Aim:- Write a simple android program to mimic the function of a calculator, which must include some basic arithmetic operation like addition, subtraction, multiplication and division.

Algorithm:-

1. Open your Android Studio . Click on Start a New Android Studio Project .Give Application Name ***Calculator*** and leave other fields as it is, then click NEXT.
2. Select the Empty Activity and click NEXT.
3. Now we have **activity_main.xml** in which we have to make the layout of our app
4. Select Design->Pallate->Layouts->TableLayout. And customise to make a Tablerow,Tablecol of 5 and 4 respectively i.e 5x4.
5. In each row add four button of format :-
    a. <Button
    b. android:id="@+id/<***button id***>" ----------> Button Id
    c. android:layout_width="30pt"
    d. android:layout_height="30pt"
    e. android:layout_marginRight="1pt"
    f. android:onClick="numberEvent" ----------> Onclick Event
    g. android:layout_weight="1"
    h. android:text=<***Button name***></Button> ------> Button Name
6. From above we have 20 button which we have to edit the {id,onClickEvent,text} field of those buttons according to our requirement and then out layout is prepared .
7. Now we have to add functionality to our app , this we will do in MainActivity.java file of our app.
8. In MainActivity.java we declare
    i. String op : For storing the operator selected by user.
    ii. String oldNumber: For storing the previous operand.
    iii. Boolean isNewOperator : For checking if new operator is selected or not, which has default value of true.
    iv. EditText ed1 : For storing the input from the editText field of app.
9. Open MainActivity.java and we have to implement five onClick event namely:
    i. numberEvent: This event is implemented to read the number from [0-9] and store it in variable ***number.***
    ii. OperatorEvent: This event is implemented to read the operator selected in the app like {+,-,*,/,mod}.
    iii. equalEvent: This event is implemented to calculate the arithemetic operation and showing the result .
    iv. clearEvent: Used to clear the editText field of app.
    v. percentageEvent: Used to calculate the percentage of the number entered.
10. Implementing the numberEvent :
    a. We declare the number variable for storing the input then we the switch statement to assign the number according to id . For example if selected button 7 then our Key will be ''but7'' and we can assign the value of 7 to number.
11. Implementing the operatorEvent:
    a. Firstly we assign the newOperator Value to true and then we save the previous number in oldNumber variable .

b. Then, we switch the id according to {+,-,*,/} and assign the op variable the symbol of the button .

12. Implementing the equalEvent:
    a. Firstly we store the newNumber in variable newNumber
    b. Then,we switch on basis of op{operator} and do the arithemetic operation and store it in the result variable.
    c. Finally , we use setText() to print the result in the editText window.
13. Implementing the clearEvent:
    a. Simply we clear the Screen by using the setText("0") method.
    b. And assigning the newOperator to true;
14. Implementing the percentEvent:
    a. Simply cal the percentage and print it.
15. Finally our app is completed.

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:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">


    <EditText
        android:id="@+id/editText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:ems="10"
        android:layout_marginBottom="1pt"
        android:gravity="right|center"
        android:inputType="textPersonName"
        android:text="0"
        android:textColor="@color/black"
        android:textSize="40pt" />


    <TableLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content">

        <TableRow
            android:layout_marginBottom="1pt"
            android:layout_width="match_parent"
            android:layout_height="match_parent">

            <Button
                android:id="@+id/bu7"
                android:layout_width="30pt"
                android:layout_height="30pt"
                android:layout_marginRight="1pt"
                android:onClick="numberEvent"
                android:layout_weight="1"
                android:text="7"></Button>
```

```
        <Button
            android:id="@+id/bu8"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:layout_marginRight="1pt"
            android:onClick="numberEvent"
            android:layout_weight="1"
            android:text="8"></Button>

        <Button
            android:id="@+id/bu9"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:onClick="numberEvent"
            android:layout_marginRight="1pt"
            android:layout_weight="1"
            android:text="9"></Button>

        <Button
            android:id="@+id/buDivide"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:onClick="operatorEvent"
            android:layout_marginRight="1pt"
            android:layout_weight="1"
            android:text="/"
            android:textSize="18sp"
            android:textColor="@color/white"></Button>


    </TableRow>

    <TableRow
        android:layout_marginBottom="1pt"
        android:layout_width="match_parent"
        android:layout_height="match_parent">

        <Button
            android:id="@+id/bu4"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:layout_marginRight="1pt"
            android:onClick="numberEvent"
            android:layout_weight="1"
            android:text="4"></Button>

        <Button
            android:id="@+id/bu5"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:onClick="numberEvent"
            android:layout_marginRight="1pt"
            android:layout_weight="1"
            android:text="5"></Button>

        <Button
            android:id="@+id/bu6"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:onClick="numberEvent"
```

```
            android:layout_marginRight="1pt"
            android:layout_weight="1"
            android:text="6"></Button>

        <Button
            android:id="@+id/buMultiply"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:layout_marginRight="1pt"
            android:onClick="operatorEvent"
            android:layout_weight="1"
            android:text="*"
            android:textSize="18sp"
            android:textColor="@color/white"></Button>


    </TableRow>

    <TableRow
        android:layout_marginBottom="1pt"
        android:layout_width="match_parent"
        android:layout_height="match_parent">

        <Button
            android:id="@+id/bu1"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:onClick="numberEvent"
            android:layout_marginRight="1pt"
            android:layout_weight="1"
            android:text="1"></Button>

        <Button
            android:id="@+id/bu2"
            android:layout_width="30pt"
            android:onClick="numberEvent"
            android:layout_height="30pt"
            android:layout_marginRight="1pt"
            android:layout_weight="1"
            android:text="2"></Button>

        <Button
            android:id="@+id/bu3"
            android:layout_width="30pt"
            android:onClick="numberEvent"
            android:layout_height="30pt"
            android:layout_marginRight="1pt"
            android:layout_weight="1"
            android:text="3"></Button>

        <Button
            android:id="@+id/buSubtract"
            android:layout_width="30pt"
            android:layout_height="30pt"
            android:layout_marginRight="1pt"
            android:onClick="operatorEvent"
            android:layout_weight="1"
            android:textSize="18sp"
            android:text="-"></Button>
```

```
        </TableRow>

        <TableRow
            android:layout_marginBottom="1pt"
            android:layout_width="match_parent"
            android:layout_height="match_parent">

            <Button
                android:id="@+id/buDecimal"
                android:layout_width="30pt"
                android:layout_height="30pt"
                android:onClick="numberEvent"
                android:layout_marginRight="1pt"
                android:layout_weight="1"
                android:text="."></Button>

            <Button
                android:id="@+id/bu0"
                android:layout_width="30pt"
                android:onClick="numberEvent"
                android:layout_height="30pt"
                android:layout_marginRight="1pt"
                android:layout_weight="1"
                android:text="0"></Button>

            <Button
                android:id="@+id/buEqual"
                android:layout_width="30pt"
                android:layout_height="30pt"
                android:layout_marginRight="1pt"
                android:layout_weight="1"
                android:onClick="equalEvent"
                android:textSize="18sp"
                android:text="="></Button>

            <Button
                android:id="@+id/buAdd"
                android:layout_width="30pt"
                android:layout_height="30pt"
                android:layout_marginRight="1pt"
                android:onClick="operatorEvent"
                android:layout_weight="1"
                android:text="+"
                android:textSize="18sp"
                android:textColor="@color/white"></Button>


        </TableRow>

        <TableRow
            android:layout_marginBottom="1pt"
            android:layout_width="match_parent"
            android:layout_height="match_parent">

            <Button
                android:id="@+id/buPercentage"
                android:layout_width="30pt"
                android:layout_height="30pt"
                android:onClick="percentEvent"
                android:layout_marginRight="1pt"
                android:layout_weight="1"
```

```
                android:text="%"></Button>

            <Button
                android:id="@+id/buMod"
                android:layout_width="30pt"
                android:layout_height="30pt"
                android:layout_marginRight="1pt"
                android:layout_weight="1"
                android:onClick="operatorEvent"
                android:text="Mod"></Button>

            <Button
                android:id="@+id/buPower"
                android:layout_width="30pt"
                android:layout_height="30pt"
                android:layout_marginRight="1pt"
                android:layout_weight="1"
                android:onClick="operatorEvent"
                android:textSize="18sp"
                android:text="^"></Button>

            <Button
                android:id="@+id/buClear"
                android:layout_width="30pt"
                android:layout_height="30pt"
                android:layout_marginRight="1pt"
                android:layout_weight="1"
                android:onClick="clearEvent"
                android:text="CE"
                android:textSize="18sp"
                android:textColor="@color/white"></Button>


        </TableRow>


    </TableLayout>

</LinearLayout>
```

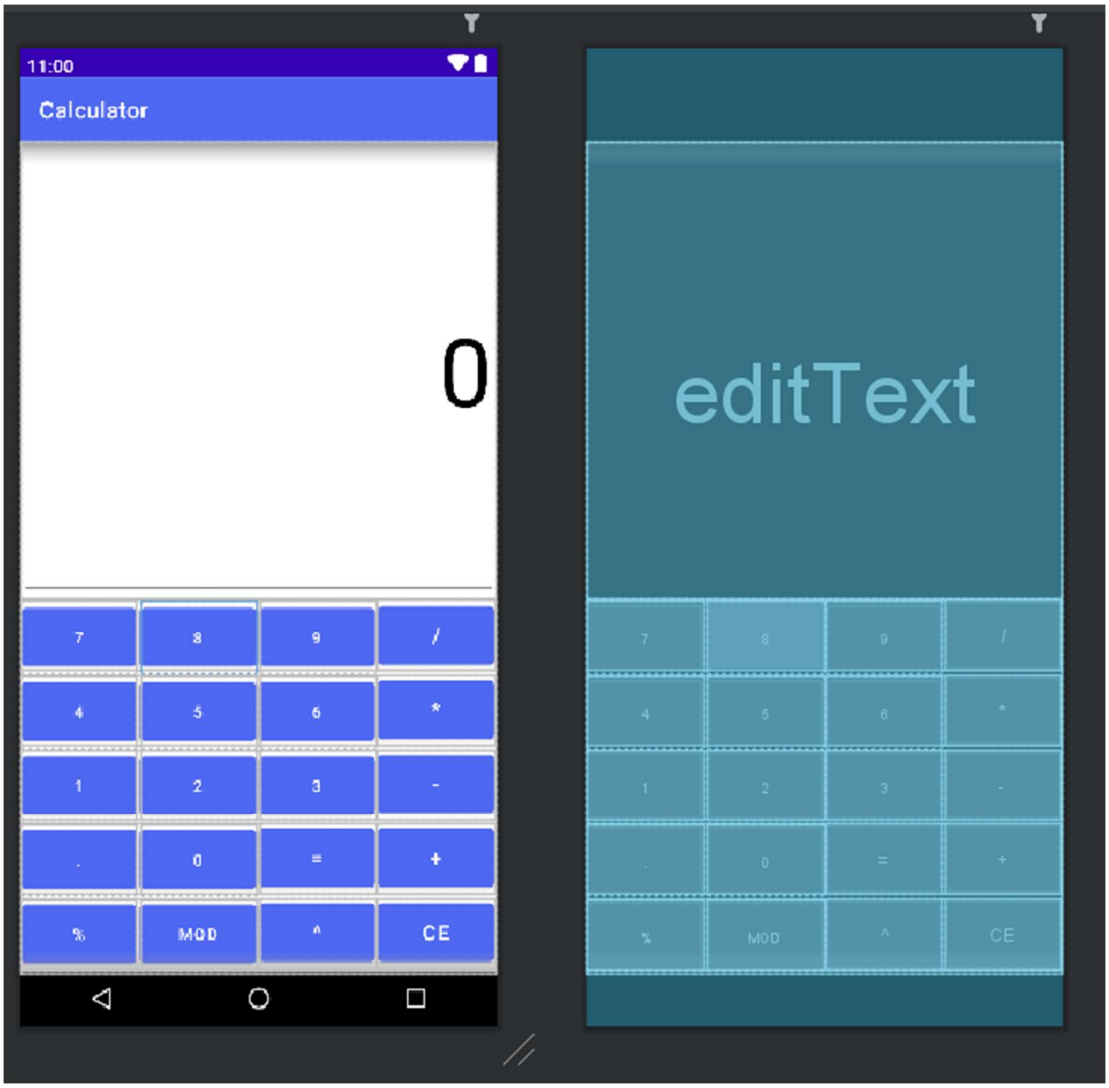
MainActivity.java:

```
package com.example.calculator;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;
import android.widget.EditText;

public class MainActivity extends AppCompatActivity {

    String op = "";
    String oldNumber = "";
    boolean isNewOperator = true;
    EditText ed1;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
```

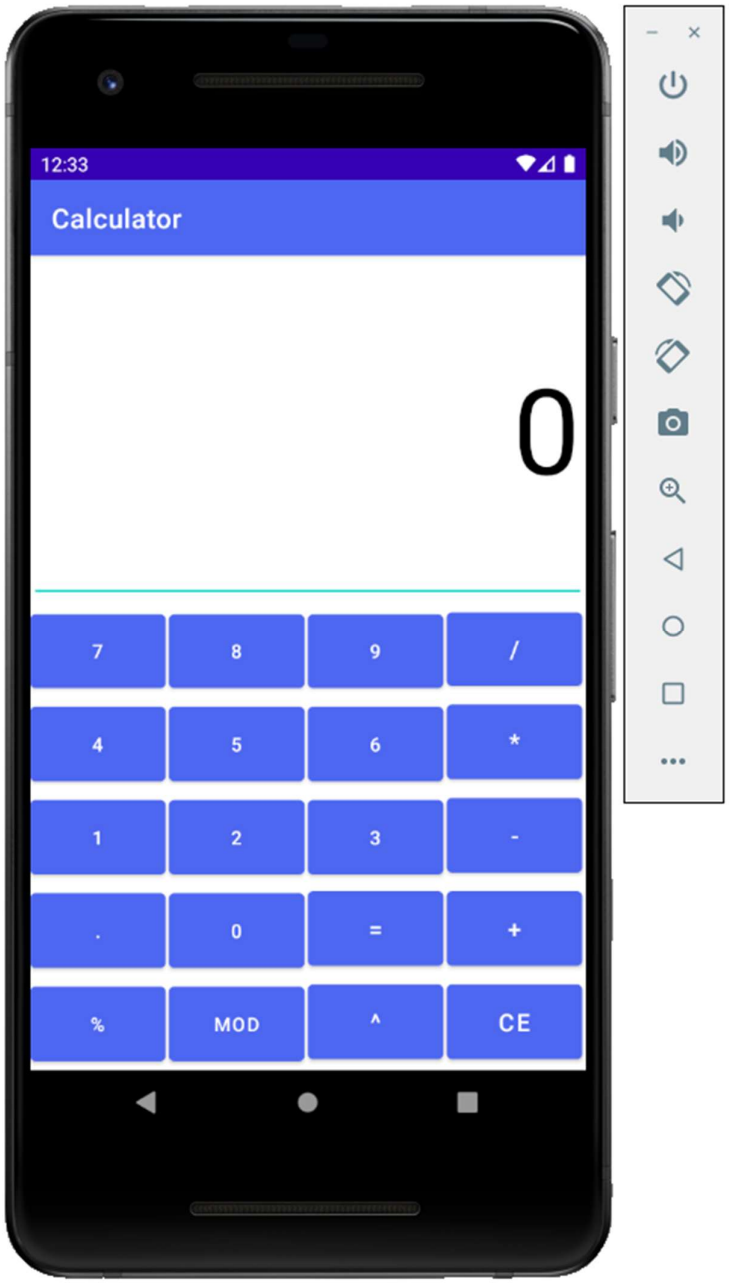
```
        setContentView(R.layout.activity_main);

        ed1 = findViewById(R.id.editText);
    }

    public void numberEvent(View view) {
        if(isNewOperator)
            ed1.setText("");
        isNewOperator = false;

        String number = ed1.getText().toString();
        switch(view.getId()){
            case R.id.bu0:
                number += "0";
                break;
            case R.id.bu1:
                number += "1";
                break;
            case R.id.bu2:
                number += "2";
                break;
            case R.id.bu3:
                number += "3";
                break;
            case R.id.bu4:
                number += "4";
                break;
            case R.id.bu5:
                number += "5";
                break;
            case R.id.bu6:
                number += "6";
                break;
            case R.id.bu7:
                number += "7";
                break;
            case R.id.bu8:
                number += "8";
                break;
            case R.id.bu9:
                number += "9";
                break;
            case R.id.buDecimal:
                number += ".";
                break;
            default:
                throw new IllegalStateException("Unexpected value: " +
view.getId());
        }
        ed1.setText(number);
    }

    public void operatorEvent(View view) {
        isNewOperator = true;
        oldNumber = ed1.getText().toString();
        switch (view.getId()){
            case R.id.buAdd: op = "+"; break;
            case R.id.buSubtract: op = "-"; break;
            case R.id.buMultiply: op = "*"; break;
            case R.id.buDivide: op = "/"; break;
            case R.id.buPower: op = "^"; break;
```

```
            case R.id.buMod: op = "%"; break;
        }
    }

    public void equalEvent(View view) {
        String newNumber = ed1.getText().toString();
        double result = 0.0;
        switch (op){
            case "+":
                result = Double.parseDouble(oldNumber) +
Double.parseDouble(newNumber);
                break;
            case "-":
                result = Double.parseDouble(oldNumber) -
Double.parseDouble(newNumber);
                break;
            case "*":
                result = Double.parseDouble(oldNumber) *
Double.parseDouble(newNumber);
                break;
            case "/":
                result = Double.parseDouble(oldNumber) /
Double.parseDouble(newNumber);
                break;
            case "^":
                result =
Math.pow(Double.parseDouble(oldNumber),Double.parseDouble(newNumber));
                break;
            case "%":
                result = Double.parseDouble(oldNumber) %
Double.parseDouble(newNumber);
                break;
            default:
                throw new IllegalStateException("Unexpected value: " + op);
        }
        ed1.setText(result + "");
    }

    public void clearEvent(View view) {
        ed1.setText("0");
        isNewOperator = true;
    }

    public void percentEvent(View view) {
        double no = Double.parseDouble(ed1.getText().toString()) / 100;
        ed1.setText(no+"");
        isNewOperator = true;
    }

}
```

Output 1 (Design and blueprint):



Output 2 (In Emulator):


12:33
Calculator
0
7
8
9
/
4
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6
*
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2
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-
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MOD
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CE