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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  
----------------------------------------------------------------------  
\*/  
  
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.*convertCelsiusToFahrenheit*(inputValue)));  
 Toast.*makeText*(this, "Temp converted from " +inputValue+" C to F: "+String.*valueOf*(ConverterUtil.*convertCelsiusToFahrenheit*(inputValue)), Toast.*LENGTH\_LONG*).show();  
 celsiusButton.setChecked(false);  
 fahrenheitButton.setChecked(true);  
 inputValue = (float) ConverterUtil.*convertCelsiusToFahrenheit*(inputValue); // Update input value  
 } else {  
 text.setText(String.*valueOf*(ConverterUtil.*convertFahrenheitToCelsius*(inputValue)));  
 Toast.*makeText*(this, "Temp converted from " +inputValue+" F to C: "+String.*valueOf*(ConverterUtil.*convertFahrenheitToCelsius*(inputValue)), Toast.*LENGTH\_LONG*).show();  
 fahrenheitButton.setChecked(false);  
 celsiusButton.setChecked(true);  
  
 }  
  
 // 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**

A screenshot of a calculator

Description automatically generatedA screenshot of a game

Description automatically generated

**-40 Degree Celsius to Fahrenheit**

**A screenshot of a calculator

Description automatically generatedA screenshot of a cell phone

Description automatically generated**

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

**A screenshot of a calculator

Description automatically generatedA screenshot of a game

Description automatically generated**

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

**A screenshot of a calculator

Description automatically generatedA screenshot of a calculator

Description automatically generated**

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

**A screenshot of a calculator

Description automatically generatedA screenshot of a cell phone

Description automatically generated**

**Snapshot 5: Icon for the App in Home Screen**

**A screenshot of a phone

Description automatically generated**

**Snapshot 6: Design for Activity\_Main XML**

**A screenshot of a computer screen

Description automatically generated**