Mobile Application Development Laboratory
Lab 1

Basic Android Application

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1.1

Aim:

To make an android application to add 2 numbers and display the sum

Description of App:

Upon entering two numbers and clicking ADD Button, the Sum of the two numbers is calculated and shown

Device Specifications:

Model: Poco F1
Android Version: 9 (API Level 28)
Resolution: 2160 x 1080 pixels

Technical Concepts Learnt:

- To create and set the value of TextView.
- To create a Button and setOnClickListener.
- To create and retrieve information from EditText views.
- To create and display Toasts.
- To assign IDs and findViewById.
- To utilize the design in emulator to set positions of various elements

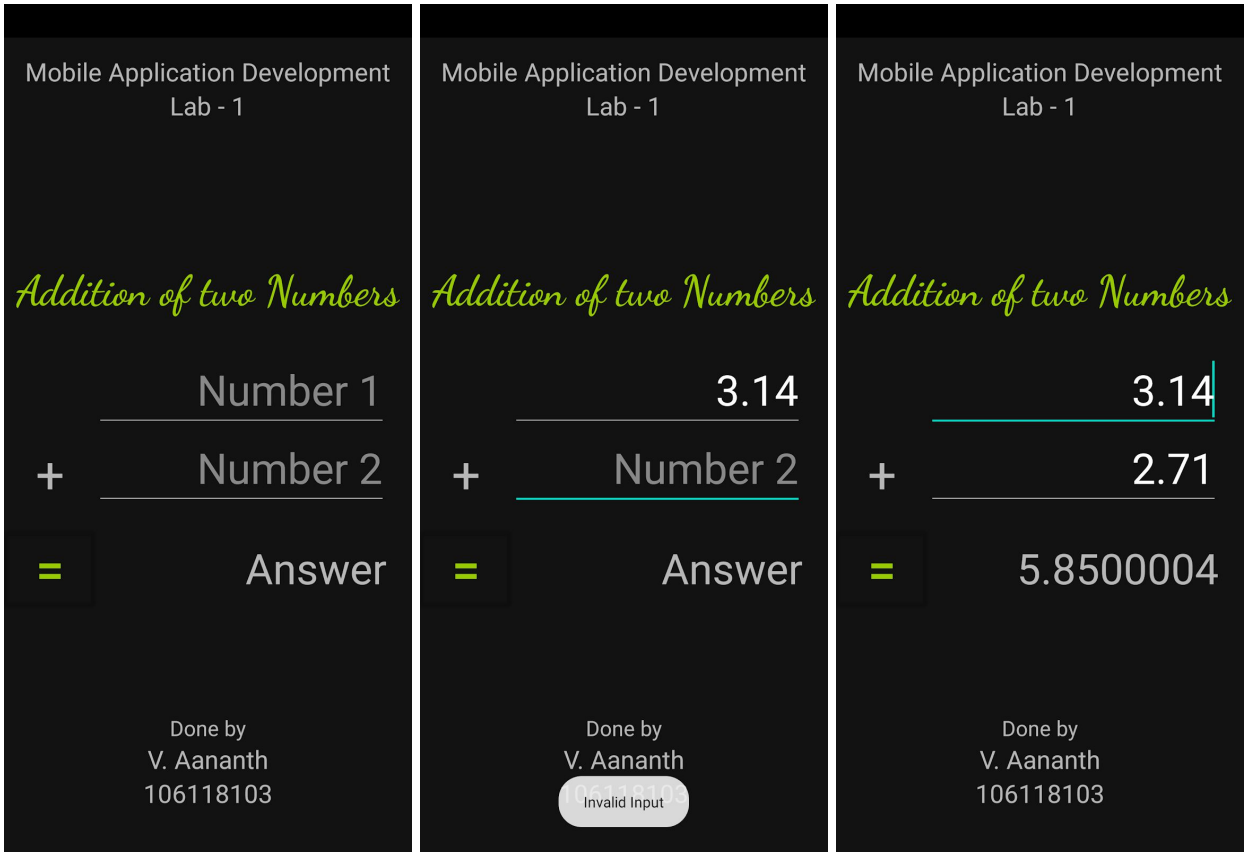
Source Code:

```
package com.example.helloworld;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
```

```
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    TextView ans_view;

    EditText en1, en2;

    Toast invalid_input;

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

        // Find views
        ans_view = (TextView) findViewById(R.id.answer);

        en1 = (EditText) findViewById(R.id.n1);
        en2 = (EditText) findViewById(R.id.n2);

        // Construct toast
        invalid_input = Toast.makeText(getApplicationContext(),
                "Invalid Input",
                Toast.LENGTH_SHORT);

        Button equalButton = (Button) findViewById(R.id.equal_button);

        equalButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                // Check for null input error
                if (en1.getText().toString().equals("") ||
en2.getText().toString().equals("")) {
                    invalid_input.show();
                } else {
                    float n1 = Float.parseFloat(en1.getText().toString());
                    float n2 = Float.parseFloat(en2.getText().toString());

                    ans_view.setText(String.valueOf(n1 + n2));
```

```
                }
            }
        });
    }
}
```

Screenshots:



(i) Base Layout (ii) Invalid Input (iii) Working Example

Outcomes:

An application was developed to perform the addition of two numbers. Various components of Java and Android Studio were studied.

1.2

Aim:

To create a simple calculator application to add, subtract, multiply, and divide two numbers.

Description of App:

An arithmetic operation is performed based on the operand selected and the numbers entered. The result is displayed upon clicking the "=" button.

Device Specifications:

Model: Poco F1
Android Version: 9 (API Level 28)
Resolution: 2160 x 1080 pixels

Technical Concepts Learnt:

- To create and set the value of TextView.
- To create a Button and setOnClickListener.
- To create and retrieve information from EditText views.
- To create and display Toasts.
- To assign IDs and findViewById.
- To work with RadioGroups, RadioButtons and setOnCheckedChangeListener.
- To utilize the design in emulator to set positions of various elements

Source Code:

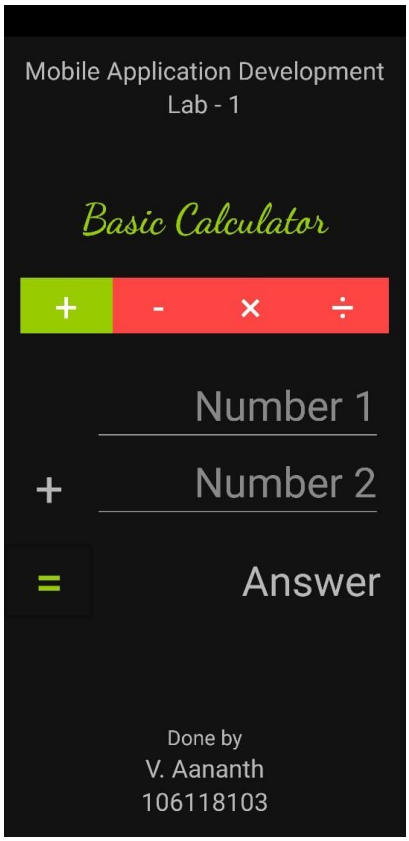
```
package com.example.simple_calculator;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.RadioGroup;
import android.widget.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    TextView op_view, ans_view;
```

```
    EditText en1, en2;

    Toast invalid_input;

    String op;

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

        // Find views
        op_view = (TextView) findViewById(R.id.op);
        ans_view = (TextView) findViewById(R.id.answer);

        en1 = (EditText) findViewById(R.id.n1);
        en2 = (EditText) findViewById(R.id.n2);

        // Construct toast
        invalid_input = Toast.makeText(getApplicationContext(),
                "Invalid Input",
                Toast.LENGTH_SHORT);


        // Select the operand
        op = "+"; // Initial value

        RadioGroup op_select = (RadioGroup) findViewById(R.id.op_group);

        op_select.setOnCheckedChangeListener(new
RadioGroup.OnCheckedChangeListener() {
            @Override
            public void onCheckedChanged(RadioGroup group, int checkedId) {
                switch (checkedId) {
                    case R.id.add:
                        changeOperand("+");
                        break;

                    case R.id.sub:
                        changeOperand("-");
                        break;

                    case R.id.mul:
```

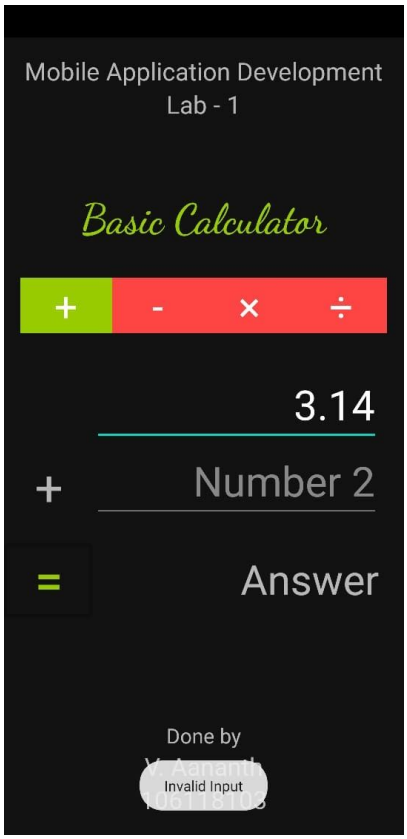
```
                        changeOperand("×");
                        break;

                    case R.id.div:
                        changeOperand("÷");
                        break;
                }
            }
        });

        Button equalButton = (Button) findViewById(R.id.equal_button);

        equalButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                // Check for null input error
                if (en1.getText().toString().equals("") ||
en2.getText().toString().equals("")) {
                    invalid_input.show();
                } else {
                    float n1 = Float.parseFloat(en1.getText().toString());
                    float n2 = Float.parseFloat(en2.getText().toString());

                    float ans = 0;

                    switch (op) {
                        case "+":
                            ans = n1 + n2;
                            break;

                        case "-":
                            ans = n1 - n2;
                            break;

                        case "×":
                            ans = n1 * n2;
                            break;

                        case "÷":
                            if (n2 == 0)
                                invalid_input.show();
                            else
                                ans = n1 / n2;
```

```
                        break;
                }

                ans_view.setText(String.valueOf(ans));
            }
        }
    });
}

private void changeOperand(String operand) {
    op = operand;

    op_view.setText(operand);
}
}
```

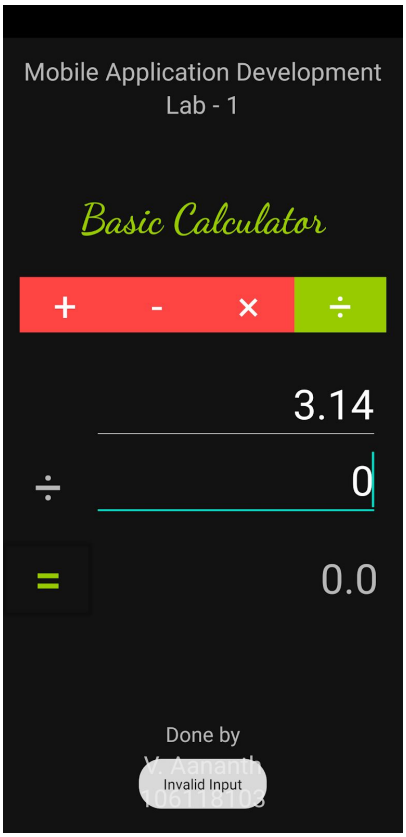
Screenshots:



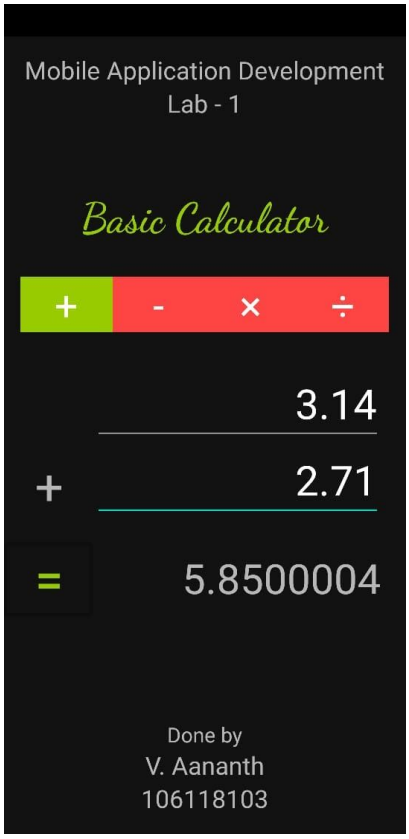
(i) Base Layout



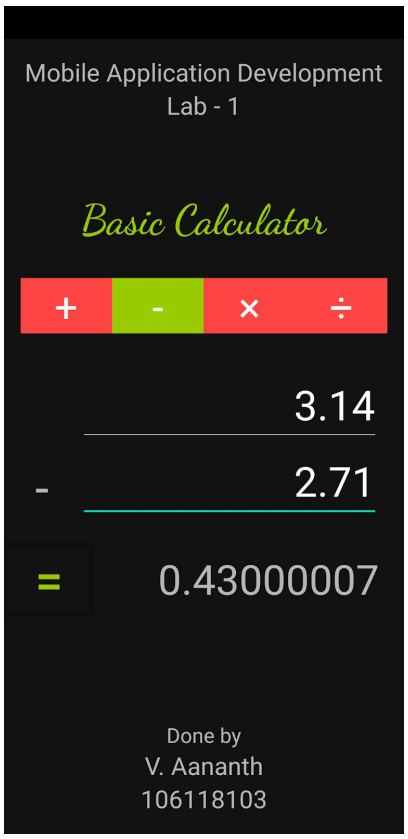
(ii) Invalid Input



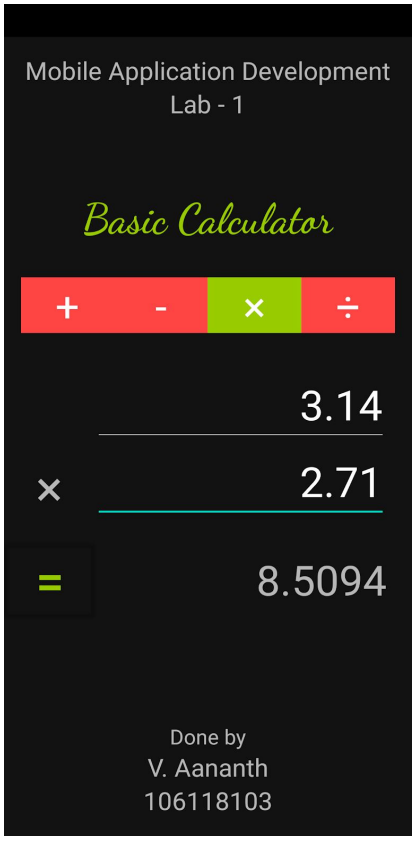
(iii) Divide by 0 Error



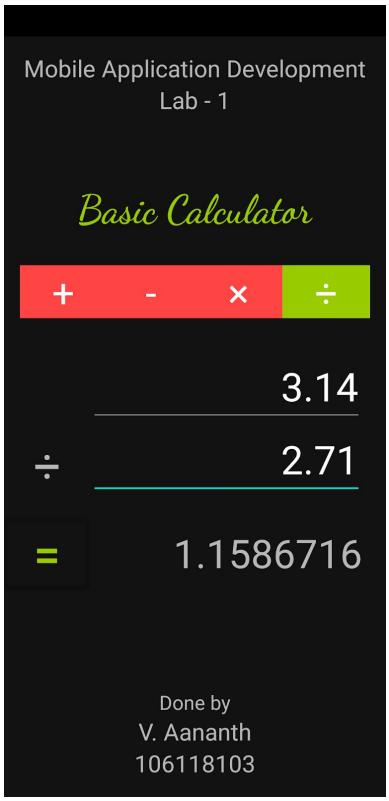
(iv) Addition



(v) Subtraction



(vi) Multiplication



(vii) Division

Outcomes:

A simple calculator application was developed to add, subtract, multiply, and divide two numbers. Various components of Java and Android Studio were studied.