

```
<?xml version="1.0" encoding="utf-8"?>
<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:id="@+id/textViewTitle"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="LOGIN FORM"
        android:textAlignment="center"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_marginBottom="24dp" />

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="USERNAME" />

    <EditText
        android:id="@+id/usernameEditText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        android:hint="Enter username" />
```

```
<TextView  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:text="PASSWORD"  
    android:layout_marginTop="16dp" />  
  
<EditText  
    android:id="@+id/passwordEditText"  
    android:layout_width="match_parent"  
    android:layout_height="wrap_content"  
    android:layout_marginTop="8dp"  
    android:hint="Enter password"  
    android:inputType="textPassword" />  
  
<Button  
    android:id="@+id/loginButton"  
    android:layout_width="match_parent"  
    android:layout_height="wrap_content"  
    android:text="Login"  
    android:layout_marginTop="24dp" />  
  
</LinearLayout>
```

```
package com.example.loginform;

import android.widget.Toast;

import android.os.Bundle;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

    private static final String VALID_USERNAME = "user";
    private static final String VALID_PASSWORD = "password";

    private EditText usernameEditText;
    private EditText passwordEditText;
    private Button loginButton;

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

        usernameEditText = findViewById(R.id.usernameEditText);
        passwordEditText = findViewById(R.id.passwordEditText);
        loginButton = findViewById(R.id.loginButton);

        loginButton.setOnClickListener(v -> {
            String enteredUsername = usernameEditText.getText().toString().trim();
            String enteredPassword = passwordEditText.getText().toString().trim();
        });
    }
}
```

```
if (isValidCredentials(enteredUsername, enteredPassword)) {
    showToast("Login Successful");
} else {
    showToast("Invalid Credentials");
}
});

}

private boolean isValidCredentials(String username, String password) {
    return VALID_USERNAME.equals(username) && VALID_PASSWORD.equals(password);
}

private void showToast(String message) {
    Toast.makeText(this, message, Toast.LENGTH_SHORT).show();
}
}
```

```
<?xml version="1.0" encoding="utf-8"?>
<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">

    <!-- Display Area -->
    <TextView
        android:id="@+id/textViewDisplay"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="0"
        android:textSize="36sp"
        android:gravity="end"
        android:padding="24dp"
        android:background="#EFEFEF" />

    <!-- Button Grid -->
    <GridLayout
        android:id="@+id/gridLayout"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:columnCount="4"
        android:layout_marginTop="16dp">

        <!-- Row 1 -->
        <Button
            style="@style/CalcButton"
            android:layout_width="wrap_content"
```

```
    android:layout_height="wrap_content"
    android:onClick="onNumberClick"
    android:tag="7"
    android:text="7" />

    <Button android:text="8" android:tag="8" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="9" android:tag="9" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="÷" android:tag="/" style="@style/CalcButton"
    android:onClick="onOperatorClick"/>

<!-- Row 2 -->

    <Button android:text="4" android:tag="4" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="5" android:tag="5" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="6" android:tag="6" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="x" android:tag="*" style="@style/CalcButton"
    android:onClick="onOperatorClick"/>

<!-- Row 3 -->

    <Button android:text="1" android:tag="1" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="2" android:tag="2" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="3" android:tag="3" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="-" android:tag="-" style="@style/CalcButton"
    android:onClick="onOperatorClick"/>

<!-- Row 4 -->

    <Button android:text="0" android:tag="0" style="@style/CalcButton"
    android:onClick="onNumberClick"/>

    <Button android:text="C" android:tag="C" style="@style/CalcButton"
    android:onClick="onClearClick"/>
```

```
<Button android:text="=" android:tag="=" style="@style/CalcButton"
    android:onClick="onEqualClick"/>

<Button android:text="+" android:tag="+" style="@style/CalcButton"
    android:onClick="onOperatorClick"/>

</GridLayout>
</LinearLayout>
```

```
package com.example.calculator;

import android.os.Bundle;
import android.view.View;
import android.widget.TextView;
import android.util.Log;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

    private TextView textViewDisplay;
    private String currentInput = "";
    private double operand1 = 0;
    private String operator = "";

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        textViewDisplay = findViewById(R.id.textViewDisplay); //

        if (textViewDisplay == null) {
            Log.e("ERROR", "textViewDisplay is null! Check your layout XML!");
        }

        updateDisplay();
    }

    private void updateDisplay() {
        if (textViewDisplay != null) {
            textViewDisplay.setText(currentInput.isEmpty() ? "0" : currentInput);
        }
    }
}
```

```
    }

}

public void onNumberClick(View view) {
    currentInput += view.getTag().toString();
    updateDisplay();
}

public void onOperatorClick(View view) {
    if (!currentInput.isEmpty()) {
        operand1 = Double.parseDouble(currentInput);
        operator = view.getTag().toString();
        currentInput = "";
        updateDisplay();
    }
}

public void onEqualClick(View view) {
    if (!currentInput.isEmpty() && !operator.isEmpty()) {
        double operand2 = Double.parseDouble(currentInput);
        double result = performOperation(operand1, operand2, operator);
        currentInput = String.valueOf(result);
        operator = "";
        updateDisplay();
    }
}

public void onClearClick(View view) {
    currentInput = "";
    operand1 = 0;
    operator = "";
}
```

```
        updateDisplay();
    }

private double performOperation(double operand1, double operand2, String operator) {
    switch (operator) {
        case "+": return operand1 + operand2;
        case "-": return operand1 - operand2;
        case "*": return operand1 * operand2;
        case "/": return operand2 != 0 ? operand1 / operand2 : Double.NaN;
        default: return 0;
    }
}
```

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

    <TextView
        android:id="@+id/lifecycleTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Activity Lifecycle Demo"
        android:textSize="24sp"
        android:textStyle="bold" />

</LinearLayout>
```

```
package com.example.activitylifecycle;

import android.os.Bundle;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

    private void showToast(String message) {
        Toast.makeText(this, message, Toast.LENGTH_SHORT).show();
    }

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

    @Override
    protected void onStart() {
        super.onStart();
        showToast("onStart called");
    }

    @Override
    protected void onResume() {
        super.onResume();
        showToast("onResume called");
    }
}
```

```
@Override  
protected void onPause() {  
    super.onPause();  
    showToast("onPause called");  
}
```

```
@Override  
protected void onStop() {  
    super.onStop();  
    showToast("onStop called");  
}
```

```
@Override  
protected void onRestart() {  
    super.onRestart();  
    showToast("onRestart called");  
}
```

```
@Override  
protected void onDestroy() {  
    super.onDestroy();  
    showToast("onDestroy called");  
}
```

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    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:orientation="vertical"
    android:padding="16dp"
    tools:context=".MainActivity">

    <Button
        android:id="@+id/constraintButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="ConstraintLayout" />

    <Button
        android:id="@+id/linearButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="LinearLayout" />

    <Button
        android:id="@+id/gridButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="GridLayout" />

    <Button
        android:id="@+id/relativeButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="RelativeLayout" />

    <Button
        android:id="@+id/frameButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
```

```
    android:text="FrameLayout" />

    <Button
        android:id="@+id/tableButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="TableLayout" />

</LinearLayout>
```

```
package com.example.uicontrols;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

import com.example.uicontrols.R;

public class MainActivity extends AppCompatActivity {

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

        Button constraintButton = findViewById(R.id.constraintButton);
        Button linearButton = findViewById(R.id.linearButton);
        Button gridButton = findViewById(R.id.gridButton);
        Button relativeButton = findViewById(R.id.relativeButton);
        Button frameButton = findViewById(R.id.frameButton);
        Button tableButton = findViewById(R.id.tableButton);

        View.OnClickListener buttonClickListener = new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String layoutName = ((Button) v).getText().toString();
                displayToken(layoutName);
            }
        };
    }
}
```

```
constraintButton.setOnClickListener(buttonClickListener);
linearButton.setOnClickListener(buttonClickListener);
gridButton.setOnClickListener(buttonClickListener);

relativeButton.setOnClickListener(buttonClickListener);
frameButton.setOnClickListener(buttonClickListener);
tableButton.setOnClickListener(buttonClickListener);
}

private void displayToken(String layoutName) {
    Toast.makeText(this, "Token from " + layoutName, Toast.LENGTH_SHORT).show();
}
}
```

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    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:orientation="vertical"
    android:gravity="center"
    android:padding="16dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/counterTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="0"
        android:textSize="48sp"
        android:layout_marginBottom="24dp"/>

    <Button
        android:id="@+id/incrementButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Increment"
        android:layout_marginBottom="12dp"/>

    <Button
        android:id="@+id/decrementButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Decrement"
        android:layout_marginBottom="12dp"/>

    <Button
        android:id="@+id/resetButton"
```

```
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Reset"/>>

</LinearLayout>
```

```
package com.example.counter;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
    private TextView counterTextView;
    private int counter = 0;

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

        counterTextView = findViewById(R.id.counterTextView);
        Button incrementButton = findViewById(R.id.incrementButton);
        Button decrementButton = findViewById(R.id.decrementButton);
        Button resetButton = findViewById(R.id.resetButton);

        updateCounterTextView();

        incrementButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                counter++;
                updateCounterTextView();
            }
        });

        decrementButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                counter--;
                updateCounterTextView();
            }
        });
    }

    private void updateCounterTextView() {
        String counterString = String.valueOf(counter);
        counterTextView.setText(counterString);
    }
}
```

```
}

});

resetButton.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        counter = 0;
        updateCounterTextView();
    }
});

private void updateCounterTextView() {
    counterTextView.setText(String.valueOf(counter));
}
}
```

File 1 — activity_main.xml

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <LinearLayout xmlns:android="http://schemas.android.com/apk/
  res/android"
3   android:layout_width="match_parent"
4   android:layout_height="match_parent"
5   android:orientation="vertical"
6   android:padding="20dp">
7
8   <TextView
9     android:text="Login Form"
10    android:textSize="24sp"
11    android:textStyle="bold"
12    android:gravity="center"
13    android:layout_width="match_parent"
14    android:layout_height="wrap_content"
15    android:layout_marginBottom="20dp" />
16
17   <EditText
18     android:id="@+id/etUsername"
19     android:hint="Enter Username"
20     android:layout_width="match_parent"
21     android:layout_height="wrap_content"
22     android:inputType="text" />
23
24   <EditText
25     android:id="@+id/etPassword"
26     android:hint="Enter Password"
27     android:layout_width="match_parent"
28     android:layout_height="wrap_content"
29     android:inputType="textPassword" />
30
31   <Button
32     android:id="@+id/btnLogin"
33     android:text="Login"
34     android:layout_width="match_parent"
35     android:layout_height="wrap_content"
36     android:layout_marginTop="15dp" />
37 </LinearLayout>
```

File 2 — MainActivity.java

```
1 package com.example.myapplication;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import android.content.Intent;
5 import android.os.Bundle;
6 import android.widget.*;
7
8 public class MainActivity extends AppCompatActivity {
9
10     EditText etUsername, etPassword;
11     Button btnLogin;
12
13     @Override
14     protected void onCreate(Bundle savedInstanceState) {
15         super.onCreate(savedInstanceState);
16         setContentView(R.layout.activity_main);
17
18         etUsername = findViewById(R.id.etUsername);
19         etPassword = findViewById(R.id.etPassword);
20         btnLogin = findViewById(R.id.btnLogin);
21
22         btnLogin.setOnClickListener(v -> {
23             String user = etUsername.getText().toString().trim();
24             String pass = etPassword.getText().toString().trim();
25
26             if (user.equals("admin") && pass.equals("1234")) {
27                 // Move to WelcomeActivity after successful
28                 // login
29                 Intent i = new Intent(MainActivity.this,
30                     WelcomeActivity.class);
31                 i.putExtra("username", user);
32                 startActivity(i);
33             } else {
34                 Toast.makeText(MainActivity.this,
35                     "Invalid Credentials", Toast.LENGTH_SHORT)
36                     .show();
37             }
38         });
39     }
40 }
```

File 3 — activity_welcome.xml

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <LinearLayout xmlns:android="http://schemas.android.com/apk/
  res/android"
3   android:layout_width="match_parent"
4   android:layout_height="match_parent"
5   android:gravity="center"
6   android:orientation="vertical">
7
8   <TextView
9     android:id="@+id/textWelcome"
10    android:text="Welcome!"
11    android:textSize="26sp"
12    android:textStyle="bold"
13    android:layout_width="wrap_content"
14    android:layout_height="wrap_content" />
15 </LinearLayout>
```

File 4 — WelcomeActivity.java

```
1 package com.example.myapplication;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import android.os.Bundle;
5 import android.widget.TextView;
6
7 public class WelcomeActivity extends AppCompatActivity {
8
9     TextView textWelcome;
10
11     @Override
12     protected void onCreate(Bundle savedInstanceState) {
13         super.onCreate(savedInstanceState);
14         setContentView(R.layout.activity_welcome);
15
16         textWelcome = findViewById(R.id.textWelcome);
17
18         // Get username from Intent
19         String username = getIntent().getStringExtra("username
20             ");
21         textWelcome.setText("Welcome, " + username + "!");
22     }
23 }
```

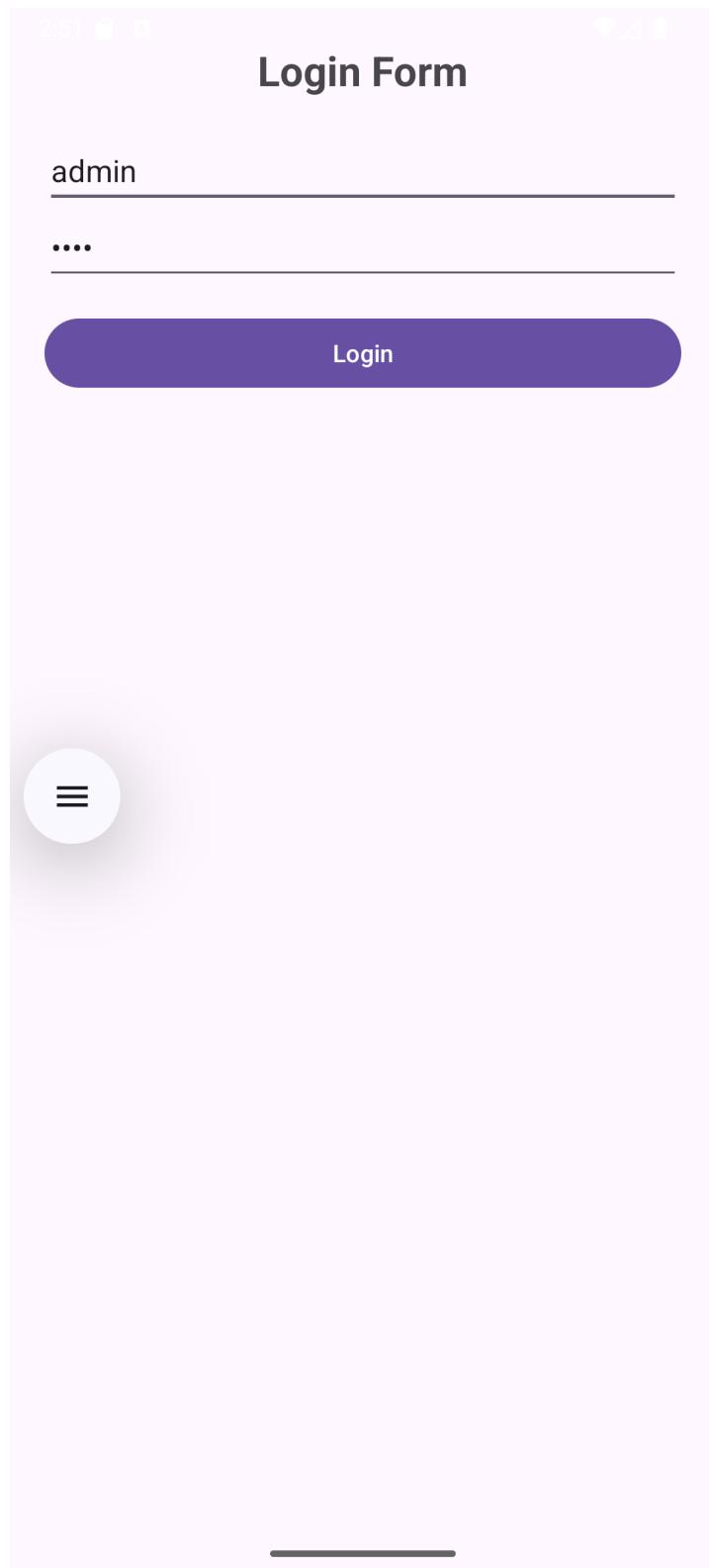


Figure 1: Login Screen

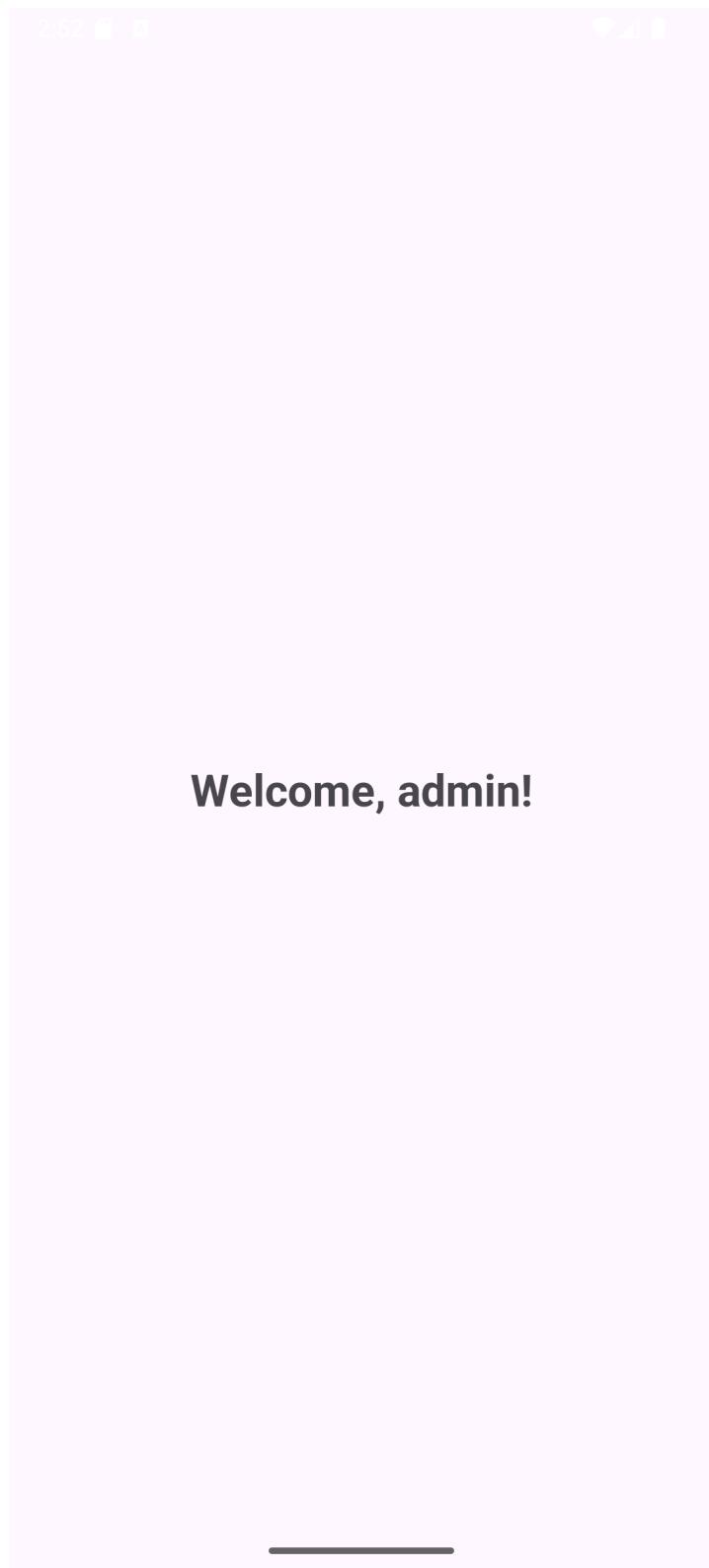


Figure 2: Welcome Screen after successful login

File 1 — activity_main.xml

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <FrameLayout xmlns:android="http://schemas.android.com/apk/res/
  /android"
3   android:id="@+id/frameLayout"
4   android:layout_width="match_parent"
5   android:layout_height="match_parent"
6   android:gravity="center"
7   android:background="#FFFFFF">
8
9   <!-- First image -->
10  <ImageView
11    android:id="@+id/image1"
12    android:layout_width="300dp"
13    android:layout_height="300dp"
14    android:src="@drawable/image1"
15    android:contentDescription="First Image" />
16
17  <!-- Second image (hidden initially) -->
18  <ImageView
19    android:id="@+id/image2"
20    android:layout_width="300dp"
21    android:layout_height="300dp"
22    android:src="@drawable/image2"
23    android:visibility="gone"
24    android:contentDescription="Second Image" />
25
26 </FrameLayout>
```

File 2 — MainActivity.java

```
1 package com.example.toggleimageapp;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import android.os.Bundle;
5 import android.view.View;
6 import android.widget.FrameLayout;
7 import android.widget.ImageView;
8
9 public class MainActivity extends AppCompatActivity {
10
11     ImageView img1, img2;
12     boolean showingFirst = true;
13
14     @Override
15     protected void onCreate(Bundle savedInstanceState) {
16         super.onCreate(savedInstanceState);
17         setContentView(R.layout.activity_main);
18
19         img1 = findViewById(R.id.image1);
20         img2 = findViewById(R.id.image2);
21         FrameLayout frame = findViewById(R.id.frameLayout);
22
23         // Toggle images when the frame is clicked
24         frame.setOnClickListener(new View.OnClickListener() {
25             @Override
26             public void onClick(View v) {
27                 if (showingFirst) {
28                     img1.setVisibility(View.GONE);
29                     img2.setVisibility(View.VISIBLE);
30                 } else {
31                     img1.setVisibility(View.VISIBLE);
32                     img2.setVisibility(View.GONE);
33                 }
34                 showingFirst = !showingFirst;
35             }
36         });
37     }
38 }
```



Figure 3: First Image Display



Figure 4: Second Image after clicking

File 1 — activity_main.xml

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <LinearLayout
3     xmlns:android="http://schemas.android.com/apk/res/android"
4     android:layout_width="match_parent"
5     android:layout_height="match_parent"
6     android:gravity="center"
7     android:orientation="vertical"
8     android:background="#ECECEC"
9     android:padding="24dp">
10
11     <TextView
12         android:layout_width="wrap_content"
13         android:layout_height="wrap_content"
14         android:text="Main Activity"
15         android:textSize="24sp"
16         android:textStyle="bold"
17         android:layout_marginBottom="20dp"/>
18
19     <Button
20         android:id="@+id/btnNext"
21         android:layout_width="wrap_content"
22         android:layout_height="wrap_content"
23         android:text="Go to Next Activity"
24         android:padding="12dp"
25         android:backgroundTint="#2196F3"
26         android:textColor="#FFFFFF" />
27
28 </LinearLayout>
```

File 2 — MainActivity.java

```
1 package com.example.intentdemo;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import android.content.Intent;
5 import android.os.Bundle;
6 import android.widget.Button;
7
8 public class MainActivity extends AppCompatActivity {
9
10     Button btnNext;
11
12     @Override
13     protected void onCreate(Bundle savedInstanceState) {
14         super.onCreate(savedInstanceState);
15         setContentView(R.layout.activity_main);
16
17         btnNext = findViewById(R.id.btnNext);
18
19         btnNext.setOnClickListener(v -> {
20             // Explicit Intent - to navigate to SecondActivity
21             Intent intent = new Intent(MainActivity.this,
22                 SecondActivity.class);
23             startActivity(intent);
24         });
25     }
26 }
```

File 3 — SecondActivity.java

```
1 package com.example.intentdemo;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import android.os.Bundle;
5 import android.widget.TextView;
6 import android.widget.LinearLayout;
7 import android.view.Gravity;
8 import android.graphics.Color;
9
10 public class SecondActivity extends AppCompatActivity {
11
12     @Override
13     protected void onCreate(Bundle savedInstanceState) {
14         super.onCreate(savedInstanceState);
15
16         // Simple layout created programmatically
17         LinearLayout layout = new LinearLayout(this);
18         layout.setOrientation(LinearLayout.VERTICAL);
19         layout.setGravity(Gravity.CENTER);
20
21         TextView txt = new TextView(this);
22         txt.setText("Welcome to the Second Activity!");
23         txt.setTextSize(22f);
24         txt.setTextColor(Color.BLACK);
25
26         layout.addView(txt);
27         setContentView(layout);
28     }
29 }
```

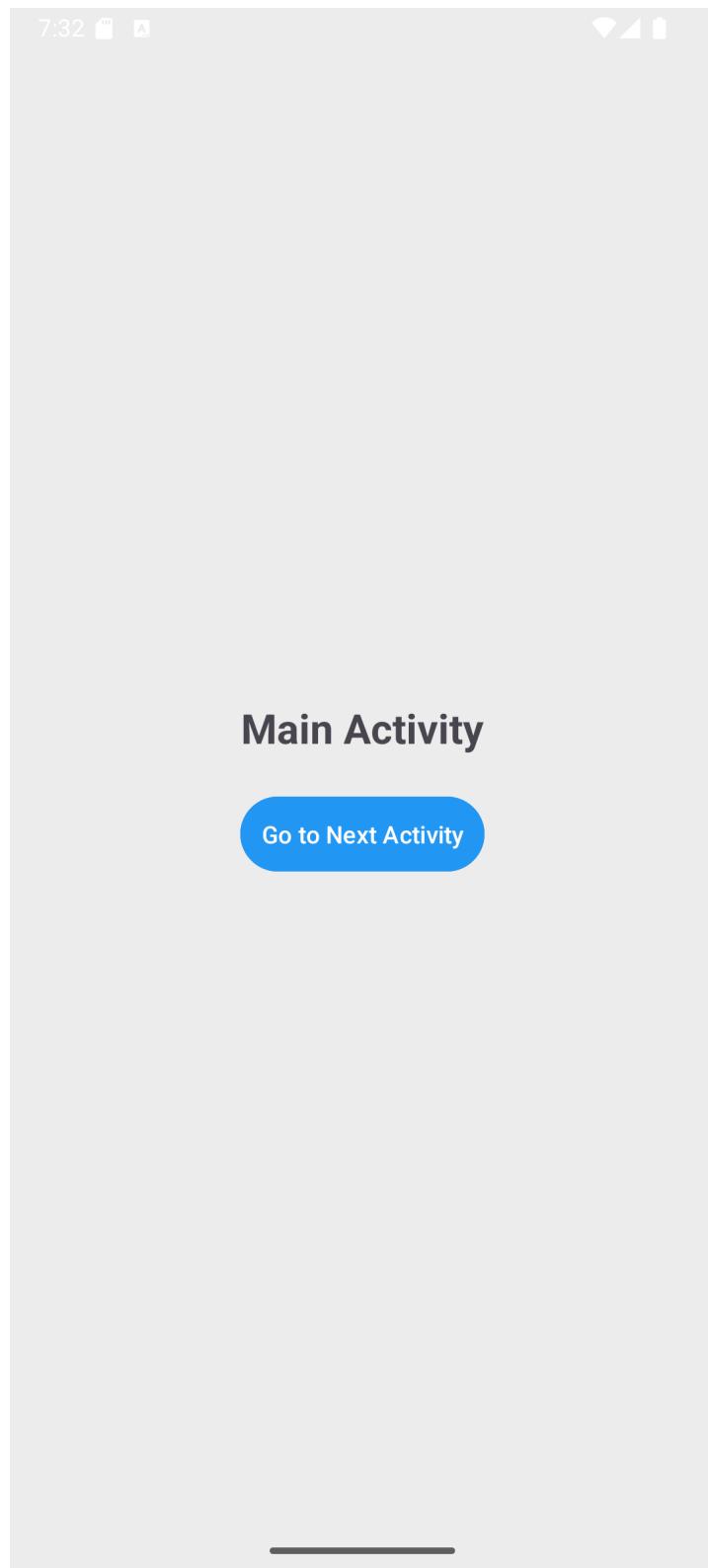


Figure 5: Main Activity Screen

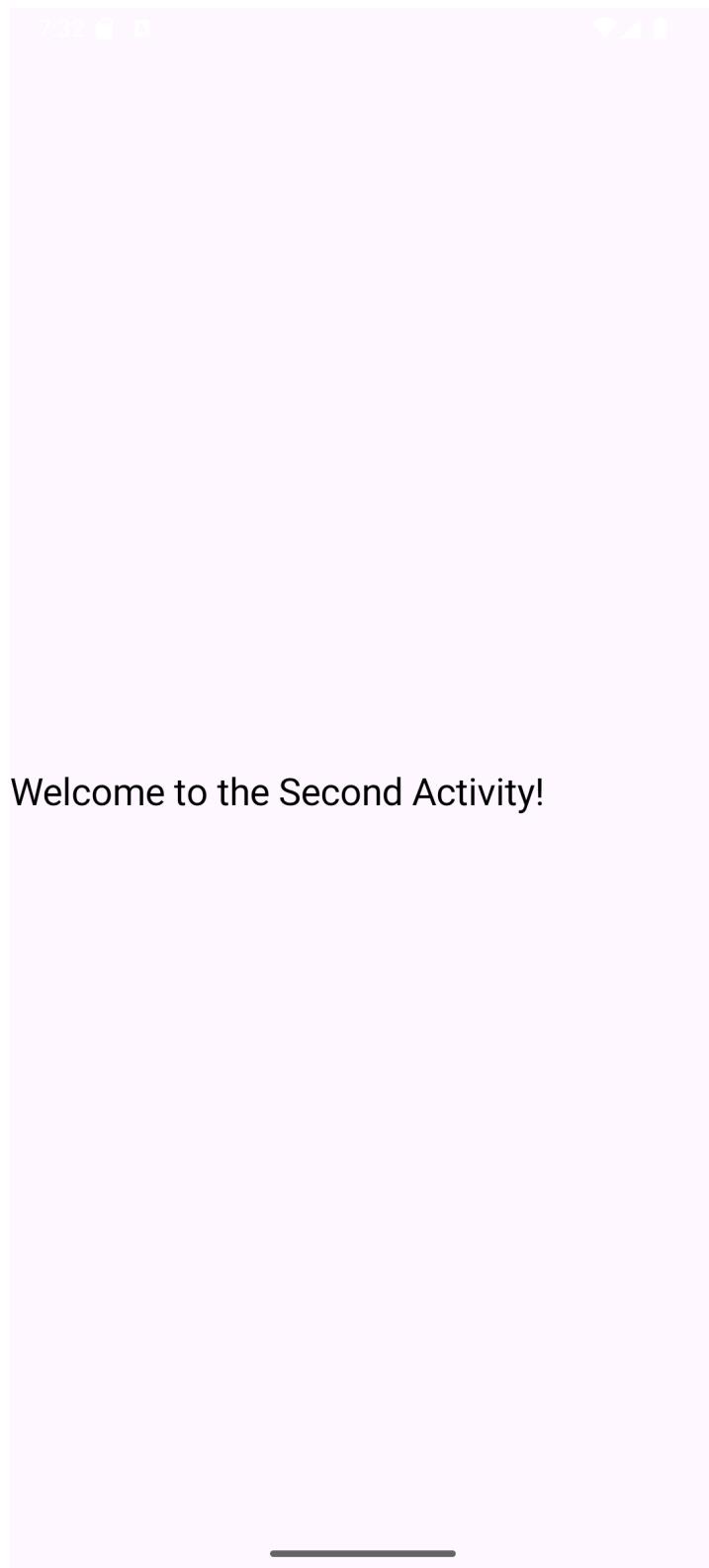


Figure 6: Second Activity Screen