

Lab 3

Introduction to Android Development

1. Simple Calculator

MainActivity.java

```
package com.example.simplecalculator;

import android.app.Activity;
import android.os.Bundle;
import android.text.TextUtils;
import android.view.View;
import android.widget.EditText;
import android.widget.ImageButton;
import android.widget.TextView;

public class MainActivity extends Activity implements
View.OnClickListener{
    EditText t1;
    EditText t2;
    ImageButton plus;
    ImageButton minus;
    ImageButton multiply;
    ImageButton divide;
    TextView displayResult;
    String oper = "";

    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        // find the EditText elements (defined in
res/layout/activity_main.xml
        t1 = (EditText) findViewById(R.id.t1);
```

```

        t2 = (EditText) findViewById(R.id.t2);
        plus = (ImageButton) findViewById(R.id.plus);
        minus = (ImageButton) findViewById(R.id.minus);
        multiply = (ImageButton) findViewById(R.id.multiply);
        divide = (ImageButton) findViewById(R.id.divide);
        displayResult = (TextView) findViewById(R.id.displayResult);
        // set listeners
        plus.setOnClickListener( this );
        minus.setOnClickListener( this );
        multiply.setOnClickListener( this );
        divide.setOnClickListener( this );
    }

    // @Override
    public void onClick( View view ) {
        double num1 = 0;
        double num2 = 0;
        double result = 0;
        // check if the fields are empty
        if (TextUtils.isEmpty(t1.getText().toString())
            || TextUtils.isEmpty(t2.getText().toString())) {
            return;
        }
        // read EditText and fill variables with numbers
        num1 = Float.parseFloat(t1.getText().toString());
        num2 = Float.parseFloat(t2.getText().toString());
        // perform operations
        // save operator in oper for later use
        switch ( view.getId() ) {
            case R.id.plus:
                oper = "+";
                result = num1 + num2;
                break;
            case R.id.minus:
                oper = "-";
                result = num1 - num2;
                break;
            case R.id.multiply:

```

```

        oper = "*";
        result = num1 * num2;
        break;
    case R.id.divide:
        oper = "/";
        result = num1 / num2;
        break;
    default:
        break;
    }
    // form the output line
    displayResult.setText(num1 + " " + oper + " " + num2 + " = " +
result);
    }
}

```

activity_main.xml

```

<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent">
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/linearLayout1"
        android:layout_marginLeft="12pt"
        android:layout_marginRight="12pt"
        android:layout_marginTop="4pt">
        <EditText
            android:layout_weight="1"
            android:layout_height="wrap_content"
            android:layout_marginEnd="6pt"
            android:id="@+id/t1"
            android:layout_width="match_parent"

```

```

        android:inputType="numberDecimal">
    </EditText>
    <EditText
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:layout_marginStart="6pt"
        android:id="@+id/t2"
        android:layout_width="match_parent"
        android:inputType="numberDecimal">
    </EditText>
</LinearLayout>
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:id="@+id/linearLayout2"
    android:layout_marginTop="0dp"
    android:layout_marginStart="2dp"
    android:layout_marginEnd="5dp">
    <ImageButton
        android:layout_height="match_parent"
        android:layout_width="0dp"
        android:layout_weight="1"
        android:src="@drawable/plus"
        android:textSize="10pt"
        android:id="@+id/plus"
        android:padding="20dp"
        android:scaleType="fitCenter"
        android:adjustViewBounds="true">
    </ImageButton>
    <ImageButton
        android:layout_height="match_parent"
        android:layout_width="0dp"
        android:layout_weight="1"
        android:src="@drawable/minus"
        android:textSize="10pt"
        android:id="@+id/minus"
        android:padding="20dp"

```

```

        android:scaleType="fitCenter"
        android:adjustViewBounds="true">
    </ImageButton>
</LinearLayout>
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:id="@+id/linearLayout3"
    android:layout_marginTop="0dp"
    android:layout_marginStart="2dp"
    android:layout_marginEnd="5dp">
    <ImageButton
        android:layout_height="match_parent"
        android:layout_width="0dp"
        android:layout_weight="1"
        android:src="@drawable/times"
        android:textSize="10pt"
        android:id="@+id/multiply"
        android:padding="20dp"
        android:scaleType="fitCenter"
        android:adjustViewBounds="true">
    </ImageButton>
    <ImageButton
        android:layout_height="match_parent"
        android:layout_width="0dp"
        android:layout_weight="1"
        android:src="@drawable/divide"
        android:textSize="10pt"
        android:id="@+id/divide"
        android:padding="20dp"
        android:scaleType="fitCenter"
        android:adjustViewBounds="true">
    </ImageButton>
</LinearLayout>
<TextView
    android:layout_height="wrap_content"
    android:layout_width="match_parent"

```

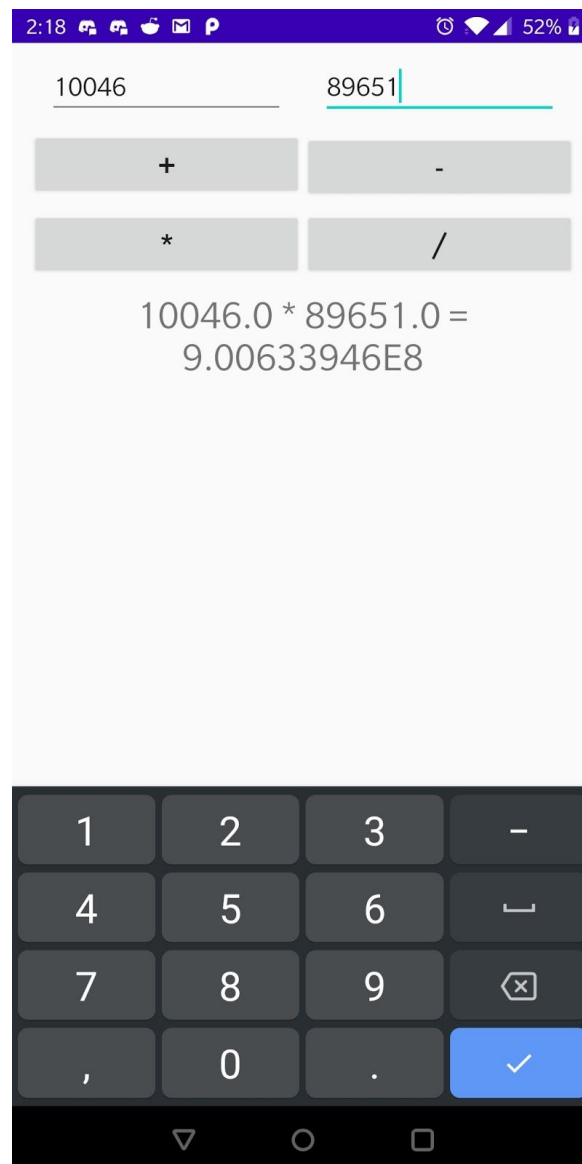
```

        android:layout_marginLeft="6pt"
        android:layout_marginRight="6pt"
        android:textSize="12pt"
        android:layout_marginTop="4pt"
        android:id="@+id/displayResult"
        android:gravity="center_horizontal">
    </TextView>
</LinearLayout>

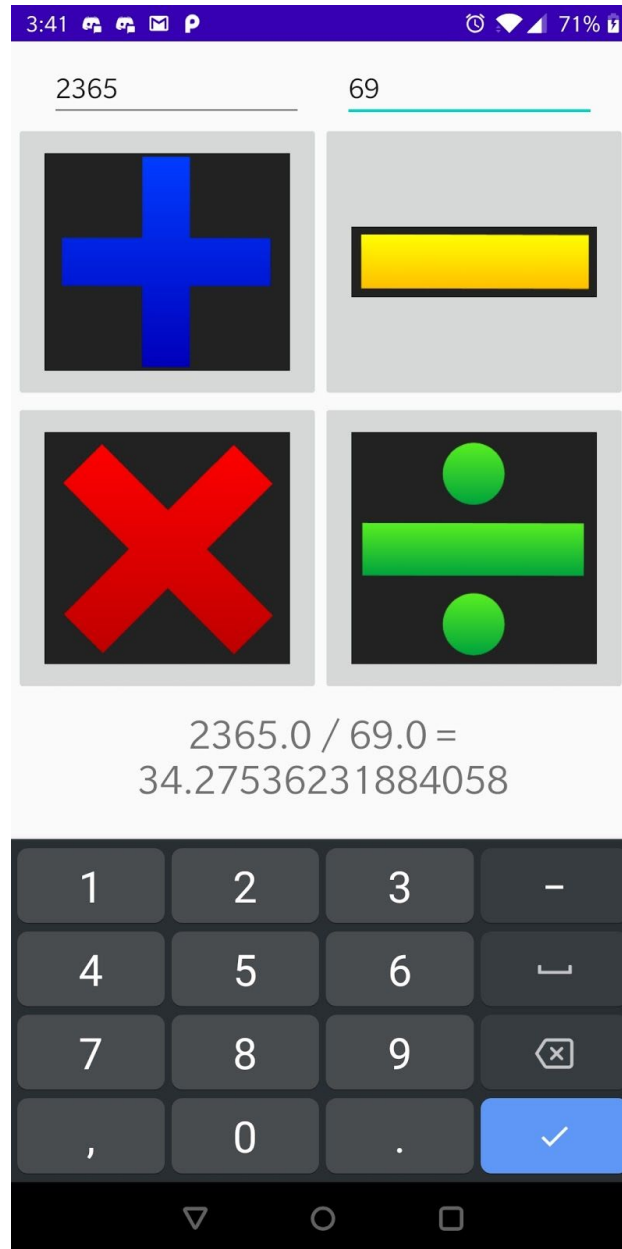
```

Outputs:

- This is the screenshot of the calculator without changing the buttons for the operators to an image:



- This is the screenshot of the calculator after implementing/changing the buttons into an image:



2. Android Fragments

MainActivity.java

```
package com.example.fragment;

import android.support.v4.app.FragmentTransaction;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;

public class MainActivity extends AppCompatActivity {

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

        FragmentTransaction
        fragmentTransaction=getSupportFragmentManager().beginTransaction();

        fragmentTransaction.add(R.id.fragment_container, new
        Fragment1());
        fragmentTransaction.commit();
    }
}
```

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

    <FrameLayout
        android:layout_width="match_parent"
```



```

        android:layout_height="match_parent"
        android:id="@+id/fragment_container"
    />
</LinearLayout>

```

Fragment1.java

```

package com.example.fragment;
import android.os.Bundle;
import android.support.annotation.NonNull;
import android.support.annotation.Nullable;
import android.support.v4.app.Fragment;
import android.support.v4.app.FragmentTransaction;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.Button;

public class Fragment1 extends Fragment {
    @Nullable
    @Override
    public View onCreateView(@NonNull LayoutInflater inflater,
        @Nullable ViewGroup container, @Nullable Bundle savedInstanceState)
    {
        View view = inflater.inflate(R.layout.fragment1, container,
false);
        Button
btnFragment=(Button)view.findViewById(R.id.btnFragment2);

        btnFragment.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                FragmentTransaction
fr=getFragmentManager().beginTransaction();
                fr.replace(R.id.fragment_container,new Fragment2());
            }
        });
    }
}

```

```

        fr.commit();
    }
});
return view;
}
}

```

fragment1.xml

```

<?xml version="1.0" encoding="utf-8"?>
<FrameLayout
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:background="#ddeedd82"
    tools:context=".Fragment1">

    <Button
        android:id="@+id/btnFragment2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="40dp"
        android:text="@string/fragment_b" />

    <Button
        android:id="@+id/btnFragment"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="@string/fragment_a" />

    <TextView
        android:id="@+id/TextView1"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginTop="80dp"

```

```

        android:text="@string/i_am_fragment_a"
        android:textAllCaps="false"
        android:textColor="@android:color/black"
        android:textSize="40sp"
        android:textStyle="bold" />
</FrameLayout>

```

Fragment2.java

```

package com.example.fragment;
import android.os.Bundle;
import android.support.annotation.NonNull;
import android.support.annotation.Nullable;
import android.support.v4.app.Fragment;
import android.support.v4.app.FragmentTransaction;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.Button;
public class Fragment2 extends Fragment {
    public View onCreateView(@NonNull LayoutInflater inflater,
@Nullable ViewGroup container, @Nullable Bundle savedInstanceState)
    {
        View view = inflater.inflate(R.layout.fragment2, container,
false);
        Button
btnFragment=(Button)view.findViewById(R.id.btnFragment3);
        btnFragment.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                FragmentTransaction
fr=getFragmentManager().beginTransaction();
                fr.replace(R.id.fragment_container,new Fragment1());
                fr.commit();
            }
        });
    }
}

```

```

        return view;
    }
}

```

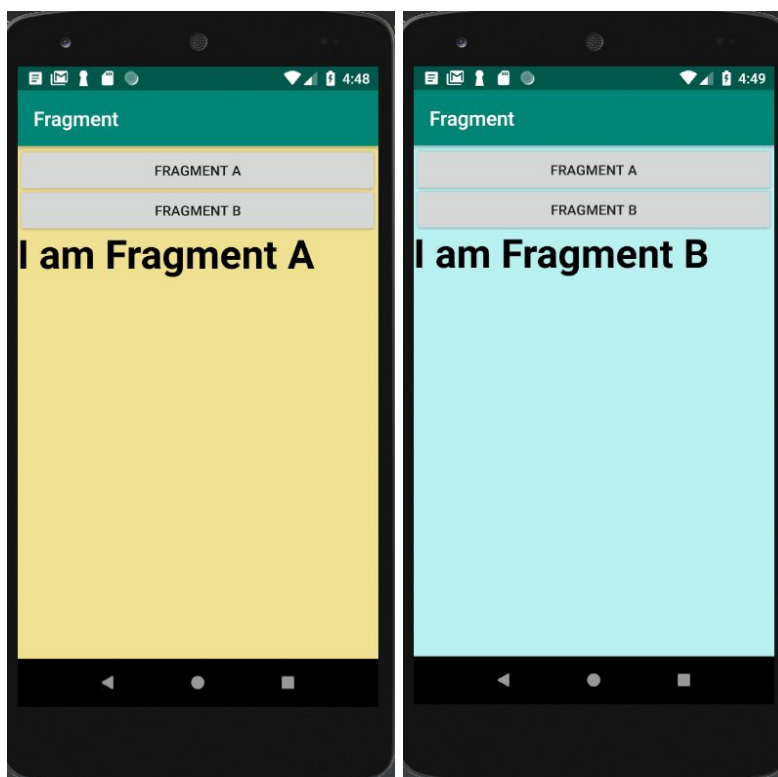
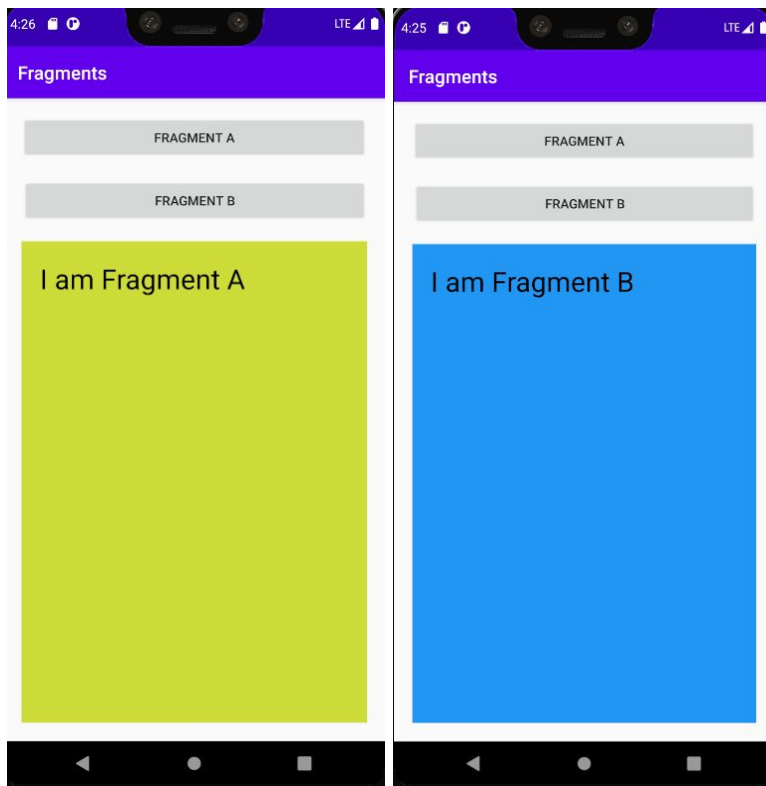
fragment2.xml

```

<?xml version="1.0" encoding="utf-8"?>
<FrameLayout
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:background="#ddafeeee"
    tools:context=".Fragment2">
    <TextView
        android:id="@+id/TextView2"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginTop="80dp"
        android:text="@string/i_am_fragment_b"
        android:textAllCaps="false"
        android:textColor="@android:color/black"
        android:textSize="40sp"
        android:textStyle="bold" />
    <Button
        android:id="@+id/btnFragment4"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="40dp"
        android:text="@string/fragment_b" />
    <Button
        android:id="@+id/btnFragment3"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="@string/fragment_a" />
</FrameLayout>

```

Outputs:



3. Report

In this lab, we learned how to use Android Studio to do some stuff such as how to create a project, how to implement an application using java language, and how to do fragments. The instruction is straightforward and we can complete this lab quickly by that. There are not too many difficulties in this lab. The one thing that took some time is the fragment learning on the website. Since this is the new thing we learnt in Android Studio, we need to take some time on this to make our project much better. Following the instructions on the first part is easy but we need to understand the principles behind it. We also figured out how to change the symbols to images. The second part, designing a fragment project, is not too hard for us because of some Android Studio experience we've had. Also, we had trouble running our code on the Android emulator for the simple calculator because it did not show the operator buttons when we ran it. We fixed this by running it on our phones instead and luckily, we got everything to run perfectly. Overall, we believe that we can get the full 20 points in this lab because we explored more about Android Studio and we implemented the java files and xml files correctly.