RAJALAKSHMI ENGINEERING COLLEGE

RAJALAKSHMI NAGAR, THANDALAM – 602 105

CS19611
Mobile Application Development Laboratory

Laboratory Record Note Book

Name : SHANMUGA PRIYA RAANJANI S H

Year / Branch / Section : III / CSE / D

Register No. : 2116220701262

Semester : VI

Academic Year : 2024 - 2025

RAJALAKSHMI ENGINEERING COLLEGE

RAJALAKSHMI NAGAR, THANDALAM – 602 105

BONAFIDE CERTIFICATE

Name : SHANMUGA PRIYA RAANJANI S H **Academic Year :** 2024-2025

Semester : VI **Branch :** Computer Science And Engineering

Register No. 2116220701262

Certified that this is the bonafide record of work done by the above student in the MOBILE APPLICATION DEVELOPMENT LABORATORY *Laboratory during the year 2024 - 2025.*

Signature of Faculty in-charge

Submitted for the Practical Examination held on . . . . . .

Internal Examiner **External Examiner**

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Reg. No. : 220701262 Name : SHANMUGA PRIYA RAANJANI S H

Year : III Branch: Computer Science and Engineering Sec: D

Ex. No. : 01 **Date : 20/02/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

GUI Components

Aim

Develop an application to change the font and color of the text and display toast message when the user presses the button.

Procedure

Step 1: Start

Step 2: Initialize the Android application using Kotlin

Step 3: Design the user interface

- Create a `TextView` to display text.
- Create a `Button` for user interaction.

Step 4: Load a custom font

- Place the `.ttf` font file into the `res/font` directory.
- Reference this font in the Kotlin code using `ResourcesCompat`.

Step 5: Link UI elements

- In `onCreate()`, link `TextView` and `Button` using `findViewById`.

Step 6: Set OnClickListener on the Button

- When the button is clicked:
  - a) Change the font of the `TextView` using the custom font.
  - b) Change the color of the `TextView` text using `setTextColor()`.
  - c) Show a `Toast` message indicating the changes were applied.

Step 7: End

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.GUIComponents"
        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>
```

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/linearLayout"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity" >

    <TextView
        android:id="@+id/tvText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Rajalakshmi Engineering College"
        android:textAlignment="center"
        android:textSize="16sp" />

    <Button
        android:id="@+id/btFontSize"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="textCapSentences"
        android:text="Change Font Size"
        android:textSize="16sp" />

    <Button
        android:id="@+id/btFontColor"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="textCapSentences"
        android:text="Change Font Color"
        android:textSize="16sp" />

    <Button
        android:id="@+id/btBackgroundColor"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="textCapSentences"
        android:text="Change Background Color"
        android:textSize="16sp" />
</LinearLayout>
```

MainActivity.kt

```
package org.rajalakshmi.guicomponents

import android.graphics.Color
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.LinearLayout
import android.widget.TextView

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

        val tvText : TextView = findViewById(R.id.tvText)
        val btFontSize : Button = findViewById(R.id.btFontSize)
        val btFontColor : Button = findViewById(R.id.btFontColor)
        val btBackgroundColor : Button = findViewById(R.id.btBackgroundColor)
        val linearLayout : LinearLayout = findViewById(R.id.linearLayout)

        var fontSize : Float = 5f
        var fontColor : Int = 0
        var backgroundColor : Int = 0

        btFontSize.setOnClickListener {
            tvText.setTextSize(fontSize)
            fontSize = (fontSize + 5) % 50
        }

        btFontColor.setOnClickListener {
            when(fontColor % 3) {
                0 -> tvText.setTextColor(Color.RED)
                1 -> tvText.setTextColor(Color.GREEN)
                2 -> tvText.setTextColor(Color.BLUE)
            }
            fontColor++
        }

        btBackgroundColor.setOnClickListener {
            when(backgroundColor % 3) {
                0 -> linearLayout.setBackgroundColor(Color.RED)
                1 -> linearLayout.setBackgroundColor(Color.GREEN)
                2 -> linearLayout.setBackgroundColor(Color.BLUE)
            }
            backgroundColor++
        }
    }
}
```

Output

Result

Ex. No. : 02 **Date : 27/02/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Simple Calculator

Aim

Develop a simple calculator to perform arithmetic and mathematical functions using Math class.

Procedure

Step 1: Start

Step 2: Design the UI

- Create two input fields for numbers (EditText1 and EditText2).
- Create buttons for operations:
- Arithmetic: `+`, `-`, `×`, `÷`
- Math functions: `sqrt`, `pow`, `sin`, `cos`, `tan`, etc.
- Create a TextView to display the result.

Step 3: Read user input

- Get number inputs from EditText1 and EditText2 (if applicable).
- Convert them from text to `Double`.

Step 4: Set up event listeners for each button

- On button click, perform the corresponding operation using Kotlin operators or `Math` class methods:
- Addition: `num1 + num2`
- Subtraction: `num1 - num2`
- Multiplication: `num1 * num2`
- Division: `num1 / num2` (check `num2 != 0`)

Step 5: Display the result

- Convert the result to a string.
- Show it in the TextView.

Step 6: Handle exceptions

- Validate inputs (e.g., non-empty, numeric).
- Handle divide-by-zero and invalid input formats.

Step 7: End

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.SimpleCalculator"
        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>
```

activity_main.xml

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

    <TextView
        android:id="@+id/tvExpression"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="60sp" />

    <TextView
        android:id="@+id/tvResult"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="60sp" />

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="50dp"
        android:orientation="horizontal">

        <Button
            android:id="@+id/btSeven"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="7" />

        <Button
            android:id="@+id/btEight"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="8" />

        <Button
            android:id="@+id/btNine"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="9" />

        <Button
            android:id="@+id/btDivision"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="/" />
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="50dp"
        android:orientation="horizontal">
```

```
        <Button
            android:id="@+id/btFour"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="4" />

        <Button
            android:id="@+id/btFive"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="5" />

        <Button
            android:id="@+id/btSix"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="6" />

        <Button
            android:id="@+id/btMultiplication"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="X" />
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="50dp"
        android:orientation="horizontal">

        <Button
            android:id="@+id/btOne"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="1" />

        <Button
            android:id="@+id/btTwo"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="2" />

        <Button
            android:id="@+id/btThree"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="3" />

        <Button
            android:id="@+id/btSubtraction"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="-" />
```

```
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="50dp"
        android:orientation="horizontal">

        <Button
            android:id="@+id/btDecimal"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="." />

        <Button
            android:id="@+id/btZero"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="0" />

        <Button
            android:id="@+id/btEqual"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="=" />

        <Button
            android:id="@+id/btAddition"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="+" />
    </LinearLayout>

    <Button
        android:id="@+id/btClear"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Clear"
        android:textAllCaps="false" />

</LinearLayout>
```

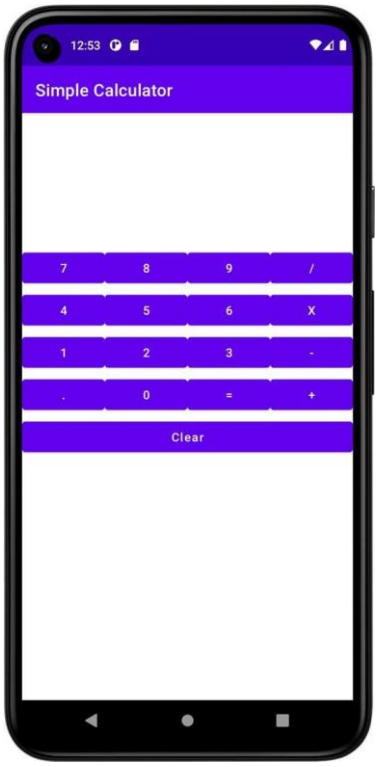
MainActivity.xml

```
package org.rajalakshmi.simplecalculator

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.TextView

class MainActivity : AppCompatActivity() {
    var input1 :Double = 0.0
    var input2 :Double = 0.0
    var addition : Boolean = false
    var subtraction : Boolean = false
    var multiplication : Boolean = false
    var division : Boolean = false
    var decimal : Boolean = false
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val tvExpression : TextView = findViewById(R.id.tvExpression)
        val tvResult : TextView = findViewById(R.id.tvResult)
        val btZero : Button = findViewById(R.id.btZero)
        val btOne : Button = findViewById(R.id.btOne)
        val btTwo : Button = findViewById(R.id.btTwo)
        val btThree : Button = findViewById(R.id.btThree)
        val btFour : Button = findViewById(R.id.btFour)
        val btFive : Button = findViewById(R.id.btFive)
        val btSix : Button = findViewById(R.id.btSix)
        val btSeven : Button = findViewById(R.id.btSeven)
        val btEight : Button = findViewById(R.id.btEight)
        val btNine : Button = findViewById(R.id.btNine)
        val btAddition : Button = findViewById(R.id.btAddition)
        val btSubtraction : Button = findViewById(R.id.btSubtraction)
        val btMultiplication : Button = findViewById(R.id.btMultiplication)
        val btDivision : Button = findViewById(R.id.btDivision)
        val btDecimal : Button = findViewById(R.id.btDecimal)
        val btEqual : Button = findViewById(R.id.btEqual)
        val btClear : Button = findViewById(R.id.btClear)

        btZero.setOnClickListener {
            tvExpression.setText("${tvExpression.text}0")
        }
        btOne.setOnClickListener {
            tvExpression.setText("${tvExpression.text}1")
        }
        btTwo.setOnClickListener {
            tvExpression.setText("${tvExpression.text}2")
        }
        btThree.setOnClickListener {
            tvExpression.setText("${tvExpression.text}3")
        }
        btFour.setOnClickListener {
            tvExpression.setText("${tvExpression.text}4")
        }
        btFive.setOnClickListener {
            tvExpression.setText("${tvExpression.text}5")
        }
        btSix.setOnClickListener {
            tvExpression.setText("${tvExpression.text}6")
```

```
}
btSeven.setOnClickListener {
    tvExpression.setText("${tvExpression.text}7")
}
btEight.setOnClickListener {
    tvExpression.setText("${tvExpression.text}8")
}
btNine.setOnClickListener {
    tvExpression.setText("${tvExpression.text}9")
}
btDecimal.setOnClickListener {
    if(!decimal) {
        tvExpression.setText("${tvExpression.text}.")
        decimal = true
    }
}
btAddition.setOnClickListener {
    if (tvExpression.getText().length != 0) {
        input1 = "${tvExpression.text}".toDouble()
        addition = true
        decimal = false
        tvExpression.setText(null)
    }
}
btSubtraction.setOnClickListener {
    if (tvExpression.getText().length != 0) {
        input1 = "${tvExpression.text}".toDouble()
        subtraction = true
        decimal = false
        tvExpression.setText(null)
    }
}
btMultiplication.setOnClickListener {
    if (tvExpression.getText().length != 0) {
        input1 = "${tvExpression.text}".toDouble()
        multiplication = true
        decimal = false
        tvExpression.setText(null)
    }
}
btDivision.setOnClickListener {
    if (tvExpression.getText().length != 0) {
        input1 = "${tvExpression.text}".toDouble()
        division = true
        decimal = false
        tvExpression.setText(null)
    }
}
btEqual.setOnClickListener() {
    input2 = "${tvExpression.text}".toDouble()
    if (addition) {
        tvExpression.setText("${input1} + ${input2}")
        val raddition : Double = input1 + input2
        tvResult.setText("${raddition}")
        addition = false
    }
    if (subtraction) {
        tvExpression.setText("${input1} - ${input2}")
        val rsubtraction : Double = input1 - input2
        tvResult.setText("${rsubtraction}")
        subtraction = false
    }
```

```
            if (multiplication) {
                tvExpression.setText("${input1} * ${input2}")
                val rmultiplication : Double = input1 * input2
                tvResult.setText("${rmultiplication}")
                multiplication = false
            }
            if (division) {
                tvExpression.setText("${input1} / ${input2}")
                val rdivision : Double = input1 / input2
                tvResult.setText("${rdivision}")
                division = false
            }
        }

        btClear.setOnClickListener {
            tvExpression.setText("")
            tvResult.setText("")
            input1 = 0.0
            input2 = 0.0
            decimal = false
        }
    }
}
```

Output


12:53
Simple Calculator
7 8 9 /
4 5 6 X
1 2 3 -
. 0 = +
Clear


12:54
Simple Calculator
5.0 / 2.0
2.5
7 8 9 /
4 5 6 X
1 2 3 -
. 0 = +
Clear

Ex. No. : 03 **Date : 04/03/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Graphical Primitives

Aim

Develop an android application to draw the circle, ellipse, rectangle and some text using Android Graphical primitives.

Procedure

Step 1: Create a New Android Project

- Open Android Studio.
- Select "New Project" > "Empty Activity."
- Name the project (e.g., `DrawShapesApp`) and choose Kotlin/Java as the language.

Step 2: Create a Custom View for Drawing Shapes

- In the `src` folder, create a new Kotlin file: `CustomView.kt`.
- In this file, create a class that extends `View` to draw shapes using `Canvas`.

Step 3: Override `onDraw` Method

- Use the `Canvas` object to draw the circle, ellipse, rectangle, and text using methods like `drawCircle()`, `drawOval()`, `drawRect()`, and `drawText()`.

Step 6: Update the `MainActivity`

- Set the custom view as the content view in `MainActivity`.

Step 5: Run the App

- Build and run the app to see the shapes and text drawn on the screen

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.GraphicalPrimitives"
        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>
```

activity_main.xml

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

    <org.rajalakshmi.graphicalprimitives.SampleCanvas
        android:layout_width="match_parent"
        android:layout_height="match_parent">
    </org.rajalakshmi.graphicalprimitives.SampleCanvas>
</androidx.constraintlayout.widget.ConstraintLayout>
```

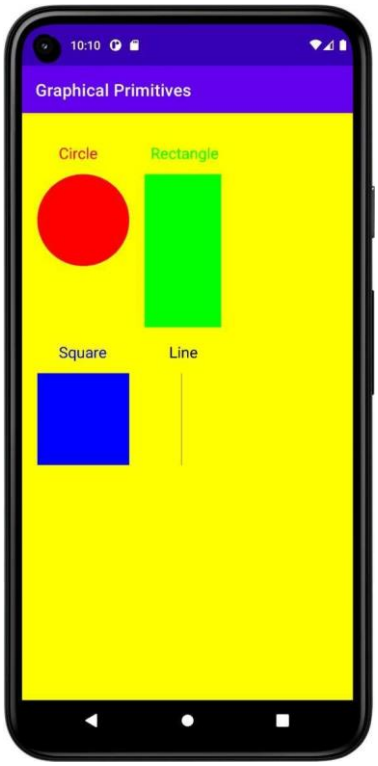
MainActivity.kt

```
package org.rajalakshmi.graphicalprimitives

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)
    }
}
```

SampleCanvas.kt

```
package org.rajalakshmi.graphicalprimitives

import android.content.Context
import android.graphics.Canvas
import android.graphics.Color
import android.graphics.Paint
import android.util.AttributeSet
import android.view.View

class SampleCanvas @JvmOverloads constructor(
    context: Context, attrs: AttributeSet? = null, defStyleAttr: Int = 0
) : View(context, attrs, defStyleAttr) {

    override fun onDraw(canvas: Canvas?) {
        super.onDraw(canvas)

        val paint : Paint = Paint()
        paint.setColor(Color.YELLOW)
        canvas?.drawPaint(paint)
        paint.setTextSize(50f);
        paint.setColor(Color.RED);
        canvas?.drawText("Circle", 120f, 150f, paint);
        canvas?.drawCircle(200f, 350f, 150f, paint);
        paint.setColor(Color.GREEN);
        canvas?.drawText("Rectangle", 420f, 150f, paint);
        canvas?.drawRect(400f, 200f, 650f, 700f, paint);
        paint.setColor(Color.BLUE);
        canvas?.drawText("Square", 120f, 800f, paint);
        canvas?.drawRect(50f, 850f, 350f, 1150f, paint);
        paint.setColor(Color.BLACK);
        canvas?.drawText("Line", 480f, 800f, paint);
        canvas?.drawLine(520f, 850f, 520f, 1150f, paint);

    }
}
```

Output



Result

Ex. No. : 04 Date : 11/03/2025

Register No. : 220701262 Name : SHANMUGA PRIYA RAANJANI S H

Android Fragments

Aim

Develop an android application to create two activities named as Student Basic Details (Register No., Name, Department) and Student Mark Details (SSLC, HSC, UG). Write an android code to combine these two activities in single screen using android fragment.

Procedure

Step 1: Create a New Android Project:

- Open Android Studio and create a new project.
- Select "Empty Activity" and name it (e.g., `StudentDetailsApp`).
- Choose Kotlin as the programming language.

Step 2: Create Two Fragments:

- One fragment for Student Basic Details.
- One fragment for Student Mark Details.

Step 3: Create a Layout for Each Fragment:

- The first fragment will contain fields for Register Number, Name, and Department.
- The second fragment will contain fields for SSLC, HSC, and UG marks.

Step 4: Combine the Fragments in the Main Activity:

- Use `FragmentTransaction` to display both fragments in a single activity

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.AndroidFragments"
        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>
```

activity_main.xml

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

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

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

        <fragment
            android:id="@+id/fragmentBasic"
            android:name="org.rajalakshmi.androidfragments.StudentBasicDetails"
            android:layout_width="match_parent"
            android:layout_height="300dp" />

        <fragment
            android:id="@+id/fragmentMark"
            android:name="org.rajalakshmi.androidfragments.StudentMarkDetails"
            android:layout_width="match_parent"
            android:layout_height="300dp" />

    </LinearLayout>
</LinearLayout>
```

fragment_student_basic_details.xml

```
<?xml version="1.0" encoding="utf-8"?>
<FrameLayout 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=".StudentBasicDetails">
    <TextView
        android:id="@+id/tvBasicDetails"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Basic Details"
        android:textAlignment="center"
        android:textSize="24sp" />
    <TextView
        android:id="@+id/tvRegisterNumber"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="50dp"
        android:text="Register No." />
    <EditText
        android:id="@+id/etRegisterNumber"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="50dp"
        android:ems="10"
        android:hint="Register Number"
        android:inputType="textPersonName" />
    <TextView
        android:id="@+id/tvName"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="125dp"
        android:text="Name" />
    <EditText
        android:id="@+id/etName"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="125dp"
        android:ems="10"
        android:hint="Name"
        android:inputType="textPersonName" />
    <TextView
        android:id="@+id/tvDepartment"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="200dp"
        android:text="Department" />
    <EditText
        android:id="@+id/etDepartment"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="200dp"
        android:ems="10"
        android:hint="Department"
        android:inputType="textPersonName" />
</FrameLayout>
```

fragment_student_mark_details.xml

```
<?xml version="1.0" encoding="utf-8"?>
<FrameLayout 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=".StudentMarkDetails">
    <TextView
        android:id="@+id/tvBasicDetails"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Mark Details"
        android:textAlignment="center"
        android:textSize="24sp" />
    <TextView
        android:id="@+id/tvSSLC"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="50dp"
        android:text="S.S.L.C." />
    <EditText
        android:id="@+id/etSSLC"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="50dp"
        android:ems="10"
        android:hint="S.S.L.C. Mark"
        android:inputType="textPersonName" />
    <TextView
        android:id="@+id/tvHSc"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="125dp"
        android:text="H.Sc." />
    <EditText
        android:id="@+id/etHSC"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="125dp"
        android:ems="10"
        android:hint="H.Sc. Mark"
        android:inputType="textPersonName" />
    <TextView
        android:id="@+id/tvUG"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="200dp"
        android:text="U.G." />
    <EditText
        android:id="@+id/etUG"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="200dp"
        android:ems="10"
        android:hint="U.G. C.G.P.A."
        android:inputType="textPersonName" />
</FrameLayout>
```

MainActivity.kt

```
package org.rajalakshmi.androidfragments

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)
    }
}
```

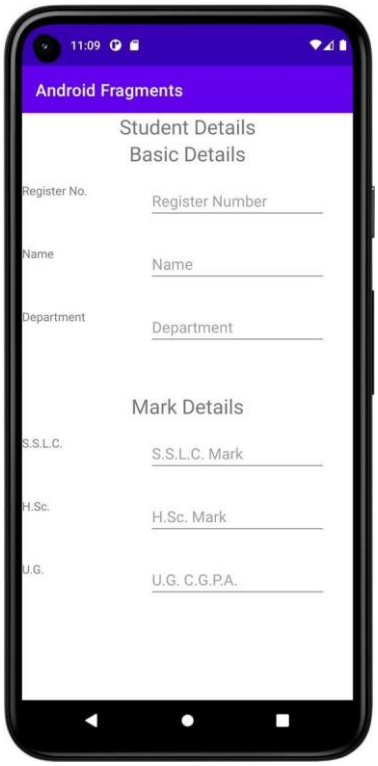
StudentBasicDetails.kt

```
package org.rajalakshmi.androidfragments
import android.os.Bundle
import androidx.fragment.app.Fragment
import android.view.LayoutInflater
import android.view.View
import android.view.ViewGroup
// TODO: Rename parameter arguments, choose names that match
// the fragment initialization parameters, e.g. ARG_ITEM_NUMBER
private const val ARG_PARAM1 = "param1"
private const val ARG_PARAM2 = "param2"

/**
 * A simple [Fragment] subclass.
 * Use the [StudentBasicDetails.newInstance] factory method to
 * create an instance of this fragment.
 */
class StudentBasicDetails : Fragment() {
    // TODO: Rename and change types of parameters
    private var param1: String? = null
    private var param2: String? = null

    override fun onCreate(savedInstanceState: Bundle?)
        { super.onCreate(savedInstanceState)
        arguments?.let {
            param1 = it.getString(ARG_PARAM1)
            param2 = it.getString(ARG_PARAM2)
        }
    }

    override fun onCreateView(
        inflater: LayoutInflater, container: ViewGroup?,
        savedInstanceState: Bundle?
    ): View? {
        // Inflate the layout for this fragment
        return inflater.inflate(R.layout.fragment_student_basic_details,
container, false)
    }

    companion object {
        /**
         * Use this factory method to create a new instance of
         * this fragment using the provided parameters.
         *
         * @param param1 Parameter 1.
         * @param param2 Parameter 2.
         * @return A new instance of fragment StudentBasicDetails.
         */
        // TODO: Rename and change types and number of parameters
        @JvmStatic
        fun newInstance(param1: String, param2: String) =
            StudentBasicDetails().apply {
                arguments = Bundle().apply {
                    putString(ARG_PARAM1, param1)
                    putString(ARG_PARAM2, param2)
                }
            }
    }
}
```

StudentMarkDetails.kt

```
package org.rajalakshmi.androidfragments
import android.os.Bundle
import androidx.fragment.app.Fragment
import android.view.LayoutInflater
import android.view.View
import android.view.ViewGroup
// TODO: Rename parameter arguments, choose names that match
// the fragment initialization parameters, e.g. ARG_ITEM_NUMBER
private const val ARG_PARAM1 = "param1"
private const val ARG_PARAM2 = "param2"

/**
 * A simple [Fragment] subclass.
 * Use the [StudentMarkDetails.newInstance] factory method to
 * create an instance of this fragment.
 */
class StudentMarkDetails : Fragment() {
    // TODO: Rename and change types of parameters
    private var param1: String? = null
    private var param2: String? = null

    override fun onCreate(savedInstanceState: Bundle?)
        { super.onCreate(savedInstanceState)
        arguments?.let {
            param1 = it.getString(ARG_PARAM1)
            param2 = it.getString(ARG_PARAM2)
        }
    }

    override fun onCreateView(
        inflater: LayoutInflater, container: ViewGroup?,
        savedInstanceState: Bundle?
    ): View? {
        // Inflate the layout for this fragment
        return inflater.inflate(R.layout.fragment_student_mark_details,
container, false)
    }

    companion object {
        /**
         * Use this factory method to create a new instance of
         * this fragment using the provided parameters.
         *
         * @param param1 Parameter 1.
         * @param param2 Parameter 2.
         * @return A new instance of fragment StudentMarkDetails.
         */
        // TODO: Rename and change types and number of parameters
        @JvmStatic
        fun newInstance(param1: String, param2: String) =
            StudentMarkDetails().apply {
                arguments = Bundle().apply {
                    putString(ARG_PARAM1, param1)
                    putString(ARG_PARAM2, param2)
                }
            }
    }
}
```

Output



Result

Ex. No. : 05 **Date : 18/03/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

SQLite

Aim

Create a Database table with the following structure using SQLite: Student (Register Number, Name, CGPA). Develop an android application to perform the following operation using SQLite developer classes. 1. Insert student Details 2. Update the student Record 3. Delete a specified record. 4. View the details.

Procedure

Step 1: Create a new Android project in Android Studio.

Step 2: Design the layout with input fields for Register Number, Name, and CGPA, along with buttons for Insert, Update, Delete, and View.

Step 3: Create a custom `SQLiteOpenHelper` class to define the `Student` table and override the necessary methods for database creation and upgrade.

Step 4: In the `MainActivity`, handle each button click to perform the corresponding database operation (insert, update, delete, or retrieve data).

Step 5: Display the retrieved student details in a `TextView` or using a `ListView`/`RecyclerView`.

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.SQLite"
        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>
```

activity_main.xml

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

    <TextView
        android:id="@+id/tvRegisterNumber"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Register Number" />

    <EditText
        android:id="@+id/etRegisterNumber"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

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

    <EditText
        android:id="@+id/etName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <TextView
        android:id="@+id/tvCGPA"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="CGPA" />

    <EditText
        android:id="@+id/etCGPA"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <Button
        android:id="@+id/btAdd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Add"
        android:textAllCaps="false" />

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

```
        android:text="View"
        android:textAllCaps="false" />

    <Button
        android:id="@+id/btModify"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Modify"
        android:textAllCaps="false" />

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

    <Button
        android:id="@+id/btClear"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Clear"
        android:textAllCaps="false" />
</LinearLayout>
```

DBContract.kt

```
package org.rajalakshmi.sqlite

import android.provider.BaseColumns

object DBContract {
    class UserEntry : BaseColumns {
        companion object {
            val TABLE_NAME = "students"
            val COLUMN_REGISTER_NUMBER = "registernumber"
            val COLUMN_NAME = "name"
            val COLUMN_CGPA = "cgpa"
        }
    }
}
```

UserModel.kt

```
package org.rajalakshmi.sqlite

class UserModel (val registernumber : String, val name : String, val cgpa :
String)
```

UsersDBHelper.kt

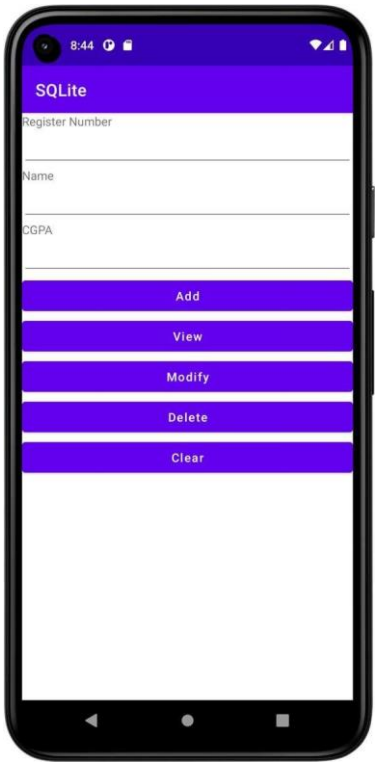
```
package org.rajalakshmi.sqlite

import android.annotation.SuppressLint
import android.content.ContentValues
import android.content.Context
import android.database.Cursor
import android.database.sqlite.SQLiteConstraintException
import android.database.sqlite.SQLiteDatabase
import android.database.sqlite.SQLiteException
import android.database.sqlite.SQLiteOpenHelper

class UsersDBHelper(context: Context) : SQLiteOpenHelper(context, DATABASE_NAME,
null, DATABASE_VERSION) {
    override fun onCreate(db: SQLiteDatabase?) {
        db?.execSQL(SQL_CREATE_ENTRIES)
    }

    override fun onUpgrade(db: SQLiteDatabase?, oldVersion: Int, newVersion:
Int) {
        db?.execSQL(SQL_DELETE_ENTRIES)
        onCreate(db)
    }

    @Throws(SQLiteConstraintException::class)
    fun insertUser(user: UserModel): Boolean {
        // Gets the data repository in write mode
        val db = writableDatabase

        // Create a new map of values, where column names are the keys
        val values = ContentValues()
        values.put(DBContract.UserEntry.COLUMN_REGISTER_NUMBER,
user.registernumber)
        values.put(DBContract.UserEntry.COLUMN_NAME, user.name)
        values.put(DBContract.UserEntry.COLUMN_CGPA, user.cgpa)

        // Insert the new row, returning the primary key value of the new row
        val newRowId = db.insert(DBContract.UserEntry.TABLE_NAME, null, values)

        return true
    }

    @SuppressLint("Range")
    fun readUser(registerNumber : String): ArrayList<UserModel> {
        val users = ArrayList<UserModel>()
        val db = writableDatabase
        var cursor: Cursor? = null
        try {
            cursor = db.rawQuery("select * from " +
DBContract.UserEntry.TABLE_NAME + " WHERE " +
DBContract.UserEntry.COLUMN_REGISTER_NUMBER + " = '" + registerNumber + "'",
null)
        }
        catch (e: SQLiteException) {
            db.execSQL(SQL_CREATE_ENTRIES)
            return ArrayList()
        }
        var name : String
        var cgpa : String
        if (cursor!!.moveToFirst()) {
```

```
            while (cursor.isAfterLast == false) {
                name =
cursor.getString(cursor.getColumnIndex(DBContract.UserEntry.COLUMN_NAME))
                cgpa =
cursor.getString(cursor.getColumnIndex(DBContract.UserEntry.COLUMN_CGPA))
                users.add(UserModel(registerNumber, name, cgpa))
                cursor.moveToNext()
            }
        }
        return users
    }

    @Throws(SQLiteConstraintException::class)
    fun deleteUser(userid: String): Boolean {
        val db = writableDatabase
        val selection = DBContract.UserEntry.COLUMN_REGISTER_NUMBER + " LIKE ?"
        val selectionArgs = arrayOf(userid)
        db.delete(DBContract.UserEntry.TABLE_NAME, selection, selectionArgs)
        return true
    }

    companion object {
        // If you change the database schema, you must increment the database
version.
        val DATABASE_VERSION = 1
        val DATABASE_NAME = "FeedReader.db"

        private val SQL_CREATE_ENTRIES =
            "CREATE TABLE " + DBContract.UserEntry.TABLE_NAME + " (" +
                    DBContract.UserEntry.COLUMN_REGISTER_NUMBER + " TEXT PRIMARY
KEY," +
                                                                  DBContract.UserEntry.COLUMN_
                                                                  NAME + " TEXT," +
                                                                  DBContract.UserEntry.COLUMN_
                                                                  CGPA + " TEXT)"
                                                private val SQL_DELETE_ENTRIES = "DROP
                                                TABLE IF EXISTS " +
DBContract.UserEntry.TABLE_NAME
    }
}
```

MainActivity.kt

```
package org.rajalakshmi.sqlite

import android.database.sqlite.SQLiteConstraintException
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.Toast

class MainActivity : AppCompatActivity() {
    lateinit var usersDBHelper : UsersDBHelper
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val etRegisterNumber : EditText = findViewById(R.id.etRegisterNumber)
        val etName : EditText = findViewById(R.id.etName)
        val etCGPA : EditText = findViewById(R.id.etCGPA)
        val btAdd : Button = findViewById(R.id.btAdd)
        val btView : Button = findViewById(R.id.btView)
        val btModify : Button = findViewById(R.id.btModify)
        val btDelete : Button = findViewById(R.id.btDelete)
        val btClear : Button = findViewById(R.id.btClear)
        usersDBHelper = UsersDBHelper(this)
        btAdd.setOnClickListener {
            val registerNumber : String = etRegisterNumber.text.toString()
            val name : String = etName.text.toString()
            val cgpa : String = etCGPA.text.toString()
            var result = usersDBHelper.insertUser(UserModel(registernumber =
registerNumber, name = name, cgpa = cgpa))
            etRegisterNumber.setText("")
            etName.setText("")
            etCGPA.setText("")
        }

        btView.setOnClickListener {
            var users = usersDBHelper.readUser(etRegisterNumber.text.toString())
            users.forEach {
                etName.setText(it.name)
                etCGPA.setText(it.cgpa)
            }
        }

        btDelete.setOnClickListener {
            var registerNumber = etRegisterNumber.text.toString()
            val result = usersDBHelper.deleteUser(registerNumber)
            if(result)
                Toast.makeText(applicationContext, "User Deleted...!",
Toast.LENGTH_LONG).show()
        }

        btClear.setOnClickListener {
            etRegisterNumber.setText("")
            etName.setText("")
            etCGPA.setText("")
        }
    }
}
```

Output


8:44
SQLite
Register Number
Name
CGPA
Add
View
Modify
Delete
Clear


8:46
SQLite
Register Number
21105405003
Name
BhuvaneswaranB
CGPA
7.1
Add
View
Modify
Delete
Clear

Ex. No. : 06 **Date : 18/03/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Form Validation

Aim

Design an android activity with two text boxes where the user can enter (username and ID) and a button (validate). Validate the entered username and ID field for the following using android code. i) Both the fields should not be empty ii) Name field should have alphabets iii) ID field should have numeric values (only 4-digit).

Procedure

Step 1: Create a New Android Project in Android Studio.

Step 2: Design the Layout with two `EditText` fields (for username and ID) and a `Button` (for validation) in the `activity_main.xml` file.

Step 3: Implement the Validation Logic in `MainActivity.kt` to check if both fields are not empty, validate that the username contains only alphabets, and validate that the ID contains only numeric values and is exactly 4 digits.

Step 4: Run the Application: If the validation fails, show a `Toast` message with an error, and if it succeeds, show a success message.

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.FormValidation"
        tools:targetApi="31">
        <activity
            android:name=".MainActivity2"
            android:exported="false" />
        <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>
```

activity_main.xml

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

    <EditText
        android:id="@+id/etUserName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the userame...!"
        android:inputType="textPersonName" />

    <EditText
        android:id="@+id/etPinNumber"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the pin number...!"
        android:inputType="textPersonName" />

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

    <Button
        android:id="@+id/btClear"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Clear"
        android:textAllCaps="false" />
</LinearLayout>
```

activity_main2.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity2">

    <TextView
        android:id="@+id/tvLoginSuccess"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Login Success...!"
        android:textAlignment="center"
        android:textSize="24sp" />
</LinearLayout>
```

MainActivity.kt

```
package org.rajalakshmi.formvalidation

import android.content.Intent
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.Toast

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

        val etUserName : EditText = findViewById(R.id.etUserName)
        val etPinNumber : EditText = findViewById(R.id.etPinNumber)
        val btLogin : Button = findViewById(R.id.btLogin)
        val btClear : Button = findViewById(R.id.btClear)

        btLogin.setOnClickListener {
            val checkUserName = "[a-zA-Z]+".toRegex()
            val checkPinNo = "[0-9]{4}".toRegex()
            if(checkUserName.matches(etUserName.text.toString()) &&
checkPinNo.matches(etPinNumber.text.toString())) {
                val intent = Intent(this, MainActivity2::class.java)
                startActivity(intent)
            }
            else {
                Toast.makeText(applicationContext, "Invalid User Name / Pin
No.",Toast.LENGTH_LONG).show()
            }
        }

        btClear.setOnClickListener {
            etUserName.text.clear()
            etPinNumber.text.clear()
        }
    }
}
```

MainActivity2.kt

```
package org.rajalakshmi.formvalidation

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

class MainActivity2 : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main2)
    }
}
```

Output


8:13
Form Validation
Enter the user name...!
Enter the pin number...!
Login
Clear

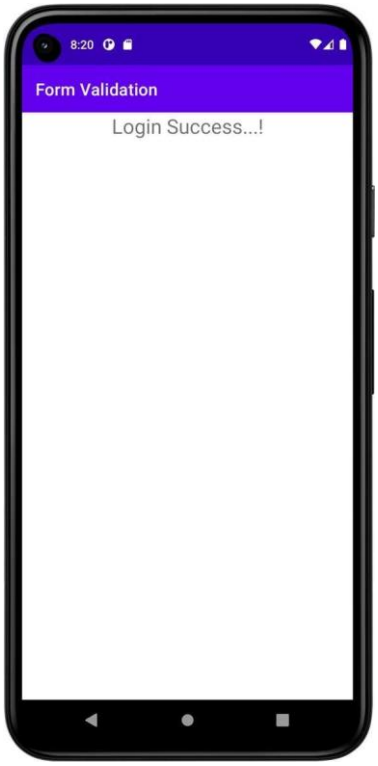

8:17
Form Validation
bhuvan123
1234
Login
Clear


8:18
Form Validation
bhuvan123
1234
Login
Clear
Invalid User Name / Pin No.


8:18
Form Validation
bhuvan
123
Login
Clear


8:19
Form Validation
bhuvan
123
Login
Clear
Invalid User Name / Pin No.


8:19
Form Validation
bhuvan
1234
Login
Clear


8:20
Form Validation
Login Success...!

Result

Ex. No. : 07 **Date : 25/03/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

SD Card

Aim

Implement an application to write the Register Number, Name and CGPA to SD card in text file format.

Procedure

Step 1: Create a New Android Project in Android Studio**.**

Step 2: Add Necessary Permissions in the `AndroidManifest.xml` to read and write to external storage.

Step 3: Design the Layout with `EditText` fields for Register Number, Name, and CGPA, and a `Button` to trigger the save action.

Step 4: Write Code to Handle Button Click in `MainActivity.kt` to get values from the input fields and save them to a text file on the SD card.

Step 5: Check for Permissions before writing to the SD card, and request them if needed**.**

Step 6: Write the Data to a text file on the SD card using `FileWriter`.

Step 7: Test the Application to ensure it saves the data to a text file successfully.

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.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:supportsRtl="true"
        android:theme="@style/Theme.SDCard"
        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>
```

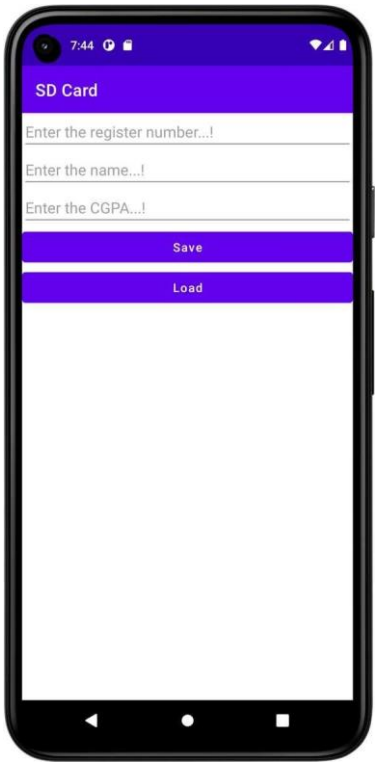
activity_main.xml

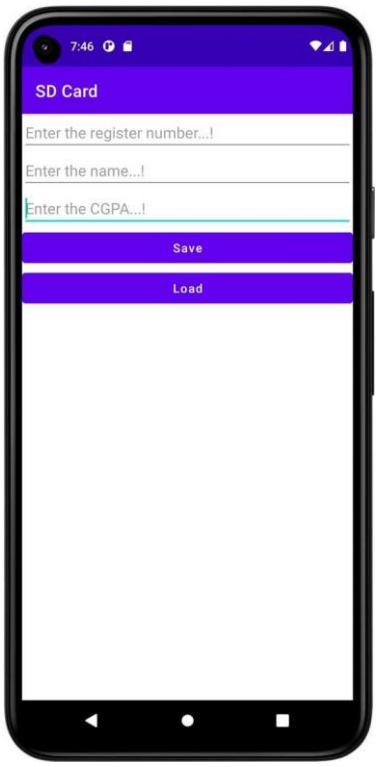
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"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

    <EditText
        android:id="@+id/etRegisterNumber"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the register number...!"
        android:inputType="textPersonName" />

    <EditText
        android:id="@+id/etName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the name...!"
        android:inputType="textPersonName" />

    <EditText
        android:id="@+id/etCGPA"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the CGPA...!"
        android:inputType="textPersonName" />

    <Button
        android:id="@+id/btSave"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Save"
        android:textAllCaps="false" />

    <Button
        android:id="@+id/btLoad"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Load"
        android:textAllCaps="false" />
</LinearLayout>
```

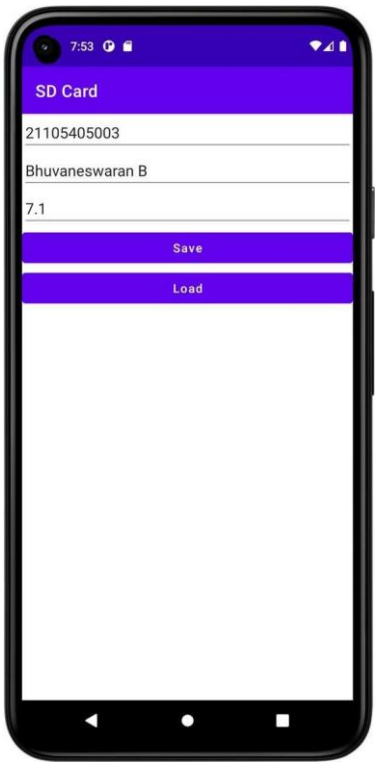
MainActivity.kt

```
package org.rajalakshmi.sdcard

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import java.io.*

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

        val etRegisterNumber : EditText = findViewById(R.id.etRegisterNumber)
        val etName : EditText = findViewById(R.id.etName)
        val etCGPA : EditText = findViewById(R.id.etCGPA)
        val btSave : Button = findViewById(R.id.btSave)
        val btLoad : Button = findViewById(R.id.btLoad)

        btSave.setOnClickListener {
            val registerNumber = etRegisterNumber.text.toString()
            val name = etName.text.toString()
            val cgpa = etCGPA.text.toString()

            val file = File(getExternalFilesDir(null), "student.txt")
            val outputStream = FileOutputStream(file, false)
            outputStream.write("$registerNumber,$name,$cgpa\n".toByteArray())
            outputStream.close()

            etRegisterNumber.text.clear()
            etName.text.clear()
            etCGPA.text.clear()
        }

        btLoad.setOnClickListener {
            val file = File(getExternalFilesDir(null), "student.txt")
            val inputStream = FileInputStream(file)

            val inputStreamReader = InputStreamReader(inputStream)
            val bufferedReader = BufferedReader(inputStreamReader)
            var line: String
            line = bufferedReader.readLine()
            val parts = line.split(",")
            etRegisterNumber.setText(parts[0])
            etName.setText(parts[1])
            etCGPA.setText(parts[2])
            inputStream.close()
        }
    }
}
```

Output







Result

Ex. No. : 08 **Date : 03/0/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Alert Dialog Box

Aim

Implement an application to display the alert box message.

Procedure

Step 1: Create a New Android Project in Android Studio.

Step 2: Design the Layout with a button to trigger the alert box.

Step 3: In the `MainActivity.kt`, set an `OnClickListener` for the button.

Step 4: Use `AlertDialog.Builder` to create and show the alert dialog with a message.

Step 5: Run the Application to ensure the alert box is displayed when the button is clicked.

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.AlertDialogBox"
        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>
```

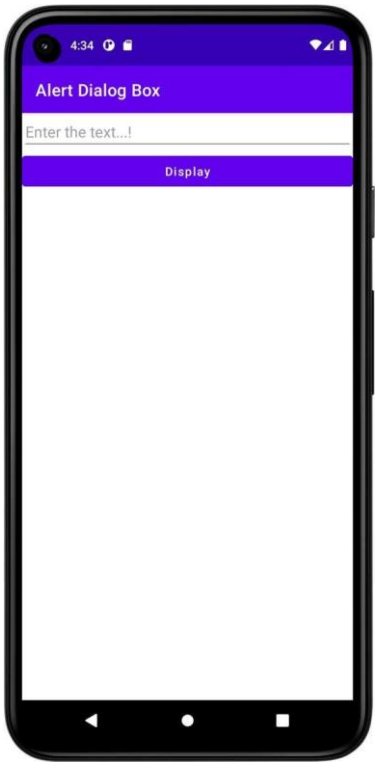
activity_main.xml

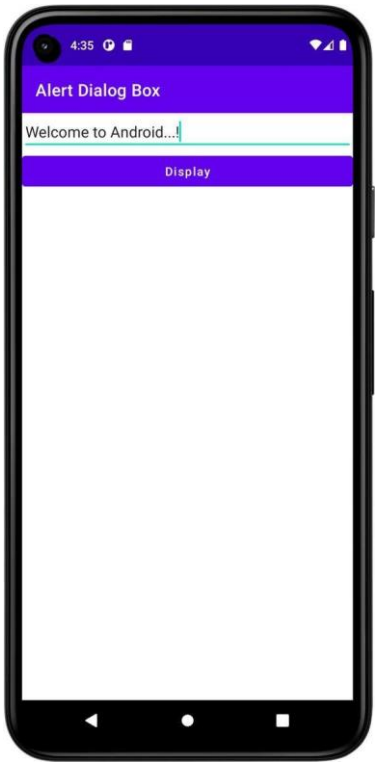
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"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

    <EditText
        android:id="@+id/etText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the text...!"
        android:inputType="textPersonName" />

    <Button
        android:id="@+id/btDisplay"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Display"
        android:textAllCaps="false" />
</LinearLayout>
```

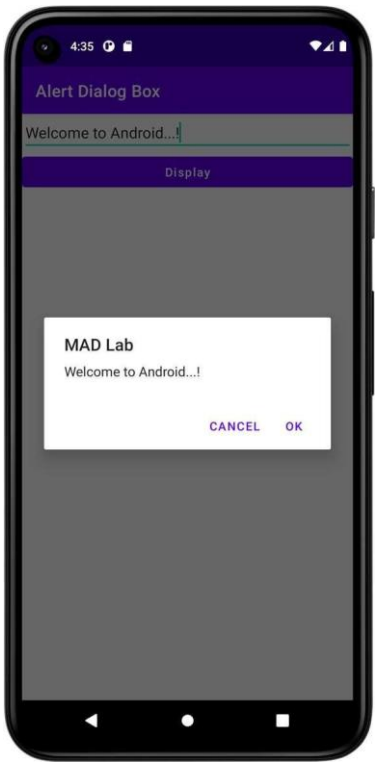
MainActivity.kt

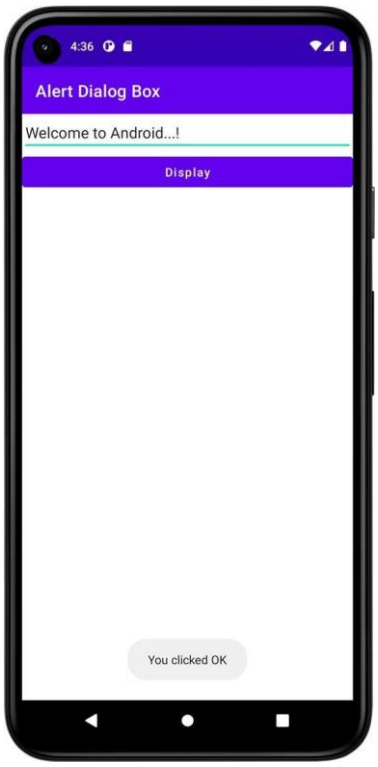
```
package org.rajalakshmi.alertdialogbox

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.Toast
import androidx.appcompat.app.AlertDialog

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

        val etText : EditText = findViewById(R.id.etText)
        val btDisplay : Button = findViewById(R.id.btDisplay)

        btDisplay.setOnClickListener {
            val alertDialog = AlertDialog.Builder(this)
                .setTitle("MAD Lab")
                .setMessage(etText.text.toString())
                .setPositiveButton("OK") { dialog, which ->
                    Toast.makeText(applicationContext, "You clicked OK",
Toast.LENGTH_LONG).show()
                }
                .setNegativeButton("Cancel") { dialog, which ->
                    Toast.makeText(applicationContext, "You clicked Cancel",
Toast.LENGTH_LONG).show()
                }
                .create()
            alertDialog.show()
        }
    }
}
```

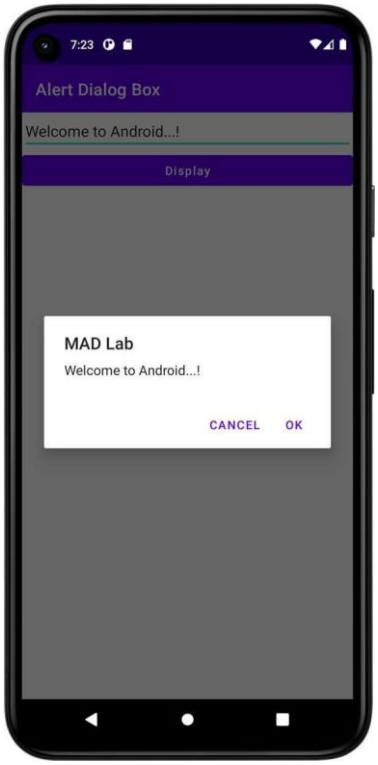
Output

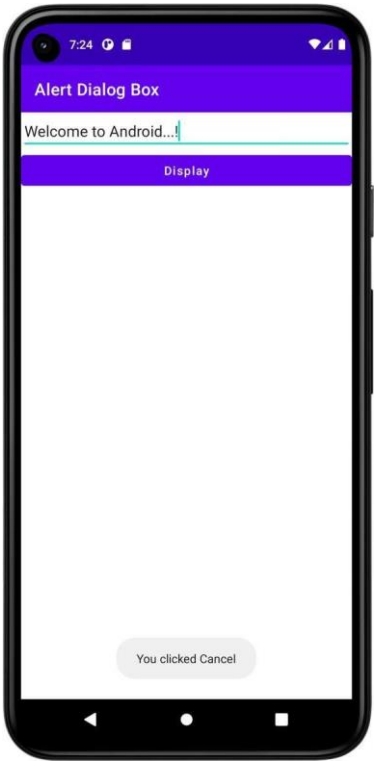

4:34
Alert Dialog Box
Enter the text...!
Display


4:35
Alert Dialog Box
Welcome to Android...!
Display


4:35
Alert Dialog Box
Welcome to Android...!
Display
MAD Lab
Welcome to Android...!
CANCEL
OK


4:36
Alert Dialog Box
Welcome to Android...!
Display
You clicked OK


7:23
Alert Dialog Box
Welcome to Android...!
Display
MAD Lab
Welcome to Android...!
CANCEL
OK


7:24
Alert Dialog Box
Welcome to Android...!
Display
You clicked Cancel

Result

Ex. No. : 09 **Date : 12/04/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Alarm

Aim

Write a mobile application to set the alarm using android Alarm Manager class.

Procedure

Step1: Create a New Android Project in Android Studio**.**

Step 2: Add Permissions in the `AndroidManifest.xml` to access the system alarm services.

Step 3: Design the Layout with `EditText` fields to enter the alarm time and a `Button` to set the alarm.

Step 4: Implement Alarm Logic in the `MainActivity.kt` using `AlarmManager` to set an alarm at a specific time.

Step 5: Handle Alarm Trigger: Create a `BroadcastReceiver` to handle when the alarm goes off.

Step 6: Test the Application to ensure the alarm is set and triggered correctly.

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.SCHEDULE_EXACT_ALARM"/>
    <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:supportsRtl="true"
        android:theme="@style/Theme.MyApplication"
        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>
        <receiver android:name=".AlarmReceiver">
        </receiver>
    </application>

</manifest>
```

activity_main.xml

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

    <TimePicker
        android:id="@+id/timePicker"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_gravity="center" />

    <Button
        android:id="@+id/btSetAlarm"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Set Alarm"
        android:textAllCaps="false" />

    <Button
        android:id="@+id/btnStopAlarm"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Stop Alarm"
        android:textAllCaps="false" />

</LinearLayout>
```

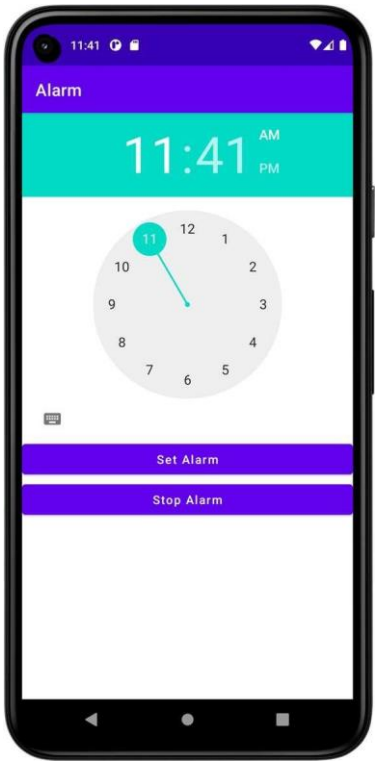
MainActivity.kt

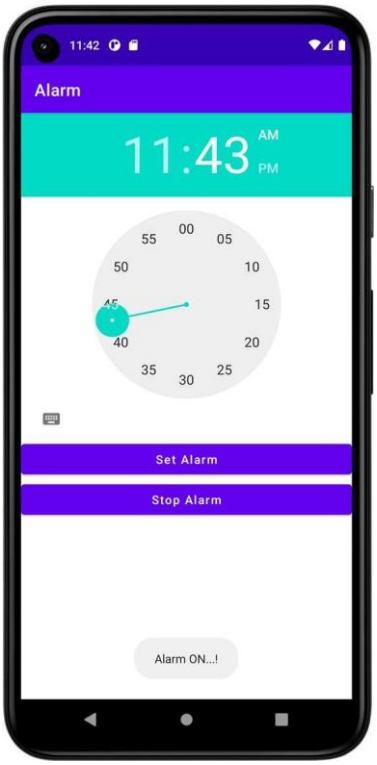
```
package org.rajalakshmi.myapplication

import android.app.AlarmManager
import android.app.PendingIntent
import android.content.Intent
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.TimePicker
import android.widget.Toast
import java.util.*

class MainActivity : AppCompatActivity() {
    lateinit var pendingIntent: PendingIntent
    private lateinit var alarmManager: AlarmManager
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val alarmTimePicker: TimePicker = findViewById(R.id.timePicker)
        val btSetAlarm : Button = findViewById(R.id.btSetAlarm)
        val btStopAlarm : Button = findViewById(R.id.btnStopAlarm)
        alarmManager = getSystemService(ALARM_SERVICE) as AlarmManager

        btSetAlarm.setOnClickListener {
            Toast.makeText(applicationContext, "Alarm ON...!",
Toast.LENGTH_LONG).show()
            val calendar: Calendar = Calendar.getInstance()
            calendar.set(Calendar.HOUR_OF_DAY, alarmTimePicker.hour)
            calendar.set(Calendar.MINUTE, alarmTimePicker.minute)
            val intent = Intent(this, AlarmReceiver::class.java)
            pendingIntent = PendingIntent.getBroadcast(this.applicationContext,
2, intent, PendingIntent.FLAG_CANCEL_CURRENT)
            val time:Long = calendar.timeInMillis - (calendar.timeInMillis %
60000)
            alarmManager.setRepeating(AlarmManager.RTC_WAKEUP, time, 10000,
pendingIntent)
        }

        btStopAlarm.setOnClickListener {
            alarmManager.cancel(pendingIntent)
            Toast.makeText(applicationContext, "Alarm OFF...!",
Toast.LENGTH_LONG).show()
        }
    }
}
```

AlarmReceiver.kt

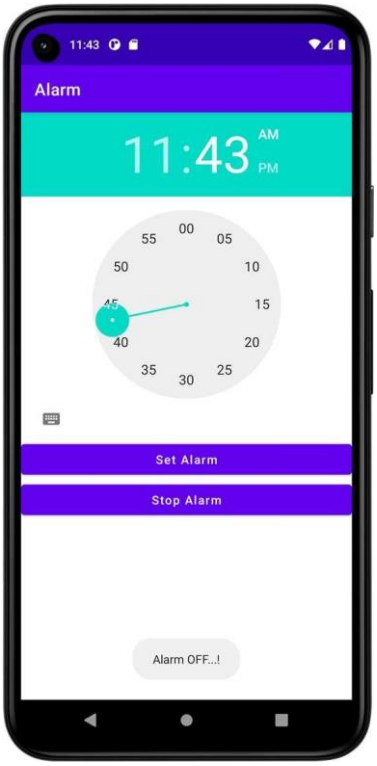
```
package org.rajalakshmi.myapplication

import android.content.BroadcastReceiver
import android.content.Context
import android.content.Intent
import android.media.Ringtone
import android.media.RingtoneManager
import android.net.Uri
import android.widget.Toast

class AlarmReceiver : BroadcastReceiver() {

    override fun onReceive(context: Context?, intent: Intent?) {
        Toast.makeText(context, "Alarm Ringing...!", Toast.LENGTH_LONG).show()
        var ringtone: Ringtone
        val alarmUri: Uri =
RingtoneManager.getDefaultUri(RingtoneManager.TYPE_ALARM)
        ringtone = RingtoneManager.getRingtone(context, alarmUri)
        ringtone.play()
    }
}
```

Output


11:41
Alarm
11:41 AM PM
Set Alarm
Stop Alarm


11:42
Alarm
11:43 AM PM
Set Alarm
Stop Alarm
Alarm ON...!


11:43
Alarm
11:43 AM PM
Set Alarm
Stop Alarm
Alarm Ringing...!


11:43
Alarm
11:43 AM PM
Set Alarm
Stop Alarm
Alarm OFF...!

Ex. No. : 10 Date : 12/04/2025

Register No. : 220701262 Name : SHANMUGA PRIYA RAANJANI S H

Telephony Services

Aim

Develop an android application to display the information of the telephony services.

Procedure

Step 1: Create a New Android Project in Android Studio.

Step 2: Add Permissions in the `AndroidManifest.xml` to access telephony services.

Step 3: Design the Layout with `TextView` elements to display the telephony information (phone number, network type, SIM status).

Step 4: Use the TelephonyManager to retrieve telephony data in `MainActivity`.

Step 5: Display the Telephony Information on the screen by setting the text of the `TextView` widgets with the obtained values.

Step 6: Test the Application to ensure it correctly retrieves and displays telephony information.

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.READ_PHONE_STATE"/>
    <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:supportsRtl="true"
        android:theme="@style/Theme.TelephonyServices"
        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>
```

activity_main.xml

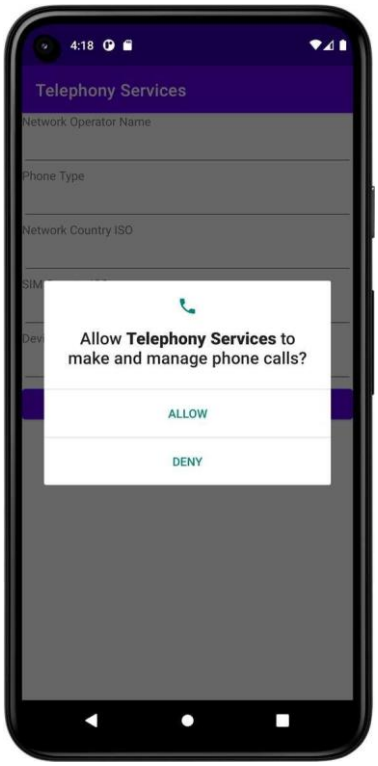
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"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

    <TextView
        android:id="@+id/tvNetworkOperatorName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Network Operator Name" />

    <EditText
        android:id="@+id/etNetworkOperatorName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <TextView
        android:id="@+id/tvPhoneType"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Phone Type" />

    <EditText
        android:id="@+id/etPhoneType"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <TextView
        android:id="@+id/tvNetworkCountryISO"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Network Country ISO" />

    <EditText
        android:id="@+id/etNetworkCountryISO"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <TextView
        android:id="@+id/tvSIMCountryISO"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="SIM Country ISO" />

    <EditText
        android:id="@+id/etSIMCountryISO"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
```

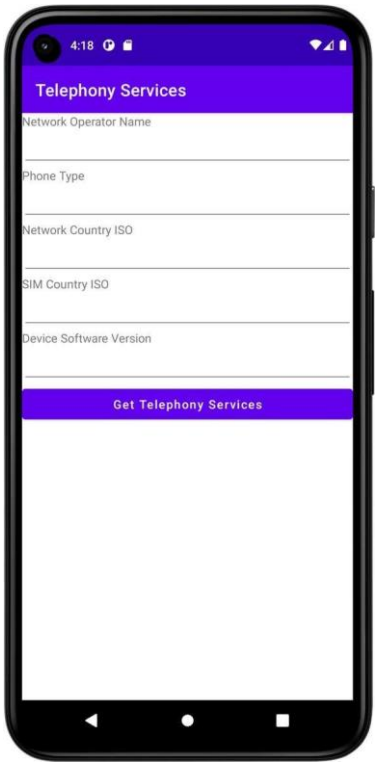
```
        android:inputType="textPersonName" />

    <TextView
        android:id="@+id/tvDeviceSoftwareVersion"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Device Software Version" />

    <EditText
        android:id="@+id/etDeviceSoftwareVersion"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <Button
        android:id="@+id/btGetTelephonyServices"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Get Telephony Services"
        android:textAllCaps="false" />
</LinearLayout>
```

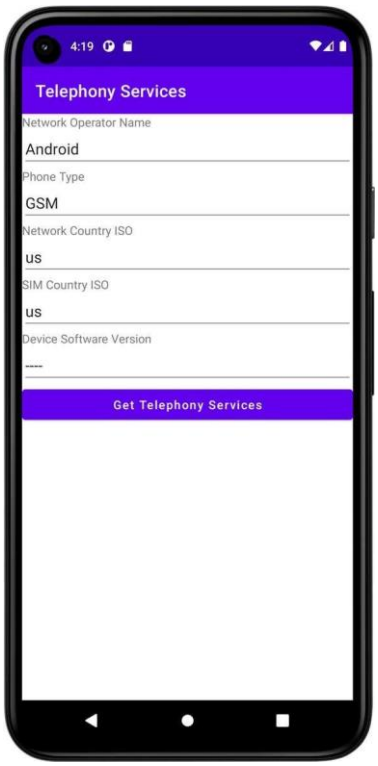
MainActivity.kt

```
package org.rajalakshmi.telephonyservices

import android.content.Context
import android.content.pm.PackageManager
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.telephony.TelephonyManager
import android.widget.Button
import android.widget.EditText
import androidx.core.app.ActivityCompat

class MainActivity : AppCompatActivity() {
    private val REQUEST_CODE_PHONE_STATE = 1000
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val etNetworkOperatorName : EditText =
findViewById(R.id.etNetworkOperatorName)
        val etPhoneType : EditText = findViewById(R.id.etPhoneType)
        val etNetworkCountryISO : EditText =
findViewById(R.id.etNetworkCountryISO)
        val etSIMCountryISO : EditText = findViewById(R.id.etSIMCountryISO)
        val etDeviceSoftwareVersion : EditText =
findViewById(R.id.etDeviceSoftwareVersion)
        val btGetTelephonyServices : Button =
findViewById(R.id.btGetTelephonyServices)
        val telephonyManager = getSystemService(Context.TELEPHONY_SERVICE) as
TelephonyManager

        if (ActivityCompat.checkSelfPermission(this,
android.Manifest.permission.READ_PHONE_STATE) !=
PackageManager.PERMISSION_GRANTED ) {
            ActivityCompat.requestPermissions(this,
arrayOf(android.Manifest.permission.READ_PHONE_STATE), REQUEST_CODE_PHONE_STATE)
        }
        btGetTelephonyServices.setOnClickListener {
            val networkOperatorName = telephonyManager.networkOperatorName
            val phoneType: Int = telephonyManager.getPhoneType()
            var strphoneType : String = ""
            val networkCountryISO: String =
telephonyManager.getNetworkCountryIso()
            val SIMCountryISO: String = telephonyManager.getSimCountryIso()
            val deviceSoftwareVersion: String? =
telephonyManager.getDeviceSoftwareVersion()

            when (phoneType) {
                TelephonyManager.PHONE_TYPE_CDMA -> strphoneType = "CDMA"
                TelephonyManager.PHONE_TYPE_GSM -> strphoneType = "GSM"
                TelephonyManager.PHONE_TYPE_NONE -> strphoneType = "NONE"
            }
            etNetworkOperatorName.setText(networkOperatorName)
            etPhoneType.setText(strphoneType)
            etNetworkCountryISO.setText(networkCountryISO)
            etSIMCountryISO.setText(SIMCountryISO)
            etDeviceSoftwareVersion.setText(deviceSoftwareVersion)
        }
    }
}
```

Output







Result

Ex. No. : 11 **Date : 12/04/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Send SMS

Aim

Develop an application to send SMS.

Procedure

Step 1: Create a New Android Project in Android Studio.

Step 2: Add Permissions in the `AndroidManifest.xml` file to allow the app to send SMS.

Step 3: Design the Layout with `EditText` for the phone number and message, and a `Button` to trigger the SMS sending.

Step 4: Handle Button Click in the `MainActivity` to send the SMS.

Step 5: Test the Application to ensure SMS is sent correctly.

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.SEND_SMS"/>
    <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:supportsRtl="true"
        android:theme="@style/Theme.SendSMS"
        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>
```

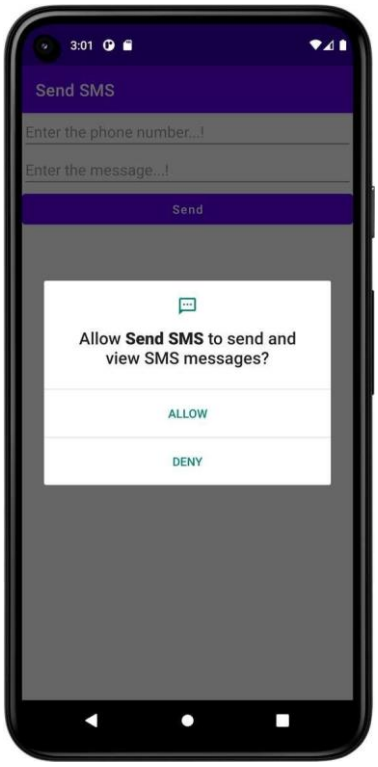
activity_main.xml

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

    <EditText
        android:id="@+id/etPhoneNumber"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the phone number...!"
        android:inputType="textPersonName" />

    <EditText
        android:id="@+id/etMessage"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the message...!"
        android:inputType="textPersonName" />

    <Button
        android:id="@+id/btSend"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Send"
        android:textAllCaps="false" />
</LinearLayout>
```

MainActivity.kt

```
package org.rajalakshmi.sendsms

import android.os.Build
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.telephony.SmsManager
import android.widget.Button
import android.widget.EditText
import android.widget.Toast
import androidx.core.app.ActivityCompat

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

        val etPhoneNumber : EditText = findViewById(R.id.etPhoneNumber)
        val etMessage : EditText = findViewById(R.id.etMessage)
        val btSend : Button = findViewById(R.id.btSend)
        ActivityCompat.requestPermissions(this,
arrayOf(android.Manifest.permission.SEND_SMS),1000)

        btSend.setOnClickListener {
            val phoneNumber = etPhoneNumber.text.toString()
            val message = etMessage.text.toString()
            val smsManager: SmsManager
            smsManager = SmsManager.getDefault()
            smsManager.sendTextMessage(phoneNumber, null, message, null, null)
            Toast.makeText(applicationContext, "Message Sent",
Toast.LENGTH_LONG).show()
        }
    }
}
```

Output



Result

Ex. No. : 12 **Date : 12/04/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Send Email

Aim

Develop an application to send Email.

Procedure

Step 1: Create a new Android project in Android Studio.

Step 2: Design the layout with fields for recipient email, subject, and message, and add a "Send Email" button.

Step 3: Implement the email sending logic in the `MainActivity` using an implicit intent with action `Intent.ACTION_SENDTO`.

Step 4: Use a `mailto:` URI to ensure the email app is launched.

Step 5: Run the app and test by sending an email using the default email client on the device.

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.SendEmail"
        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>
```

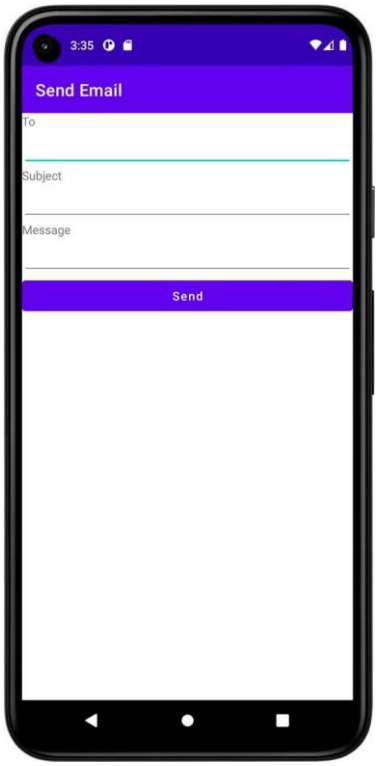
activity_main.xml

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

    <TextView
        android:id="@+id/tvEmail"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="To" />

    <EditText
        android:id="@+id/etEmail"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <TextView
        android:id="@+id/tvSubject"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Subject" />

    <EditText
        android:id="@+id/etSubject"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <TextView
        android:id="@+id/tvMessage"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Message" />

    <EditText
        android:id="@+id/etMessage"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName" />

    <Button
        android:id="@+id/btSend"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Send"
        android:textAllCaps="false" />
</LinearLayout>
```

MainActivity.kt

```
package org.rajalakshmi.sendemail

import android.content.Intent
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import android.widget.TextView

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

        val etEmail : EditText = findViewById(R.id.etEmail)
        val etSubject : EditText = findViewById(R.id.etSubject)
        val etMessage : EditText = findViewById(R.id.etMessage)
        val btSend : Button = findViewById(R.id.btSend)
        btSend.setOnClickListener {
           val email = etEmail.text.toString()
           val subject = etSubject.text.toString()
           val message = etMessage.text.toString()
           val intent = Intent(Intent.ACTION_SEND)
           intent.putExtra(Intent.EXTRA_EMAIL, arrayOf(email))
           intent.putExtra(Intent.EXTRA_SUBJECT, subject)
           intent.putExtra(Intent.EXTRA_TEXT, message)
           intent.type = "message/rfc822"
           startActivity(Intent.createChooser(intent, "Choose
           an Email client :"))
           }
     }
}
```

Output



Result

Ex. No. : 13 **Date : 14/04/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Text to Speech

Aim

Develop an android application to perform Text to Speech.

Procedure

Step 1: Create a new Android project in Android Studio.

Step 2: Design the layout with an `EditText` for input and a `Button` to trigger speech.

Step 3: Initialize the `TextToSpeech` engine in the `MainActivity`.

Step 4: Handle the button click to convert the entered text to speech.

Step 5: Release the `TextToSpeech` resources in the `onDestroy()` method.

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.TextToSpeech"
        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>
```

activity_main.xml

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

    <EditText
        android:id="@+id/etText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Enter the text..!"
        android:inputType="textPersonName"
        android:textSize="24sp" />

    <Button
        android:id="@+id/btSpeak"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Speak"
        android:textAllCaps="false"
        android:textSize="24sp" />
</LinearLayout>
```

MainActivity.kt

```
package org.rajalakshmi.texttospeech

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.speech.tts.TextToSpeech
import android.widget.Button
import android.widget.EditText
import android.widget.Toast
import java.util.*

class MainActivity : AppCompatActivity(), TextToSpeech.OnInitListener {
    lateinit var tts : TextToSpeech
    lateinit var btSpeak : Button
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        val etText : EditText = findViewById(R.id.etText)
        btSpeak = findViewById(R.id.btSpeak)
        btSpeak.isEnabled = false
        tts = TextToSpeech(this, this)

        btSpeak.setOnClickListener {
            val text = etText!!.text.toString()
            tts!!.speak(text, TextToSpeech.QUEUE_FLUSH, null,"")
        }
    }

    override fun onInit(status: Int) {
        if (status == TextToSpeech.SUCCESS) {
            val result = tts!!.setLanguage(Locale.US)

            if (result == TextToSpeech.LANG_MISSING_DATA || result ==
TextToSpeech.LANG_NOT_SUPPORTED) {
                Toast.makeText(applicationContext, "The Language not
supported...!", Toast.LENGTH_LONG).show()
            }
            else {
                btSpeak!!.isEnabled = true
            }
        }
    }
}
```

Output

Result

Ex. No. : 14 **Date : 14/04/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Speech to Text

Aim

Develop an android application to perform Speech to Text.

Procedure

Step 1: Create a new Android project in Android Studio.

Step 2: Design the layout with a `Button` to start voice input and a `TextView` to display the recognized text.

Step 3: Use `Intent.ACTION_RECOGNIZE_SPEECH` to launch the speech recognizer.

Step 4: Capture the result in `onActivityResult` and display the recognized speech in the `TextView`.

Step 5: Handle microphone permission for devices running Android 6.0 and above.

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">
    <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:supportsRtl="true"
        android:theme="@style/Theme.SpeechToText"
        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>
```

activity_main.xml

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

    <ImageView
        android:id="@+id/imgMic"
        android:layout_width="match_parent"
        android:layout_height="250dp"
        app:srcCompat="@android:drawable/ic_btn_speak_now" />

    <TextView
        android:id="@+id/tvText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Output appears here...!"
        android:textSize="24sp" />
</LinearLayout>
```

MainActivity.kt

```
package org.rajalakshmi.speechtotext

import android.content.Intent
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.speech.RecognizerIntent
import android.widget.ImageView
import android.widget.TextView
import java.util.*

class MainActivity : AppCompatActivity() {
    lateinit var tvText : TextView
    private val REQUEST_CODE_SPEECH_INPUT = 1000
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        var imgMic : ImageView = findViewById(R.id.imgMic)
        tvText = findViewById(R.id.tvText)
        imgMic.setOnClickListener {
            val intent = Intent(RecognizerIntent.ACTION_RECOGNIZE_SPEECH)
            intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE_MODEL,
RecognizerIntent.LANGUAGE_MODEL_FREE_FORM)
            intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE,
Locale.getDefault())
            intent.putExtra(RecognizerIntent.EXTRA_PROMPT, "Speak...!")
            startActivityForResult(intent, REQUEST_CODE_SPEECH_INPUT)
        }
    }

    override fun onActivityResult(requestCode: Int, resultCode: Int, data:
Intent?) {
        super.onActivityResult(requestCode, resultCode, data)
        if(requestCode == REQUEST_CODE_SPEECH_INPUT && resultCode == RESULT_OK
&& data != null) {
            var res : ArrayList<String> =
data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS) as
ArrayList<String>
            tvText.setText( Objects.requireNonNull(res)[0])
        }
    }
}
```

Output

Result

Ex. No. : 15 **Date : 14/04/2025**

Register No. : 220701262 **Name : SHANMUGA PRIYA RAANJANI S H**

Image Capture

Aim

Develop an android application to capture image using camera and displaying the image using ImageView.

Procedure

Step 1: Create a new Android project in Android Studio.

Step 2: Add the camera permission to the `AndroidManifest.xml` file.

Step 3: Design the layout with a `Button` to open the camera and an `ImageView` to display the image.

Step 4: Use an `Intent` with `MediaStore.ACTION_IMAGE_CAPTURE` to launch the camera.

Step 5 : Handle the captured image in `onActivityResult` and display it in the `ImageView`.

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">

    <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:supportsRtl="true"
        android:theme="@style/Theme.ImageCapture"
        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>
```

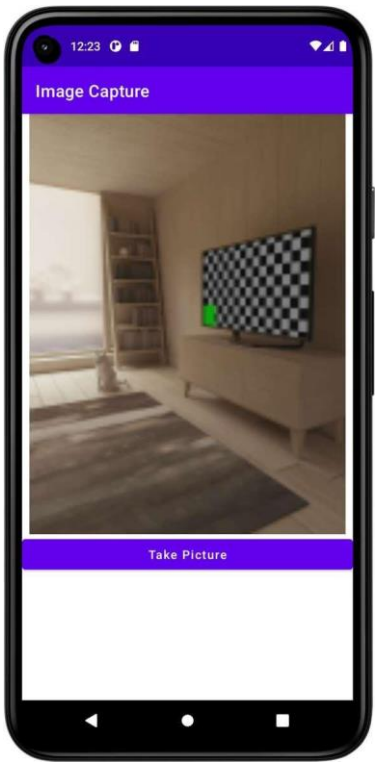
activity_main.xml

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

    <ImageView
        android:id="@+id/imgImage"
        android:layout_width="match_parent"
        android:layout_height="500dp"
        app:srcCompat="@android:drawable/ic_menu_camera" />

    <Button
        android:id="@+id/btTakePicture"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:inputType="textCapWords"
        android:text="Take Picture" />
</LinearLayout>
```

MainActivity.kt

```
package org.rajalakshmi.imagecapture

import android.content.Intent
import android.graphics.Bitmap
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.provider.MediaStore
import android.widget.Button
import android.widget.ImageView

class MainActivity : AppCompatActivity() {
    lateinit var imgImage : ImageView
    private val REQUEST_CODE_IMAGE_CAPTURE = 1000
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        imgImage = findViewById(R.id.imgImage)
        val btTakePicture : Button = findViewById(R.id.btTakePicture)

        btTakePicture.setOnClickListener {
            val intent = Intent(MediaStore.ACTION_IMAGE_CAPTURE)
            startActivityForResult(intent, REQUEST_CODE_IMAGE_CAPTURE)
        }
    }

    override fun onActivityResult(requestCode: Int, resultCode: Int, data:
Intent?) {
        super.onActivityResult(requestCode, resultCode, data)
        if(requestCode == REQUEST_CODE_IMAGE_CAPTURE && resultCode == RESULT_OK)
{
            val photo = data!!.extras!!["data"] as Bitmap?
            imgImage.setImageBitmap(photo)
        }
    }
}
```

Output



Result