LAB#02

INTRODUCING ACTIVITY AND CREATE FIRST ANDROID APPLICATION

Activity

Android's architecture encourages component reuse, enabling you to publish and share Activities, Services, and data with other applications, with access managed by the security restrictions you define. Activity is the base class for the visual, interactive components of your application; it is roughly equivalent to a Form in traditional desktop development.

Create First Activity

- By default your project contains **activity_main.xml** file and **MainActivity.Java** File.
- If you want to create another Activity, right click on res folder and choose New> Activity> Empty Activity.Name the activity.
- Go to res folder and click on activity_first.xml.

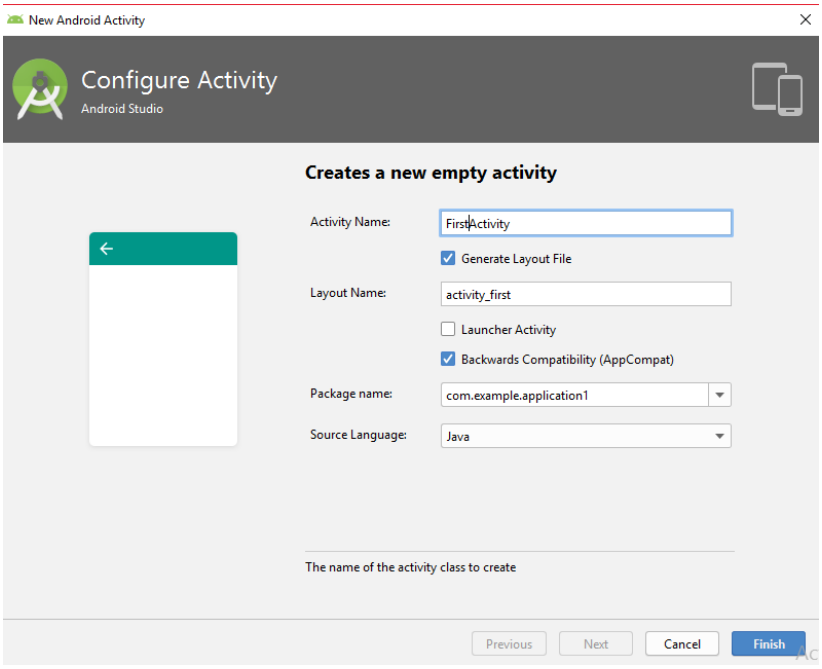


Fig. 1. Showing the configuration activity

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.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:layout_width="match_parent"
   android:layout_height="match_parent"
   android:background="@android:color/holo_green_light"
   tools:context=".FirstActivity">
   <TextView
      android:id="@+id/textView"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="First Program"
      app:layout_constraintBottom_toBottomOf="parent"
```

```
    app:layout_constraintHorizontal_bias="0.456"
    app:layout_constraintLeft_toLeftOf="parent"
    app:layout_constraintRight_toRightOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.467" />
  <Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="submit"
    android:text="submit"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintHorizontal_bias="0.458"
    app:layout_constraintLeft_toLeftOf="parent"
    app:layout_constraintRight_toRightOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.595" />
  </android.support.constraint.ConstraintLayout>
```

- Now add method to submit method to FirstActivity.java file.

```
package com.example.application1;

import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Toast;

public class FirstActivity extends AppCompatActivity {

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

    public void submit(View view) {

        Toast.makeText(this,"This is our First
Program",Toast.LENGTH_LONG).show();


    }
}
```

Lab Task

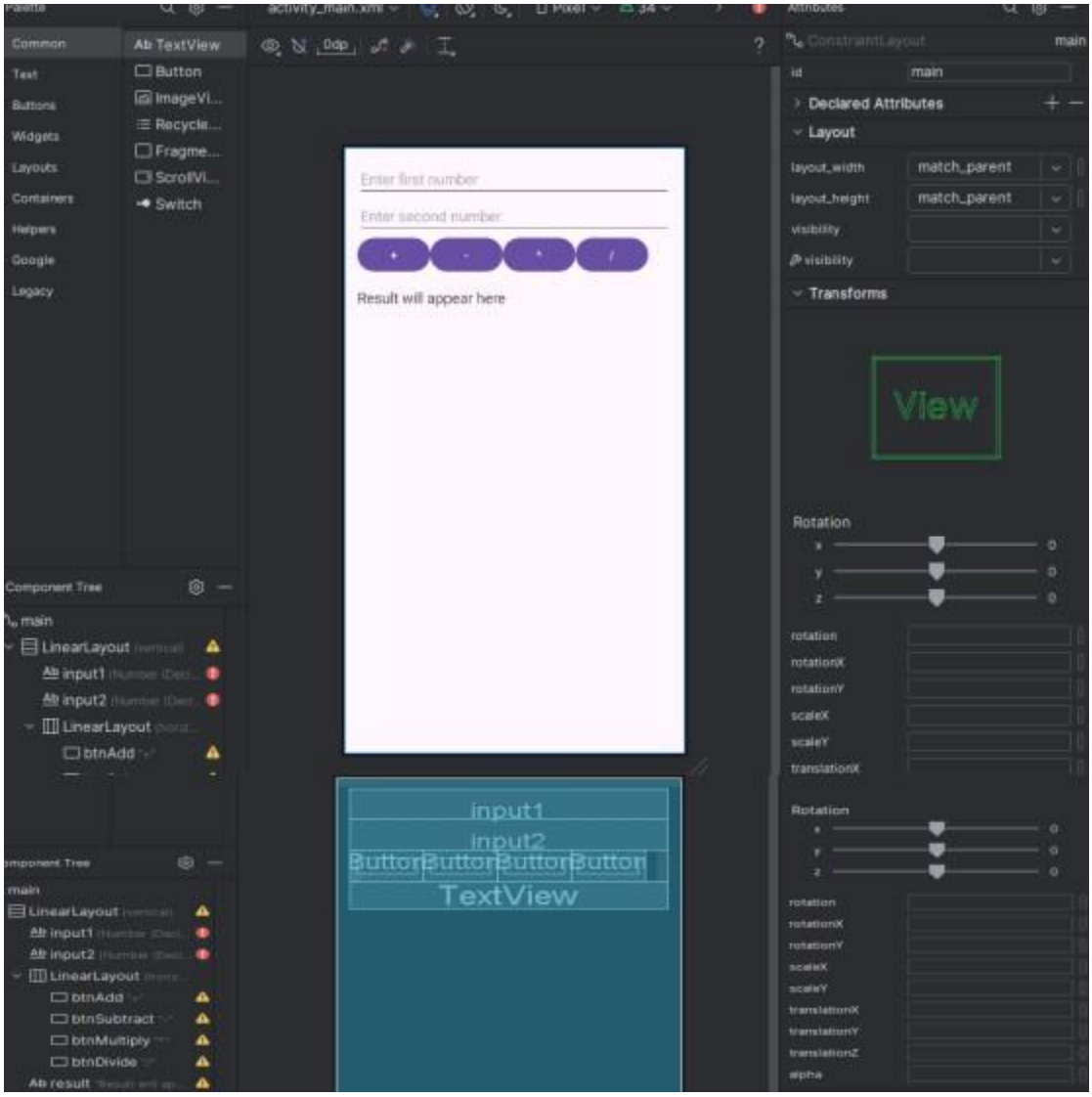
1) Create calculator in Android Studio.

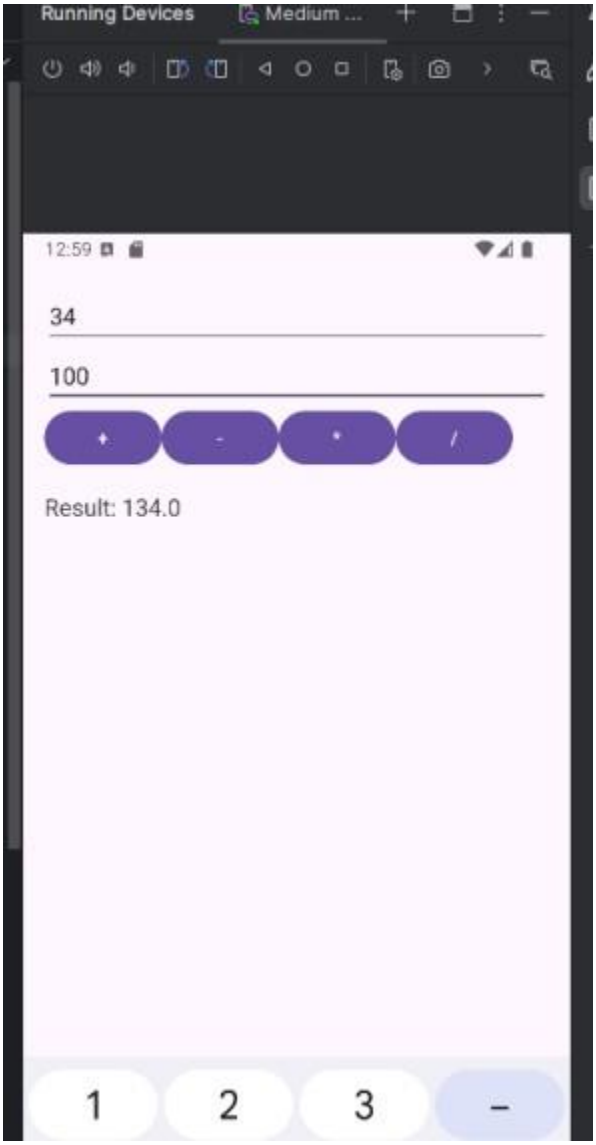
```
import android.os.Bundle;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;

public class MainActivity extends AppCompatActivity {

    2 usages
    EditText input1, input2;
    4 usages
    TextView result;
    2 usages
    Button btnAdd, btnSubtract, btnMultiply, btnDivide;
```

```
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        EdgeToEdge.enable( $this$enableEdgeToEdge: this);
        setContentView(R.layout.activity_main);

        // Set padding for edge-to-edge display
        ViewCompat.setOnApplyWindowInsetsListener(findViewById(R.id.main), (v, insets) -> {
            Insets systemBars = insets.getInsets(WindowInsetsCompat.Type.systemBars());
            v.setPadding(systemBars.left, systemBars.top, systemBars.right, systemBars.bottom);
            return insets;
        });

        // Initialize calculator elements
        input1 = findViewById(R.id.input1);
        input2 = findViewById(R.id.input2);
        result = findViewById(R.id.result);

        btnAdd = findViewById(R.id.btnAdd);
        btnSubtract = findViewById(R.id.btnSubtract);
        btnMultiply = findViewById(R.id.btnMultiply);
        btnDivide = findViewById(R.id.btnDivide);

        btnAdd.setOnClickListener(v -> performOperation( operator: '+'));
        btnSubtract.setOnClickListener(v -> performOperation( operator: '-'));
```

```
        btnMultiply.setOnClickListener(v -> performOperation( operator: '*'));
        btnDivide.setOnClickListener(v -> performOperation( operator: '/'));
    }

    4 usages
    private void performOperation(char operator) {
        String num1Str = input1.getText().toString();
        String num2Str = input2.getText().toString();

        if (!num1Str.isEmpty() && !num2Str.isEmpty()) {
            double num1 = Double.parseDouble(num1Str);
            double num2 = Double.parseDouble(num2Str);
            double resultValue = 0;

            switch (operator) {
                case '+':
                    resultValue = num1 + num2;
                    break;
                case '-':
                    resultValue = num1 - num2;
                    break;
                case '*':
                    resultValue = num1 * num2;
                    break;
                case '/':
                    if (num2 != 0) {
                        resultValue = num1 / num2;
                    } else {
                        result.setText("Cannot divide by zero");
                        return;
```

```
                    break;
            }

            result.setText("Result: " + resultValue);
        } else {
            result.setText("Please enter both numbers");
        }
    }
}
```


Enter first number
Enter second number
Result will appear here
input1
input2
Button
Button
Button
Button
TextView
View
Component Tree
main
LinearLayout
input1
input2
LinearLayout
btnAdd
btnSubtract
btnMultiply
btnDivide
result
Declared Attributes
Layout
layout_width
match_parent
layout_height
match_parent
Transforms
Rotation

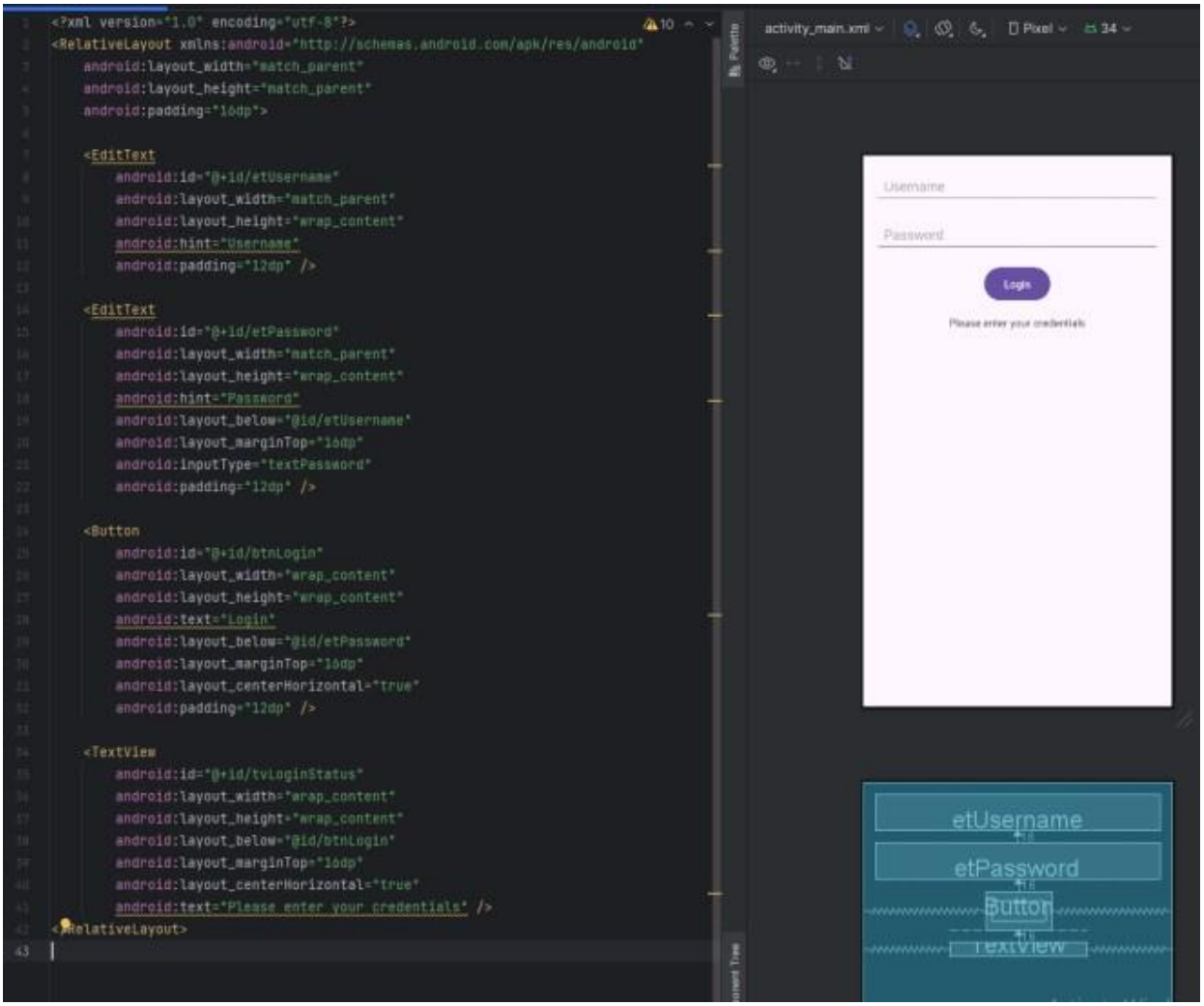

Running Devices
Medium ...
12:59
34
100
+
-
*
/
Result: 134.0
1
2
3
–

2) Create Login activity and navigate to next activity.

```
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;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    2 usages
    private EditText etUsername, etPassword;
    2 usages
    private TextView tvLoginStatus;
    2 usages
    private Button btnLogin;

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

        // Initialize views
        etUsername = findViewById(R.id.etUsername);
        etPassword = findViewById(R.id.etPassword);
        tvLoginStatus = findViewById(R.id.tvLoginStatus);
        btnLogin = findViewById(R.id.btnLogin);

        // Set login button click listener
        btnLogin.setOnClickListener(new View.OnClickListener() {
```

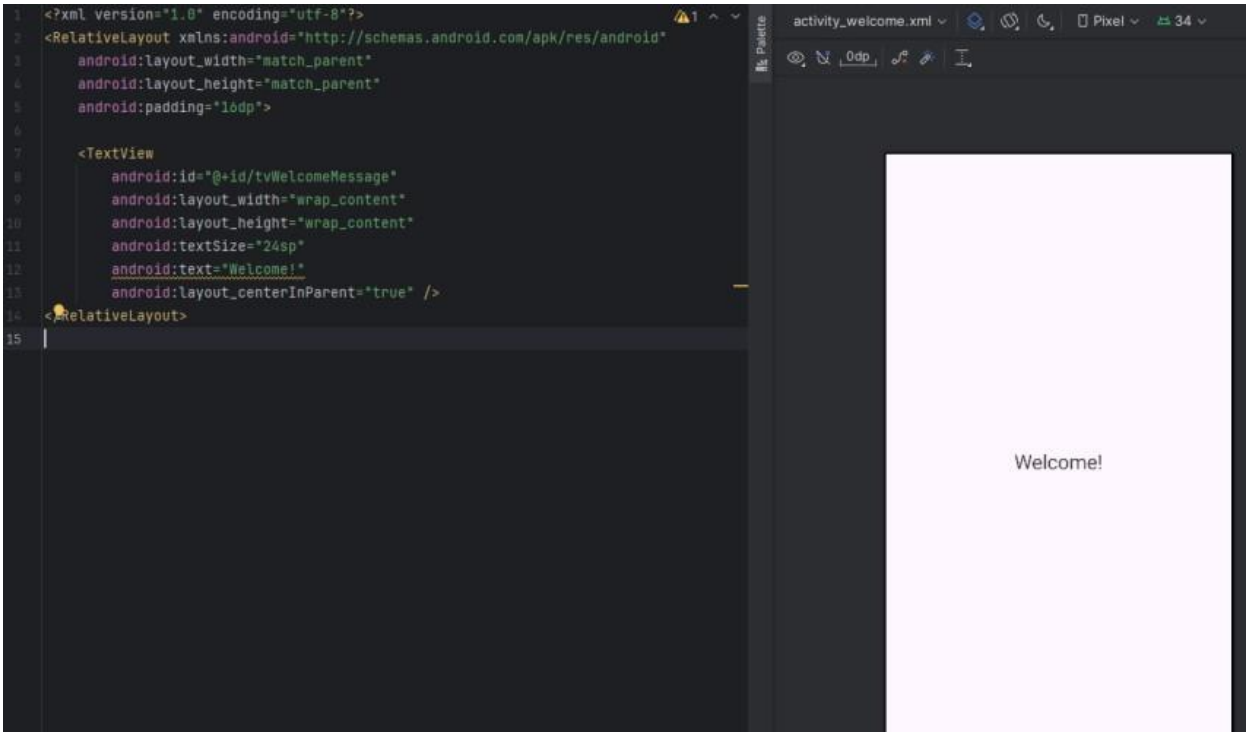
```
        // Set login button click listener
        btnLogin.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                String username = etUsername.getText().toString().trim();
                String password = etPassword.getText().toString().trim();

                // Check if username and password fields are non-empty
                if (!username.isEmpty() && !password.isEmpty()) {
                    // Navigate to WelcomeActivity
                    Intent intent = new Intent( packageContext: MainActivity.this, WelcomeActivity.class);
                    intent.putExtra( name: "USERNAME", username); // Pass username to WelcomeActivity
                    startActivity(intent);
                } else {
                    tvLoginStatus.setText("Login Failed. Fields cannot be empty.");
                    Toast.makeText( context: MainActivity.this, text: "Please enter both username and password", Toast.LENGTH_SHORT).show();
                }
            }
        });
    }
```

```java
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.TextView;

public class WelcomeActivity extends AppCompatActivity {

    2 usages
    private TextView tvWelcomeMessage;

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

        // Initialize the welcome message TextView
        tvWelcomeMessage = findViewById(R.id.tvWelcomeMessage);

        // Get the username from the intent
        String username = getIntent().getStringExtra( name: "USERNAME");

        // Set welcome message
        tvWelcomeMessage.setText("Login Successful! Welcome, " + username + "!");
    }
}
```



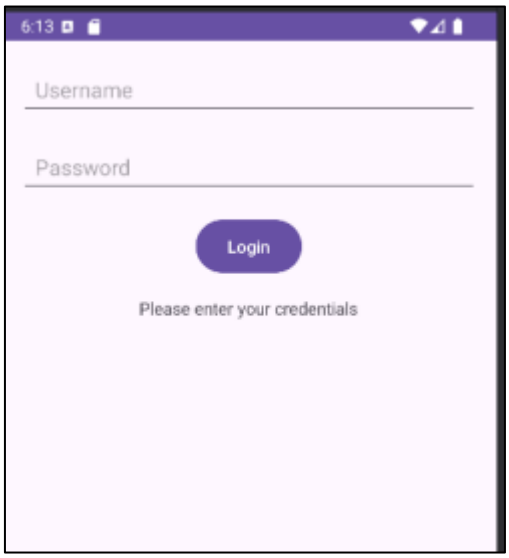

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">

    <EditText
        android:id="@+id/etUsername"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Username"
        android:padding="12dp" />

    <EditText
        android:id="@+id/etPassword"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:layout_below="@id/etUsername"
        android:layout_marginTop="16dp"
        android:inputType="textPassword"
        android:padding="12dp" />

    <Button
        android:id="@+id/btnLogin"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Login"
        android:layout_below="@id/etPassword"
        android:layout_marginTop="16dp"
        android:layout_centerHorizontal="true"
        android:padding="12dp" />

    <TextView
        android:id="@+id/tvLoginStatus"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/btnLogin"
        android:layout_marginTop="16dp"
        android:layout_centerHorizontal="true"
        android:text="Please enter your credentials" />
</RelativeLayout>
```

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">

    <TextView
        android:id="@+id/tvWelcomeMessage"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="24sp"
        android:text="Welcome!"
        android:layout_centerInParent="true" />
</RelativeLayout>
```



activity_main.xml | activity_welcome.xml | WelcomeActivity.java | MainActivity.java | AndroidManifes

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">

    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.LoginActivity"
        tools:targetApi="31">

        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>

        <!-- Add WelcomeActivity here -->
        <activity
            android:name=".WelcomeActivity"
            android:exported="false" />
    </application>

</manifest>
```


6:13
Username
Password
Login
Please enter your credentials