EXP NO: 9	Basic Calculator App Using Android UI Controls

AIM:

Develop an Android application using controls like Button, TextView, EditText for designing a calculator having basic functionality like Addition, Subtraction, multiplication, and Division.

CODE:

MainActivity.kt

```
package com.example.myapplication_sabharishraja

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

class MainActivity : AppCompatActivity() {

    private lateinit var display: EditText
    private var currentInput: String = ""
    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)

        display = findViewById(R.id.display)

        // Number buttons
        setButtonClickListener(R.id.button0)
        setButtonClickListener(R.id.button1)
        setButtonClickListener(R.id.button2)
        setButtonClickListener(R.id.button3)
        setButtonClickListener(R.id.button4)
        setButtonClickListener(R.id.button5)
        setButtonClickListener(R.id.button6)
        setButtonClickListener(R.id.button7)
        setButtonClickListener(R.id.button8)
        setButtonClickListener(R.id.button9)

        // Operator buttons
        setOperatorClickListener(R.id.buttonAdd, "+")
        setOperatorClickListener(R.id.buttonSubtract, "-")
        setOperatorClickListener(R.id.buttonMultiply, "*")
        setOperatorClickListener(R.id.buttonDivide, "/")
```

```
        // Clear button
        findViewById<Button>(R.id.buttonClear).setOnClickListener {
            currentInput = ""
            operand1 = 0.0
            operand2 = 0.0
            operator = ""
            display.setText("")
        }

        // Equal button
        findViewById<Button>(R.id.buttonEqual).setOnClickListener {
            if (operator.isEmpty()) return@setOnClickListener

            try {
                operand2 = currentInput.toDouble()

                val result = when (operator)
                    { "+" -> operand1 +
                    operand2 "-" -> operand1 -
                    operand2 "*" -> operand1 *
                    operand2 "/" -> {
                        if (operand2 == 0.0) {
                            Toast.makeText(this@MainActivity, "Cannot divide by zero",
Toast.LENGTH_SHORT).show()
                            return@setOnClickListener
                        }
                        operand1 / operand2
                    }
                    else -> 0.0
                }

                display.setText(result.toString())
                operand1 = result // Update operand1 for subsequent calculations
                operator = ""
                currentInput = result.toString()
            } catch (e: Exception) {
                Toast.makeText(this@MainActivity, "Error: Invalid Input",
Toast.LENGTH_SHORT).show()
            }
        }
    }

    // Set up number button listeners
    private fun setButtonClickListener(buttonId: Int)
        { val button: Button = findViewById(buttonId)
        button.setOnClickListener {
            currentInput += button.text.toString()
            display.setText(currentInput)
        }
    }

    // Set up operator button listeners
    private fun setOperatorClickListener(buttonId: Int, op: String)
        { val button: Button = findViewById(buttonId)
```

```
        button.setOnClickListener {
            if (currentInput.isNotEmpty())
                { operand1 = currentInput.toDouble()
                currentInput = ""
                operator = op
            }
        }
    }

    // Optional: Add functionality to handle decimal point (if needed)
    private fun isDecimalPointValid(): Boolean {
        return !currentInput.contains(".")
    }

}
```

activity_main.xml

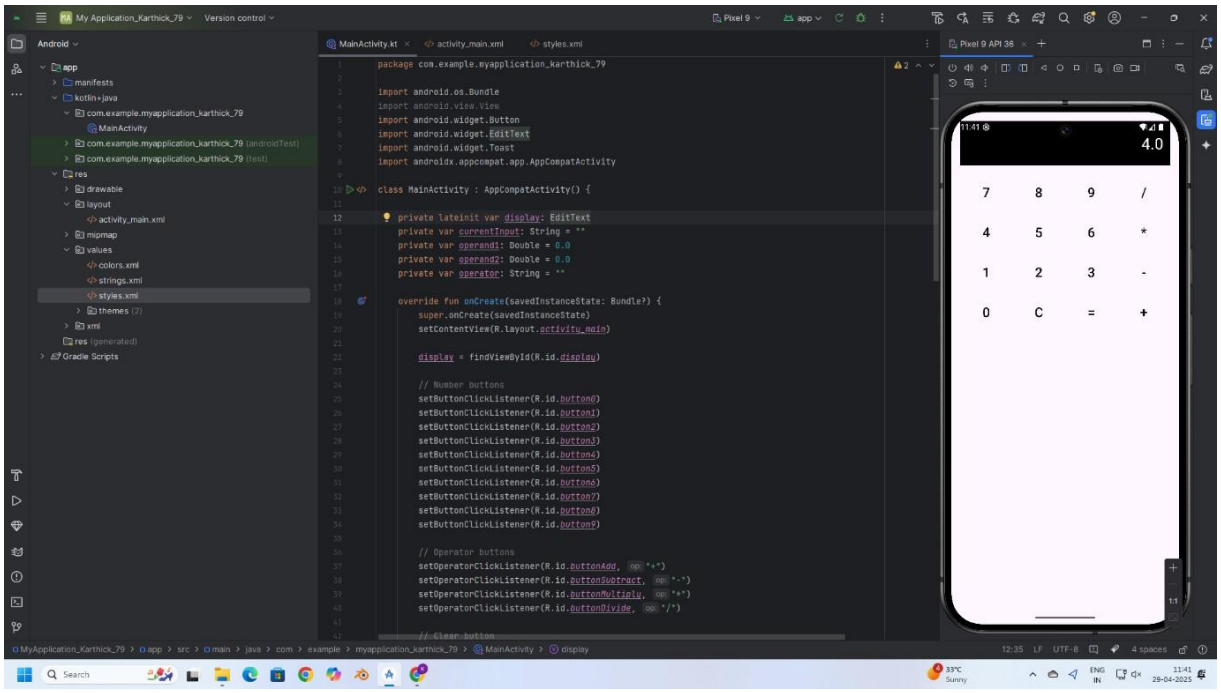
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/calculatorLayout"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="16dp"
    tools:context=".MainActivity">

    <EditText
        android:id="@+id/display"
        android:layout_width="match_parent"
        android:layout_height="80dp"
        android:background="#000000"
        android:textColor="#FFFFFF"
        android:textSize="28sp"
        android:gravity="end|center_vertical"
        android:inputType="none"
        android:focusable="false"
        android:clickable="false"
        android:padding="12dp"
        android:layout_marginBottom="12dp" />

    <!-- Row 1: 7 8 9 / -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">
        <Button android:id="@+id/button7" style="@style/CalcButton" android:text="7" />
        <Button android:id="@+id/button8" style="@style/CalcButton" android:text="8" />
        <Button android:id="@+id/button9" style="@style/CalcButton" android:text="9" />
        <Button android:id="@+id/buttonDivide" style="@style/CalcButton" android:text="/" />
    </LinearLayout>

    <!-- Row 2: 4 5 6 * -->
    <LinearLayout
```

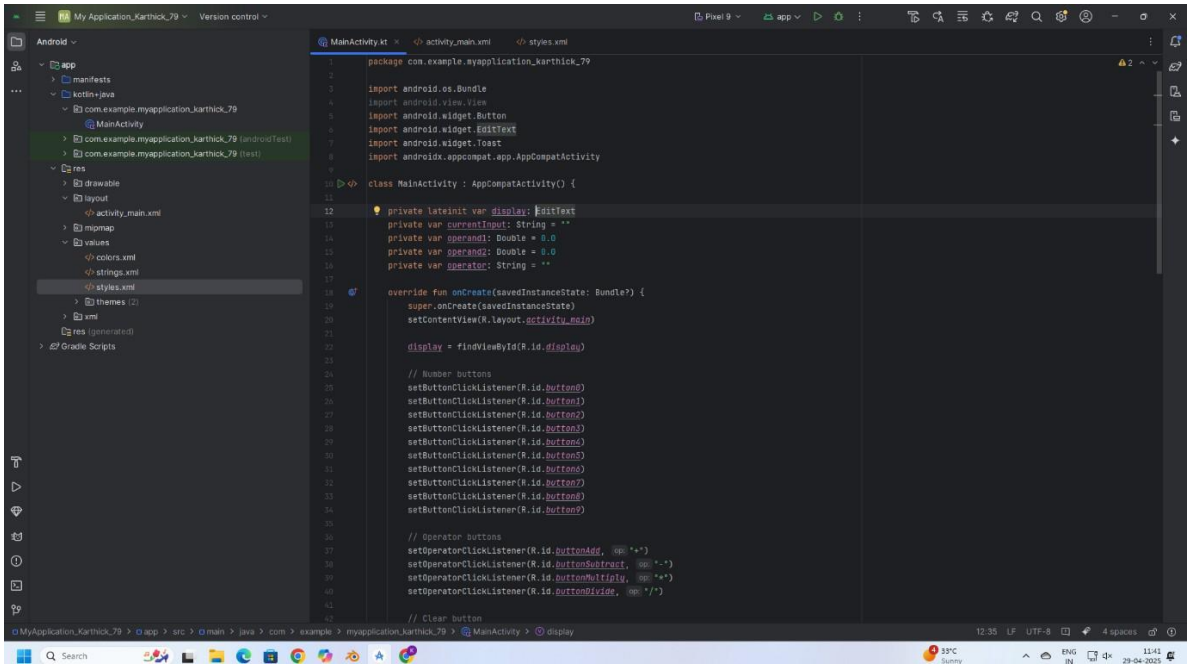
```
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">
        <Button android:id="@+id/button4" style="@style/CalcButton" android:text="4" />
        <Button android:id="@+id/button5" style="@style/CalcButton" android:text="5" />
        <Button android:id="@+id/button6" style="@style/CalcButton" android:text="6" />
        <Button android:id="@+id/buttonMultiply" style="@style/CalcButton" android:text="*" />
    </LinearLayout>

    <!-- Row 3: 1 2 3 - -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">
        <Button android:id="@+id/button1" style="@style/CalcButton" android:text="1" />
        <Button android:id="@+id/button2" style="@style/CalcButton" android:text="2" />
        <Button android:id="@+id/button3" style="@style/CalcButton" android:text="3" />
        <Button android:id="@+id/buttonSubtract" style="@style/CalcButton" android:text="-" />
    </LinearLayout>

    <!-- Row 4: 0 C = + -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">
        <Button android:id="@+id/button0" style="@style/CalcButton" android:text="0" />
        <Button android:id="@+id/buttonClear" style="@style/CalcButton" android:text="C" />
        <Button android:id="@+id/buttonEqual" style="@style/CalcButton" android:text="=" />
        <Button android:id="@+id/buttonAdd" style="@style/CalcButton" android:text="+" />
    </LinearLayout>

</LinearLayout>
```

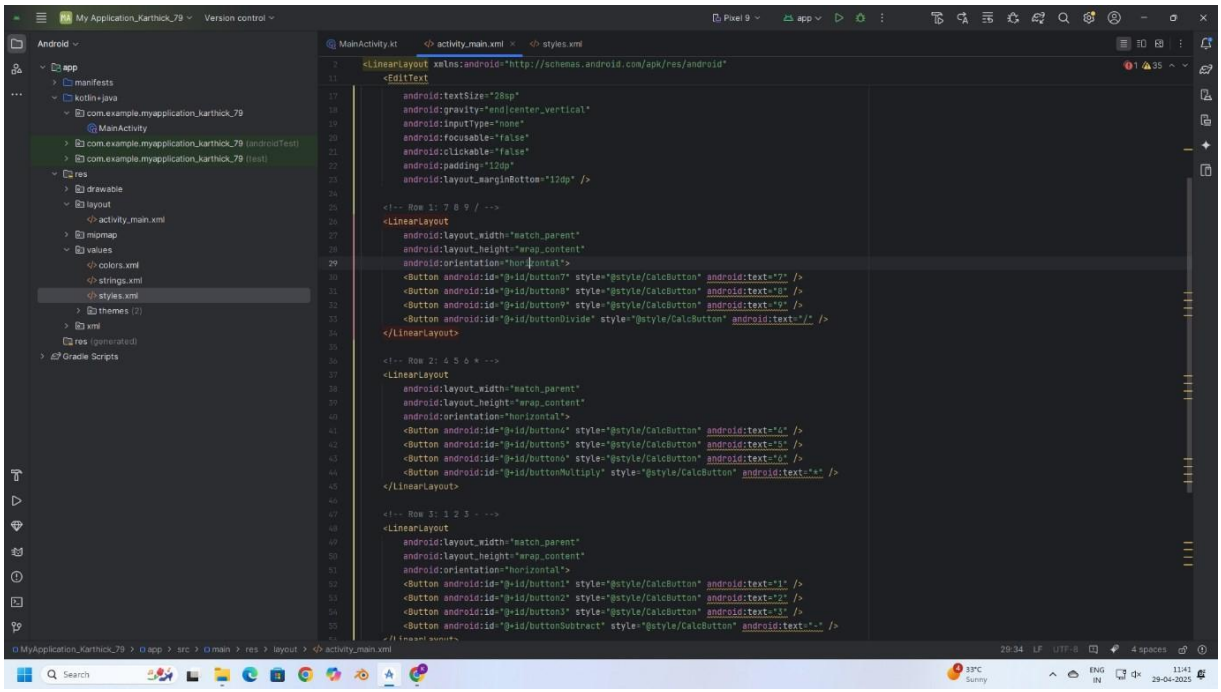
styles.xml

```
<resources>
<style name="CalcButton">
<item name="android:layout_width">0dp</item>
<item name="android:layout_height">wrap_content</item>
<item name="android:layout_weight">1</item>
<item name="android:padding">16dp</item>
<item name="android:textSize">24sp</item>
<item name="android:background">?attr/selectableItemBackground</item>
<item name="android:textColor">#000000</item>
</style>
</resources>
```

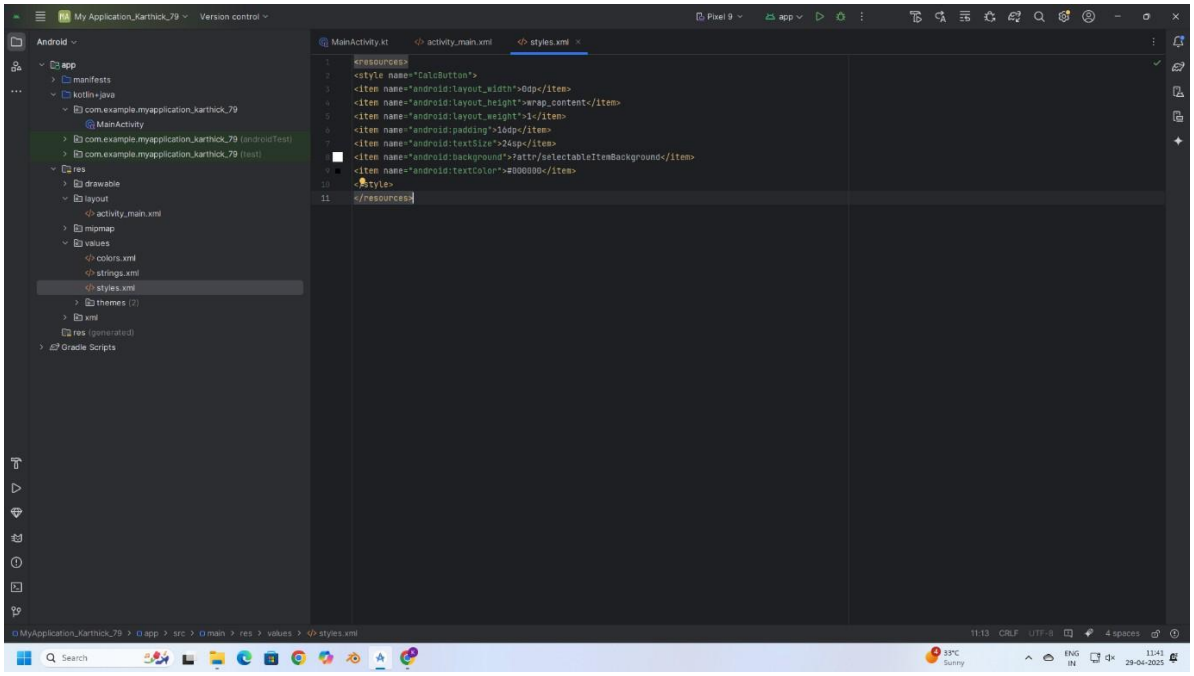
OUTPUT:


MainActivity.kt
activity_main.xml
styles.xml
Pixel 9 API 36
4.0
7 8 9 /
4 5 6 *
1 2 3 -
0 C = +

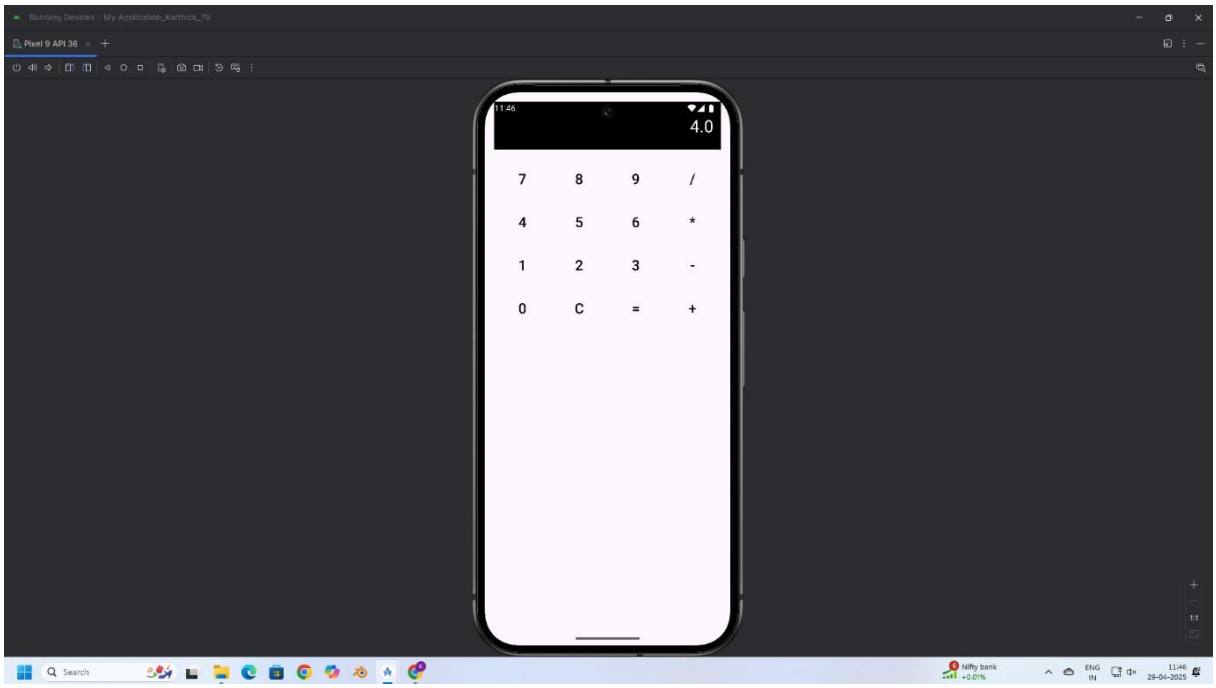

MainActivity.kt
activity_main.xml
styles.xml



```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    <EditText
        android:textSize="28sp"
        android:gravity="end|center_vertical"
        android:inputType="none"
        android:focusable="false"
        android:clickable="false"
        android:padding="12dp"
        android:layout_marginBottom="12dp" />

    <!-- Row 1: 7 8 9 / -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">
        <Button android:id="@+id/button7" style="@style/CalcButton" android:text="7" />
        <Button android:id="@+id/button8" style="@style/CalcButton" android:text="8" />
        <Button android:id="@+id/button9" style="@style/CalcButton" android:text="9" />
        <Button android:id="@+id/buttonDivide" style="@style/CalcButton" android:text="/" />
    </LinearLayout>

    <!-- Row 2: 4 5 6 * -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">
        <Button android:id="@+id/button4" style="@style/CalcButton" android:text="4" />
        <Button android:id="@+id/button5" style="@style/CalcButton" android:text="5" />
        <Button android:id="@+id/button6" style="@style/CalcButton" android:text="6" />
        <Button android:id="@+id/buttonMultiply" style="@style/CalcButton" android:text="*" />
    </LinearLayout>

    <!-- Row 3: 1 2 3 - -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">
        <Button android:id="@+id/button1" style="@style/CalcButton" android:text="1" />
        <Button android:id="@+id/button2" style="@style/CalcButton" android:text="2" />
        <Button android:id="@+id/button3" style="@style/CalcButton" android:text="3" />
        <Button android:id="@+id/buttonSubtract" style="@style/CalcButton" android:text="-" />
```



```
<resources>
<style name="CalcButton">
<item name="android:layout_width">0dp</item>
<item name="android:layout_height">wrap_content</item>
<item name="android:layout_weight">1</item>
<item name="android:padding">16dp</item>
<item name="android:textSize">24sp</item>
<item name="android:background">?attr/selectableItemBackground</item>
<item name="android:textColor">#000000</item>
</style>
</resources>
```



RESULT:

Thus, a basic calculator application was successfully developed using Android controls like Button, TextView, and EditText to perform addition, subtraction, multiplication, and division operations.