



MAHARASHTRA STATE BOARD  
OF TECHNICAL EDUCATION, MUMBAI.



# Government Polytechnic, Osmanabad

## Microproject Title

**“Scientific Calculator in Android”**

## Submitted By

| Roll No. | Student Name      | Enrolment No. |
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2021-22.



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# Government Polytechnic, Osmanabad

## CERTIFICATE

This is certified that, the microproject entitled **Scientific Calculator in Android** Submitted by **Mr. Mohite Dipak Balu** Roll Number **35** of **Sixth** Semester of Diploma in **Computer Engineering (CO)** has completed satisfactory in the course **Mobile Application Development (22617)** for academic year **2021-22** as prescribed in the curriculum.

Date :     /     /

Place : **Osmanabad**

Enrolment No : **1901180310**

Exam Seat No : **292506**

Institute  
Seal

Lecturer

Principal

Head of Department

## Acknowledgement

- I take it as an opportunity to thank to all those who have directly and indirectly inspired, directed and assisted me towards successful completion of this project report.
- I express my sincere thanks to principal **Prof. S. L. Andhare sir** and Head of Department **Prof. P. J. Bansode sir** for having me allowed to submit this “Scientific Calculator in Android” report as part of my academics learning.
- I express my sincere thanks to **Prof. A. B. Gaikwad sir** lecturer in Computer Engineering department of Government Polytechnic Osmanabad for encouragement throughout project report and guideline in designing and working out of this project...!

# Index

| Sr. No. | Content  | Page No. |
|---------|--|----------|
| 1.0     | Rationale  | 05       |
| 2.0     | Course Outcome Achieved                                  | 05       |
| 3.0     | Actual Methodology Followed                              | 06       |
| 3.1     | Program Code (XML)                                       | 06       |
| 3.2     | Program Code (Java)                                      | 12       |
| 3.3     | Program Code (Screenshot from Android Studio)            | 21       |
| 6.0     | Outputs of the Micro-Projects                            | 22       |
| 7.0     | Actual Resources Used                                    | 25       |
| 8.0     | Skill Developed / Learning outcome of this Micro-Project | 25       |
| 9.0     | Applications of this Micro-Project                       | 26       |
| 10.0    | Conclusion   | 26       |
| 11.0    | Reference  | 27       |

# MICRO-PROJECT REPORT

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## 1.0 Rationale

Android application development is one of the rising and growing trends in the industry of mobile. This course examines the principles of mobile application design and covers the necessary concepts which are required to understand mobile based applications and develop Android based Applications in particular. After completing this course students will design and build a variety of real-time Apps using Android.

## 2.0 Course Outcome Achieved

- Configure Android environment and development tools
- Develop rich user Interfaces by using layouts and controls.
- Use User Interface components for android application development.
- Publish Android applications.
- Developed a multipurpose Android application.
- Create an Attractive UI for our android Application.
- Developing an Event on the different components in our Android Application.

## 3.0 Actual Methodology Followed

### 3.1. Program Code (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"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:background="#000"
    android:weightSum="10"
    tools:context=".MainActivity">

  <TextView
    android:layout_width="match_parent"
    android:layout_height="50dp"
    android:background="#ffa500"
    android:gravity="center_vertical"
    android:textStyle="bold"
    android:fontFamily="sans-serif-condensed-medium"
    android:textSize="35dp"
    android:backgroundTint="#ffa500"
    android:text="Scientific Calculator" />

  <TextView
    android:id="@+id/tvsec"
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:background="#000"
    android:text=""
    android:textColor="#f6f6f6"
    android:textSize="20sp"
    android:textAlignment="viewEnd"
    android:gravity="bottom"
    android:maxLines="1"
    android:layout_weight="1"
    tools:ignore="RtlCompat">

</TextView>
```

```
<TextView
  android:id="@+id/tvmain"
  android:layout_width="match_parent"
  android:layout_height="0dp"
  android:background="#000"
  android:text=""
  android:textColor="#fff"
  android:textSize="50sp"
  android:textAlignment="viewEnd"
  android:padding="10dp"
  android:gravity="bottom"
  android:maxLines="1"
  android:layout_weight="2"
  tools:ignore="RtlCompat">

</TextView>
<LinearLayout
  android:layout_weight="7"
  android:orientation="vertical"
  android:layout_width="match_parent"
  android:layout_height="0dp">
  <LinearLayout
    android:orientation="vertical"
    android:weightSum="7"
    android:layout_width="match_parent"
    android:layout_height="match_parent">
    <LinearLayout
      android:layout_weight="1"
      android:orientation="horizontal"

      android:layout_width="match_parent"

      android:layout_height="match_parent">
      <LinearLayout
        android:orientation="horizontal"
        android:weightSum="4"

        android:layout_width="match_parent"

        android:layout_height="match_parent">
        <Button
          android:id="@+id/bac"
          android:text="AC"
```

```

        android:textSize="20sp"
        android:backgroundTint="#000"
        android:textStyle="bold"
        android:textColor="#ffa500"
        android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

        </Button>
        <Button
            android:id="@+id/bc"
            android:text="DEL"
            android:textSize="20sp"
            android:textStyle="bold"
            android:backgroundTint="#000"
            android:textColor="#ffa500"
            android:layout_weight="1"

        android:layout_width="match_parent"

        android:layout_height="match_parent">

            </Button>
            <Button
                android:id="@+id/bb1"
                android:text="("
                android:textSize="20sp"
                android:backgroundTint="#000"
                android:textStyle="bold"
                android:textColor="#ffa500"
                android:layout_weight="1"

            android:layout_width="match_parent"

            android:layout_height="match_parent">

                </Button>
                <Button
                    android:id="@+id/bb2"
                    android:text=")"
                    android:textSize="20sp"
                    android:backgroundTint="#000"
                    android:textStyle="bold"
                    android:textColor="#ffa500"
                    android:layout_weight="1"

                android:layout_width="match_parent"

```

```

    android:layout_height="match_parent">

        </Button>
        </LinearLayout>
    </LinearLayout>
    <LinearLayout
        android:layout_weight="1"
        android:orientation="horizontal"

    android:layout_width="match_parent"

    android:layout_height="match_parent">
        <LinearLayout
            android:orientation="horizontal"
            android:weightSum="5"

    android:layout_width="match_parent"

    android:layout_height="match_parent">
        <Button
            android:id="@+id/bsin"
            android:text="sin"
            android:textAllCaps="false"
            android:textSize="20sp"
            android:backgroundTint="#000"
            android:textStyle="bold"
            android:textColor="#ffa500"
            android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

        </Button>
        <Button
            android:id="@+id/bcos"
            android:text="cos"
            android:textAllCaps="false"
            android:textSize="20sp"
            android:backgroundTint="#000"
            android:textColor="#ffa500"
            android:textStyle="bold"
            android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

```

```

</Button>
<Button
    android:id="@+id/btan"
    android:text="tan"
    android:textAllCaps="false"
    android:textSize="20sp"
    android:textStyle="bold"
    android:backgroundTint="#000"
    android:textColor="#ffa500"
    android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

    </Button>
    <Button
        android:id="@+id/blog"
        android:text="log"
        android:textAllCaps="false"
        android:textSize="20sp"
        android:backgroundTint="#000"
        android:textStyle="bold"
        android:textColor="#ffa500"
        android:layout_weight="1"

        android:layout_width="match_parent"

        android:layout_height="match_parent">

        </Button>
        <Button
            android:id="@+id/bln"
            android:text="ln"
            android:textAllCaps="false"
            android:textSize="20sp"
            android:backgroundTint="#000"
            android:textStyle="bold"
            android:textColor="#ffa500"
            android:layout_weight="1"

            android:layout_width="match_parent"

            android:layout_height="match_parent">

            </Button>
            </LinearLayout>
        </LinearLayout>
    </LinearLayout>

```

```

        android:layout_weight="1"
        android:orientation="horizontal"

        android:layout_width="match_parent"

        android:layout_height="match_parent">
        <LinearLayout
            android:orientation="horizontal"
            android:weightSum="5"

            android:layout_width="match_parent"

            android:layout_height="match_parent">
            <Button
                android:id="@+id/bfact"
                android:text="x!"
                android:textAllCaps="false"
                android:textSize="20sp"
                android:backgroundTint="#000"
                android:textColor="#ffa500"
                android:textStyle="bold"
                android:layout_weight="1"

                android:layout_width="match_parent"

                android:layout_height="match_parent">

                </Button>
                <Button
                    android:id="@+id/bsquare"
                    android:text="x^2"
                    android:textAllCaps="false"
                    android:textSize="20sp"
                    android:backgroundTint="#000"
                    android:textStyle="bold"
                    android:textColor="#ffa500"
                    android:layout_weight="1"

                    android:layout_width="match_parent"

                    android:layout_height="match_parent">

                    </Button>
                    <Button
                        android:id="@+id/bsqrt"
                        android:text="√"
                        android:textAllCaps="false"
                        android:textSize="20sp"
                        android:backgroundTint="#000"

```



```

        android:textStyle="bold"
        android:textColor="#ffa500"
        android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

        </Button>
        <Button
            android:id="@+id/binv"
            android:text="1/x"
            android:textAllCaps="false"
            android:textSize="20sp"
            android:backgroundTint="#000"
            android:textColor="#ffa500"
            android:textStyle="bold"
            android:layout_weight="1"

        android:layout_width="match_parent"

        android:layout_height="match_parent">

            </Button>
            <Button
                android:id="@+id/bdiv"
                android:text="÷"
                android:textSize="20sp"
                android:backgroundTint="#000"
                android:textColor="#ffa500"
                android:layout_weight="1"
                android:textStyle="bold"

            android:layout_width="match_parent"

            android:layout_height="match_parent">

                </Button>
                </LinearLayout>
            </LinearLayout>
            <LinearLayout
                android:layout_weight="1"
                android:orientation="horizontal"

            android:layout_width="match_parent"

            android:layout_height="match_parent">
                <LinearLayout
                    android:orientation="horizontal"

```

```

        android:weightSum="4"

    android:layout_width="match_parent"

    android:layout_height="match_parent">
        <Button
            android:id="@+id/b7"
            android:text="7"
            android:textSize="25sp"
            android:backgroundTint="#000"
            android:textStyle="bold"
            android:textColor="#fff"
            android:layout_weight="1"

        android:layout_width="match_parent"

        android:layout_height="match_parent">

            </Button>
            <Button
                android:id="@+id/b8"
                android:text="8"
                android:textSize="25sp"
                android:textStyle="bold"
                android:backgroundTint="#000"
                android:textColor="#fff"
                android:layout_weight="1"

            android:layout_width="match_parent"

            android:layout_height="match_parent">

                </Button>
                <Button
                    android:id="@+id/b9"
                    android:text="9"
                    android:textSize="25sp"
                    android:backgroundTint="#000"
                    android:textColor="#fff"
                    android:textStyle="bold"
                    android:layout_weight="1"

                android:layout_width="match_parent"

                android:layout_height="match_parent">

                    </Button>
                    <Button
                        android:id="@+id/bmul"

```

```

        android:text="×"
        android:textSize="20sp"
        android:textStyle="bold"
        android:backgroundTint="#000"
        android:textColor="#ffa500"
        android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

        </Button>
        </LinearLayout>
    </LinearLayout>
    <LinearLayout
        android:layout_weight="1"
        android:orientation="horizontal"

    android:layout_width="match_parent"

    android:layout_height="match_parent">
        <LinearLayout
            android:orientation="horizontal"
            android:weightSum="4"

    android:layout_width="match_parent"

    android:layout_height="match_parent">
        <Button
            android:id="@+id/b4"
            android:text="4"
            android:textSize="25sp"
            android:backgroundTint="#000"
            android:textStyle="bold"
            android:textColor="#fff"
            android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

        </Button>
        <Button
            android:id="@+id/b5"
            android:text="5"
            android:textSize="25sp"
            android:textStyle="bold"
            android:backgroundTint="#000"
            android:textColor="#fff"

```

```

        android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

        </Button>
        <Button
            android:id="@+id/b6"
            android:text="6"
            android:textSize="25sp"
            android:textStyle="bold"
            android:backgroundTint="#000"
            android:textColor="#fff"
            android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

        </Button>
        <Button
            android:id="@+id/bmin"
            android:text="-"
            android:textSize="20sp"
            android:backgroundTint="#000"
            android:textColor="#ffa500"
            android:textStyle="bold"
            android:layout_weight="1"

    android:layout_width="match_parent"

    android:layout_height="match_parent">

        </Button>
        </LinearLayout>
    </LinearLayout>
    <LinearLayout
        android:layout_weight="1"
        android:orientation="horizontal"

    android:layout_width="match_parent"

    android:layout_height="match_parent">
        <LinearLayout
            android:orientation="horizontal"
            android:weightSum="4"

    android:layout_width="match_parent"

```

```
android:layout_height="match_parent">
    <Button
        android:id="@+id/b1"
        android:text="1"
        android:textSize="25sp"
        android:textStyle="bold"
        android:backgroundTint="#000"
        android:textColor="#fff"
        android:layout_weight="1"
```

```
android:layout_width="match_parent"
```

```
android:layout_height="match_parent">
```

```
</Button>
```

```
<Button
```

```
    android:id="@+id/b2"
    android:text="2"
    android:textSize="25sp"
    android:backgroundTint="#000"
    android:textStyle="bold"
    android:textColor="#fff"
    android:layout_weight="1"
```

```
android:layout_width="match_parent"
```

```
android:layout_height="match_parent">
```

```
</Button>
```

```
<Button
```

```
    android:id="@+id/b3"
    android:text="3"
    android:textStyle="bold"
    android:textSize="25sp"
    android:backgroundTint="#000"
    android:textColor="#fff"
    android:layout_weight="1"
```

```
android:layout_width="match_parent"
```

```
android:layout_height="match_parent">
```

```
</Button>
```

```
<Button
```

```
    android:id="@+id/bplus"
    android:text="+"
    android:textSize="20sp"
    android:textStyle="bold"
```

```
    android:backgroundTint="#000"
    android:textColor="#ffa500"
    android:layout_weight="1"
```

```
android:layout_width="match_parent"
```

```
android:layout_height="match_parent">
```

```
</Button>
```

```
</LinearLayout>
```

```
</LinearLayout>
```

```
<LinearLayout
```

```
    android:layout_weight="1"
    android:orientation="horizontal"
```

```
android:layout_width="match_parent"
```

```
android:layout_height="match_parent">
```

```
<LinearLayout
```

```
    android:orientation="horizontal"
    android:weightSum="4"
```

```
android:layout_width="match_parent"
```

```
android:layout_height="match_parent">
```

```
<Button
```

```
    android:id="@+id/bpi"
    android:text="π"
    android:textSize="25sp"
    android:textStyle="bold"
    android:backgroundTint="#000"
    android:textColor="#fff"
    android:layout_weight="1"
```

```
android:layout_width="match_parent"
```

```
android:layout_height="match_parent">
```

```
</Button>
```

```
<Button
```

```
    android:id="@+id/b0"
    android:text="0"
    android:textSize="25sp"
    android:textStyle="bold"
    android:backgroundTint="#000"
    android:textColor="#fff"
    android:layout_weight="1"
```

```
android:layout_width="match_parent"
```

**android:layout\_height="match\_parent">**

```
</Button>
<Button
    android:id="@+id/bdot"
    android:text="."
    android:textSize="25sp"
    android:backgroundTint="#000"
    android:textColor="#fff"
    android:textStyle="bold"
    android:layout_weight="1"
```

**android:layout\_width="match\_parent"**

**android:layout\_height="match\_parent">**

```
</Button>

<Button
    android:id="@+id/bequal"
```

**android:layout\_width="match\_parent"**

**android:layout\_height="match\_parent"**

**android:layout\_weight="1"**

**android:backgroundTint="#ffa500"**  
**android:text=""**

**android:layout\_marginLeft="10dp"**

**android:layout\_marginTop="5dp"**

**android:layout\_marginRight="10dp"**  
**android:textColor="#f000"**  
**android:textSize="40sp"**  
**android:textStyle="bold">**

```
</Button>
</LinearLayout>
</LinearLayout>
</LinearLayout>
</LinearLayout>

</LinearLayout>
```

### 3.2. Program Code (Java)

```
package com.example.myproject;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;
import android.widget.Toast;
public class MainActivity extends AppCompatActivity {
    Button
    b1,b2,b3,b4,b5,b6,b7,b8,b9,b0,bdot,bpi,bequal,bplus,bmin,bmul,bdiv,binv,bsqrt,bsquare,m
    bfact,bln,blog, btan,bcos,bsin,bb1,bb2,bc,bac;
    TextView tvmain,tvsec;
    String pi = "3.14159265";

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

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

```
b1 = findViewById(R.id.b1);  
b2 = findViewById(R.id.b2);  
b3 = findViewById(R.id.b3);  
b4 = findViewById(R.id.b4);  
b5 = findViewById(R.id.b5);  
b6 = findViewById(R.id.b6);  
b7 = findViewById(R.id.b7);  
b8 = findViewById(R.id.b8);  
b9 = findViewById(R.id.b9);  
b0 = findViewById(R.id.b0);  
bpi = findViewById(R.id.bpi);  
bdot = findViewById(R.id.bdot);  
bequal = findViewById(R.id.bequal);  
bplus = findViewById(R.id.bplus);  
bmin = findViewById(R.id.bmin);  
bmul = findViewById(R.id.bmul);  
bdiv = findViewById(R.id.bdiv);  
binv = findViewById(R.id.binv);  
bsqrt = findViewById(R.id.bsqrt);  
bsquare = findViewById(R.id.bsquare);  
bfact = findViewById(R.id.bfact);  
bln = findViewById(R.id.bln);  
blog = findViewById(R.id.blog);  
btan = findViewById(R.id.btan);  
bsin = findViewById(R.id.bsin);  
bcos = findViewById(R.id.bcos);  
bb1 = findViewById(R.id.bb1);  
bb2 = findViewById(R.id.bb2);  
bc = findViewById(R.id.bc);  
bac = findViewById(R.id.bac);
```

```
tvmain = findViewById(R.id.tvmain);  
tvsec = findViewById(R.id.tvsec);
```

```
//onclick listeners
```

```
b1.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        tvmain.setText(tvmain.getText()+"1");  
    }  
})
```

```
});  
b2.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        tvmain.setText(tvmain.getText()+"2");  
    }  
});  
b3.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        tvmain.setText(tvmain.getText()+"3");  
    }  
});  
b4.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        tvmain.setText(tvmain.getText()+"4");  
    }  
});  
b5.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        tvmain.setText(tvmain.getText()+"5");  
    }  
});  
b6.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        tvmain.setText(tvmain.getText()+"6");  
    }  
});  
b7.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        tvmain.setText(tvmain.getText()+"7");  
    }  
});  
b8.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        tvmain.setText(tvmain.getText()+"8");  
    }  
});
```

```

});
b9.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"9");
    }
});
b0.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"0");
    }
});
bdot.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+".");
    }
});
bac.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText("");
        tvsec.setText("");
    }
});
bc.setOnClickListener(new View.OnClickListener() {
    @Override

    public void onClick(View v) {
        try {
            String val = tvmain.getText().toString();
            val = val.substring(0, val.length() - 1);
            tvmain.setText(val);
        }
        catch (Exception e)
        {
            Toast.makeText(MainActivity.this, "Exception", Toast.LENGTH_LONG);
        }
    }

});

```

```

bplus.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"+");
    }
});
bmin.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"-");
    }
});
bmul.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"×");
    }
});
bdiv.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"÷");
    }
});
bsqrt.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        String val = tvmain.getText().toString();
        double r = Math.sqrt(Double.parseDouble(val));
        tvmain.setText(String.valueOf(r));
    }
});
bb1.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"(");
    }
});
bb2.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+")");
    }
});

```



```

    }
});
bpi.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvsec.setText(bpi.getText());
        tvmain.setText(tvmain.getText()+pi);
    }
});
bsin.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"sin");
    }
});
bcos.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"cos");
    }
});
btan.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"tan");
    }
});
binv.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+"^"+"(-1)");
    }
});
bfact.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        int val = Integer.parseInt(tvmain.getText().toString());
        int fact = factorial(val);
        tvmain.setText(String.valueOf(fact));
        tvsec.setText(val+"!");
    }
});

```

```

bsquare.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        double d = Double.parseDouble(tvmain.getText().toString());
        double square = d*d;
        tvmain.setText(String.valueOf(square));
        tvsec.setText(d+ "2");
    }
});
bln.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+ "ln");
    }
});
blog.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        tvmain.setText(tvmain.getText()+ "log");
    }
});
bequal.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        String val = tvmain.getText().toString();
        String replacedstr = val.replace('÷', '/').replace('×', '*');
        double result = eval(replacedstr);
        tvmain.setText(String.valueOf(result));
        tvsec.setText(val);
    }
});
}

//factorial function
int factorial(int n)
{
    return (n==1 || n==0) ? 1 : n*factorial(n-1);
}

//eval function

```

```

public static double eval(final String str) {
    return new Object() {
        int pos = -1, ch;

        void nextChar() {
            ch = (++pos < str.length()) ? str.charAt(pos) : -1;
        }

        boolean eat(int charToEat) {
            while (ch == ' ') nextChar();
            if (ch == charToEat) {
                nextChar();
                return true;
            }
            return false;
        }

        double parse() {
            nextChar();
            double x = parseExpression();
            if (pos < str.length()) throw new RuntimeException("Unexpected: " + (char)ch);
            return x;
        }

        double parseExpression() {
            try{
                double x = parseTerm();
                for (;;) {
                    if      (eat('+')) x += parseTerm(); // addition
                    else if (eat('-')) x -= parseTerm(); // subtraction
                    else return x;
                }
            } catch (Exception e) {
            }

            return 0;
        }

        double parseTerm() {
            double x = parseFactor();
            for (;;) {
                if      (eat('*')) x *= parseFactor(); // multiplication

```

```

        else if (eat('/')) x /= parseFactor(); // division
        else return x;
    }
}

double parseFactor() {
    if (eat('+')) return parseFactor(); // unary plus
    if (eat('-')) return -parseFactor(); // unary minus

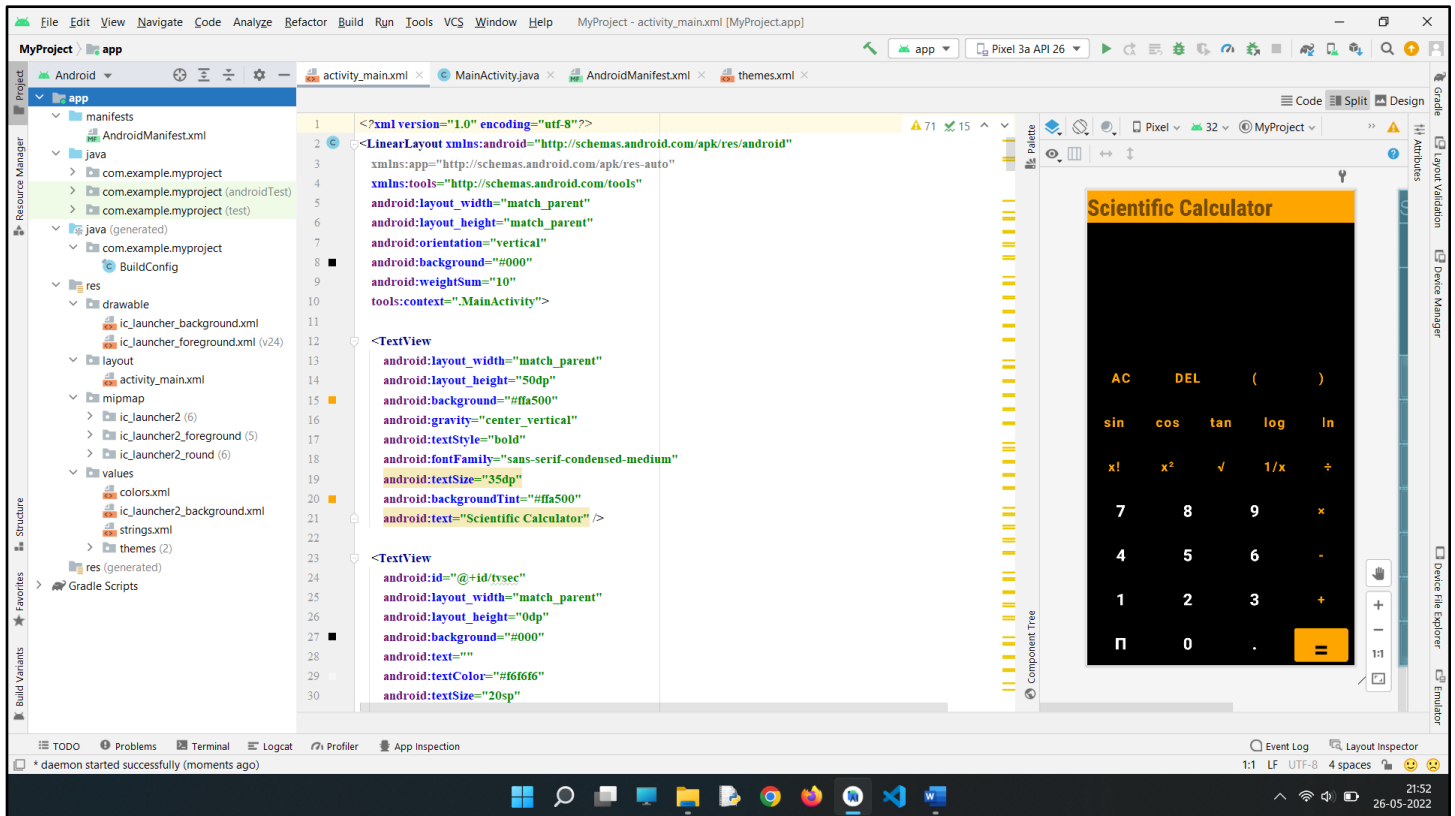
    double x;
    int startPos = this.pos;
    if (eat('(')) { // parentheses
        x = parseExpression();
        eat(')');
    } else if ((ch >= '0' && ch <= '9') || ch == '.') { // numbers
        while ((ch >= '0' && ch <= '9') || ch == '.') nextChar();
        x = Double.parseDouble(str.substring(startPos, this.pos));
    } else if (ch >= 'a' && ch <= 'z') { // functions
        while (ch >= 'a' && ch <= 'z') nextChar();
        String func = str.substring(startPos, this.pos);
        x = parseFactor();
        if (func.equals("sqrt")) x = Math.sqrt(x);
        else if (func.equals("sin")) x = Math.sin(Math.toRadians(x));
        else if (func.equals("cos")) x = Math.cos(Math.toRadians(x));
        else if (func.equals("tan")) x = Math.tan(Math.toRadians(x));
        else if (func.equals("log")) x = Math.log10(x);
        else if (func.equals("ln")) x = Math.log(x);
        else throw new RuntimeException("Unknown function: " + func);
    } else {
        throw new RuntimeException("Unexpected: " + (char)ch);
    }

    if (eat('^')) x = Math.pow(x, parseFactor()); // exponentiation

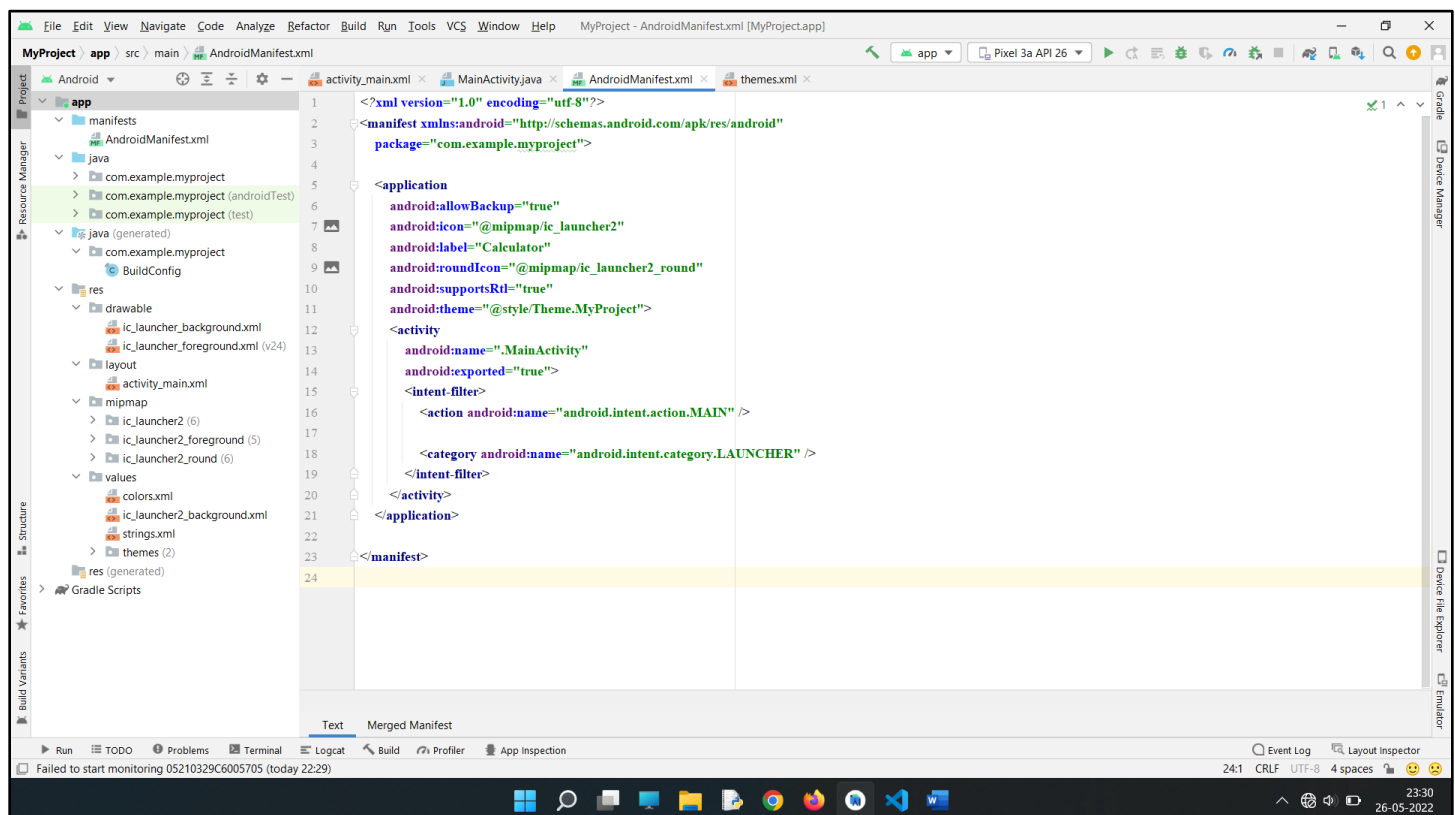
    return x;
}
}.parse();
}
}

```

## • Screenshot from Android Studio

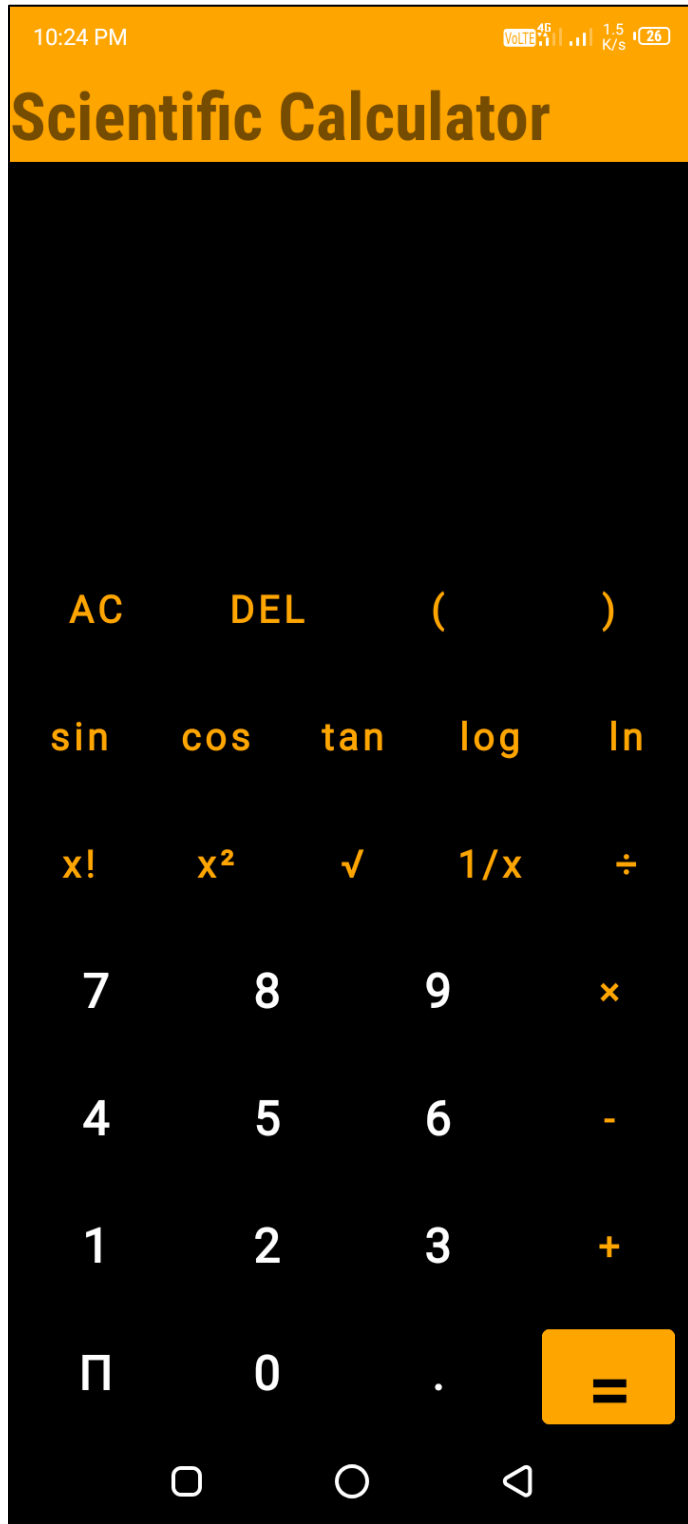


## • Screenshot from Android Studio (AndroidManifest.xml file)

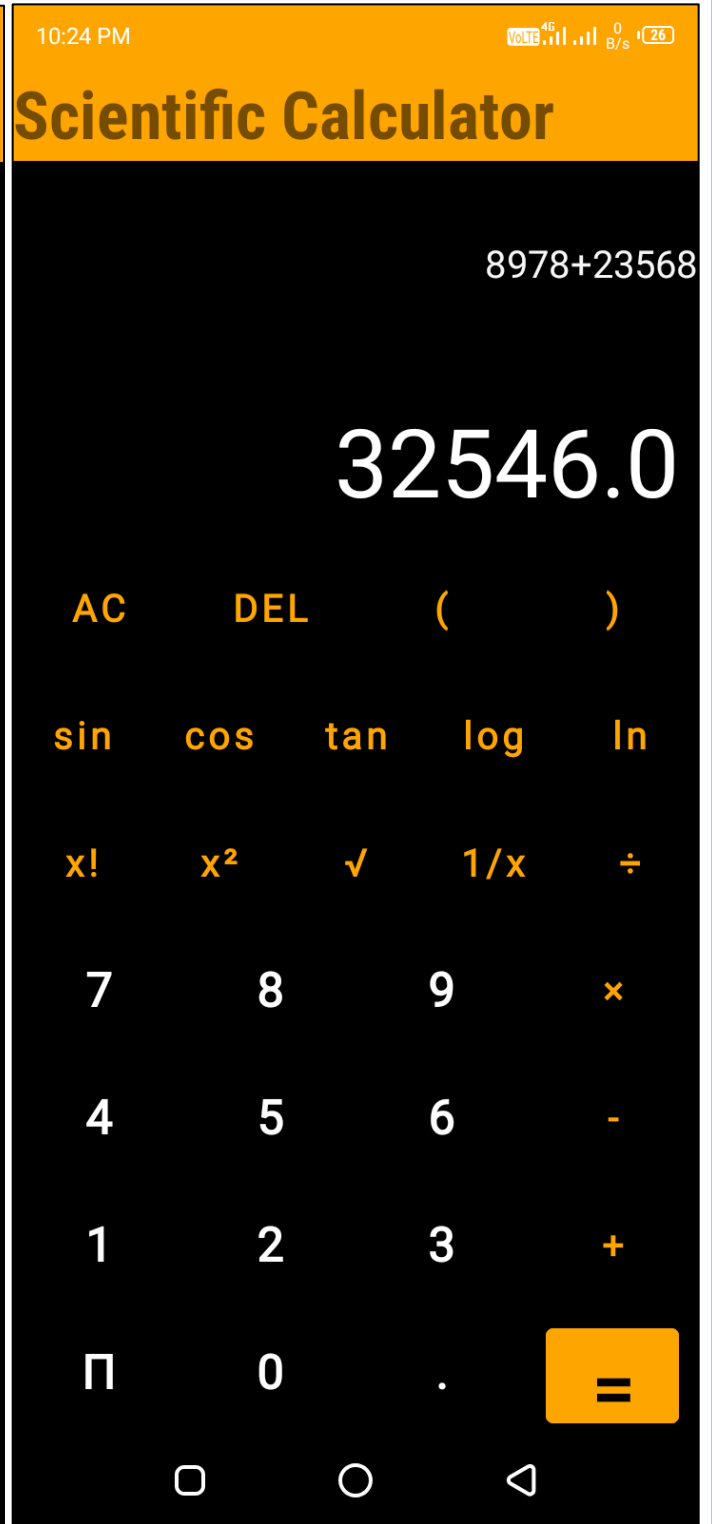


## 4.0 Outputs of the Micro-Projects

Start Screen

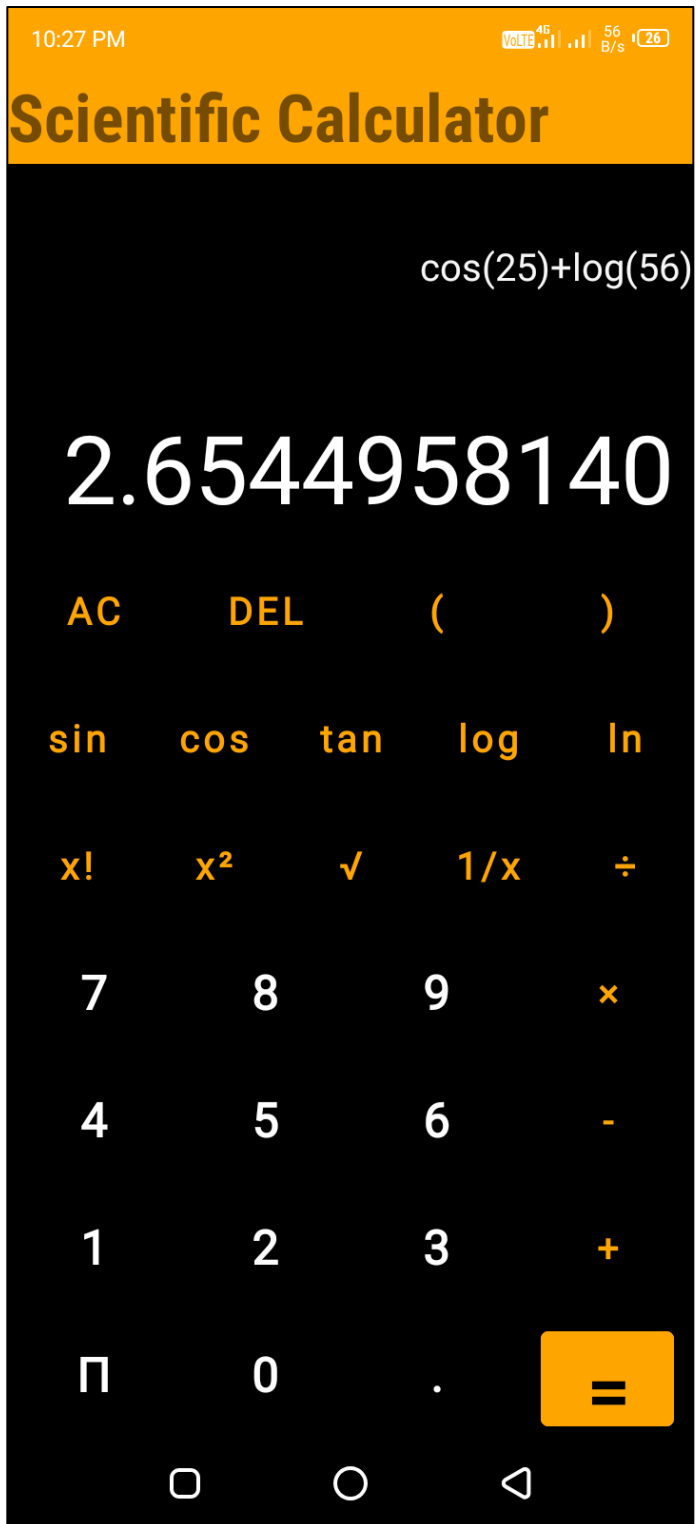


Addition Operation

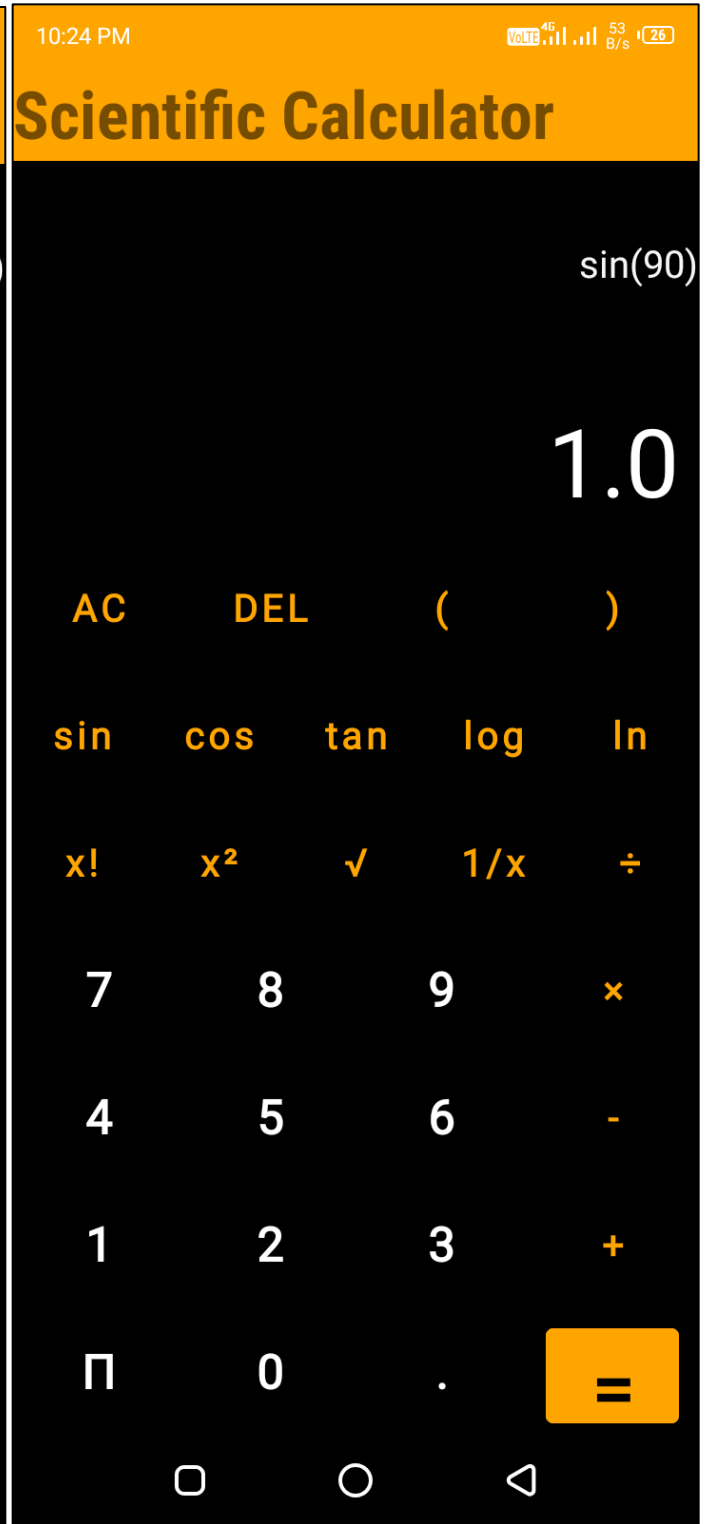


## Outputs of the Micro-Projects

### Scientific Operation

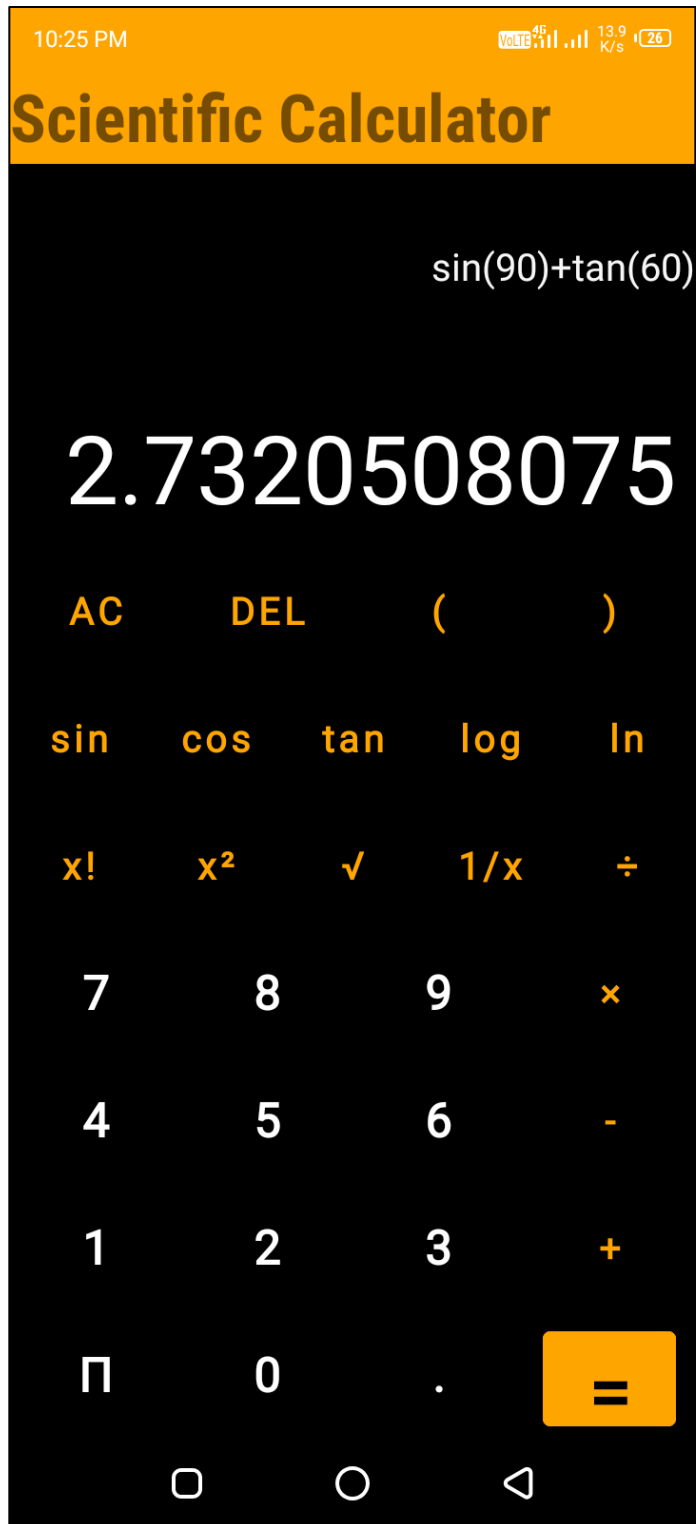


### Scientific Operation

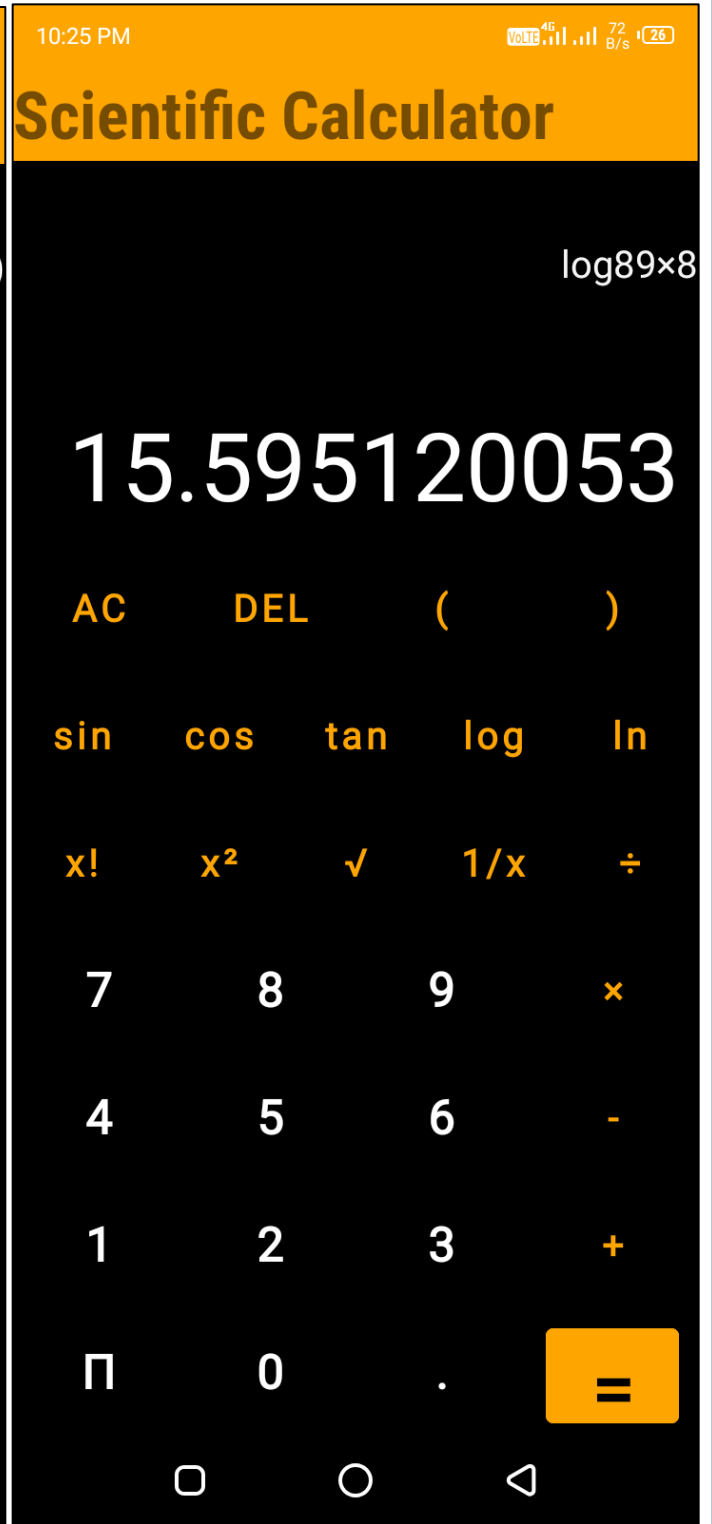


## Outputs of the Micro-Projects

Scientific Operation



Scientific Operation





## 5.0 Actual Resources Used

| Sr. No. | Name of Resource | Specification  | Quantity |
|---------|------------------|--|----------|
| 1.      | Computer System  | Intel Core-i3 10 <sup>th</sup> gen with 4GB RAM, 512GB SSD | 01       |
| 2.      | Operating System | Windows 11   | 01       |
| 3.      | Software         | Android System, MS Word                                    | 01       |
| 4.      | Book             | Mobile Application Development using Android               | 01       |
| 5.      | Internet         | Different Study Websites                                   | 01       |

## 8.0 Skill Developed / Learning Outcome of the Micro-Project

- After completion of this microproject now I am able to create my own Android applications for different purposes.
- I have seen some improvements in myself after implementing this project that are creating Android applications.
- This project helped me in preparation semester exams.
- This project helped me to understand Different UI Components in Android.
- I have studied the proper use of `onClickListener()` method for handling the events on the buttons.

## 9.0 Applications of the Micro-Project

- This microproject is as similar to a real Scientific Calculator.
- This microproject perform same operations as a real world Calsi Device.
- This Android Application can perform following tasks:-
  - i. All arithmetic operations.
  - ii. Scientific operations such as, square root,  $1^x$ , sin, cos, tan, log, In
  - iii. All mathematical operations that real Calsi perform.

## 8. Conclusion

After successful completion of this microproject entitled “Scientific Calculator in Android” I conclude that Now I am able to create a proper working android application. In this microproject we have developed a Scientific Calculator which can be used as a real-world Calculator.

At this time of conclusion, I Thank all those we have helped me in the successful completion of this project. All those who have helped me during this project completion are mentioned in references section. Thank you all!

## 9. References

### 1. Books:

- i. Android – Dixit, Prasanna Kumar
- ii. Pro Android 5 – Maclean David, Komatineni Satya
- iii. Android Programming for beginners.

### 2. MSBTE Lab Manual: MAD (22617)

### 3. Mobile Application Development using Android subject Teacher: Prof. A. B. Gaikwad sir

### 4. Android Video Tutorials form YouTube

### 5. Resources from Internet:

- a. <https://www.tutorialspoint.com/android/index.htm>
- b. <https://www.javatpoint.com/android-tutorial>
- c. <https://developer.android.com/training/basics/firstapp>
- d. <https://www.geeksforgeeks.org/android-tutorial/>
- e. <https://www.udemy.com/course/learn-android-application-development-y/>
- f. <https://www.vogella.com/tutorials/android.html>
- g. <https://www.youtube.com/watch?v=fis26HvvDII>
- h. <https://www.youtube.com/watch?v=mXjZQX3UzOs>
- i. <https://www.youtube.com/watch?v=ZLNO2c7nqjw>
- j. <https://www.youtube.com/watch?v=EknEIzswvC0>
- k. <https://www.edureka.co/blog/android-tutorial/>

**Thank You**