



**Mobile Application Development
SOFE 4640U**

Report for Mortgage EMI Calculator App

Student Name: Hemshikha Sultoo

Student Id: 100670616

Objective

The objective of this assignment is to gain hands-on experience in creating an app by working with Android Layouts, Views and Intents. The app is a Mortgage EMI calculator app that will allow users to calculate their equated monthly installments using 3 pieces of information:

- 1) The principal amount - the amount of money loaned.
- 2) The annual interest - the interest rate paid over a span of 12 months.
- 3) The tenure period - the term over which the user will have to complete the mortgage payment.

Software used for implementation: Android Studio

Android Version: Lollipop, 5.0

Project file submission: GitHub

Link to GitHub Repository

<https://github.com/hsultoo/WebAppDev---Assignment1>

Code and Layout Review

1) Main_Activity.java

```
package com.example.emicalculator;

import android.os.Bundle;

import com.google.android.material.snackbar.Snackbar;

import androidx.appcompat.app.AppCompatActivity;

import android.view.View;

import androidx.navigation.NavController;
import androidx.navigation.Navigation;
import androidx.navigation.ui.AppBarConfiguration;
import androidx.navigation.ui.NavigationUI;

import com.example.emicalculator.databinding.ActivityMainBinding;

import android.view.Menu;
import android.view.MenuItem;
```

```

public class MainActivity extends AppCompatActivity {

    private AppBarConfiguration appBarConfiguration;
    private ActivityMainBinding binding;

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

        binding = ActivityMainBinding.inflate(getLayoutInflater());
        setContentView(binding.getRoot());

        setSupportActionBar(binding.toolbar);

        NavController navController = Navigation.findNavController(this,
R.id.nav_host_fragment_content_main);
        appBarConfiguration = new
AppBarConfiguration.Builder(navController.getGraph()).build();
        NavigationUI.setupActionBarWithNavController(this, navController,
appBarConfiguration);

        /*binding.fab.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Snackbar.make(view, "Replace with your own action",
Snackbar.LENGTH_LONG)
                    .setAction("Action", null).show();
            }
        });*/
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        // Inflate the menu; this adds items to the action bar if it is present.
        getMenuInflater().inflate(R.menu.menu_main, menu);
        return true;
    }

    @Override
    public boolean onOptionsItemSelected(MenuItem item) {

```

```

        // Handle action bar item clicks here. The action bar will
        // automatically handle clicks on the Home/Up button, so long
        // as you specify a parent activity in AndroidManifest.xml.
        int id = item.getItemId();

        //noinspection SimplifiableIfStatement
        if (id == R.id.action_settings) {
            return true;
        }

        return super.onOptionsItemSelected(item);
    }

    @Override
    public boolean onSupportNavigateUp() {
        NavController navController = Navigation.findNavController(this,
            R.id.nav_host_fragment_content_main);
        return NavigationUI.navigateUp(navController, appBarConfiguration)
            || super.onSupportNavigateUp();
    }
}

```

2) FirstFragment.java

This java file contains all the activities, events and intents used to make the app functional. Fragment_first.xml is the XML for this java file. TextView objects have been used to user input for the 3 main parameters. The button name “Calculate my EMI” is used to calculate the EMI. The results are displayed in the end. The code is well commented for the readers.

```

package com.example.emicalculator;

import android.content.Intent;
import android.os.Bundle;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;

```

```

import android.widget.Button;
import android.widget.TextView;

import androidx.annotation.NonNull;
import androidx.fragment.app.Fragment;
import androidx.navigation.fragment.NavHostFragment;

import com.example.emicalculator.databinding.FragmentFirstBinding;

import java.security.Principal;

public class FirstFragment extends Fragment {

    private FragmentFirstBinding binding;

    @Override
    public View onCreateView(
        LayoutInflater inflater, ViewGroup container,
        Bundle savedInstanceState

    ) {

        binding = FragmentFirstBinding.inflate(inflater, container, false);
        return binding.getRoot();

    }

    public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {
        super.onViewCreated(view, savedInstanceState);

        //refer to the button that will calculate the EMI and set an OnClickListener.
        view.findViewById(R.id.calculate).setOnClickListener(new
        View.OnClickListener() {
            @Override
            public void onClick(View view) {

                //call the function that will perform the calculaion when the button is
                pressed
                calculateEMI(view);
            }
        });
    }
}

```

```
    }  
    });  
}
```

```
//define methos that will perform the calculation when the button is pressed  
public void calculateEMI(View view){
```

```
    //access the user input for principal, convert to string and parse to double  
    datatype for calculation
```

```
    TextView Principal = (TextView) getView().findViewById(R.id.principalNum);  
    String principal = Principal.getText().toString();  
    double P = Double.parseDouble(principal);
```

```
    //access the user input for the annual interest in %, convert to string and parse  
    to double datatype for calculation
```

```
    TextView Interest = (TextView) getView().findViewById(R.id.interestNum);  
    String interest = Interest.getText().toString();  
    double I = Double.parseDouble(interest);
```

```
    //access the user input for the duration or term in years, convert to string and  
    parse to double datatype for calculation
```

```
    TextView Tenure = (TextView) getView().findViewById(R.id.tenureNum);  
    String tenure = Tenure.getText().toString();  
    double T = Double.parseDouble(tenure);
```

```
    //number of months in a year  
    int n = 12;
```

```
    //interest as a fraction  
    double inter = I/100;
```

```
    //compute the complicated power calculation  
    double powerCalc = Math.pow((1+(inter/n)), (n*T));
```

```
    //substitute the power calculation in the mortgage EMI equation (from  
    https://www.thebalance.com/calculate-mortgage-315668)
```

```
    double emi = (P*(inter/n)*powerCalc) / (powerCalc-1);
```

//access the view where the output will be displayed and use setText to allow display.

```
    TextView EMIval = (TextView) getView().findViewById(R.id.emiVal);
    EMIval.setText("$" + String.valueOf(emi));
}

@Override
public void onDestroyView() {
    super.onDestroyView();
    binding = null;
}
}
```

3) fragment_first.xml

Below is the XML for the Java file.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
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:background="#D3FAFF"
tools:context=".FirstFragment">

<Button
    android:id="@+id/calculate"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:backgroundTint="#167E74"
    android:fontFamily="sans-serif-black"
    android:text="@string/calculateemibutton"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
```

```
app:layout_constraintHorizontal_bias="0.497"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/tenureNum"
app:layout_constraintVertical_bias="0.175" />
```

```
<TextView
    android:id="@+id/instruct"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="40dp"
    android:fontFamily="sans-serif-black"
    android:text="Fill out the following information to calculate your EMI."
    android:textAlignment="center"
    android:textAppearance="@style/TextAppearance.AppCompat.Body2"
    android:textColor="#000000"
    android:textSize="20sp"
    app:layout_constraintTop_toTopOf="parent"
    tools:layout_editor_absoluteX="0dp" />
```

```
<TextView
    android:id="@+id/principalTxt"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="28dp"
    android:fontFamily="sans-serif-black"
    android:text="Principal Amount"
    android:textAppearance="@style/TextAppearance.AppCompat.Body2"
    android:textColor="#000000"
    android:textSize="20sp"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/instruct" />
```

```
<TextView
    android:id="@+id/interestTxt"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="124dp"
    android:layout_marginTop="32dp"
    android:layout_marginEnd="124dp"
```



```
android:fontFamily="sans-serif-black"
android:text="Annual Interest"
android:textAppearance="@style/TextAppearance.AppCompat.Body2"
android:textColor="#000000"
android:textSize="20sp"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintHorizontal_bias="0.478"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/principalNum" />
```

<TextView

```
android:id="@+id/tenureTxt"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginStart="124dp"
android:layout_marginTop="32dp"
android:layout_marginEnd="124dp"
android:fontFamily="sans-serif-black"
android:text="Tenure"
android:textAppearance="@style/TextAppearance.AppCompat.Body2"
android:textColor="#000000"
android:textSize="20sp"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintHorizontal_bias="0.494"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/interestNum" />
```

<EditText

```
android:id="@+id/principalNum"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_marginTop="12dp"
android:ems="10"
android:fontFamily="sans-serif-black"
android:hint="Enter principal amount"
android:inputType="number"
android:textAlignment="center"
android:textAppearance="@style/TextAppearance.AppCompat.Body2"
android:textColor="#000000"
app:layout_constraintEnd_toEndOf="parent"
```

```
app:layout_constraintHorizontal_bias="0.502"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toBottomOf="@+id/principalTxt" />
```

```
<EditText
    android:id="@+id/interestNum"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="124dp"
    android:layout_marginTop="12dp"
    android:layout_marginEnd="124dp"
    android:ems="10"
    android:fontFamily="sans-serif-black"
    android:hint="Enter interest in %"
    android:inputType="number"
    android:textAlignment="center"
    android:textAppearance="@style/TextAppearance.AppCompat.Body2"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="1.0"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/interestTxt" />
```

```
<EditText
    android:id="@+id/tenureNum"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="124dp"
    android:layout_marginTop="12dp"
    android:layout_marginEnd="124dp"
    android:ems="10"
    android:fontFamily="sans-serif-black"
    android:hint="Enter no. of years"
    android:inputType="number"
    android:textAlignment="center"
    android:textAppearance="@style/TextAppearance.AppCompat.Body2"
    android:textColor="#000000"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="1.0"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/tenureTxt" />
```

```
<TextView
    android:id="@+id/textView4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="84dp"
    android:layout_marginTop="36dp"
    android:fontFamily="sans-serif-black"
    android:text="Your EMI:"
    android:textColor="#000000"
    android:textSize="20sp"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/calculate" />
```

```
<TextView
    android:id="@+id/emiVal"
    android:layout_width="136dp"
    android:layout_height="25dp"
    android:layout_marginStart="136dp"
    android:layout_marginTop="36dp"
    android:layout_marginEnd="84dp"
    android:fontFamily="sans-serif-black"
    android:textAppearance="@style/TextAppearance.AppCompat.Body2"
    android:textColor="#050505"
    android:textSize="20sp"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.929"
    app:layout_constraintStart_toEndOf="@+id/textView4"
    app:layout_constraintTop_toBottomOf="@+id/calculate" />
```

```
</androidx.constraintlayout.widget.ConstraintLayout>
```

Test Screenshots

The following shows that the App is functioning correctly.

Principal = 100000

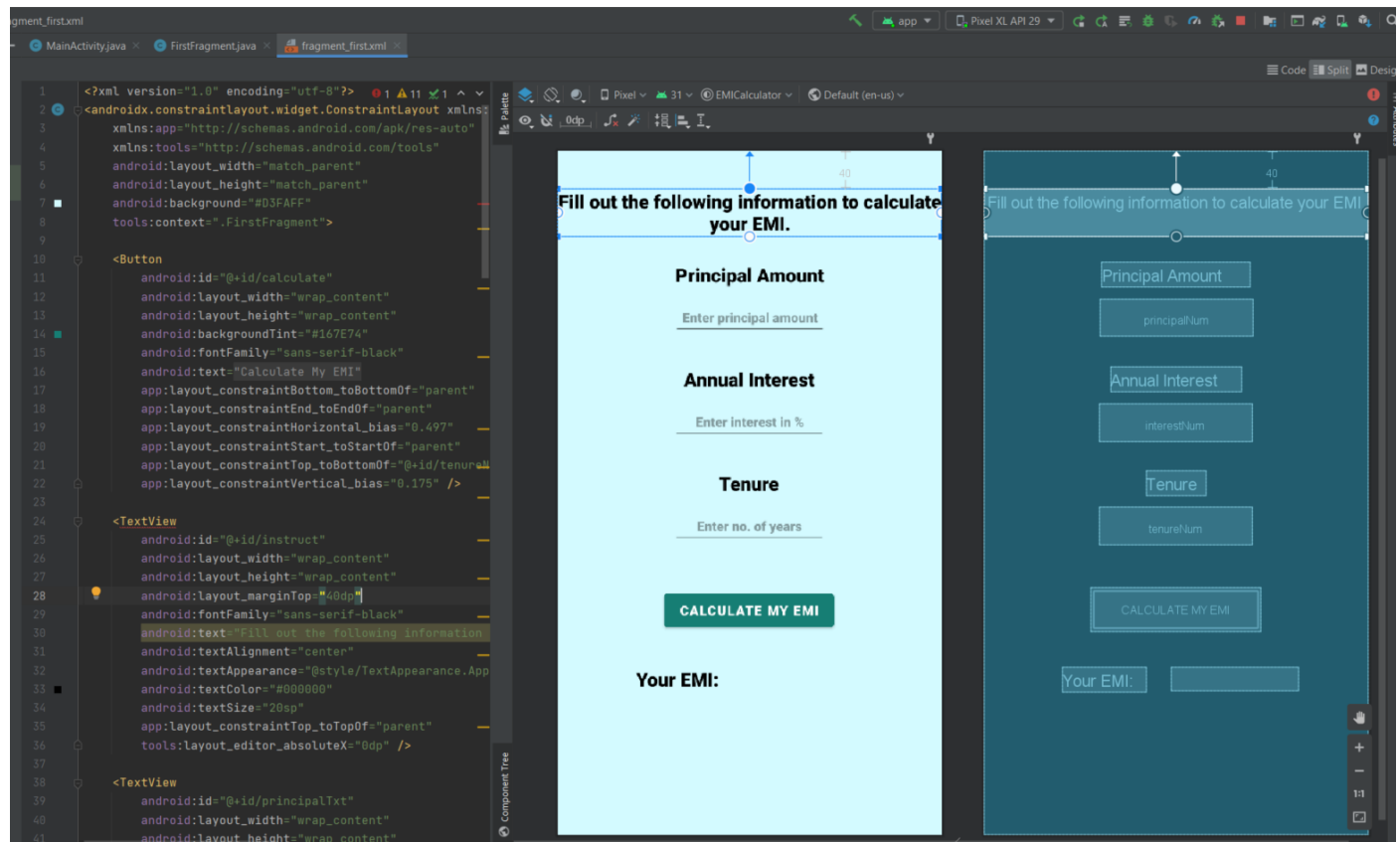
Interest = 6

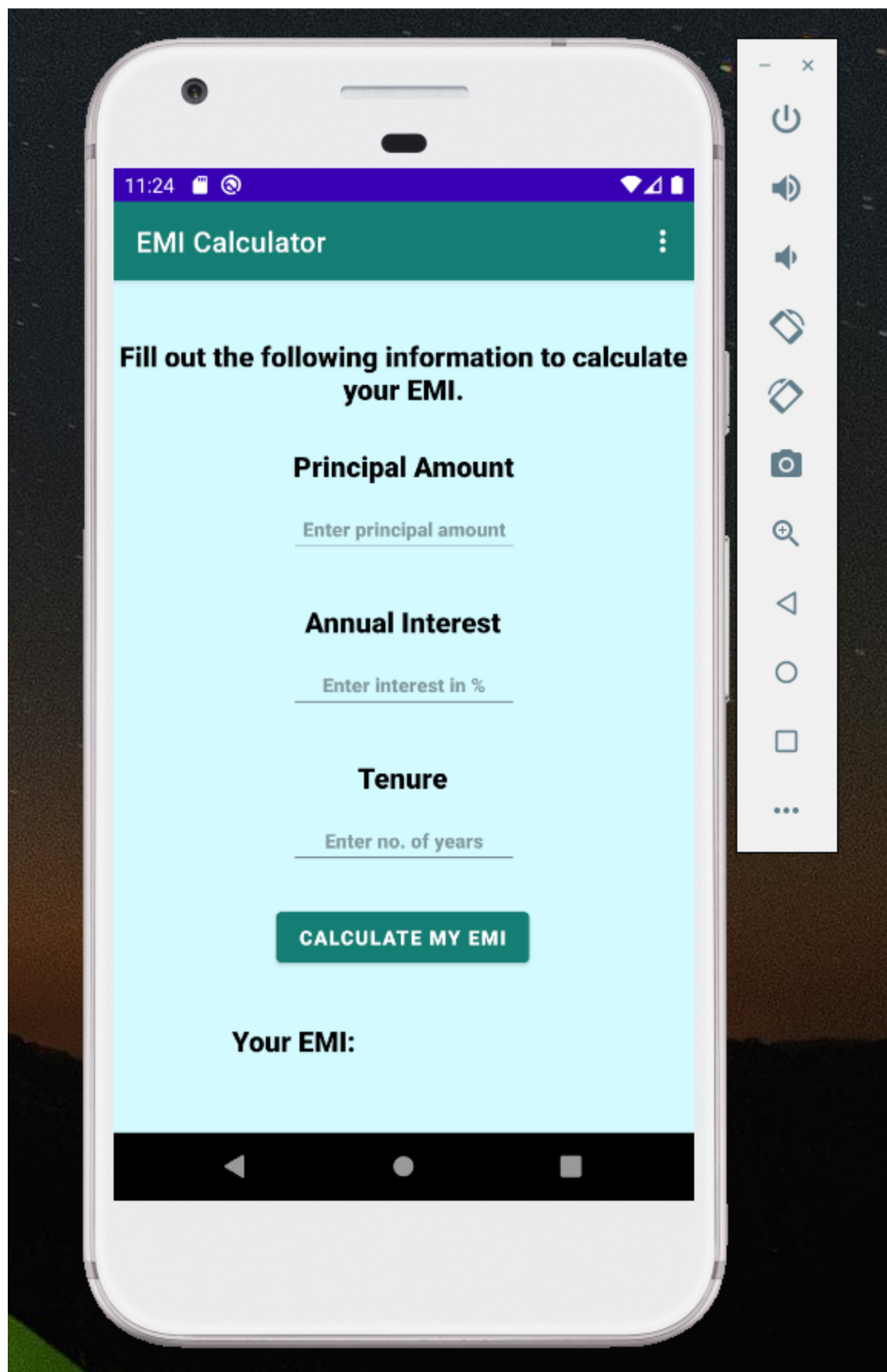
Tenure = 30

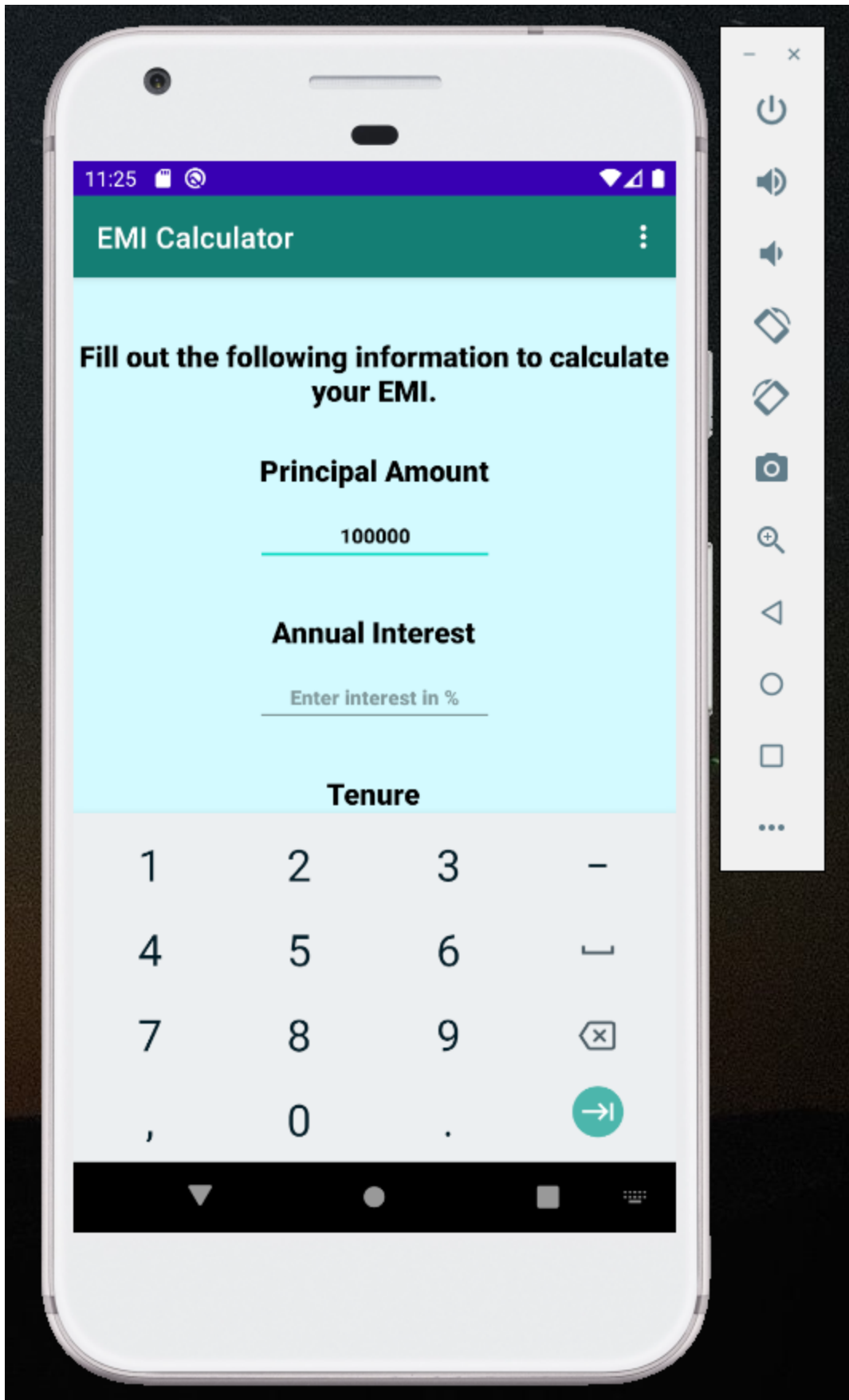
Formula:

$$\text{EMI} = [P * (\text{inter}/n) * ((1 + (\text{inter}/n))^{(n * T)})] / [((1 + (\text{inter}/n))^{(n * T)}) - 1]$$

[1]







11:25

EMI Calculator

Fill out the following information to calculate your EMI.

Principal Amount

100000

Annual Interest

Enter interest in %

Tenure

1

2

3

-

4

5

6

⌋

7

8

9

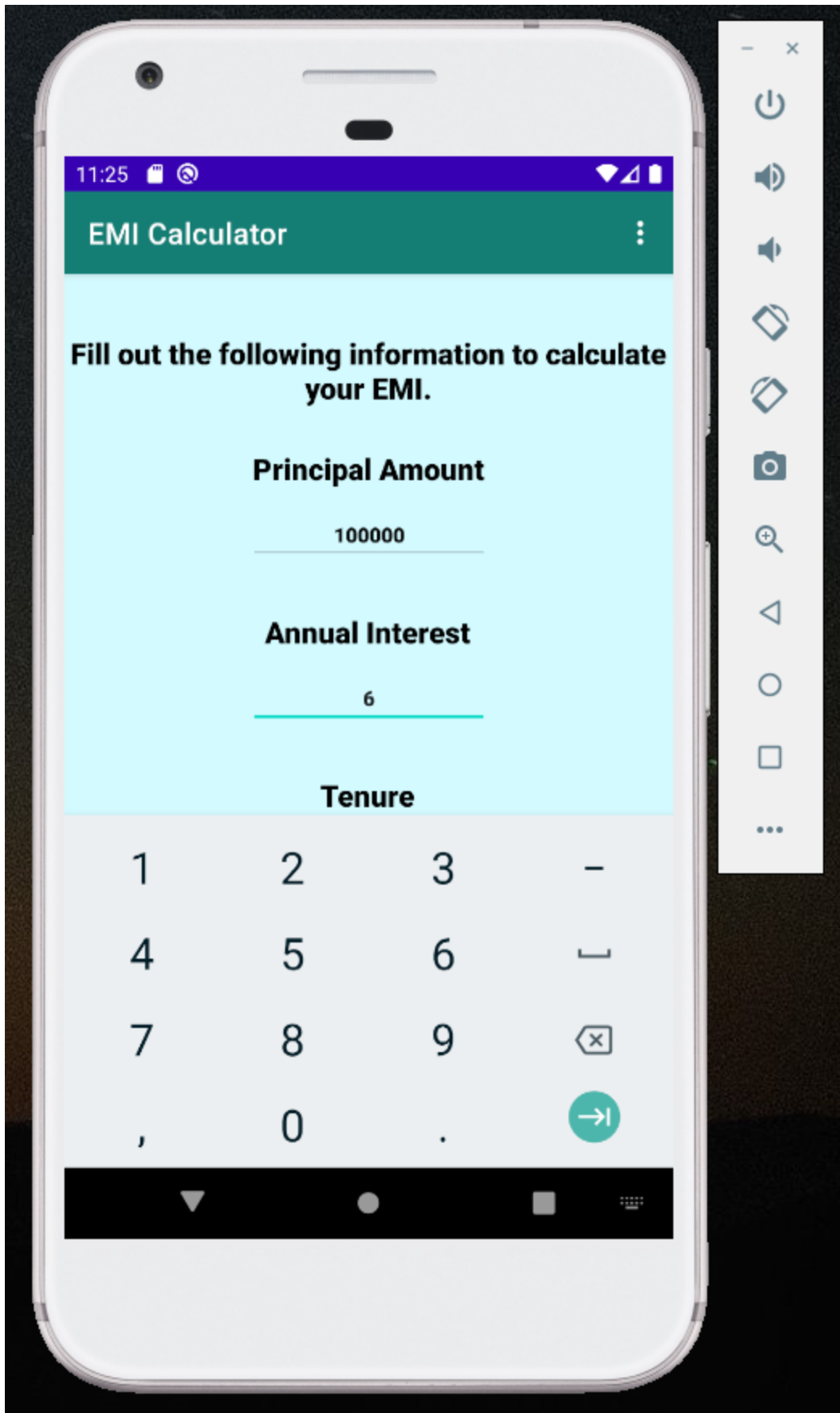
⌫

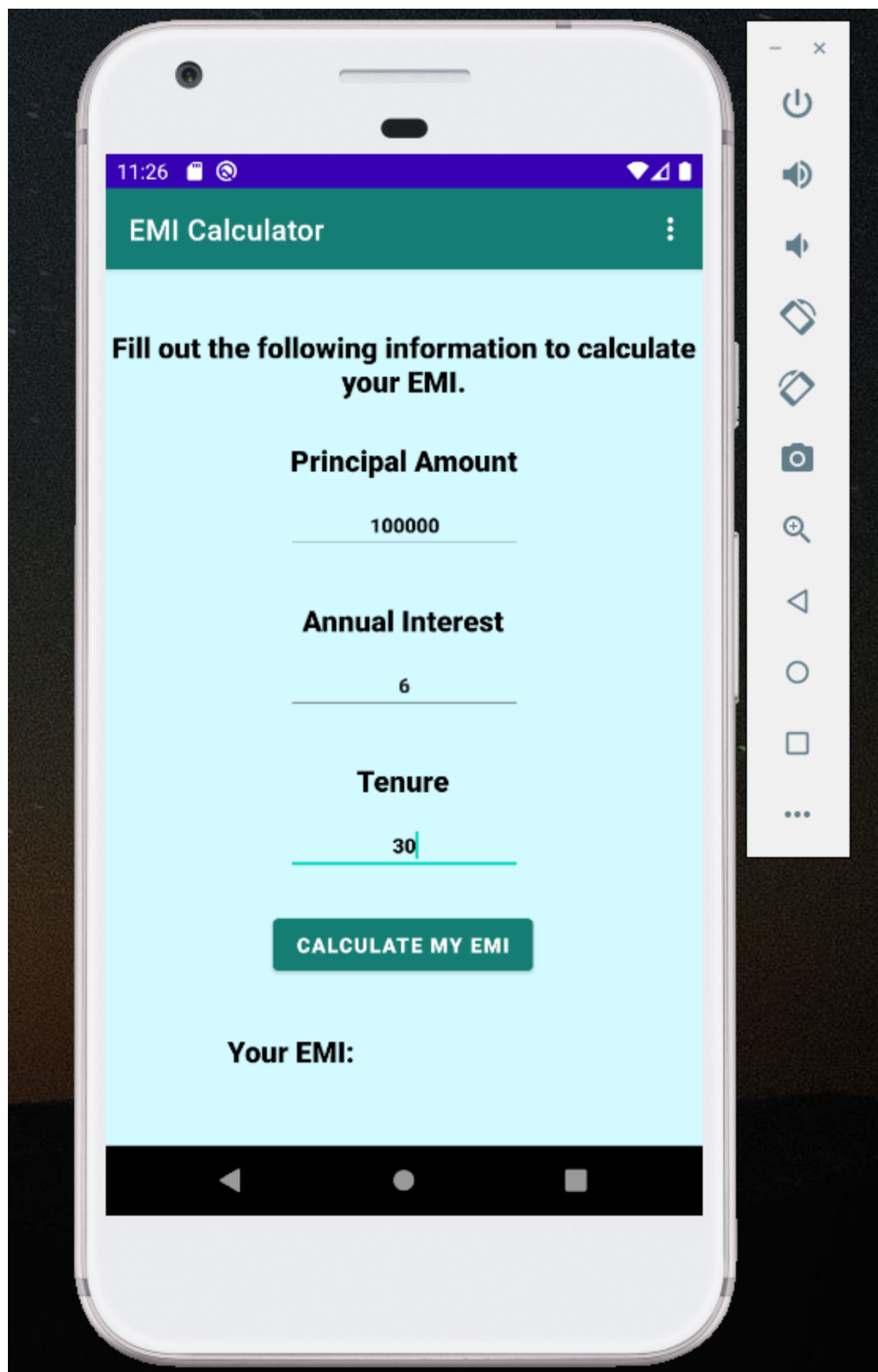
,

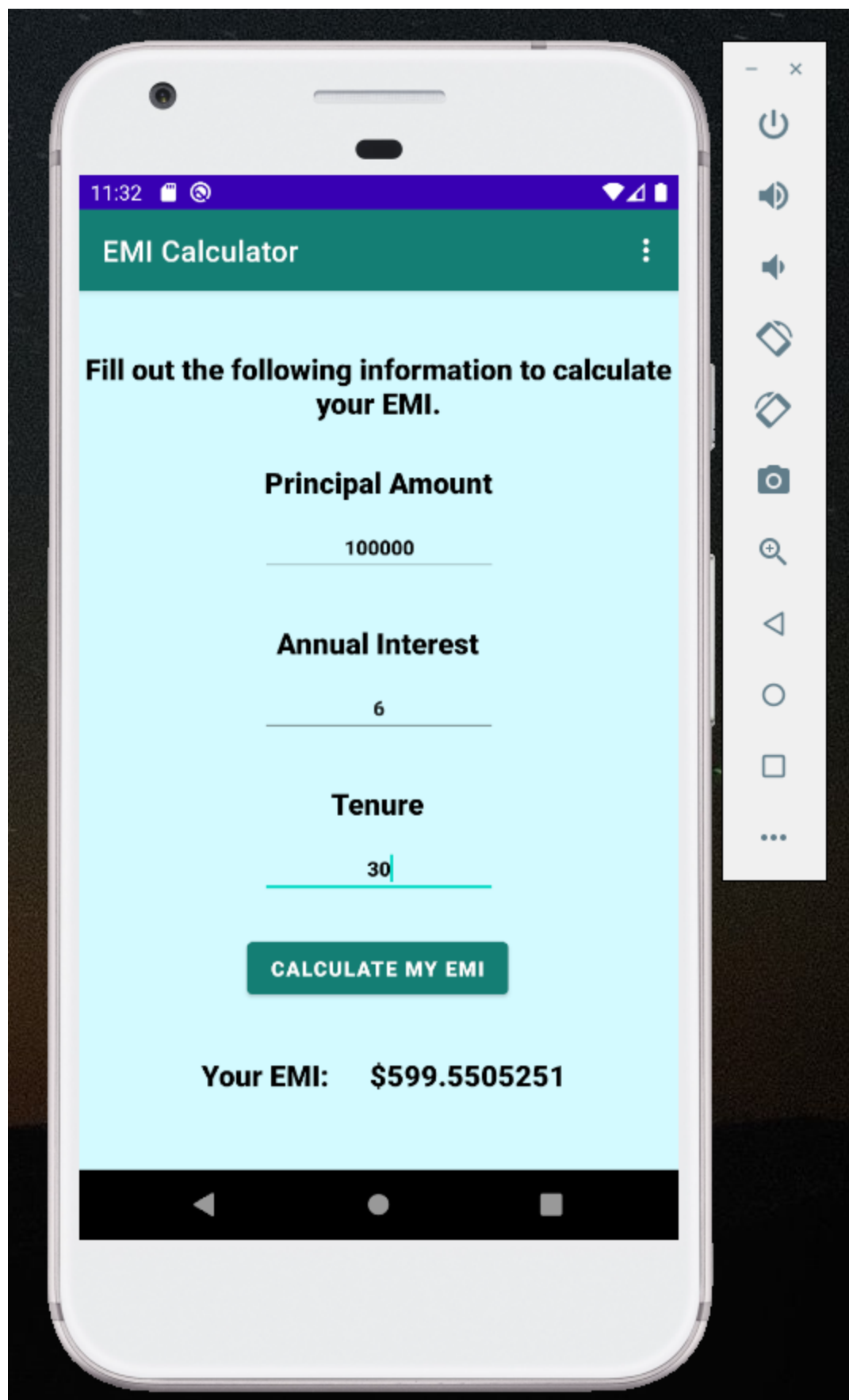
0

.

→







References

[1]J. PRITCHARD, "How To Calculate Mortgage Payments Before You Buy or Refinance", *The Balance*, 2021. [Online]. Available: <https://www.thebalance.com/calculate-mortgage-315668>. [Accessed: 17- Oct- 2021].