Ex. No. : 02A **Date: 24/02/2026**

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Basic Calculator

Aim

To design and develop a Basic Calculator Android application using **Kotlin and XML** that performs arithmetic operations such as Addition, Subtraction, Multiplication, Division, and Modulus.

Procedure:

Step 1: Create New Project

- Open Android Studio
- Click **New Project**
- Select **Empty Activity**
- Choose Kotlin as language

Step 2: Design the User Interface

- Open `activity_main.xml`
- Add:
  - 2 EditText fields (for input values)
  - 1 TextView (for result)
  - 5 Buttons (+, -, *, /, %)
- Apply styles for UI design

Step 3: Define UI Components in Kotlin

- Open `MainActivity.kt`
- Use `findViewById()` to connect XML elements
- Store references of:
  - EditTexts
  - Buttons
  - Result TextView

Step 4: Implement Click Listeners

- Add `setOnClickListener` for each button
- Call a `calculate()` function

Step 5: Implement Calculation Logic

- Get input values
- Convert String → Double
- Use `when` statement to perform:
  - Addition
  - Subtraction
  - Multiplication
  - Division
  - Modulus

Step 6: Handle Errors

- Check empty input
- Prevent division by zero
- Display Toast messages

Step 7: Run the Application

- Connect emulator/device
- Click Run
- Test all operations

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:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.MyApplication">
        <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"
    android:background="#EDE7F6"
    android:padding="20dp">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:background="#FFFFFF"
        android:padding="24dp"
        android:elevation="8dp">

        <TextView
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Basic Calculator"
            android:textSize="22sp"
            android:textStyle="bold"
            android:gravity="center"
            android:paddingBottom="24dp" />
```

```
        <TextView
            android:text="Enter Value 1"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"/>

        <EditText
            android:id="@+id/etValue1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:inputType="numberDecimal"
            android:layout_marginBottom="16dp"/>

        <TextView
            android:text="Enter Value 2"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"/>

        <EditText
            android:id="@+id/etValue2"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:inputType="numberDecimal"
            android:layout_marginBottom="16dp"/>

        <TextView
            android:text="Result"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"/>

        <TextView
            android:id="@+id/tvResult"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="18sp"
            android:padding="8dp"
            android:background="#D1C4E9"
            android:layout_marginBottom="24dp"/>

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="horizontal"
            android:gravity="center">

            <Button
                android:id="@+id/btnAdd"
                android:text="+"
                style="@style/CalcButtonStyle"/>

            <Button
                android:id="@+id/btnSub"
                android:text="-"
                style="@style/CalcButtonStyle"/>

            <Button
```

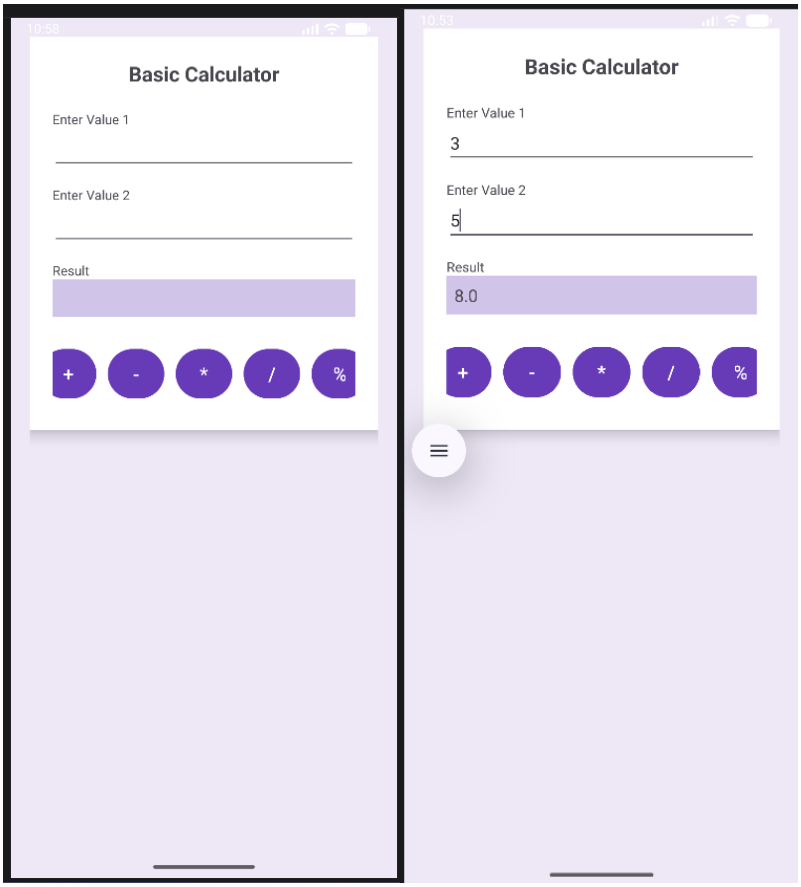
```
                android:id="@+id/btnMul"
                android:text="*"
                style="@style/CalcButtonStyle"/>

            <Button
                android:id="@+id/btnDiv"
                android:text="/"
                style="@style/CalcButtonStyle"/>

            <Button
                android:id="@+id/btnMod"
                android:text="%"
                style="@style/CalcButtonStyle"/>

        </LinearLayout>

    </LinearLayout>

</ScrollView>
```

MainActivity.kt

```
package com.example.myapplication

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

class MainActivity : AppCompatActivity() {

    private lateinit var value1: EditText
    private lateinit var value2: EditText
    private lateinit var result: TextView

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

        value1 = findViewById(R.id.etValue1)
        value2 = findViewById(R.id.etValue2)
        result = findViewById(R.id.tvResult)

        val btnAdd: Button = findViewById(R.id.btnAdd)
        val btnSub: Button = findViewById(R.id.btnSub)
        val btnMul: Button = findViewById(R.id.btnMul)
        val btnDiv: Button = findViewById(R.id.btnDiv)
        val btnMod: Button = findViewById(R.id.btnMod)

        btnAdd.setOnClickListener { calculate("+") }
        btnSub.setOnClickListener { calculate("-") }
        btnMul.setOnClickListener { calculate("*") }
        btnDiv.setOnClickListener { calculate("/") }
```

```
        btnMod.setOnClickListener { calculate("%") }
    }

    private fun calculate(operator: String) {
        val num1 = value1.text.toString()
        val num2 = value2.text.toString()

        if (num1.isEmpty() || num2.isEmpty()) {
            Toast.makeText(this, "Please enter both values",
Toast.LENGTH_SHORT).show()
            return
        }

        val n1 = num1.toDouble()
        val n2 = num2.toDouble()

        val res = when (operator) {
            "+" -> n1 + n2
            "-" -> n1 - n2
            "*" -> n1 * n2
            "/" -> {
                if (n2 == 0.0) {
                    Toast.makeText(this, "Cannot divide by zero",
Toast.LENGTH_SHORT).show()
                    return
                }
                n1 / n2
            }
            "%" -> n1 % n2
            else -> 0.0
        }

        result.text = res.toString()
    }
}
```

Output



Result:

The Basic Calculator Android application was successfully developed using Kotlin and XML.
It performs addition, subtraction, multiplication, division, and modulus operations correctly.
The application was tested and executed successfully with proper error handling.