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**Green University of Bangladesh**

**Department of Computer Science and Engineering (CSE)**

**Faculty of Sciences and Engineering**

**Semester: (Fall, Year:2024, B.Sc. in CSE (Day)**

**Lab Report NO #03**

**Course Title: Mobile Application Development**

**Course Code: CSE-402 Section: 213 D-3**

**Lab Experiment Name: Design and Development of a Calculator Application**

**Student Details**

| **Name** | | **ID** |
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**Lab Date : 30-09-2024**

**Submission Date : 07-10-2024**

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| **Lab Report Status**  **Marks: ………………………………… Signature:.....................**  **Comments:.............................................. Date:..............................** |
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1. **TITLE OF THE LAB REPORT EXPERIMENT**

**Android Intent**

**2. OBJECTIVES**

**Problem 1:**

* Create a simple Android application featuring a login system.
* Enable activity navigation following user authentication.
* Implement two temperature conversion features: Fahrenheit to Celsius and Celsius to Fahrenheit.
* Ensure intuitive navigation across various sections of the app.

**3. PROCEDURE**

**Step 1**: Develop the Login Activity

* Design a login interface containing two input fields for username and password using **EditText**.
* Include two buttons: one for logging in and another for user registration.

Implement login functionality utilizing **SharedPreferences** to save and retrieve user credentials.

**Step 2**: **Set Up SharedPreferences for User Authentication**

* Use **SharedPreferences** to save the username and password during user registration.
* During the login process, check the entered credentials against the stored values in **SharedPreferences.**
* If the credentials are correct, transition to the Fahrenheit to Celsius conversion activity.

**Step 3**: Create the Fahrenheit to Celsius Conversion Activity

* Develop a new activity with an EditText field for inputting temperature in Fahrenheit.
* Add a button that, when clicked, converts the Fahrenheit input to Celsius using the formula: Celsius=Fahrenheit−321.8\text{Celsius} = \frac{\text{Fahrenheit} - 32}{1.8}Celsius=1.8Fahrenheit−32​
* Display the conversion result in a TextView.

**Step 4**: **Create the Celsius to Fahrenheit Conversion Activity**

* Create another activity for converting Celsius to Fahrenheit.
* Implement a similar setup as in the previous step, with the formula:  
  Fahrenheit = (Celsius \* 1.8) + 32.
* Add a button for navigation back to the Fahrenheit to Celsius conversion page.

**Step 5**: Implement Navigation Between Activities

* In the Fahrenheit to Celsius conversion activity, add a button that navigates to the Celsius to Fahrenheit conversion activity.
* Conversely, provide a "Back" button in the Celsius to Fahrenheit conversion activity to return to the previous activity.

**4. IMPLEMENTATION:**

**Login page:**

**activity\_login.xml**

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:orientation="vertical"  
 android:padding="16dp">  
  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Login"  
 android:textSize="24sp"/>  
  
 <EditText  
 android:id="@+id/usernameInput"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Username"/>  
  
 <EditText  
 android:id="@+id/passwordInput"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:inputType="textPassword"  
 android:hint="Password"/>  
  
 <Button  
 android:id="@+id/loginButton"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Login"/>  
  
 <Button  
 android:id="@+id/createAccountButton"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Create Account"  
 android:layout\_marginTop="16dp"/>  
</LinearLayout>

**LoginActivity.java:**

package com.example.myapplication;  
  
import androidx.appcompat.app.AppCompatActivity;  
import android.content.Intent;  
import android.content.SharedPreferences;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
import android.widget.Toast;  
  
public class LoginActivity extends AppCompatActivity {  
  
 private EditText usernameInput, passwordInput;  
 private Button loginButton, createAccountButton;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_login*);  
  
 usernameInput = findViewById(R.id.*usernameInput*);  
 passwordInput = findViewById(R.id.*passwordInput*);  
 loginButton = findViewById(R.id.*loginButton*);  
 createAccountButton = findViewById(R.id.*createAccountButton*);  
  
 // Login button click listener  
 loginButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 String username = usernameInput.getText().toString();  
 String password = passwordInput.getText().toString();  
  
 // Retrieve stored username and password from SharedPreferences  
 SharedPreferences sharedPreferences = getSharedPreferences("UserPrefs", *MODE\_PRIVATE*);  
 String storedUsername = sharedPreferences.getString("username", null);  
 String storedPassword = sharedPreferences.getString("password", null);  
  
 // Validate the entered credentials  
 if (username.equals(storedUsername) && password.equals(storedPassword)) {  
 Toast.*makeText*(LoginActivity.this, "Login Successful!", Toast.*LENGTH\_SHORT*).show();  
  
 // Navigate to the Fahrenheit to Celsius converter activity  
 Intent intent = new Intent(LoginActivity.this, FahrenheitToCelsiusActivity.class);  
 startActivity(intent);  
 finish(); // Close the login activity to prevent returning back  
 } else {  
 Toast.*makeText*(LoginActivity.this, "Invalid Login", Toast.*LENGTH\_SHORT*).show();  
 }  
 }  
 });  
  
 // Create Account button click listener  
 createAccountButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Navigate to the Create Account Activity  
 Intent intent = new Intent(LoginActivity.this, CreateAccountActivity.class);  
 startActivity(intent);  
 }  
 });  
 }  
}

**Create account:**

**activity\_create\_account.xml**

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:orientation="vertical"  
 android:padding="16dp">  
  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Create Account"  
 android:textSize="24sp"  
 android:layout\_marginBottom="20dp"/>  
  
 <EditText  
 android:id="@+id/username"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Username"/>  
  
 <EditText  
 android:id="@+id/password"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:inputType="textPassword"  
 android:hint="Password"/>  
  
 <Button  
 android:id="@+id/createAccountButton"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Create Account"  
 android:layout\_marginTop="16dp"/>  
  
 <Button  
 android:id="@+id/backButton"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Back"  
 android:layout\_marginTop="16dp"/>  
  
</LinearLayout>

**CreateAccountActivity.java**

package com.example.myapplication;  
  
import androidx.appcompat.app.AppCompatActivity;  
import android.content.SharedPreferences;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
import android.widget.Toast;  
  
public class CreateAccountActivity extends AppCompatActivity {  
  
 private EditText username, password;  
 private Button createAccountButton, backButton;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_create\_account*);  
  
 username = findViewById(R.id.*username*);  
 password = findViewById(R.id.*password*);  
 createAccountButton = findViewById(R.id.*createAccountButton*);  
 backButton = findViewById(R.id.*backButton*);  
  
 createAccountButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Retrieve the input from EditTexts  
 String user = username.getText().toString();  
 String pass = password.getText().toString();  
  
 // Store account information in SharedPreferences  
 SharedPreferences sharedPreferences = getSharedPreferences("UserPrefs", *MODE\_PRIVATE*);  
 SharedPreferences.Editor editor = sharedPreferences.edit();  
 editor.putString("username", user);  
 editor.putString("password", pass);  
 editor.apply(); // Save changes  
  
 Toast.*makeText*(CreateAccountActivity.this, "Account created for " + user, Toast.*LENGTH\_SHORT*).show();  
  
 // Close the CreateAccountActivity  
 finish();  
 }  
 });  
  
 // Back button click listener  
 backButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Go back to the previous activity (LoginActivity)  
 finish(); // This will close the CreateAccountActivity  
 }  
 });  
 }  
}

**Celsius to fahrenheit:**

**activity\_celsius\_to\_fahrenheit.xml**

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:orientation="vertical"  
 android:padding="16dp">  
  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Celsius to Fahrenheit Converter"  
 android:textSize="24sp"/>  
  
 <EditText  
 android:id="@+id/enterTemp"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Enter Temperature in Celsius"  
 android:inputType="numberDecimal"/>  
  
 <Button  
 android:id="@+id/cToF"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Convert to Fahrenheit"/>  
  
 <TextView  
 android:id="@+id/result"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Result will be shown here"  
 android:textSize="20sp"  
 android:layout\_marginTop="20dp"/>  
  
 <!-- Add a button to navigate back to the main activity -->  
 <Button  
 android:id="@+id/backButton"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Back"  
 android:layout\_marginTop="30dp"/>  
</LinearLayout>

**Celsius ToFahrenheitActivity.java**

package com.example.myapplication;  
  
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;  
  
public class CelsiusToFahrenheitActivity extends AppCompatActivity {  
  
 private Button cToF, backButton;  
 private TextView result;  
 private EditText enterTemp;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_celsius\_to\_fahrenheit);  
  
 // Referencing UI components  
 cToF = findViewById(R.id.cToF);  
 result = findViewById(R.id.result);  
 enterTemp = findViewById(R.id.enterTemp);  
 backButton = findViewById(R.id.backButton);  
  
 cToF.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Convert the input temperature from EditText to double  
 double temp = Double.parseDouble(enterTemp.getText().toString());  
 // Convert Celsius to Fahrenheit  
 double result1 = (temp \* 1.8) + 32;  
 // Display the result  
 result.setText(String.valueOf(result1));  
 }  
 });  
  
 // Back button click listener  
 backButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 finish(); // This will close the CelsiusToFahrenheitActivity and return to the LoginActivity  
 }  
 });  
 }  
}

**Fahrenheit to celsius:**

**activity\_fahrenheit\_to\_celsius.xml**

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:orientation="vertical"  
 android:padding="16dp">  
  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Fahrenheit to Celsius Converter"  
 android:textSize="24sp"  
 android:layout\_gravity="center"/>  
  
 <EditText  
 android:id="@+id/enterTempF"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Enter Temperature in Fahrenheit"  
 android:inputType="numberDecimal"/>  
  
 <Button  
 android:id="@+id/fToC"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Convert to Celsius"/>  
  
 <TextView  
 android:id="@+id/resultF"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Result will be shown here"  
 android:textSize="20sp"  
 android:layout\_marginTop="20dp"/>  
  
 <!-- Button to navigate to Celsius to Fahrenheit converter -->  
 <Button  
 android:id="@+id/cToFButton"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Celsius to Fahrenheit"  
 android:layout\_marginTop="30dp"/>  
  
</LinearLayout>

**Fahrenheit ToCelsiusActivity.java**

package com.example.myapplication;  
  
import androidx.appcompat.app.AppCompatActivity;  
import android.content.Intent;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
import android.widget.TextView;  
  
public class FahrenheitToCelsiusActivity extends AppCompatActivity {  
  
 private Button fToC, cToFButton;  
 private TextView resultF;  
 private EditText enterTempF;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_fahrenheit\_to\_celsius*);  
  
 // Referencing UI components  
 fToC = findViewById(R.id.*fToC*);  
 resultF = findViewById(R.id.*resultF*);  
 enterTempF = findViewById(R.id.*enterTempF*);  
 cToFButton = findViewById(R.id.*cToFButton*);  
  
 fToC.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Convert the input temperature from EditText to double  
 double tempF = Double.*parseDouble*(enterTempF.getText().toString());  
 // Convert Fahrenheit to Celsius  
 double resultC = (tempF - 32) / 1.8;  
 // Display the result  
 resultF.setText(String.*valueOf*(resultC));  
 }  
 });  
  
 cToFButton.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 // Navigate to Celsius to Fahrenheit activity  
 Intent intent = new Intent(FahrenheitToCelsiusActivity.this, CelsiusToFahrenheitActivity.class);  
 startActivity(intent);  
 }  
 });  
 }  
}

**OUTPUTS**

| **Primary page:** | **Create account:**  C:\Users\HP\OneDrive\Pictures\Screenshots\Screenshot 2024-10-07 201730.png | **Login account:**  C:\Users\HP\OneDrive\Pictures\Screenshots\Screenshot 2024-10-07 202108.png |
| --- | --- | --- |
| **Converter-1:**  C:\Users\HP\OneDrive\Pictures\Screenshots\Screenshot 2024-10-07 201916.png | **Converter-2**  C:\Users\HP\OneDrive\Pictures\Screenshots\Screenshot 2024-10-07 201853.png |

**5. ANALYSIS AND DISCUSSION**

* **What went well**: The login system and navigation between activities worked as expected. The app structure and flow were intuitive for users.
* **Challenges**: Setting up **SharedPreferences** and handling edge cases (like empty input) were initially tricky but resolved with error checking.
* **Most difficult part**: Managing navigation between multiple activities without causing crashes.
* **What I liked**: Implementing a practical login system that simulates real-world applications.
* **What I learned**: I gained deeper insights into Android activity lifecycle, state management with **SharedPreferences**, and user interface design for mobile applications.