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Lab1 – Feb/02/2024

Intelligent Device Applications (ITMD-555)

PROJECT Temperature Converter App 50 points

Objective: To create basic interface of temperature converter app.

PROJECT DESCRIPTION

Introduction. This lab will have you create a simple temperature conversion app! Instructions include how to drag and drop into a layout view, to add User Interface (UI) components to the view, add/set properties for your components as well as manually add and edit various files. Also included is the functionality of the app that will be applied with an added Java class.

Controls for this app include EditText, Button, RadioGroup, RadioButtons and an ImageView. Interface of the app at runtime shown below, is what you will be similarly building for this lab.

Source Code:

- The background color of the layout changes dynamically to visually represent temperature ranges in F (C is converted to F and displayed after conversion):
  - Blue: Indicates temperatures above 90 degrees Fahrenheit.
  - Yellow: Indicates temperatures between 0 and 90 degrees Fahrenheit.
  - Red: Indicates temperatures below 0 degrees Fahrenheit.
- Images (e.g., sun or frost) are displayed in the ImageView based on the temperature range.
  - Sun: Indicates it is above 90 F
  - Frost: Indicates it is below 0 F

MainActivity.java

```
/*
-----------------------------------------------------------------------
- Author Rahul Nagaraju
- Assignment: Lab1
- FileName: MainActivity.java
- Course: ITMD-555 Intelligent Device Applications
- Instructor: James Papademas
-----------------------------------------------------------------------
*/
```

```java
package com.example.tempconverter;

// Importing necessary classes from the Android framework
import android.graphics.Color;
import android.os.Bundle;
import android.view.View;
import android.widget.EditText;
import android.widget.ImageView;
import android.widget.RadioButton;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;

/**
 * The MainActivity.java file serves as the central component of an
Android application
 * dedicated to temperature conversion between Celsius and Fahrenheit.
 *
 * It employs various user interface elements like EditText for accepting
temperature input,
 * RadioButtons for selecting temperature units, and ImageView for
presenting temperature-related visual cues.
 *
 * The program's core functionalities involve:
 * - Processing user-provided temperature values and ensuring their
validity.
 * - Executing temperature conversions between Celsius and Fahrenheit
through a utility class (ConverterUtil).
 * - Dynamically updating the user interface to reflect converted
temperature values,
 *   including altering the layout's background color and displaying
relevant images
 *   (such as a sun or frost) within an ImageView.
 * - Providing users with informative feedback via Toast messages to
validate their inputs.
 *
 * In summary, the MainActivity orchestrates temperature conversion
operations while delivering
 * an engaging user experience that visually communicates temperature
ranges through color changes and imagery.
 */

// MainActivity class declaration, extending AppCompatActivity
public class MainActivity extends AppCompatActivity {

    // Declaration of variables
    private EditText text; // EditText for user input
    ImageView iv; // ImageView to display images
    View view; // View to manipulate background color

    // onCreate method called when the activity is starting
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main); // Setting the layout
        text = findViewById(R.id.editTextNumberDecimal2); // Initializing
EditText
    }

    // onClick method called when a button is clicked
```

```
    // (assigned in the XML layout file using the android:onClick
attribute)
    public void onClick(View view) {
        if (view.getId() == R.id.button) { // Check if the clicked view is
the button

            // Retrieving references to the radio buttons
            RadioButton celsiusButton = findViewById(R.id.radioButton);
            RadioButton fahrenheitButton =
findViewById(R.id.radioButton2);

            // Validating user input
            if (text.getText().length() == 0) {
                Toast.makeText(this, "Please enter a valid number",
Toast.LENGTH_LONG).show();
                return;
            }

            // Parsing user input to float
            float inputValue =
Float.parseFloat(text.getText().toString());

            // Checking which radio button is checked and performing
temperature conversion
            if (celsiusButton.isChecked()) {

text.setText(String.valueOf(ConverterUtil.convertFahrenheitToCelsius(input
Value)));
                celsiusButton.setChecked(false);
                fahrenheitButton.setChecked(true);
            } else {

text.setText(String.valueOf(ConverterUtil.convertCelsiusToFahrenheit(input
Value)));
                fahrenheitButton.setChecked(false);
                celsiusButton.setChecked(true);
                inputValue = (float)
ConverterUtil.convertCelsiusToFahrenheit(inputValue); // Update input
value
            }

            // Setting background color and image based on temperature
value
            view = findViewById(R.id.activity_main); // Getting the main
layout view
            iv = findViewById(R.id.imageView3); // Initializing ImageView

            if (inputValue > 90) { // If temperature is above 90
                // Set background color to sky blue and display sun image
                view.setBackgroundColor(Color.parseColor("#87ceff"));
                iv.setVisibility(View.VISIBLE); // Show ImageView
                //clear any prior image
                ((ImageView)
iv.findViewById(R.id.imageView3)).setImageResource(0);
                iv.setImageResource(R.drawable.sun); // Set sun image
            } else if (inputValue < 90 && inputValue > 0) { // If
temperature is between 0 and 90
                // Set background color to yellow and hide ImageView
                view.setBackgroundColor(Color.YELLOW);
                iv.setVisibility(View.GONE); // Hide ImageView
```

```
            } else { // If temperature is below 0
                // Set background color to red and display frost image
                view.setBackgroundColor(Color.RED);
                iv.setVisibility(View.VISIBLE); // Show ImageView
                ((ImageView)
iv.findViewById(R.id.imageView3)).setImageResource(0);
                iv.setImageResource(R.drawable.frosty); // Set frost image
            }
        }
    }
} // End of MainActivity class
```

Source Code:

Activity_main.xml

```
<?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:id="@+id/activity_main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@color/myColor"
    tools:context=".MainActivity">


    <EditText
        android:id="@+id/editTextNumberDecimal2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="92dp"
        android:layout_marginTop="36dp"
        android:ems="10"
        android:inputType="numberSigned|numberDecimal"
        tools:ignore="SpeakableTextPresentCheck"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" >
        <requestFocus/>
    </EditText>

    <RadioGroup
        android:id="@+id/radioGroup"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        app:layout_constraintStart_toStartOf="@+id/editTextNumberDecimal2"
        app:layout_constraintTop_toBottomOf="@+id/editTextNumberDecimal2">

        <RadioButton
            android:id="@+id/radioButton"
```

```
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:checked="true"
            android:text="@string/celsius" />

        <RadioButton
            android:id="@+id/radioButton2"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="@string/fahrenheit" />
    </RadioGroup>

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/calc"
        android:onClick="onClick"
        app:layout_constraintStart_toStartOf="@+id/radioGroup"
        app:layout_constraintTop_toBottomOf="@+id/radioGroup" />

    <ImageView
        android:id="@+id/imageView3"
        android:layout_width="210dp"
        android:layout_height="391dp"
        android:layout_marginTop="4dp"
        android:visibility="gone"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="@+id/editTextNumberDecimal2"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="@+id/button"
        app:layout_constraintTop_toBottomOf="@+id/button"
        app:srcCompat="@drawable/sun" />

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

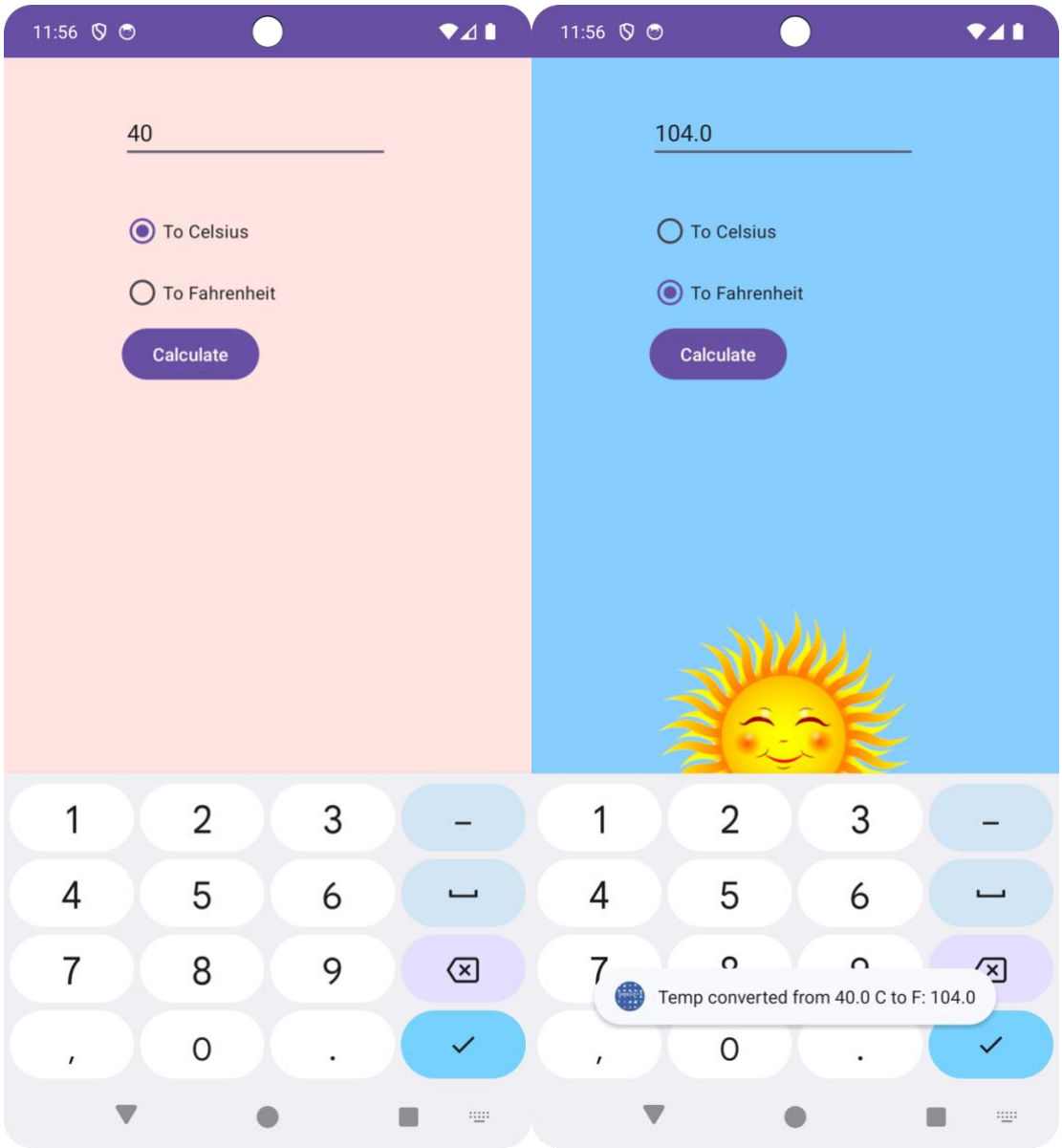
Source Code:

ConverterUtil.java

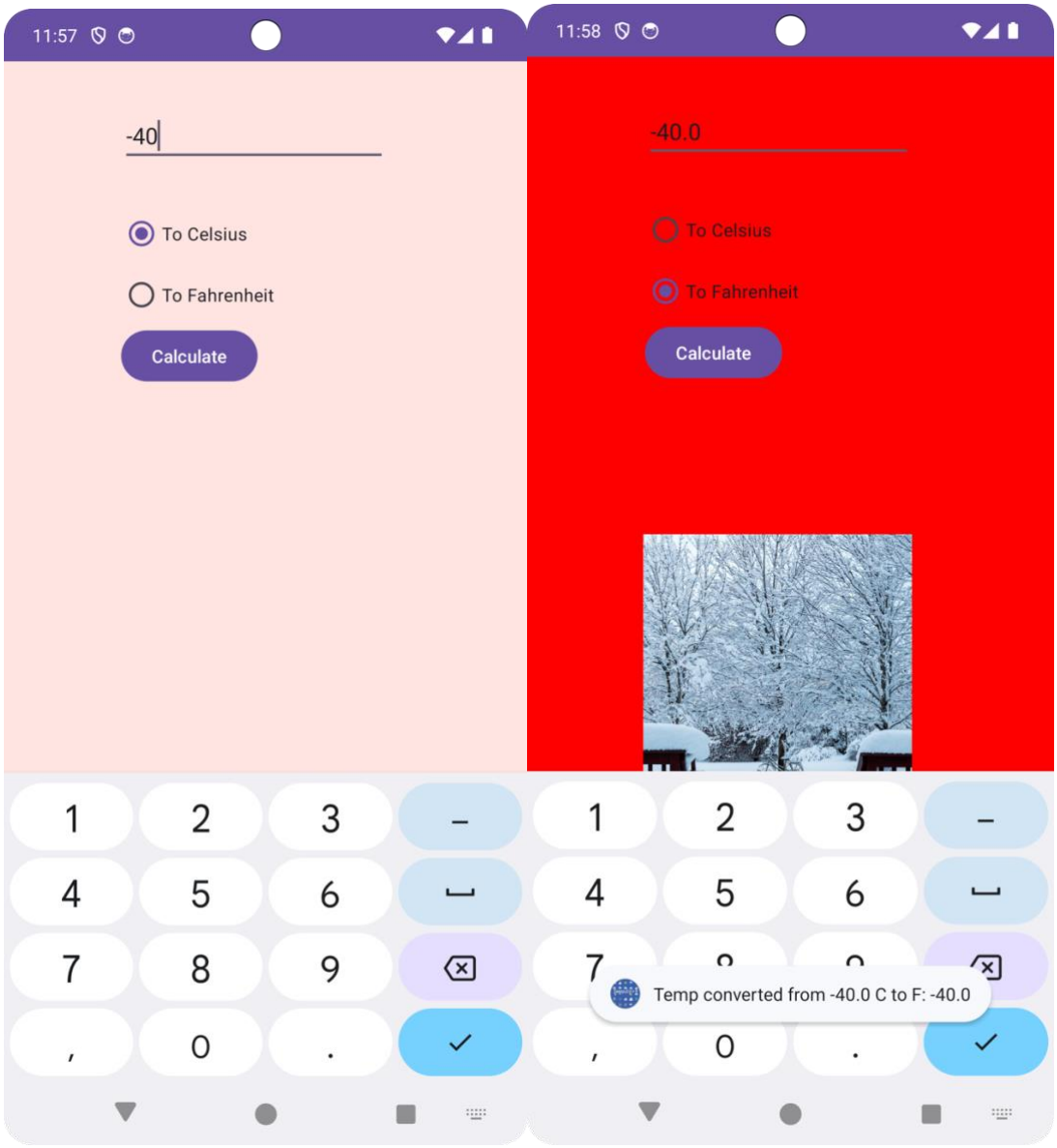
```
package com.example.tempconverter;

public class ConverterUtil {

    /**
     * @param fahrenheit
     * @return
     */
    // convrts to celsius
    public static double convertFahrenheitToCelsius(float fahrenheit) {
        return ((fahrenheit - 32) * 5.0 / 9.0);
```

```
    }

    /**
     * @param celsius
     * @return
     */
    // converts to fahrenheit
    public static double convertCelsiusToFahrenheit(float celsius) {
        return (celsius * (9 / 5.0)) + 32;
    }
}
```

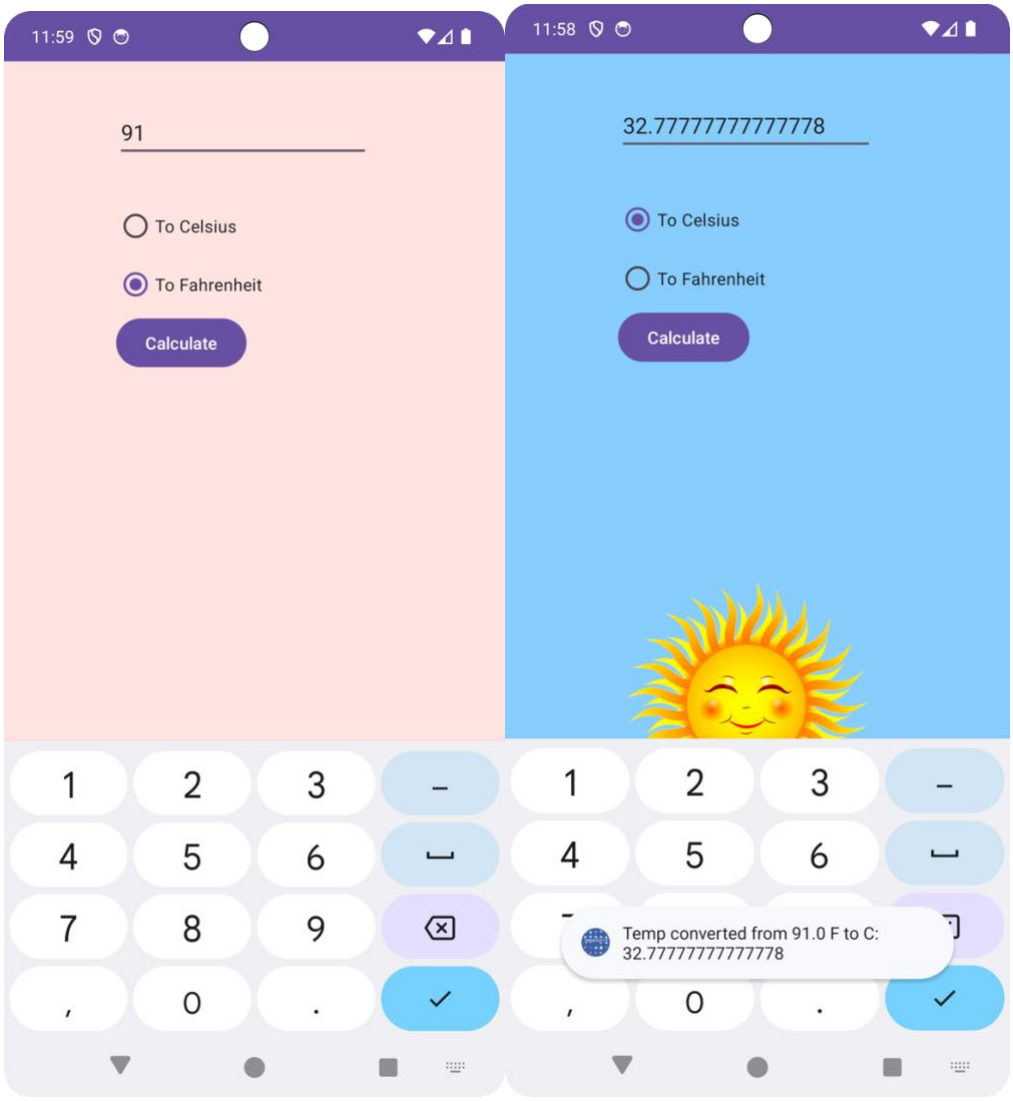
Snapshot 1: 40 Degree Celsius to Fahrenheit



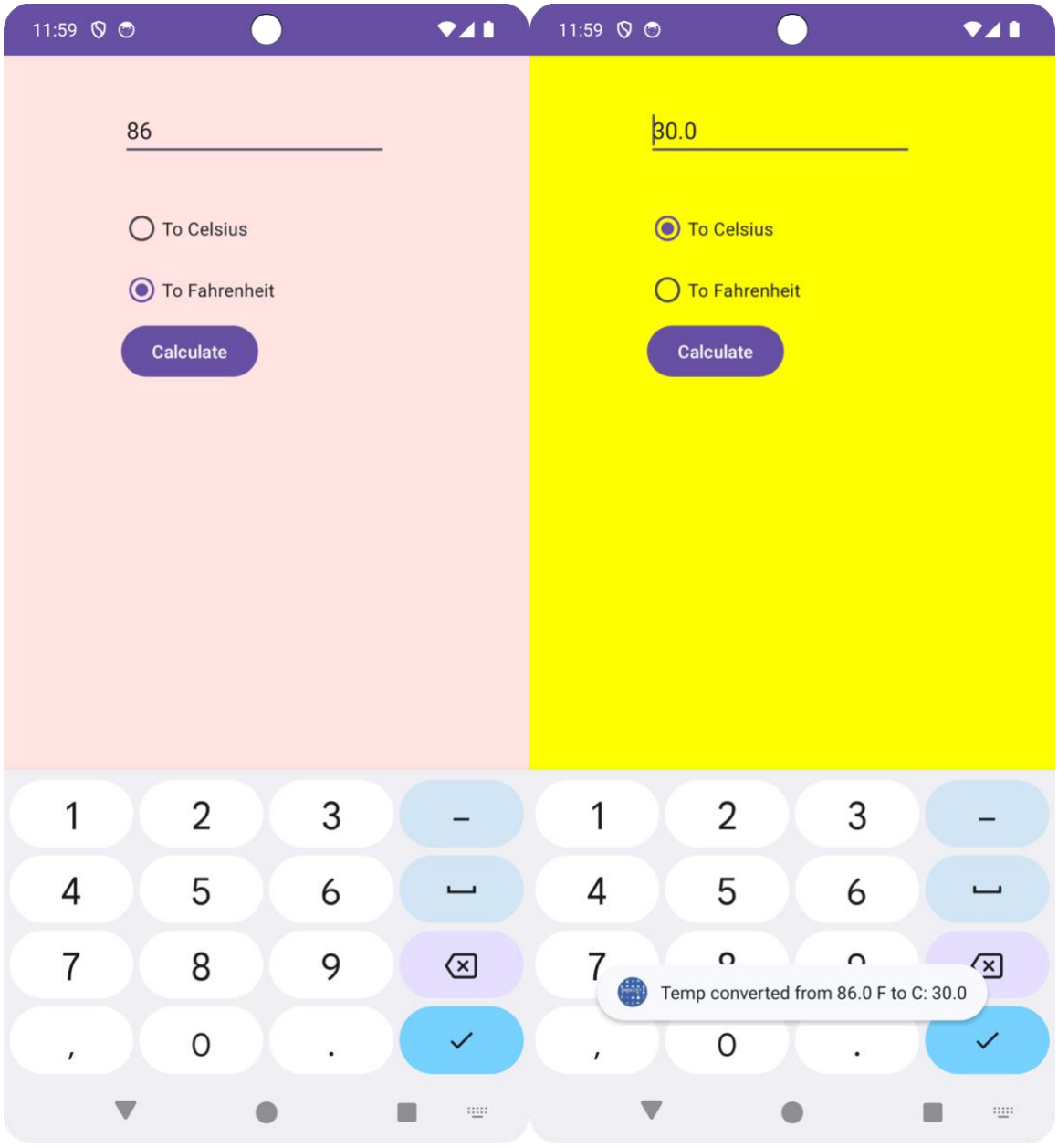
- **40 Degree Celsius to Fahrenheit**



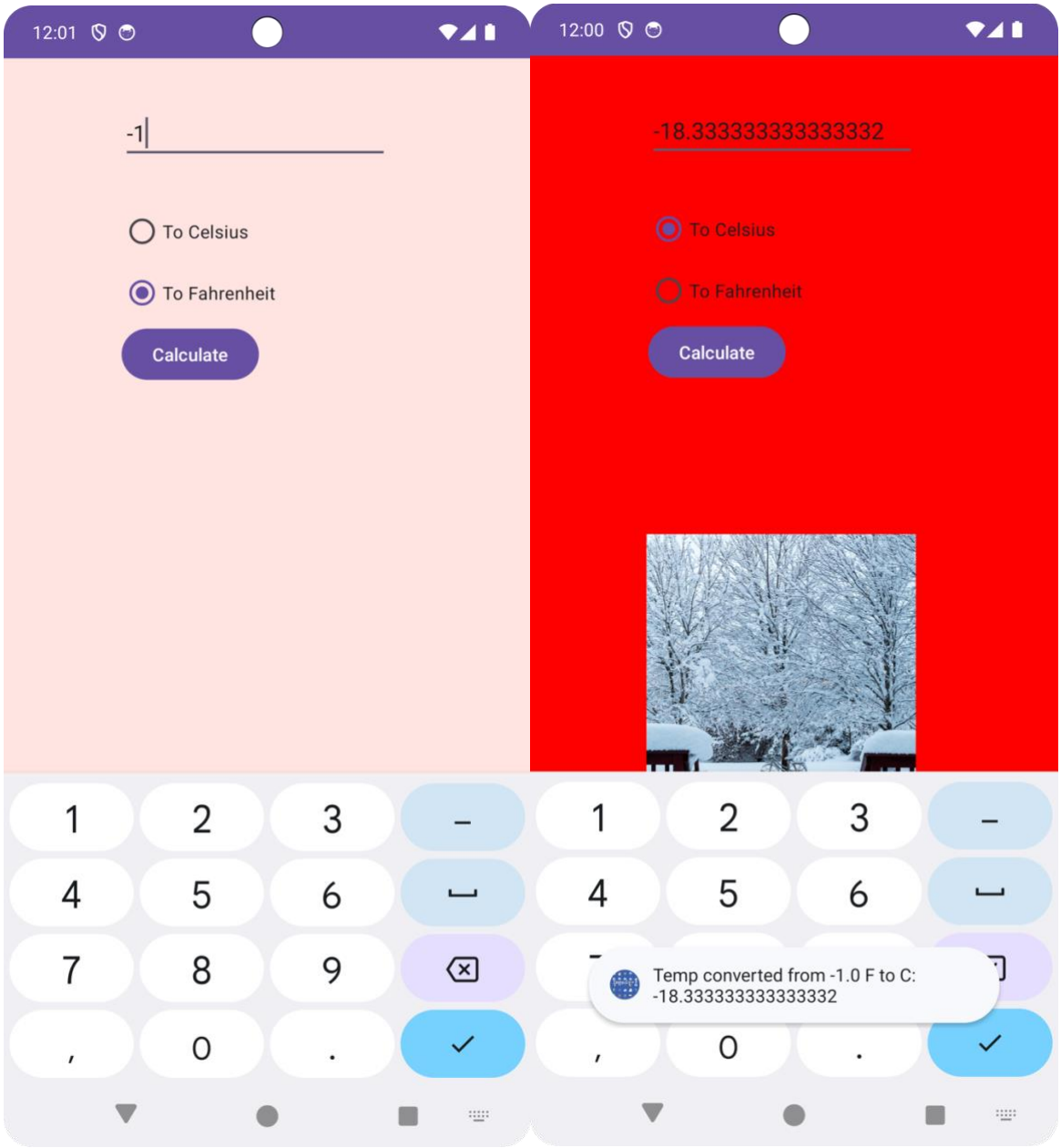
Snapshot 2: Temp > 90 F. Set Blue Background and Sun Image.



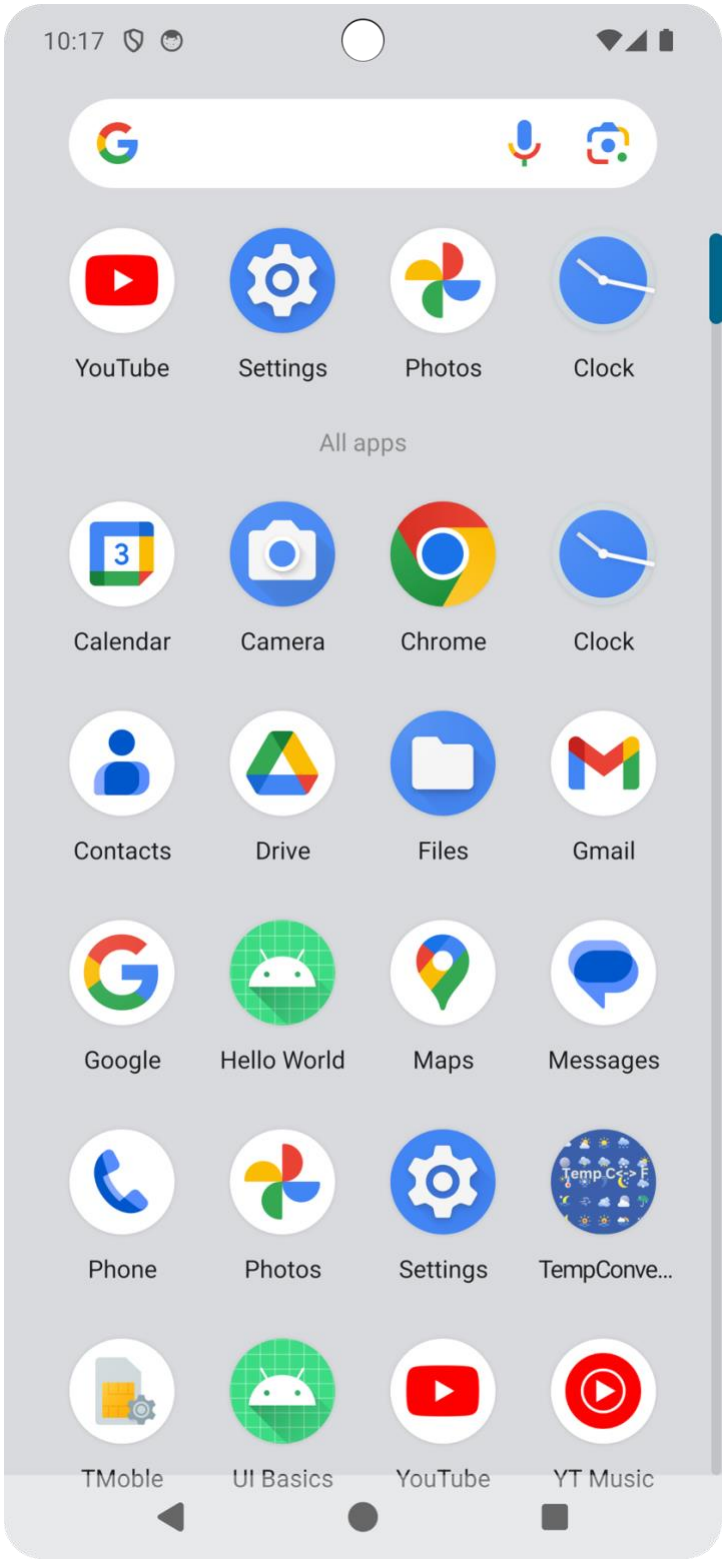
Snapshot 3: Temp < 90F i.e., 86 F to C. Set Yellow Background, but no Image



Snapshot 4 : Temp < 0 F -> Red Background and Frosty Image



Snapshot 5: Icon for the App in Home Screen



Snapshot 6: Design for Activity_Main XML