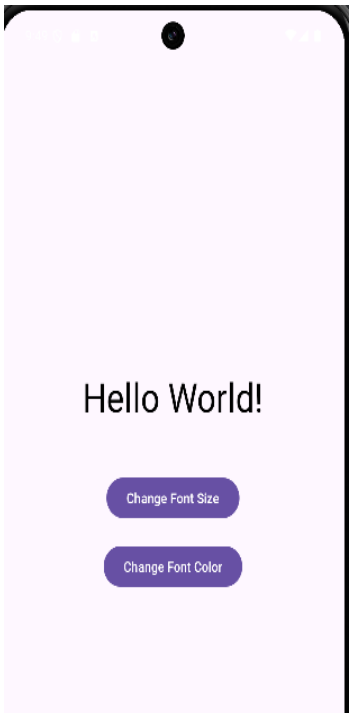
## Activity.xml:

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

    <TextView
        android:id="@+id/textView"
        android:text="Hello World!"
        android:textSize="20sp"
```

```
        android:textColor="#000000"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:padding="20dp"/>

    <Button
        android:id="@+id/sizeButton"
        android:text="Change Font Size"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"/>

    <Button
        android:id="@+id/colorButton"
        android:text="Change Font Color"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="20dp"/>
</LinearLayout>
```

## Output:


Hello World!
Change Font Size
Change Font Color
Hello World!
Change Font Size
Change Font Color


Hello World!
Change Font Size
Change Font Color

## PROGRAM 3

## Main_Activity.java:

```
package com.example.simpleadder;

import android.app.NotificationChannel;
import android.app.NotificationManager;
import android.os.Build;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.NotificationCompat;

public class MainActivity extends AppCompatActivity {

    EditText edit1, edit2;
    Button addButton;
    final String CHANNEL_ID = "simple_channel";

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

        edit1 = findViewById(R.id.editText1);
        edit2 = findViewById(R.id.editText2);
        addButton = findViewById(R.id.button1);
```

```
        createNotificationChannel();

        addButton.setOnClickListener(v -> {
            try {
                int num1 = Integer.parseInt(edit1.getText().toString());
                int num2 = Integer.parseInt(edit2.getText().toString());
                int sum = num1 + num2;

                String message = "Sum is: " + sum;
                Toast.makeText(MainActivity.this, message, Toast.LENGTH_LONG).show();

                // Push-style notification
                NotificationCompat.Builder builder = new
NotificationCompat.Builder(MainActivity.this, CHANNEL_ID)
                        .setSmallIcon(android.R.drawable.ic_dialog_info)
                        .setContentTitle("Addition Result")
                        .setContentText(message)
                        .setPriority(NotificationCompat.PRIORITY_DEFAULT);

                NotificationManager manager = (NotificationManager)
getSystemService(NOTIFICATION_SERVICE);
                manager.notify(1, builder.build());

            } catch (Exception e) {
                Toast.makeText(MainActivity.this, "Enter valid numbers",
Toast.LENGTH_SHORT).show();
            }
        });
    }
```

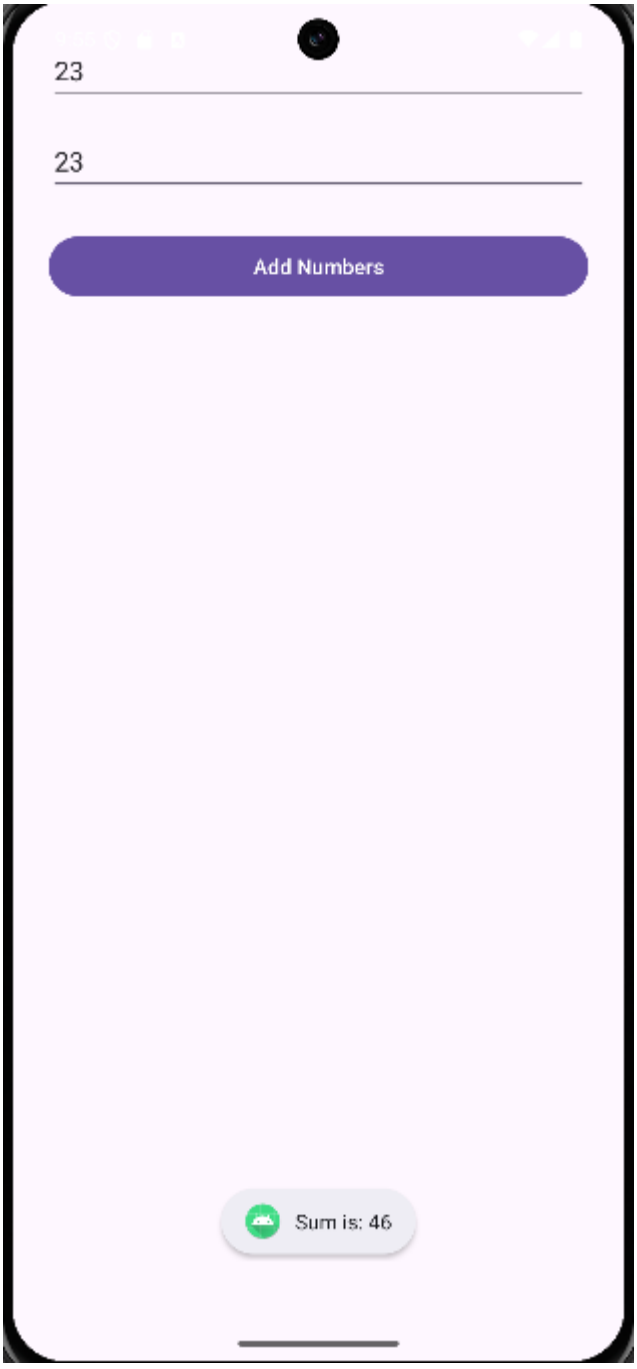
```
    // Notification Channel required for Android 8.0+
    private void createNotificationChannel() {
        if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
            CharSequence name = "SimpleChannel";
            String description = "For Addition Notifications";
            int importance = NotificationManager.IMPORTANCE_DEFAULT;
            NotificationChannel channel = new NotificationChannel(CHANNEL_ID, name,
importance);
            channel.setDescription(description);


            NotificationManager notificationManager =
getSystemService(NotificationManager.class);
            notificationManager.createNotificationChannel(channel);
        }
    }
}
```

## Activity.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="24dp">

    <EditText
        android:id="@+id/editText1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
```

```
        android:hint="Enter Number 1"
        android:inputType="number" />

    <EditText
        android:id="@+id/editText2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter Number 2"
        android:inputType="number"
        android:layout_below="@id/editText1"
        android:layout_marginTop="16dp" />

    <Button
        android:id="@+id/button1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Add Numbers"
        android:layout_below="@id/editText2"
        android:layout_marginTop="24dp"/>
</RelativeLayout>
```

**Output:**



## PROGRAM 4

## Main_Activity.java:

```
package com.padma.myapplication4;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
    private EditText editText;
    private StringBuilder input;

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

        editText = findViewById(R.id.editTextText);
        input = new StringBuilder();

        int[] buttonIds = {
                R.id.button7, R.id.button8, R.id.button9, R.id.button10,
                R.id.button11, R.id.button12, R.id.button13, R.id.button15,
                R.id.button16, R.id.button17, R.id.button18, R.id.button19,
                R.id.button20, R.id.button21, R.id.button22, R.id.button23
        };
```

```
    for (int id : buttonIds) {
        Button button = findViewById(id);
        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String text = ((Button) v).getText().toString();
                if (text.equals("=")) {
                    calculateResult();
                } else {
                    input.append(text);
                    editText.setText(input.toString());
                }
            }
        });
    }
}

private void calculateResult() {
    try {
        double result = eval(input.toString());
        editText.setText(String.valueOf(result));
        input.setLength(0);
    } catch (Exception e) {
        editText.setText("Error");
        input.setLength(0);
    }
}

private double eval(String expression) {
```

```
        return new Object() {
            int pos = -1, ch;

            void nextChar() {
                ch = (++pos < expression.length()) ? expression.charAt(pos) : -1;
            }

            boolean potta (int charToEat) {
                while (ch == ' ') nextChar();
                if (ch == charToEat) {
                    nextChar();
                    return true;
                }
                return false;
            }

            double parse() {
                nextChar();
                double x = parseExpression();
                if (pos < expression.length()) throw new RuntimeException("Unexpected: " +
(char) ch);
                return x;
            }

            double parseExpression() {
                double x = parseTerm();
                while (true) {
                    if (potta('+')) x += parseTerm();
                    else if (potta('-')) x -= parseTerm();
```

```
            else return x;
        }
    }

    double parseTerm() {
        double x = parseFactor();
        while (true) {
            if (potta('*')) x *= parseFactor();
            else if (potta('/')) x /= parseFactor();
            else return x;
        }
    }

    double parseFactor() {
        if (potta('+')) return parseFactor();
        if (potta('-')) return -parseFactor();

        double x;
        int startPos = this.pos;
        if ((ch >= '0' && ch <= '9') || ch == '.') {
            while ((ch >= '0' && ch <= '9') || ch == '.') nextChar();
            x = Double.parseDouble(expression.substring(startPos, this.pos));
        } else {
            throw new RuntimeException("Unexpected: " + (char) ch);
        }

        return x;
    }
}.parse();
```

```
    }
}
```

## Activity.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/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="106dp"
        android:layout_height="21dp"
        android:layout_marginTop="50dp"
        android:text="Native calculator"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/editTextText"
```

```
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="16dp"
    android:layout_marginBottom="7dp"
    android:ems="10"
    android:inputType="text"
    android:text="Enter the number:"
    app:layout_constraintBottom_toTopOf="@+id/button7"
    app:layout_constraintStart_toStartOf="parent" />

<Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginEnd="11dp"
    android:layout_marginBottom="9dp"
    android:text="calculate"
    app:layout_constraintBottom_toTopOf="@+id/button9"
    app:layout_constraintEnd_toEndOf="parent" />

<Button
    android:id="@+id/button7"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="7dp"
    android:layout_marginTop="155dp"
    android:text="1"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
```

```
<Button
    android:id="@+id/button8"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="10dp"
    android:layout_marginEnd="9dp"
    android:text="2"
    app:layout_constraintEnd_toStartOf="@+id/button9"
    app:layout_constraintTop_toBottomOf="@+id/editTextText" />

<Button
    android:id="@+id/button9"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginEnd="2dp"
    android:text="3"
    app:layout_constraintBaseline_toBaselineOf="@+id/button8"
    app:layout_constraintEnd_toStartOf="@+id/button" />

<Button
    android:id="@+id/button10"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="12dp"
    android:layout_marginEnd="10dp"
    android:text="+"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/button" />
```

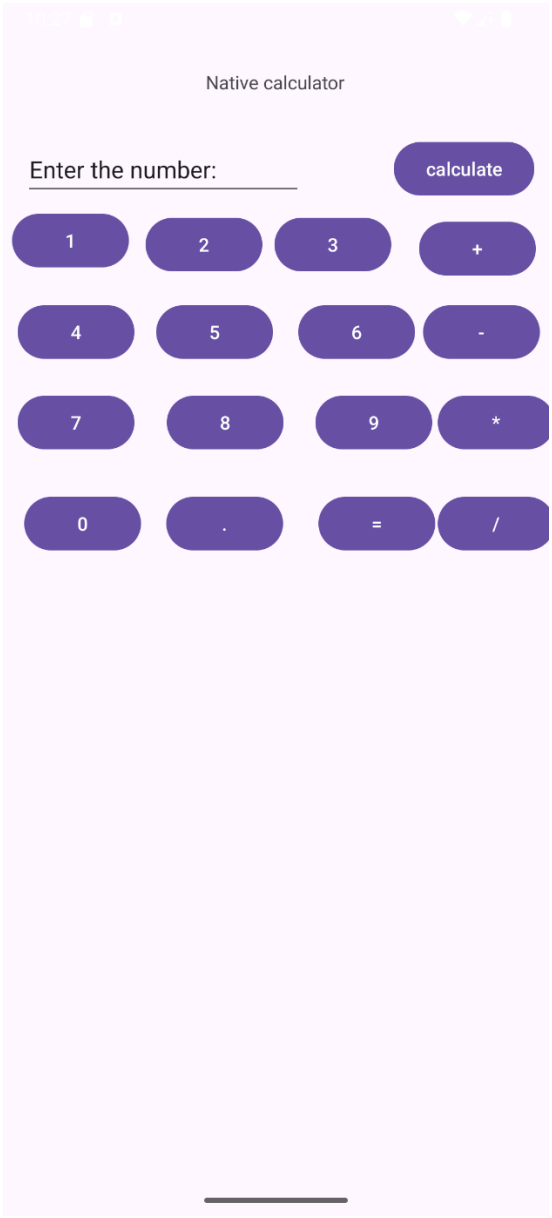
```
<Button
    android:id="@+id/button11"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="11dp"
    android:text="4"
    app:layout_constraintBaseline_toBaselineOf="@+id/button12"
    app:layout_constraintStart_toStartOf="parent" />

<Button
    android:id="@+id/button12"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="8dp"
    android:text="5"
    app:layout_constraintBaseline_toBaselineOf="@+id/button13"
    app:layout_constraintStart_toStartOf="@+id/button8" />

<Button
    android:id="@+id/button13"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="15dp"
    android:layout_marginEnd="6dp"
    android:text="6"
    app:layout_constraintEnd_toStartOf="@+id/button23"
    app:layout_constraintTop_toBottomOf="@+id/button10" />
```

```
<Button
    android:id="@+id/button15"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="11dp"
    android:text="7"
    app:layout_constraintBaseline_toBaselineOf="@+id/button16"
    app:layout_constraintStart_toStartOf="parent" />

<Button
    android:id="@+id/button16"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="8dp"
    android:layout_marginTop="20dp"
    android:text="8"
    app:layout_constraintStart_toStartOf="@+id/button12"
    app:layout_constraintTop_toBottomOf="@+id/button12" />

<Button
    android:id="@+id/button17"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="20dp"
    android:layout_marginEnd="4dp"
    android:text="9"
    app:layout_constraintEnd_toStartOf="@+id/button18"
    app:layout_constraintTop_toBottomOf="@+id/button13" />
```

```
<Button
    android:id="@+id/button18"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="11dp"
    android:text="*"
    app:layout_constraintBaseline_toBaselineOf="@+id/button17"
    app:layout_constraintStart_toStartOf="@+id/button23" />

<Button
    android:id="@+id/button19"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="16dp"
    android:text="0"
    app:layout_constraintBaseline_toBaselineOf="@+id/button20"
    app:layout_constraintStart_toStartOf="parent" />

<Button
    android:id="@+id/button20"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="19dp"
    android:text="."
    app:layout_constraintStart_toEndOf="@+id/button19"
    app:layout_constraintTop_toTopOf="@+id/button21" />

<Button
    android:id="@+id/button21"
```

```
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="28dp"
        android:layout_marginEnd="2dp"
        android:text="="
        app:layout_constraintEnd_toStartOf="@+id/button22"
        app:layout_constraintTop_toBottomOf="@+id/button17" />

    <Button
        android:id="@+id/button22"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="/"
        app:layout_constraintBaseline_toBaselineOf="@+id/button21"
        app:layout_constraintStart_toStartOf="@+id/button18" />

    <Button
        android:id="@+id/button23"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="7dp"
        android:text="-"
        app:layout_constraintBaseline_toBaselineOf="@+id/button13"
        app:layout_constraintEnd_toEndOf="parent" />

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

**Output:**



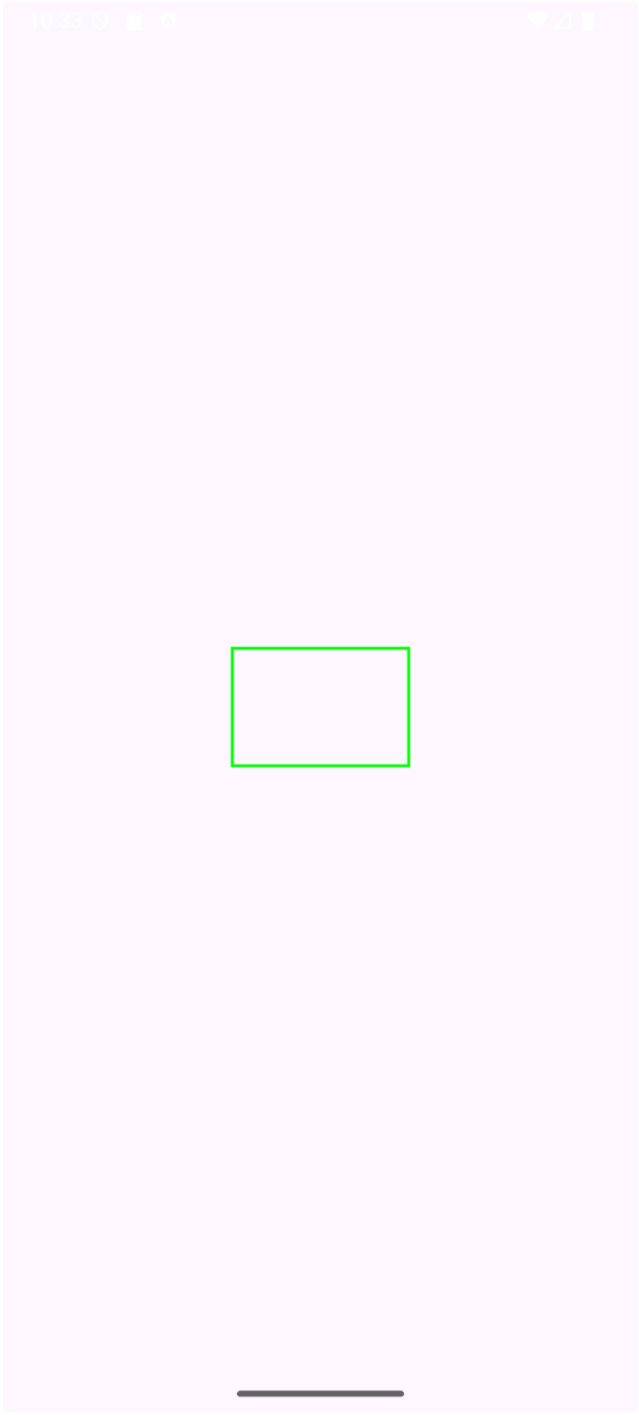
## PROGRAM 5a

## Main_Activity.java:

```
package com.example.graphics;

import android.app.Activity;
import android.content.Context;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.Paint;
import android.os.Bundle;
import android.view.View;

public class MainActivity extends Activity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(new MyView(this));
    }

    private class MyView extends View {

        public MyView(Context context) {
            super(context);
        }

        @Override
        protected void onDraw(Canvas canvas) {
            super.onDraw(canvas);
```

```
            int canvasWidth = canvas.getWidth();
            int canvasHeight = canvas.getHeight();

            int rectWidth = 300;
            int rectHeight = 200;

            int left = (canvasWidth - rectWidth) / 2;
            int top = (canvasHeight - rectHeight) / 2;
            int right = left + rectWidth;
            int bottom = top + rectHeight;

            Paint myPaint = new Paint();
            myPaint.setColor(Color.GREEN);
            myPaint.setStyle(Paint.Style.STROKE);
            myPaint.setStrokeWidth(5);

            canvas.drawRect(left, top, right, bottom, myPaint);
        }
    }
}
```

**Output:**



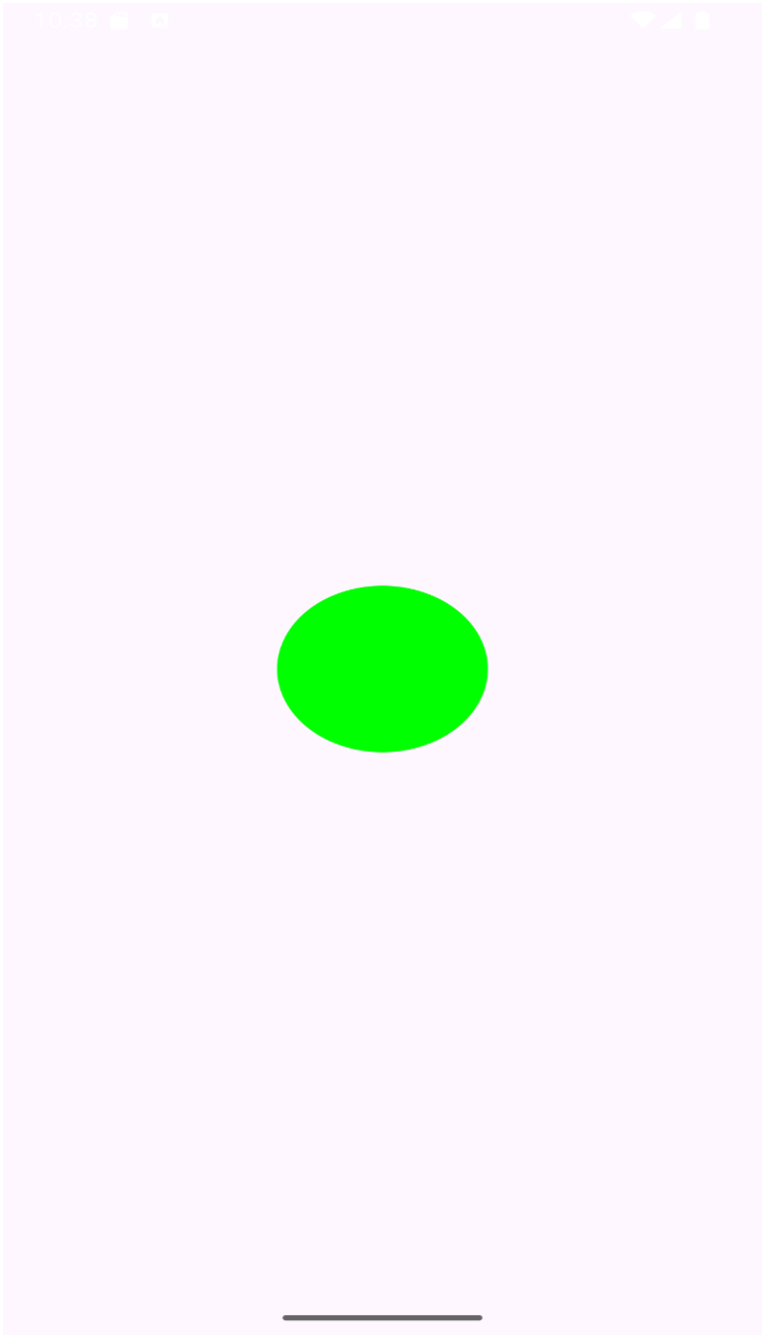
## PROGRAM 5b

## Main_Activity.java:

```
package com.example.circle;

import android.app.Activity;
import android.content.Context;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.Paint;
import android.os.Bundle;
import android.view.View;

public class MainActivity extends Activity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(new MyView(this));
    }

    private class MyView extends View {

        public MyView(Context context) {
            super(context);
        }

        @Override
        protected void onDraw(Canvas canvas) {
            super.onDraw(canvas);
```

```
            int canvasWidth = canvas.getWidth();
            int canvasHeight = canvas.getHeight();

            int centerX = canvasWidth / 2;
            int centerY = canvasHeight / 2;
            int radius = 150;  // Radius of the circle

            Paint paint = new Paint();
            paint.setAntiAlias(true);             // Smooth edges
            paint.setStyle(Paint.Style.FILL);     // Fill the circle
            paint.setColor(Color.parseColor("#00FF00"));  // Bright green

            canvas.drawCircle(centerX, centerY, radius, paint);
        }
    }
}
```

**Output:**



## PROGRAM 6

## Main_Activity.java:

```
package com.example.databaseapp;

import android.app.Activity;
import android.app.AlertDialog;
import android.content.Context;
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;

public class MainActivity extends Activity {

    EditText Rollno, Name, Marks;
    Button Insert, Delete, Update, View, ViewAll;
    SQLiteDatabase db;

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

        // Initialize Views
        Rollno = findViewById(R.id.Rollno);
        Name = findViewById(R.id.Name);
        Marks = findViewById(R.id.Marks);
```

```
        Insert = findViewById(R.id.Insert);
        Delete = findViewById(R.id.Delete);
        Update = findViewById(R.id.Update);
        View = findViewById(R.id.View);
        ViewAll = findViewById(R.id.ViewAll);

        // Create database and table
        db = openOrCreateDatabase("StudentDB", Context.MODE_PRIVATE, null);
        db.execSQL("CREATE TABLE IF NOT EXISTS student(rollno VARCHAR, name
VARCHAR, marks VARCHAR);");

        // Set Click Listeners
        Insert.setOnClickListener(v -> executeDbOperation("insert"));
        Delete.setOnClickListener(v -> executeDbOperation("delete"));
        Update.setOnClickListener(v -> executeDbOperation("update"));
        View.setOnClickListener(v -> executeDbOperation("view"));
        ViewAll.setOnClickListener(v -> executeDbOperation("view_all"));
    }

    private void executeDbOperation(String operation) {
        String rollno = Rollno.getText().toString();
        String name = Name.getText().toString();
        String marks = Marks.getText().toString();

        switch (operation) {
            case "insert":
                if (isEmpty(rollno, name, marks)) {
                    showMessage("Error", "Please fill all fields");
                    return;
```

```
            }
            db.execSQL("INSERT INTO student VALUES('" + rollno + "', '" + name + "', '" +
marks + "');");
            showMessage("Success", "Record Inserted");
            break;

        case "delete":
            if (rollno.isEmpty()) {
                showMessage("Error", "Please enter Rollno");
                return;
            }
            Cursor c = db.rawQuery("SELECT * FROM student WHERE rollno='" + rollno +
"'", null);
            if (c.moveToFirst()) {
                db.execSQL("DELETE FROM student WHERE rollno='" + rollno + "'");
                showMessage("Success", "Record Deleted");
            } else {
                showMessage("Error", "Invalid Rollno");
            }
            break;

        case "update":
            if (isEmpty(rollno, name, marks)) {
                showMessage("Error", "Please fill all fields");
                return;
            }
            c = db.rawQuery("SELECT * FROM student WHERE rollno='" + rollno + "'",
null);
            if (c.moveToFirst()) {
```

```
                db.execSQL("UPDATE student SET name='" + name + "', marks='" + marks + "'
WHERE rollno='" + rollno + "'");
                showMessage("Success", "Record Updated");
            } else {
                showMessage("Error", "Invalid Rollno");
            }
            break;

        case "view":
            if (rollno.isEmpty()) {
                showMessage("Error", "Please enter Rollno");
                return;
            }
            c = db.rawQuery("SELECT * FROM student WHERE rollno='" + rollno + "'",
null);
            if (c.moveToFirst()) {
                Name.setText(c.getString(1));
                Marks.setText(c.getString(2));
            } else {
                showMessage("Error", "Invalid Rollno");
                clearText();
            }
            break;

        case "view_all":
            c = db.rawQuery("SELECT * FROM student", null);
            if (c.getCount() == 0) {
                showMessage("Error", "No records found");
                return;
            }
```

```
            StringBuilder buffer = new StringBuilder();
            while (c.moveToNext()) {
               buffer.append("Rollno: ").append(c.getString(0)).append("\n")
                     .append("Name: ").append(c.getString(1)).append("\n")
                     .append("Marks: ").append(c.getString(2)).append("\n\n");
            }
            showMessage("Student Details", buffer.toString());
            break;
      }

      clearText();
   }

   private boolean isEmpty(String rollno, String name, String marks) {
      return rollno.isEmpty() || name.isEmpty() || marks.isEmpty();
   }

   private void showMessage(String title, String message) {
      new AlertDialog.Builder(this)
            .setCancelable(true)
            .setTitle(title)
            .setMessage(message)
            .show();
   }

   private void clearText() {
      Rollno.setText("");
      Name.setText("");
      Marks.setText("");
```

```
        Rollno.requestFocus();
    }
}
```

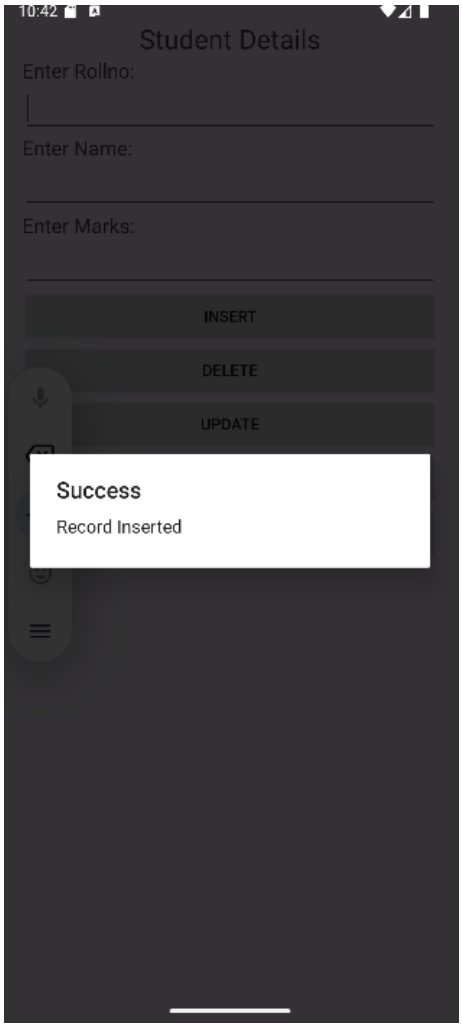
## Activity.xml:

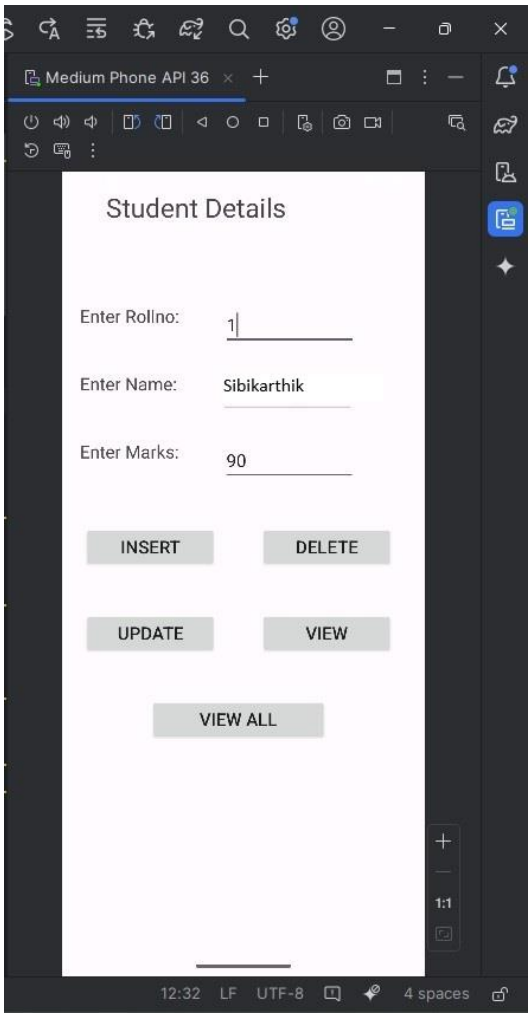
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="20dp">

    <TextView
        android:id="@+id/titleText"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Student Details"
        android:textSize="24sp"
        android:layout_gravity="center" />

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter Rollno:"
        android:textSize="18sp" />
```

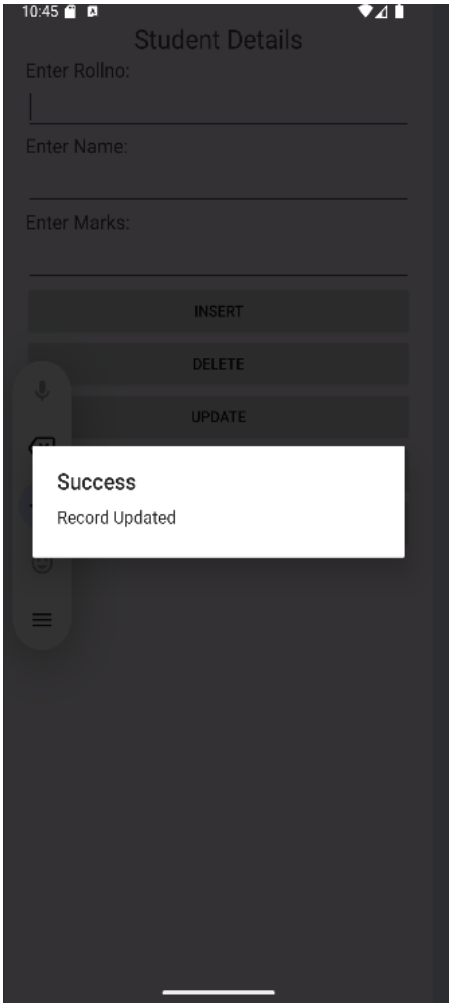
```
<EditText
        android:id="@+id/Rollno"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="number" />

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter Name:"
        android:textSize="18sp" />

    <EditText
        android:id="@+id/Name"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="text" />

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter Marks:"
        android:textSize="18sp" />

    <EditText
        android:id="@+id/Marks"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="number" />
```

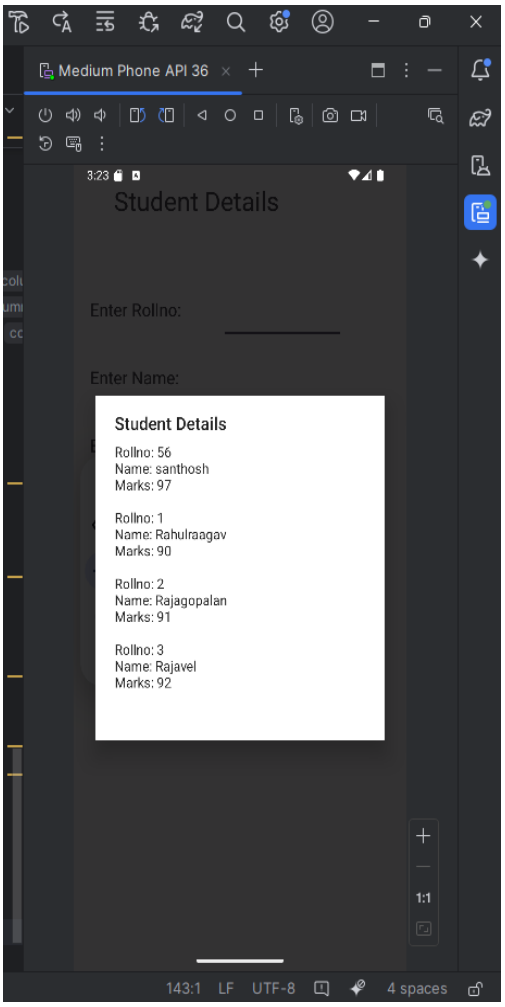
```
 <Button
        android:id="@+id/Insert"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Insert" />

    <Button
        android:id="@+id/Delete"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Delete" />

    <Button
        android:id="@+id/Update"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Update" />

    <Button
        android:id="@+id/View"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="View" />
    <Button
        android:id="@+id/ViewAll"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="View All" />
</LinearLayout>
```

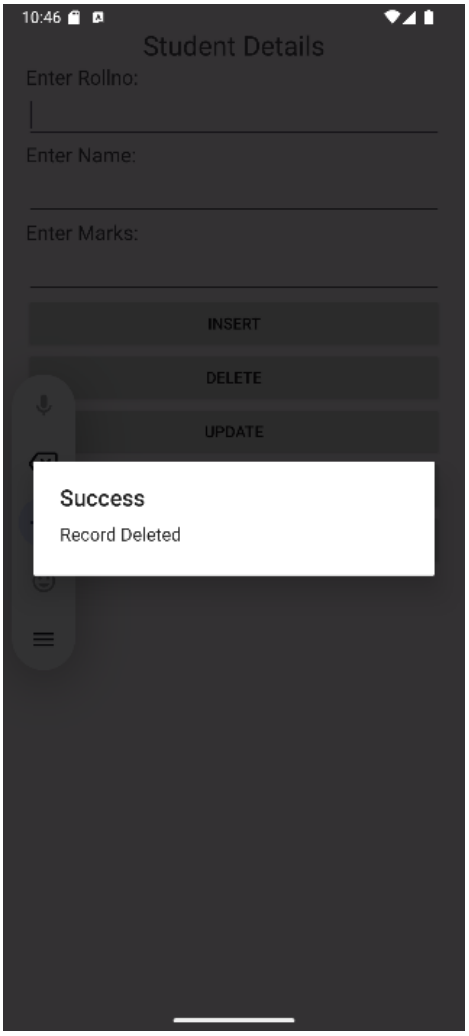
## Output:

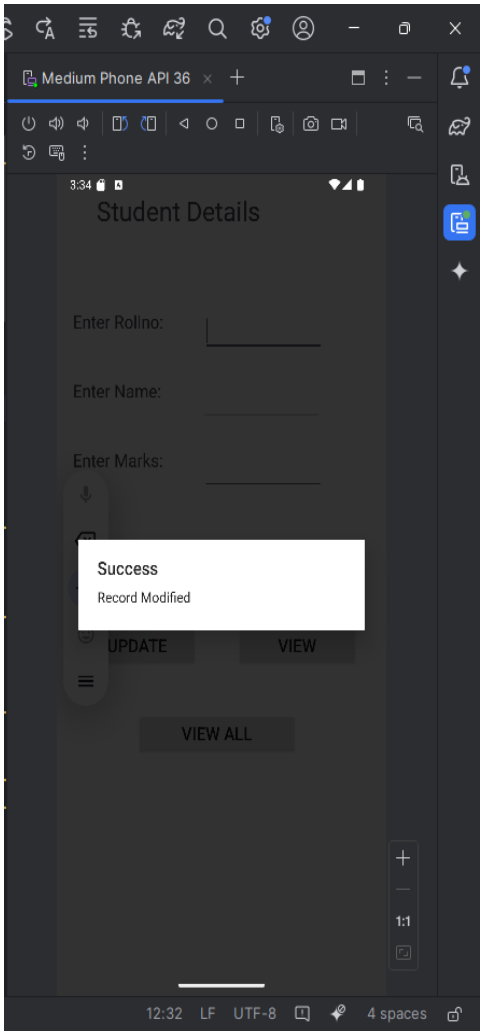

10:42
Student Details
Enter Rollno:
Enter Name:
Enter Marks:
INSERT
DELETE
UPDATE
Success
Record Inserted


Medium Phone API 36
Student Details
Enter Rollno:
1
Enter Name:
Sibikarthik
Enter Marks:
90
INSERT
DELETE
UPDATE
VIEW
VIEW ALL
1:1
12:32
LF
UTF-8
4 spaces


10:45
Student Details
Enter Rollno:
Enter Name:
Enter Marks:
INSERT
DELETE
UPDATE
Success
Record Updated


Medium Phone API 36
3:23
Student Details
Enter Rollno:
Enter Name:
Student Details
Rollno: 56
Name: santhosh
Marks: 97
Rollno: 1
Name: Rahulraagav
Marks: 90
Rollno: 2
Name: Rajagopalan
Marks: 91
Rollno: 3
Name: Rajavel
Marks: 92
1:1
143:1
LF
UTF-8
4 spaces


10:46
Student Details
Enter Rollno:
Enter Name:
Enter Marks:
INSERT
DELETE
UPDATE
Success
Record Deleted


Medium Phone API 36
3:34
Student Details
Enter Rollno:
Enter Name:
Enter Marks:
Success
Record Modified
UPDATE
VIEW
VIEW ALL
1:1
12:32
LF
UTF-8
4 spaces

## PROGRAM 7

## Android_manifest.xml:

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    package="com.padma.studentchatapp">

    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.StudentChatApp"
        tools:targetApi="31">

        <!-- Set LoginActivity as launcher -->
        <activity
            android:name=".LoginActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>

        <activity android:name=".RegisterActivity" android:exported="true" />
        <activity android:name=".UserListActivity" android:exported="true" />
```

```
        <activity android:name=".ChatActivity" android:exported="true" />
        <activity android:name=".MainActivity" android:exported="false" />
    </application>

</manifest>
```

## Activity_register.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="24dp"
    android:orientation="vertical"
    android:gravity="center"
    android:background="#FF6F6F">

    <EditText
        android:id="@+id/editTextEmail"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Email"
        android:inputType="textEmailAddress"
        android:padding="10dp"
        android:background="@android:drawable/editbox_background" />

    <EditText
        android:id="@+id/editTextPassword"
```

```
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:inputType="textPassword"
        android:padding="10dp"
        android:background="@android:drawable/editbox_background"
        android:layout_marginTop="12dp"/>

    <Button
        android:id="@+id/buttonRegister"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Register"
        android:layout_marginTop="20dp"
        android:background="#FF4081"
        android:textColor="#FFFFFF"/>
</LinearLayout>
```

## Activity_login.xml:

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent" android:layout_height="match_parent"
    android:padding="20dp" android:orientation="vertical">

    <EditText android:id="@+id/editTextEmail"
        android:hint="Email" android:inputType="textEmailAddress"
        android:layout_width="match_parent" android:layout_height="wrap_content"/>

    <EditText android:id="@+id/editTextPassword"
```

```
    android:hint="Password" android:inputType="textPassword"
    android:layout_width="match_parent" android:layout_height="wrap_content"/>

  <Button android:id="@+id/buttonLogin"
    android:text="Login" android:layout_width="match_parent"
android:layout_height="wrap_content"/>

  <Button android:id="@+id/buttonToRegister"
    android:text="Go to Register" android:layout_width="match_parent"
android:layout_height="wrap_content"/>
</LinearLayout>
```

## Activity_chat.xml:

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

  <androidx.recyclerview.widget.RecyclerView
    android:id="@+id/recyclerViewMessages"
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="1"
    android:padding="10dp" />

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

```
        android:padding="8dp">

        <EditText
            android:id="@+id/editTextMessage"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:hint="Type a message" />

        <ImageButton
            android:id="@+id/buttonSend"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:src="@android:drawable/ic_menu_send" />
    </LinearLayout>
</LinearLayout>
```

## RegisterActivity.java:

```
package com.padma.studentchatapp;

import android.content.Intent;
import android.os.Bundle;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

import com.google.firebase.auth.FirebaseAuth;
import com.google.firebase.database.FirebaseDatabase;
```

```
public class RegisterActivity extends AppCompatActivity {

    EditText editTextEmail, editTextPassword;
    Button buttonRegister;
    FirebaseAuth mAuth;

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

        // Initialize Firebase Authentication
        mAuth = FirebaseAuth.getInstance();

        // Bind UI elements
        editTextEmail = findViewById(R.id.editTextEmail);
        editTextPassword = findViewById(R.id.editTextPassword);
        buttonRegister = findViewById(R.id.buttonRegister);

        // Register button click listener
        buttonRegister.setOnClickListener(view -> {
            String email = editTextEmail.getText().toString().trim();
            String password = editTextPassword.getText().toString().trim();

            // Basic input validation
            if (email.isEmpty() || password.isEmpty()) {
                Toast.makeText(this, "Email and Password cannot be empty",
Toast.LENGTH_SHORT).show();
```

```
            return;
        }

        // Firebase create user
        mAuth.createUserWithEmailAndPassword(email, password)
                .addOnCompleteListener(task -> {
                    if (task.isSuccessful()) {
                        // Get UID and save user to database
                        String uid = mAuth.getCurrentUser().getUid();
                        User newUser = new User(uid, email);

                        FirebaseDatabase.getInstance().getReference("users")
                                .child(uid)
                                .setValue(newUser)
                                .addOnCompleteListener(dbTask -> {
                                    if (dbTask.isSuccessful()) {
                                        Toast.makeText(this, "Registration Successful!",
Toast.LENGTH_SHORT).show();

                                        // ✅ Redirect to UserListActivity
                                        startActivity(new Intent(RegisterActivity.this,
UserListActivity.class));
                                        finish();
                                    } else {
                                        Toast.makeText(this, "Database Error: " +
dbTask.getException().getMessage(), Toast.LENGTH_LONG).show();
                                    }
                                });
                    } else {
```

```
                    Toast.makeText(this, "Error: " + task.getException().getMessage(),
Toast.LENGTH_LONG).show();
                }
            });
        });
    }
}
```

## ChatActivity.java:

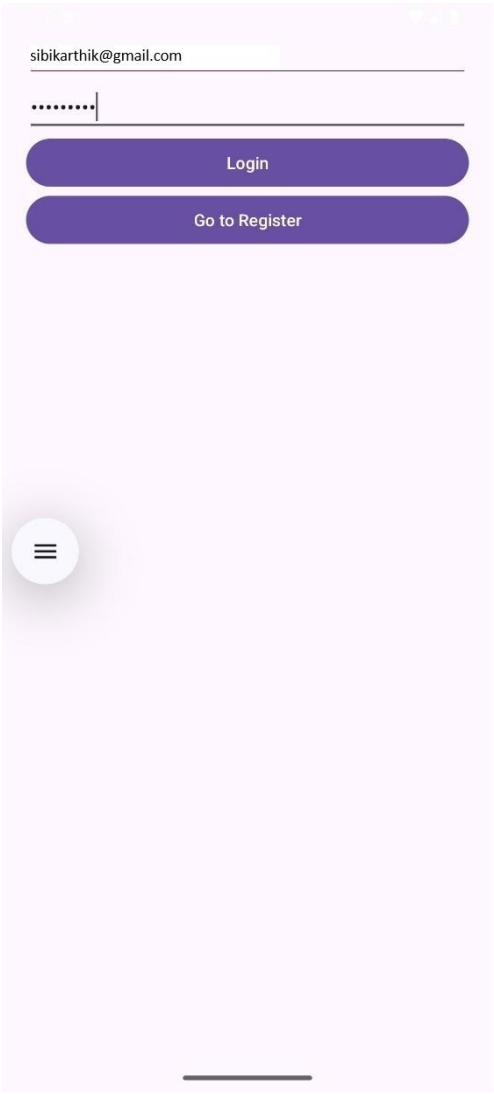
```
package com.padma.studentchatapp;

import android.os.Bundle;
import android.widget.EditText;
import android.widget.ImageButton;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;

import com.google.firebase.auth.FirebaseAuth;
import com.google.firebase.database.*;

import java.util.ArrayList;
import java.util.HashMap;
import java.util.List;

public class ChatActivity extends AppCompatActivity {
```

```
EditText editTextMessage;
ImageButton buttonSend;
RecyclerView recyclerViewMessages;
MessageAdapter messageAdapter;
List<Message> messageList;

String receiverId, senderId, chatRoomId;
DatabaseReference chatRef;

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

    editTextMessage = findViewById(R.id.editTextMessage);
    buttonSend = findViewById(R.id.buttonSend);
    recyclerViewMessages = findViewById(R.id.recyclerViewMessages);

    receiverId = getIntent().getStringExtra("receiverId");
    senderId = FirebaseAuth.getInstance().getCurrentUser().getUid();

    // Create common chat room ID regardless of sender or receiver order
    if (senderId.compareTo(receiverId) < 0) {
        chatRoomId = senderId + "_" + receiverId;
    } else {
        chatRoomId = receiverId + "_" + senderId;
    }
```

```
        chatRef =
FirebaseDatabase.getInstance().getReference("chats").child(chatRoomId).child("messages");

        messageList = new ArrayList<>();
        messageAdapter = new MessageAdapter(this, messageList, senderId);

        recyclerViewMessages.setLayoutManager(new LinearLayoutManager(this));
        recyclerViewMessages.setAdapter(messageAdapter);

        buttonSend.setOnClickListener(v -> {
            String messageText = editTextMessage.getText().toString().trim();
            if (!messageText.isEmpty()) {
                sendMessage(senderId, receiverId, messageText);
                editTextMessage.setText("");
            }
        });

        readMessages();
    }

    private void sendMessage(String sender, String receiver, String message) {
        HashMap<String, String> msg = new HashMap<>();
        msg.put("sender", sender);
        msg.put("receiver", receiver);
        msg.put("message", message);

        chatRef.push().setValue(msg);
    }
```

```
    private void readMessages() {
        chatRef.addValueEventListener(new ValueEventListener() {
            @Override
            public void onDataChange(@NonNull DataSnapshot snapshot) {
                messageList.clear();
                for (DataSnapshot dataSnapshot : snapshot.getChildren()) {
                    Message msg = dataSnapshot.getValue(Message.class);
                    messageList.add(msg);
                }
                messageAdapter.notifyDataSetChanged();
                recyclerViewMessages.scrollToPosition(messageList.size() - 1);
            }

            @Override
            public void onCancelled(@NonNull DatabaseError error) {
            }
        });
    }
}
```

**OUTPUT:**


sibikarthik@gmail.com
Login
Go to Register


2:17
sibikarthik@gmail.com
Register


alexmcc@gmail.com
akashsrmvec@gmail.com
elumalai@gmail.com


hii akash
how are you?
I'm fine Alex
what are you doing ?
Type a message

## PROGRAM 8

## Android manifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    package="com.example.ex8"> <!-- Change this to match your actual package name -->

    <!-- Permissions for reading/writing to external storage -->
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"
/>
    <uses-permission android:name="android.permission.READ_EXTERNAL_STORAGE"
/>

    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Ex8"
        tools:targetApi="31">

        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
```

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

</application>

</manifest>
```

## ActivityMain.xml

```
<RelativeLayout 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:paddingBottom="16dp"
    android:paddingLeft="16dp"
    android:paddingRight="16dp"
    android:paddingTop="16dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Saved Data Will Appear Here" />

    <EditText
        android:id="@+id/editText1"
```

```
        android:layout_width="200dp"
        android:layout_height="wrap_content"
        android:layout_above="@id/button1"
        android:layout_toRightOf="@id/textView1"
        android:layout_marginBottom="50dp"
        android:hint="Enter data"
        android:ems="10" >
        <requestFocus />
    </EditText>

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/textView1"
        android:layout_centerVertical="true"
        android:layout_marginLeft="32dp"
        android:text="Save Data" />

    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_toRightOf="@id/button1"
        android:layout_centerVertical="true"
        android:layout_marginLeft="36dp"
        android:text="Show Data" />
</RelativeLayout>
```

## MainActivity.java

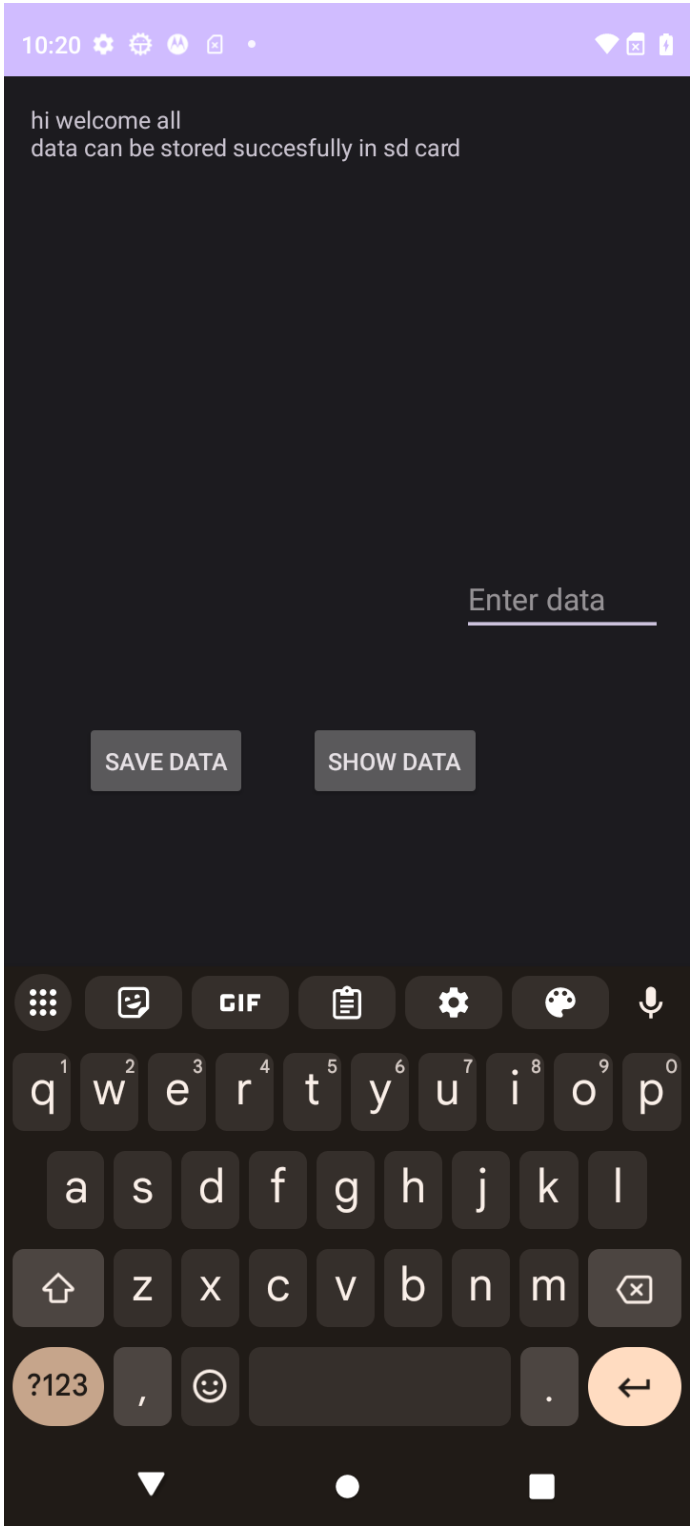
```
package com.example.My Application8;

import android.Manifest;
import android.app.Activity;
import android.content.pm.PackageManager;
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 androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;

import java.io.File;
import java.io.FileInputStream;
import java.io.FileOutputStream;
import java.io.IOException;

public class MainActivity extends Activity {

    Button b1, b2;
    EditText e;
    TextView tv;
```

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

        tv = findViewById(R.id.textView1);
        b1 = findViewById(R.id.button1);
        b2 = findViewById(R.id.button2);
        e = findViewById(R.id.editText1);

        // Request storage permissions at runtime
        if (ContextCompat.checkSelfPermission(this,
Manifest.permission.WRITE_EXTERNAL_STORAGE)
                != PackageManager.PERMISSION_GRANTED) {
            ActivityCompat.requestPermissions(this,
                    new String[]{Manifest.permission.WRITE_EXTERNAL_STORAGE}, 1);
        }

        // Save data to SD card
        b1.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                String text = e.getText().toString();
                if (isExternalStorageWritable()) {
                    File file = new File(getExternalFilesDir(null), "myfile.txt");
                    try (FileOutputStream fos = new FileOutputStream(file, true)) {
                        fos.write((text + "\n").getBytes());
                        Toast.makeText(getApplicationContext(), "Data saved to SD card",
Toast.LENGTH_SHORT).show();
                        e.setText(""); // Clear after saving
```

```
            } catch (IOException ex) {
                Toast.makeText(getApplicationContext(), "Save failed",
Toast.LENGTH_SHORT).show();
                ex.printStackTrace();
            }
        }
    }
});

// Show data from SD card
b2.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        File file = new File(getExternalFilesDir(null), "myfile.txt");
        if (isExternalStorageReadable()) {
            try (FileInputStream fis = new FileInputStream(file)) {
                int ch;
                StringBuilder builder = new StringBuilder();
                while ((ch = fis.read()) != -1) {
                    builder.append((char) ch);
                }
                tv.setText(builder.toString());
                Toast.makeText(getApplicationContext(), "File read",
Toast.LENGTH_SHORT).show();
            } catch (IOException ex) {
                Toast.makeText(getApplicationContext(), "Read failed",
Toast.LENGTH_SHORT).show();
                ex.printStackTrace();
            }
        }
```

```
            }
        });
    }
private boolean isExternalStorageWritable() {
        return
Environment.MEDIA_MOUNTED.equals(Environment.getExternalStorageState());
    }


    private boolean isExternalStorageReadable() {
        String state = Environment.getExternalStorageState();
        return Environment.MEDIA_MOUNTED.equals(state) ||
                Environment.MEDIA_MOUNTED_READ_ONLY.equals(state);
    }
}
```

**OUTPUT:**


10:20
hi welcome all
data can be stored succesfully in sd card
Enter data
SAVE DATA
SHOW DATA
GIF
?123

## PROGRAM 9

## Android Manifest.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    package="com.example.gpstrackingapp">
    <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>
    <uses-permission
android:name="android.permission.ACCESS_COARSE_LOCATION"/>
    <uses-permission android:name="android.permission.INTERNET" />
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.GPSTrackingApp"
        tools:targetApi="31">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>     </application>
```

## Activity_main.xml:

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

    <Button
        android:id="@+id/btnShowLocation"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Show My Location"/>
</LinearLayout>
```

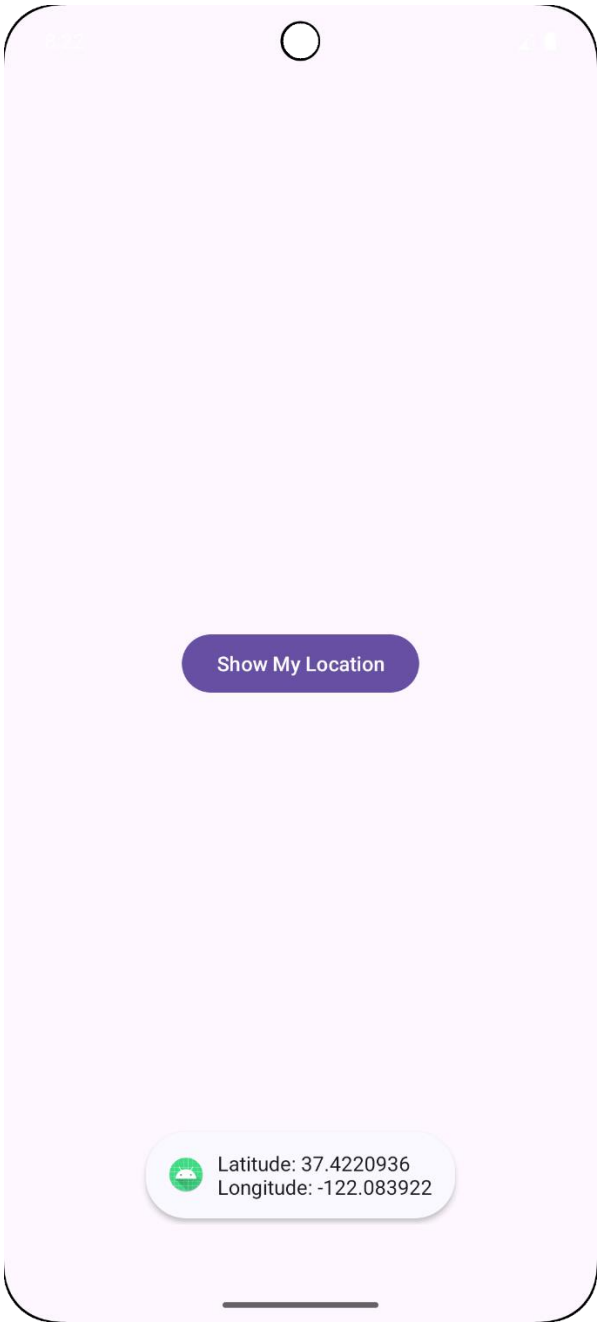
## Main Activity.java:

```
package com.example.gpstrackingapp;
import android.Manifest;
import android.content.pm.PackageManager;
import android.location.Location;
import android.os.Bundle;
import android.widget.Button;
import android.widget.Toast;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
```

```
import androidx.core.app.ActivityCompat;
import com.google.android.gms.location.FusedLocationProviderClient;
import com.google.android.gms.location.LocationServices;
import com.google.android.gms.tasks.OnSuccessListener;
public class MainActivity extends AppCompatActivity {
   Button btnShowLocation;
   FusedLocationProviderClient fusedLocationClient;
   private static final int LOCATION_PERMISSION_CODE = 101;
   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main);
      btnShowLocation = findViewById(R.id.btnShowLocation);
      fusedLocationClient = LocationServices.getFusedLocationProviderClient(this);
      btnShowLocation.setOnClickListener(view -> {
         if (ActivityCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_FINE_LOCATION) !=
PackageManager.PERMISSION_GRANTED) {
            ActivityCompat.requestPermissions(this, new
String[]{Manifest.permission.ACCESS_FINE_LOCATION},
LOCATION_PERMISSION_CODE);
         } else {
            getLastLocation();
         }
      });
   }
   private void getLastLocation() {
      fusedLocationClient.getLastLocation()
            .addOnSuccessListener(this, location -> {
               if (location != null) {
```

```
                double lat = location.getLatitude();
                double lon = location.getLongitude();
                Toast.makeText(getApplicationContext(),
                        "Latitude: " + lat + "\nLongitude: " + lon,
                        Toast.LENGTH_LONG).show();
            } else {
                Toast.makeText(getApplicationContext(), "Location not available",
Toast.LENGTH_SHORT).show();
            }
        });
    }
    // Handle permission result
    @Override
    public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions,
                                           @NonNull int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);
        if (requestCode == LOCATION_PERMISSION_CODE) {
            if (grantResults.length > 0 && grantResults[0] ==
PackageManager.PERMISSION_GRANTED) {
                getLastLocation();
            } else {
                Toast.makeText(this, "Permission denied", Toast.LENGTH_SHORT).show();
            }
        }
    }
}
```

**OUTPUT:**



## PROGRAM 10

## Activity.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/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <!-- Drag & Drop UI -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="horizontal"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toEndOf="parent">

        <!-- Draggable Emoji -->
        <TextView
            android:id="@+id/emoji1"
            android:layout_width="100dp"
            android:layout_height="100dp"
            android:text="🍏"
```

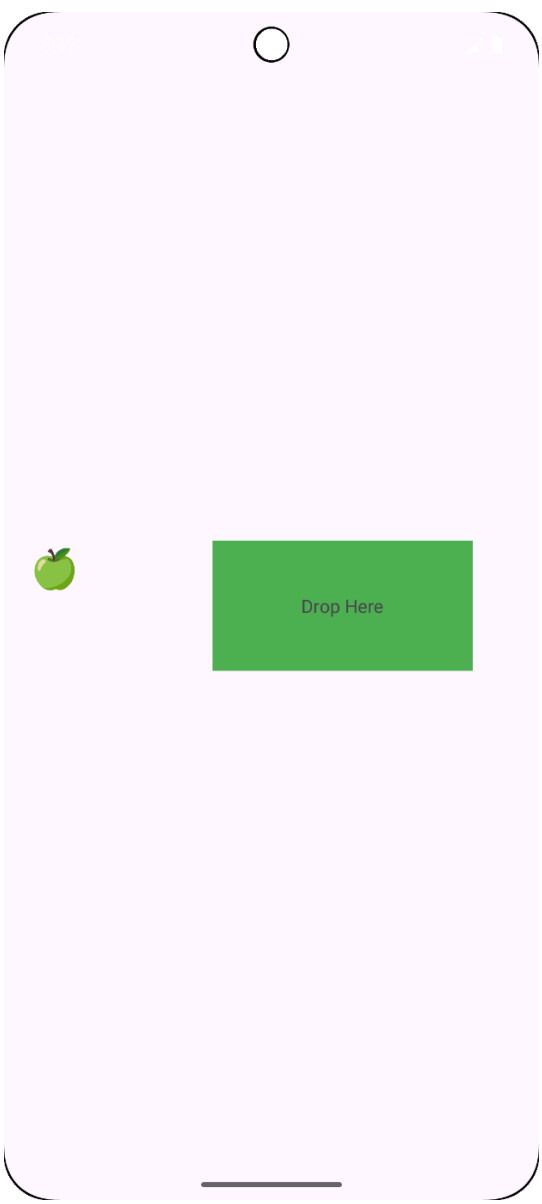
```
        android:textSize="30sp"
        android:layout_gravity="center_vertical"
        android:layout_marginStart="20dp"/>

    <!-- Drop Target -->
    <TextView
        android:id="@+id/target1"
        android:layout_width="200dp"
        android:layout_height="100dp"
        android:background="#4CAF50"
        android:text="Drop Here"
        android:layout_gravity="center_vertical"
        android:layout_marginStart="40dp"
        android:gravity="center"/>
  </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

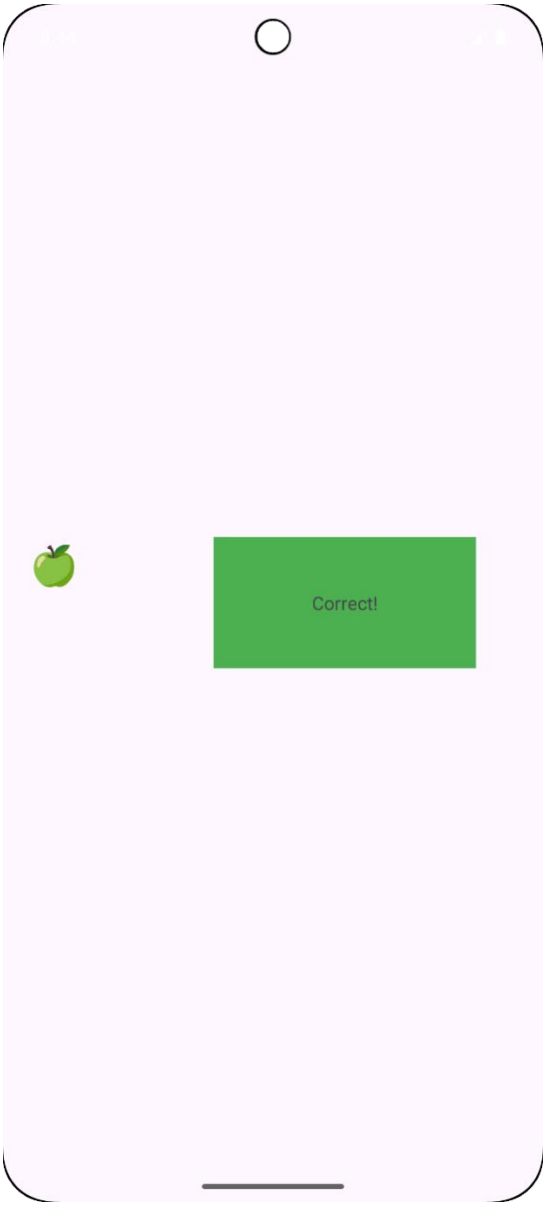
## MainActivity.java:

```
package com.example.dragdrop;

import android.os.Bundle;
import android.view.DragEvent;
import android.view.View;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
  @Override
```

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

        // Set drag listeners
        findViewById(R.id.emoji1).setOnLongClickListener(v -> {
            View.DragShadowBuilder shadow = new View.DragShadowBuilder(v);
            v.startDragAndDrop(null, shadow, v, 0);
            return true;
        });

         findViewById(R.id.target1).setOnDragListener((v, event) -> {
            if (event.getAction() == DragEvent.ACTION_DROP) {
                TextView dropped = (TextView) event.getLocalState();
                TextView target = (TextView) v;
                target.setText("Correct!");
            }
            return true;
        });
    }
}
```

**OUTPUT:**



## PROGRAM 11

## Main_activity.java:

```
package com.example.alarmclock;
import android.app.AlarmManager;
import android.app.PendingIntent;
import android.content.Intent;
import android.os.Bundle;
import android.widget.TextView;
import android.widget.TimePicker;
import android.widget.ToggleButton;
import android.view.View;
import androidx.appcompat.app.AppCompatActivity;
import java.util.Calendar;

public class MainActivity extends AppCompatActivity {

    private AlarmManager alarmManager;
    private PendingIntent pendingIntent;
    private TimePicker alarmTimePicker;
    private TextView alarmText;

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

        alarmTimePicker = findViewById(R.id.alarmTimePicker);
        alarmText = findViewById(R.id.alarmText);
```

```
        alarmManager = (AlarmManager) getSystemService(ALARM_SERVICE);
    }

    public void onToggleClicked(View view) {
        ToggleButton toggle = (ToggleButton) view;

        if (toggle.isChecked()) {
            int hour = alarmTimePicker.getHour();
            int minute = alarmTimePicker.getMinute();

            Calendar calendar = Calendar.getInstance();
            calendar.set(Calendar.HOUR_OF_DAY, hour);
            calendar.set(Calendar.MINUTE, minute);
            calendar.set(Calendar.SECOND, 0);

            Intent intent = new Intent(this, AlarmReceiver.class);
            pendingIntent = PendingIntent.getBroadcast(this, 0, intent,
PendingIntent.FLAG_IMMUTABLE);
            alarmManager.set(AlarmManager.RTC_WAKEUP, calendar.getTimeInMillis(),
pendingIntent);

            alarmText.setText("Alarm set for: " + hour + ":" + String.format("%02d", minute));
        } else {
            if (pendingIntent != null) {
                alarmManager.cancel(pendingIntent);
            }
            alarmText.setText("Alarm canceled");
        }
    }
}
```

## AlarmService.java:

```
package com.example.alarmclock;
import android.app.IntentService;
import android.app.NotificationManager;
import android.app.PendingIntent;
import android.content.Context;
import android.content.Intent;
import androidx.core.app.NotificationCompat;

public class AlarmService extends IntentService {

    public AlarmService() {
        super("AlarmService");
    }

    @Override
    protected void onHandleIntent(Intent intent) {
        sendNotification("Wake Up! Alarm is ringing!");
    }

    private void sendNotification(String msg) {
        NotificationManager manager = (NotificationManager)
getSystemService(Context.NOTIFICATION_SERVICE);

        Intent intent = new Intent(this, MainActivity.class);
        PendingIntent contentIntent = PendingIntent.getActivity(this, 0, intent,
PendingIntent.FLAG_IMMUTABLE);
```

```
        NotificationCompat.Builder builder = new NotificationCompat.Builder(this, "default")
                .setSmallIcon(R.drawable.ic_launcher_foreground)
                .setContentTitle("Alarm Clock")
                .setContentText(msg)
                .setContentIntent(contentIntent)
                .setAutoCancel(true);

        manager.notify(1, builder.build());
    }
}
```

## AlarmReceiver.java:

```
package com.example.alarmclock;
import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.media.Ringtone;
import android.media.RingtoneManager;
import android.net.Uri;

public class AlarmReceiver extends BroadcastReceiver {

    @Override
    public void onReceive(Context context, Intent intent) {
        Uri alarmUri = RingtoneManager.getDefaultUri(RingtoneManager.TYPE_ALARM);
        if (alarmUri == null) {
            alarmUri =
RingtoneManager.getDefaultUri(RingtoneManager.TYPE_NOTIFICATION);
```

```
        }
        Ringtone ringtone = RingtoneManager.getRingtone(context, alarmUri);
        ringtone.play();

        Intent service = new Intent(context, AlarmService.class);
        context.startService(service);
    }
}
```

## AndroidManifest.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">
    <uses-permission android:name="android.permission.WAKE_LOCK" />

    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.AlarmClock"
        tools:targetApi="31">
        <activity
            android:name=".MainActivity"
            android:exported="true">
```

```
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <!-- Register the broadcast receiver for alarm -->
        <receiver android:name=".AlarmReceiver" />
        <!-- Register the service to handle alarm notification -->
        <service android:name=".AlarmService" />
    </application>
</manifest>
```

## Activity.xml:

```
<RelativeLayout 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"
    tools:context=".MainActivity">

    <TimePicker
        android:id="@+id/alarmTimePicker"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="50dp"/>

    <ToggleButton
        android:id="@+id/alarmToggle"
```

```
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Alarm On/Off"
        android:onClick="onToggleClicked"
        android:layout_below="@id/alarmTimePicker"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="30dp"/>

    <TextView
        android:id="@+id/alarmText"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="No Alarm Set"
        android:layout_below="@id/alarmToggle"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="20dp"/>
</RelativeLayout>
```

**OUTPUT:**