

## **activity\_main.xml:**

```
<?xml version="1.0" encoding="utf-8"?>

<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    tools:context=".MainActivity"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
>

    <EditText
        android:layout_width="match_parent"
        android:layout_height="200dp"
        android:id="@+id/et_input"
        android:background="#f3f2f2"
        android:gravity="right|bottom"
        android:textSize="40sp"
        android:textStyle="bold"
    />

    <GridLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"

        android:columnCount="5"
        android:orientation="vertical"
        android:rowCount="5">

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="horizontal"
            android:layout_rowWeight="1">

            <Button
                android:id="@+id/bt_sin"
                android:layout_width="0dp"
                android:layout_height="match_parent"
                android:layout_weight="1"
                android:background="#D3D3D3"
                android:gravity="center"
                android:padding="10dp"
                android:text="sin"
                android:textColor="#000000"
                android:textSize="30sp" />

            <Button
                android:id="@+id/bt_cos"
                android:layout_width="0dp"
                android:layout_height="match_parent"
                android:layout_weight="1"
```

```
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="cos"
        android:textColor="#000000"
        android:textSize="30sp" />
```

```
<Button
    android:id="@+id/bt_log"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="log"
    android:textColor="#000000"
    android:textSize="30sp" />
```

```
<Button
    android:id="@+id/bt_del"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="DEL"
    android:textColor="#000000"
    android:textSize="30sp" />
```

```
<Button
    android:id="@+id/bt_c"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="C"
    android:textColor="#000000"
    android:textSize="30sp" />
```

```
</LinearLayout>
```

```
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal"
    android:layout_rowWeight="1">
```

```
<Button
    android:id="@+id/bt_7"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
```

```

        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="7"
        android:textColor="#000000"
        android:textSize="30sp" />

<Button
    android:id="@+id/bt_8"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="8"
    android:textColor="#000000"
    android:textSize="30sp" />

<Button
    android:id="@+id/bt_9"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="9"
    android:textColor="#000000"
    android:textSize="30sp" />

<Button
    android:id="@+id/bt_open"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="("
    android:textColor="#000000"
    android:textSize="30sp" />

<Button
    android:id="@+id/bt_close"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text=")"
    android:textColor="#000000"
    android:textSize="30sp" />

</LinearLayout>

```

```

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal"
    android:layout_rowWeight="1">

    <Button
        android:id="@+id/bt_4"
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="4"
        android:textColor="#000000"
        android:textSize="30sp" />

    <Button
        android:id="@+id/bt_5"
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="5"
        android:textColor="#000000"
        android:textSize="30sp" />

    <Button
        android:id="@+id/bt_6"
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="6"
        android:textColor="#000000"
        android:textSize="30sp" />

    <Button
        android:id="@+id/bt_plus"
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="+"
        android:textColor="#000000"
        android:textSize="30sp" />

    <Button
        android:id="@+id/bt_minus"

```

```

        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="-"
        android:textColor="#000000"
        android:textSize="30sp" />

</LinearLayout>

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal"
    android:layout_rowWeight="1">

    <Button
        android:id="@+id/bt_1"
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="1"
        android:textColor="#000000"
        android:textSize="30sp" />

    <Button
        android:id="@+id/bt_2"
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="2"
        android:textColor="#000000"
        android:textSize="30sp" />

    <Button
        android:id="@+id/bt_3"
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="3"
        android:textColor="#000000"
        android:textSize="30sp" />

    <Button
        android:id="@+id/bt_mul"
        android:layout_width="0dp"

```

```
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="X"
        android:textColor="#000000"
        android:textSize="30sp" />
```

```
<Button
    android:id="@+id/bt_div"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="/"
    android:textColor="#000000"
    android:textSize="30sp" />
```

```
</LinearLayout>
```

```
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal"
    android:layout_rowWeight="1">
```

```
<Button
    android:id="@+id/bt_0"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="2"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="0"
    android:textColor="#000000"
    android:textSize="30sp" />
```

```
<Button
    android:id="@+id/bt_dot"
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:background="#D3D3D3"
    android:gravity="center"
    android:padding="10dp"
    android:text="."
    android:textColor="#000000"
    android:textSize="30sp" />
```

```
<Button
    android:id="@+id/bt_percent"
    android:layout_width="0dp"
    android:layout_height="match_parent"
```

```

        android:layout_weight="1"
        android:background="#D3D3D3"
        android:gravity="center"
        android:padding="10dp"
        android:text="%"
        android:textColor="#000000"
        android:textSize="30sp" />

        <Button
            android:id="@+id/bt_equal"
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:background="#D3D3D3"
            android:gravity="center"
            android:padding="10dp"
            android:text="="
            android:textColor="#000000"
            android:textSize="30sp" />

    </LinearLayout>

</GridLayout>

</LinearLayout>

```

## **MainActivity.java**

```

package com.example.ex3;

import androidx.appcompat.app.AppCompatActivity;

import android.graphics.Color;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import java.util.ArrayList;
import java.util.EmptyStackException;
import java.util.Stack;
import java.lang.*;

public class MainActivity extends AppCompatActivity implements
View.OnClickListener{

    EditText et_input;
    Stack<String> stack;
    ArrayList<String> post_input;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
}

```

```

        et_input=findViewById(R.id.et_input);
        stack=new Stack<String>();
        post_input=new ArrayList<String>();
        String

ops[]={"c","del","dot","plus","minus","mul","div","percent","open","close","equal","sin","cos","log"};

        for(int i=0;i<10;i++){
            int
id=getResources().getIdentifier("bt_"+Integer.toString(i),"id",getPackageName());
            findViewById(id).setOnClickListener(this);
        }
        for(int i=0;i<14;i++){
            int
id=getResources().getIdentifier("bt_"+ops[i],"id",getPackageName());
            findViewById(id).setOnClickListener(this);
        }
    }
    @Override
    public void onClick(View v) throws EmptyStackException{
        float result;

        switch (v.getId()){
            case R.id.bt_c:
                et_input.setText("");
                break;
            case R.id.bt_del:
                String val=et_input.getText().toString();
                et_input.setText(val.substring(0,val.length()-1));
                break;
            case R.id.bt_equal:
                String ip=et_input.getText().toString();
                if(!ip.startsWith("sin") && !ip.startsWith("cos") &&
!ip.startsWith("log")) {
                    postFix(ip);
                    try {
                        result = calc();
                        et_input.setText(String.valueOf(result));
                    }catch(EmptyStackException ex){
                        Toast.makeText(this, "INVALID. SYNTAX!",
Toast.LENGTH_SHORT).show();
                        et_input.setText("");
                        makeEmpty();
                        post_input.clear();
                    }
                }
            else
                trig_calc(ip);
            break;
            default:
                Button bt_num=(Button)v;
                et_input.setText(et_input.getText().toString()
+ bt_num.getText());
                break;
        }
    }

```



```

    }
    et_input.setSelection(et_input.getEditableText().length());
}

static int precedence(char c) {
    switch (c) {
        case '+':
        case '-':
            return 1;
        case 'X':
        case '/':
        case '%':
            return 2;
    }
    return -1;
}

private void postFix(String ip) {
    makeEmpty();
    post_input.clear();
    String num_ip;
    int prev=0; //1 for op , 0 for other cases

    for (int i = 0; i < ip.length() ; i++) {

        char c = ip.charAt(i);
        //check if char is operator
        if(precedence(c)>0) //operator
        {
            if(i==0)
                post_input.add("0"); //unary -6=0-6
            if(prev!=1) //not op
            {
                while(stack.isEmpty()==false &&
precedence(stack.peek().charAt(0))>=precedence(c))
                    post_input.add(stack.pop());
            }
            else
                post_input.add("0");
            stack.push(String.valueOf(c));
            prev=1;
        }
        else if(c==' ')
        {
            char x = stack.pop().charAt(0);

            try {
                while (x != '(') {
                    post_input.add(String.valueOf(x));
                    //result += x;
                    x = stack.pop().charAt(0);
                }
            } catch (EmptyStackException e)
            {
                Log.i("got", "mmmmmmmm-----brac expc");
                //stack.push("Error");
                Log.i("got", "kkkkkk-----

```

```

"+stack.peek());
                                Log.i("got", "kkkkkk-----");
"+stack.size());
                                Toast.makeText(this, "INVALID. SYNTAX!",
Toast.LENGTH_SHORT).show();
                                et_input.setText("");
                                makeEmpty();
                                post_input.clear();
                                }
                                finally { prev=0; }
                                }
                                else if(c=='(')
                                { stack.push(String.valueOf(c)); prev=0; }

                                else {
                                    //character is neither operator nor (
                                    num_ip = String.valueOf(c);
                                    while ( (i + 1 != ip.length()) && (
Character.isDigit(ip.charAt(i + 1)) || ip.charAt(i + 1)=='.' )) {
                                        num_ip = num_ip + ip.charAt(i + 1);
                                        i++;
                                    }

                                    post_input.add(num_ip);
                                    prev=0;
                                }
                                }
                                while(!stack.isEmpty())
                                    post_input.add(stack.pop());
                                }

private float calc() throws EmptyStackException{
    makeEmpty();
    float res;

    Stack<Float> float_stack=new Stack<>();

    for(int i=0;i<post_input.size();i++)
    {
        String post_str=post_input.get(i);

        try {

            float n = Float.parseFloat(post_str);
            float_stack.push(n);
            Log.i("err", "no: " + n);
        } catch (NumberFormatException ex) {
            Log.i("err", "ty: " + post_str);
            try {
                float val1 = float_stack.pop();
                float val2 = float_stack.pop();

                switch (post_str) {
                    case "+":
                        float_stack.push(val2 + val1);
                        break;

```

```

        case "-":
            float t = val2 - val1;
            float_stack.push(val2 - val1);
            Log.i("err", "ty: " + t);
            break;

        case "/":
            float_stack.push(val2 / val1);
            break;

        case "X":
            float_stack.push(val2 * val1);
            break;

        case "%":
            float_stack.push(val2 % val1);
            break;
    }
} catch (EmptyStackException exe) {
    /*Toast t = Toast.makeText(this, "INVALID -
    SYNTAX!", Toast.LENGTH_SHORT);
    View v = t.getView();
    v.setBackgroundColor(Color.WHITE);
    t.show();*/
    Toast.makeText(this, "INVALID - SYNTAX!",
    Toast.LENGTH_SHORT).show();
    et_input.setText("");
    makeEmpty();
    post_input.clear();
}

    }
    catch (EmptyStackException ex) {
        Toast.makeText(this, "INVALID .. SYNTAX!",
        Toast.LENGTH_SHORT).show();
        et_input.setText("");
        makeEmpty();
        post_input.clear();
    }
}

    res=float_stack.pop();
    return res; //change return value in fn call
}

private void trig_calc(String ip){

    Double val = Double.parseDouble(ip.substring(3));
    if(ip.startsWith("sin"))

    et_input.setText(Double.toString(Math.sin(Math.toRadians(val))));
    else if(ip.startsWith("cos"))

    et_input.setText(Double.toString(Math.cos(Math.toRadians(val))));
    else if(ip.startsWith("log"))
        et_input.setText(Double.toString(Math.log(val)));
}

```

```
private void makeEmpty() {  
    while (!stack.isEmpty())  
        stack.pop();  
}
```

### Output:







**activity\_main.xml:**

**MainActivity.java**

**Output:**