EX: 9 Develop an Android application using controls like Button, TextView, EditText for designing a calculator having basic functionality like Addition, Subtraction, multiplication, and Division.

AIM:

To develop an Android application using Kotlin in Android Studio with basic UI components like EditText, Button, and TextView to perform basic arithmetic operations such as Addition, Subtraction, Multiplication, and Division**.**

ALGORITHM:

- **Start Android Studio** and create a new project named `calculat` using **Kotlin** and **Empty Activity**.

- **Design the UI** in `activity_main.xml` using:

  - `EditText` for entering two numbers.
  - `Button` for each arithmetic operation (`+`, `-`, `×`, `÷`).
  - `TextView` to display the result.

- In `MainActivity.kt`:

  - Initialize and link the UI elements using `findViewById`.
  - Add `setOnClickListener` to each button.

- **On each button click**:

  - Fetch the input numbers from `EditText`.
  - Check if the inputs are valid numbers.
  - Perform the corresponding operation (`+`, `-`, `×`, `÷`).
  - Display the result in `TextView`.

- Handle special cases like:

  - Invalid input (empty or non-numeric).
  - Division by zero (show appropriate error message).

- **Run the app** in an emulator or on a real Android device to test all functionalities.

- **Stop the application** after successful execution.

CODE:

`activity_main.xml` (UI Layout)

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

    <EditText
        android:id="@+id/etFirstNumber"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter first number"
        android:inputType="numberDecimal" />

    <EditText
        android:id="@+id/etSecondNumber"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter second number"
        android:inputType="numberDecimal"
        android:layout_marginTop="12dp"/>

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

```
    android:layout_marginTop="20dp">

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

    <Button
        android:id="@+id/btnSubtract"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="-"
        android:layout_marginStart="10dp"/>

    <Button
        android:id="@+id/btnMultiply"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="×"
        android:layout_marginStart="10dp"/>

    <Button
        android:id="@+id/btnDivide"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="÷"
        android:layout_marginStart="10dp"/>
</LinearLayout>
```

```
    <TextView
        android:id="@+id/tvResult"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Result:"
        android:textSize="18sp"
        android:textStyle="bold"
        android:layout_marginTop="30dp"/>
</LinearLayout>
```

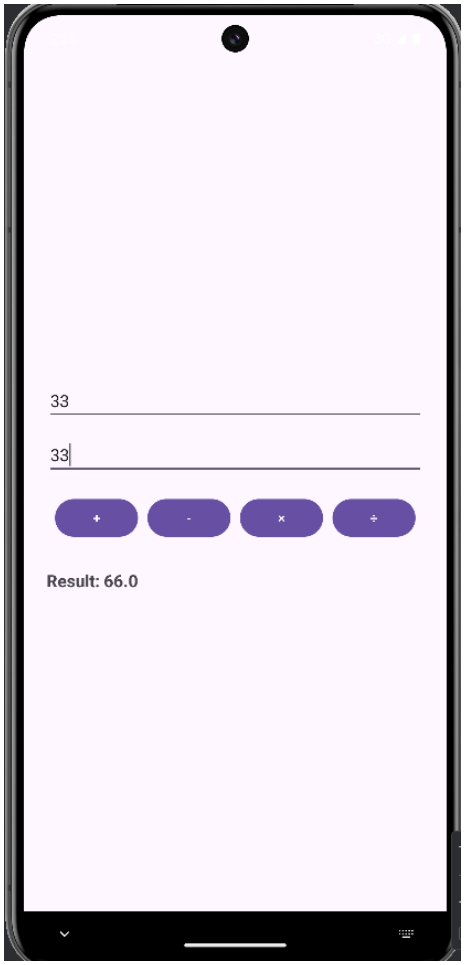
`MainActivity.kt` (Logic in Kotlin)

```
package com.example.calculat

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

class MainActivity : AppCompatActivity() {

    private lateinit var etFirstNumber: EditText
    private lateinit var etSecondNumber: EditText
    private lateinit var tvResult: TextView
    private lateinit var btnAdd: Button
    private lateinit var btnSubtract: Button
    private lateinit var btnMultiply: Button
    private lateinit var btnDivide: Button

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

```
    // Linking UI elements
    etFirstNumber = findViewById(R.id.etFirstNumber)
    etSecondNumber = findViewById(R.id.etSecondNumber)
    tvResult = findViewById(R.id.tvResult)
    btnAdd = findViewById(R.id.btnAdd)
    btnSubtract = findViewById(R.id.btnSubtract)
    btnMultiply = findViewById(R.id.btnMultiply)
    btnDivide = findViewById(R.id.btnDivide)

    btnAdd.setOnClickListener {
        calculate('+')
    }

    btnSubtract.setOnClickListener {
        calculate('-')
    }

    btnMultiply.setOnClickListener {
        calculate('*')
    }

    btnDivide.setOnClickListener {
        calculate('/')
    }
}

private fun calculate(operator: Char) {
    val num1 = etFirstNumber.text.toString().toDoubleOrNull()
    val num2 = etSecondNumber.text.toString().toDoubleOrNull()
```

```
        if (num1 == null || num2 == null) {
            tvResult.text = "Please enter valid numbers"
            return
        }

        val result = when (operator) {
            '+' -> num1 + num2
            '-' -> num1 - num2
            '*' -> num1 * num2
            '/' -> if (num2 != 0.0) num1 / num2 else {
                tvResult.text = "Cannot divide by 0"
                return
            }
            else -> 0.0
        }

        tvResult.text = "Result: $result"
    }
}
```

OUTPUT:



RESULT:

Thus the program is executed successfully.