Ex. No. : 02 Date :

Register No. : Name :

Simple Calculator

Aim

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

Procedure

Step 1 : File -> NewProject

Provide the application name and Click “Next”

Step 2 : Select the target android devices

Select the minimum SDK to run the application. Click “Next”.

Step 3 : Choose the activity for the application (By default choose “Blank Activity).

Click “Next”.

Step 4 : Enter activity name and click "Finish".

Step 5 : Edit the program.

Step 6 : Run the application, 2-ways to run the application.

1. Running through emulator

2. Running through mobile 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/too
<application
      android:allowBackup="true"
      android:dataExtractionRules="@xml/data_extraction_rules"
```

```
            android:fullBackupContent="@xml/backup_rules"

            android:icon="@mipmap/ic_launcher"

            android:label="@string/app_name"

            android:roundIcon="@mipmap/ic_launcher_round"

            android:supportsRtl="true"

            android:theme="@style/Theme.EX2"

            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"?>
<ScrollView
  xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="match_parent"
  android:layout_height="match_parent">

  <LinearLayout
    android:orientation="vertical"
    android:padding="16dp"
    android:gravity="center"
    android:layout_width="match_parent"
    android:layout_height="wrap_content">

    <EditText
```

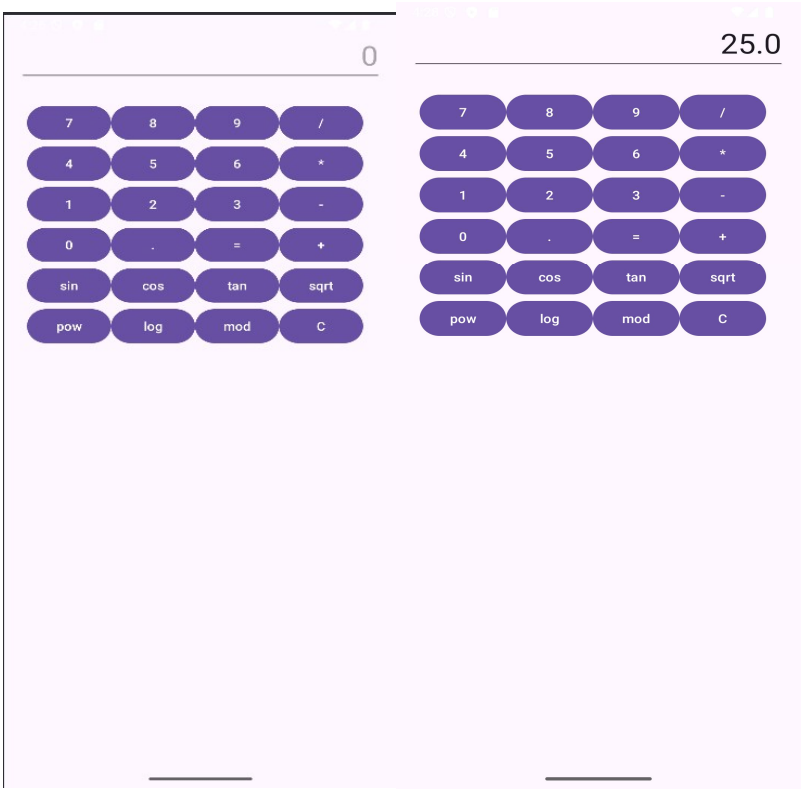
```
        android:id="@+id/input"
        android:hint="0"
        android:textSize="32sp"
        android:gravity="right"
        android:inputType="none"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"/>

    <GridLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:columnCount="4"
        android:rowCount="6"
        android:padding="8dp"
        android:layout_marginTop="16dp">

        <!-- Number Buttons -->
        <Button android:id="@+id/btn7" android:text="7"/>
        <Button android:id="@+id/btn8" android:text="8"/>
        <Button android:id="@+id/btn9" android:text="9"/>
        <Button android:id="@+id/btnDivide" android:text="/"/>

        <Button android:id="@+id/btn4" android:text="4"/>
        <Button android:id="@+id/btn5" android:text="5"/>
        <Button android:id="@+id/btn6" android:text="6"/>
        <Button android:id="@+id/btnMultiply" android:text="*"/>

        <Button android:id="@+id/btn1" android:text="1"/>
        <Button android:id="@+id/btn2" android:text="2"/>
        <Button android:id="@+id/btn3" android:text="3"/>
        <Button android:id="@+id/btnMinus" android:text="-"/>

        <Button android:id="@+id/btn0" android:text="0"/>
        <Button android:id="@+id/btnDot" android:text="."/>
        <Button android:id="@+id/btnEquals" android:text="="/>
        <Button android:id="@+id/btnPlus" android:text="+"/>

        <!-- Scientific Buttons -->
        <Button android:id="@+id/btnSin" android:text="sin"/>
        <Button android:id="@+id/btnCos" android:text="cos"/>
        <Button android:id="@+id/btnTan" android:text="tan"/>
        <Button android:id="@+id/btnSqrt" android:text="sqrt"/>

        <Button android:id="@+id/btnPow" android:text="pow"/>
        <Button android:id="@+id/btnLog" android:text="log"/>
        <Button android:id="@+id/btnMod" android:text="mod"/>
        <Button android:id="@+id/btnClear" android:text="C"/>

    </GridLayout>
  </LinearLayout>
</ScrollView>
```

MainActivity.xml

```
package com.example.ex2

import android.os.Bundle
import android.widget.Button
import android.widget.EditText
import androidx.appcompat.app.AppCompatActivity
import kotlin.math.*

class MainActivity : AppCompatActivity() {

    private lateinit var input: EditText
    private var operand1: Double = 0.0
    private var operand2: Double = 0.0
    private var operator: String = ""

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

        input = findViewById(R.id.input)

        // Number Buttons
        val numberButtons = listOf(
            R.id.btn0, R.id.btn1, R.id.btn2, R.id.btn3, R.id.btn4,
            R.id.btn5, R.id.btn6, R.id.btn7, R.id.btn8, R.id.btn9, R.id.btnDot
        )

        for (id in numberButtons) {
            findViewById<Button>(id).setOnClickListener {
                input.append((it as Button).text)
            }
        }

        // Operator Buttons
        findViewById<Button>(R.id.btnPlus).setOnClickListener { setOperator("+") }
        findViewById<Button>(R.id.btnMinus).setOnClickListener { setOperator("-") }
        findViewById<Button>(R.id.btnMultiply).setOnClickListener { setOperator("*") }
        findViewById<Button>(R.id.btnDivide).setOnClickListener { setOperator("/") }
        findViewById<Button>(R.id.btnMod).setOnClickListener { setOperator("mod") }
        findViewById<Button>(R.id.btnPow).setOnClickListener { setOperator("pow") }

        // Scientific Functions
        findViewById<Button>(R.id.btnSin).setOnClickListener { singleOperator("sin") }
        findViewById<Button>(R.id.btnCos).setOnClickListener { singleOperator("cos") }
        findViewById<Button>(R.id.btnTan).setOnClickListener { singleOperator("tan") }
        findViewById<Button>(R.id.btnSqrt).setOnClickListener { singleOperator("sqrt") }
        findViewById<Button>(R.id.btnLog).setOnClickListener { singleOperator("log") }
```

```
        // Equals Button
        findViewById<Button>(R.id.btnEquals).setOnClickListener { calculate() }

        // Clear Button
        findViewById<Button>(R.id.btnClear).setOnClickListener { clear() }
    }

    private fun setOperator(op: String) {
        operand1 = input.text.toString().toDoubleOrNull() ?: 0.0
        operator = op
        input.text.clear()
    }

    private fun singleOperator(op: String) {
        val value = input.text.toString().toDoubleOrNull() ?: 0.0
        val result = when (op) {
            "sin" -> sin(Math.toRadians(value))
            "cos" -> cos(Math.toRadians(value))
            "tan" -> tan(Math.toRadians(value))
            "sqrt" -> sqrt(value)
            "log" -> log10(value)
            else -> 0.0
        }
        input.setText(result.toString())
    }

    private fun calculate() {
        operand2 = input.text.toString().toDoubleOrNull() ?: 0.0
        val result = when (operator) {
            "+" -> operand1 + operand2
            "-" -> operand1 - operand2
            "*" -> operand1 * operand2
            "/" -> operand1 / operand2
            "mod" -> operand1 % operand2
            "pow" -> operand1.pow(operand2)
            else -> 0.0
        }
        input.setText(result.toString())
    }

    private fun clear() {
        input.text.clear()
        operand1 = 0.0
        operand2 = 0.0
        operator = ""
    }
}
```

Output



Result

The Application developed using Android Studio was done.