```java
package com.example.apcspportfolioproject;

import android.annotation.SuppressLint;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Spinner;
import android.widget.TextView;
import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

import java.util.Objects;

public class Volume extends AppCompatActivity {

    // Variables Used in this program
    Spinner VolumeUnitsSpinner;
    EditText input;
    final String[] VolumeUnits = {"Cubic Centimeter", "Cubic Millimeter","Cubic Inch", "Liter", "Milliliter",
"Gallon","Fluid Ounce", "Tablespoon"}; // List Collection Type
    Button convert;
    TextView textView2, textView3, textView4, textView5, textView6, textView7, textView8, textView9,
textView10;

    @SuppressLint("SetTextI18n")
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_volume);

        // Removing the action bar and making the app fullscreen
        getSupportActionBar().hide();
        getWindow().getDecorView().setSystemUiVisibility(View.SYSTEM_UI_FLAG_FULLSCREEN);

        // Initializing the variables used in this app
        VolumeUnitsSpinner = findViewById(R.id.VolumeUnitsSpinner);
        input = findViewById(R.id.input);
        convert = findViewById(R.id.convert);
        textView2 = findViewById(R.id.textView2);
        textView3 = findViewById(R.id.textView3);
        textView4 = findViewById(R.id.textView4);
        textView5 = findViewById(R.id.textView5);
        textView6 = findViewById(R.id.textView6);
        textView7 = findViewById(R.id.textView7);
        textView8 = findViewById(R.id.textView8);
        textView9 = findViewById(R.id.textView9);
        textView2.setText("Cubic Centimeter");
        textView3.setText("Cubic Millimeter");
        textView4.setText("Cubic Inch");
        textView5.setText("Liter");
        textView6.setText("Milliliter");
        textView7.setText("Gallon");
        textView8.setText("Fluid Ounce");
        textView9.setText("Tablespoon");
        final TextView[] textViews = {textView2, textView3, textView4, textView5, textView6, textView7,
textView8, textView9}; // List Collection Type

        /*
            The following is the code for the spinner. The spinner is populated with the available units to
convert to.
            The user can choose from any of the units in the spinner. The spinner is set to the first item in
the lThat by
            default when the app is opened to avoid a null pointer exception. A toast is also displayed to the
user when
            the user choose something to confirm the selection has been received.
         */
        ArrayAdapter<String> adapter = new ArrayAdapter<>(this, android.R.layout.simple_spinner_item,
VolumeUnits);
        adapter.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item);
        VolumeUnitsSpinner.setAdapter(adapter);
        VolumeUnitsSpinner.setPrompt("Select a unit");
        VolumeUnitsSpinner.setOnItemSelectedListener(new AdapterView.OnItemSelectedListener() {
            @Override
            public void onItemSelected(AdapterView<?> parent, View view, int position, long id) {
                String text = parent.getItemAtPosition(position).toString();
                Toast.makeText(parent.getContext(), text, Toast.LENGTH_SHORT).show();
            }
            @Override
```

```
            public void onNothingSelected(AdapterView<?> parent) {
            }
        });

        /*
            The following is where the user can enter a number to be converted. This along with the selection
in the spinner
            will be used to convert the number to all units. A toast is displayed when the user clicks enter on
the EditText
            stating that the user should click the convert button instead.
         */
        input.setOnEditorActionListener((v, actionId, event) -> {
            Toast.makeText(Volume.this, "Please click the convert button", Toast.LENGTH_SHORT).show();
            return false;
        });

        /*
            The following is the main user action that triggers events in the app.
            The button takes in the user's number input in the EditText and the current selection in the
spinner
            and converts the number to all units.
         */
        convert.setOnClickListener(new View.OnClickListener() {
            @SuppressLint("SetTextI18n")
            @Override
            public void onClick(View v) {
                if (input.getText().toString().isEmpty()) {
                    Toast.makeText(Volume.this, "Please enter a number", Toast.LENGTH_SHORT).show();
                }
                else {

                    /*
                        First the current selection in the spinner is taken and the user's input is taken and
stored in a variable.
                        Then the convertToAllUnits method is called and the results are stored in an array.
                     */
                    String currentSelection = VolumeUnitsSpinner.getSelectedItem().toString();
                    double inputNumber = Double.parseDouble(input.getText().toString());
                    double[] convertedValues = convertToAllUnits(currentSelection, inputNumber); // List
Collection Type and a call to a student created procedure

                    // Display the results in the TextViews
                    for (int i = 0; i < textViews.length; i++) { // An integrative algorithm is used to display
the results
                        textViews[i].setText(textViews[i].getText().toString().split(": ")[0] + ": "
+convertedValues[i]); // Instructions for output
                    }
                }
            }
        });


    }

    /*
        The following methods convert milliliters to all units. The method takes in a double and returns a
double.
        These methods are called in the convertToAllUnits method. All are examples of a student created
procedure that
        contributes towards the intended purpose of the app. They all include one or more parameters with their
data types
        indicated.
     */
    public double convertMillilitersToMilliliters(double milliliters) {
        return milliliters;
    }
    public double convertMillilitersToCubicCentimeters(double milliliters) {
        return milliliters / 10.0;
    }
    public double convertMillilitersToCubicMillimeters(double milliliters) {
        return milliliters * 1000;
    }
    public double convertMillilitersToCubicInches(double milliliters) {
        return milliliters / 16.387064;
    }
    public double convertMillilitersToLiters(double milliliters) {
        return milliliters / 1000.0;
    }
    public double convertMillilitersToGallons(double milliliters) {
        return milliliters / 3785.412;
    }
    public double convertMillilitersToFluidOunces(double milliliters) {
        return milliliters / 29.5735295625;
```

```
}
public double convertMillilitersToTablespoons(double milliliters) {
    return milliliters / 14.78676478125;
}
public double convertToMilliliters(String units, double number) {

    // if-statement that depends on the value of the parameter
    if (units.equals("Cubic Centimeter")) {
        return number * 10;
    }
    else if (units.equals("Cubic Millimeter")) {
        return number / 1000.0;
    }
    else if (units.equals("Cubic Inch")) {
        return number * 16.387064;
    }
    else if (units.equals("Liter")) {
        return number * 1000;
    }
    else if (units.equals("Milliliter")) {
        return number;
    }
    else if (units.equals("Gallon")) {
        return number * 3785.412;
    }
    else if (units.equals("Fluid Ounce")) {
        return number * 29.5735295625;
    }
    else if (units.equals("Tablespoon")) {
        return number * 14.78676478125;
    }
    else {
        return 0;
    }
}

/*
    The following method takes in the user's input and the current selection in the spinner. Then the
user's input is
    first converted into milliliters. Then the milliliters are converted into all other units using several
methods all coded above.
    The results are rounded to 2 decimal places and stored in an array. The array is then returned.
 */
public double[] convertToAllUnits(String units, double number) {
    double[] convertedValues = new double[9]; // List Collection Type

    // First convert to milliliters
    double milliliters = convertToMilliliters(units, number);

    // Then convert to all other units
    convertedValues[0] = convertMillilitersToCubicCentimeters(milliliters);
    convertedValues[1] = convertMillilitersToCubicMillimeters(milliliters);
    convertedValues[2] = convertMillilitersToCubicInches(milliliters);
    convertedValues[3] = convertMillilitersToLiters(milliliters);
    convertedValues[4] = convertMillilitersToMilliliters(milliliters);
    convertedValues[5] = convertMillilitersToGallons(milliliters);
    convertedValues[6] = convertMillilitersToFluidOunces(milliliters);
    convertedValues[7] = convertMillilitersToTablespoons(milliliters);

    // Round to 3 decimal places
    for (int i = 0; i < convertedValues.length; i++) {
        convertedValues[i] = Math.round(convertedValues[i] * 1000.0) / 1000.0;
    }

    // Return array
    return convertedValues;
}
}
```