



Sistema Universidad Abierta

**UNIDAD 5
ACTIVIDAD 1**

Materia:

PROGRAMACIÓN DE DISPOSITIVOS MÓVILES

Asesor:

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Semestre:

**6°
Semestre**

Alumno:

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Unidad 5.

Actividad 1.

1. Calcula la secuencia de fibonacci de cualquier número “ n ”
2. Deberá de emplear la estructura de control “*For*” o “Recursividad” para la ejecución de su programa.
3. Agregar dos botones en la vista, utilizando recursos XML. a. Primer botón de avance
b. Segundo botón de retroceso.
4. Agregar un *TextView* en la vista utilizando recursos XML, éste *textView* mostrará el valor actual de la secuencia *fibonacci*.
5. Al dar click en el botón deberá de realizar la secuencia *fibonacci* empezando con el número 1.

#1 click, el *textview* deberá de mostrar el valor de: 1
#2 click, el *textview* deberá de mostrar el valor de: 1
#3 click, el *textview* deberá de mostrar el valor de: 2
#4 click, el *textview* deberá de mostrar el valor de: 3
#5 click, el *textview* deberá de mostrar el valor de: 5
#6 click, el *textview* deberá de mostrar el valor de: 8
... consecutivamente ...

Incluir “*memoization*” en el cálculo de la secuencia fibonacci.

```
package com.example.myapplication;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.Button;
import android.widget.TextView;
import java.util.HashMap;

public class MainActivity extends AppCompatActivity {

    // 1. Declarar Vistas y variables de estado
    private TextView tvFibonacciResult;
    private Button btnNext, btnPrevious;

    // Esta es la "memoria" para guardar cálculos.
    // Usamos Long porque la secuencia Fibonacci crece muy rápido.
    private HashMap<Integer, Long> memoCache = new HashMap<>();

    // Esta variable rastrea nuestra posición actual en la secuencia
    // Empezamos en 1 (F(1)) según tu ejemplo.
    private int currentIndex = 1;

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

        // 2. Conectar las Vistas del XML
        tvFibonacciResult = findViewById(R.id.tv_fibonacci_result);
        btnNext = findViewById(R.id.btn_next);
        btnPrevious = findViewById(R.id.btn_previous);
    }
}
```

```

    // 3. Configurar los Listeners (eventos de click)
    setupListeners();

    // 4. Mostrar el valor inicial (F(1) = 1)
    updateFibonacciDisplay();
}

/**
 * Configura los clicks de los botones
 */
private void setupListeners() {

    // 5. Lógica del botón de AVANCE
    btnNext.setOnClickListener(v -> {
        currentIndex++;
        updateFibonacciDisplay();
    });

    // 5. Lógica del botón de RETROCESO
    btnPrevious.setOnClickListener(v -> {
        // No permitimos retroceder más allá de 1
        if (currentIndex > 1) {
            currentIndex--;
            updateFibonacciDisplay();
        }
    });
}

/**
 * Calcula el valor de Fibonacci y actualiza el TextView
 */
private void updateFibonacciDisplay() {
    long fibValue = fibonacci(currentIndex);
    tvFibonacciResult.setText(String.valueOf(fibValue));
}

/**
 * 2. Función RECURSIVA con MEMOIZATION para calcular Fibonacci(n)
 *
 * F(n) = F(n-1) + F(n-2)
 * Casos base: F(0) = 0, F(1) = 1
 */
private long fibonacci(int n) {
    // Casos Base de la recursividad
    if (n <= 1) {
        return n; // F(0) = 0, F(1) = 1
    }

    // ---- INICIO DE MEMOIZATION ----
    // 1. Revisar si ya calculamos este valor antes
    if (memoCache.containsKey(n)) {
        // Si está en el caché, lo regresamos directamente.
        // Esto evita miles de cálculos repetidos.
        return memoCache.get(n);
    }
    // ---- FIN DE MEMOIZATION ----
}

```

```

        // 2. Si no está en el caché, lo calculamos (la llamada
        recursiva)
        long result = fibonacci(n - 1) + fibonacci(n - 2);

        // 3. Guardamos el resultado en el caché antes de regresarla
        memoCache.put(n, result);

        return result;
    }
}

```

The screenshot shows the Android Studio interface with the code editor open to the MainActivity.java file. The code implements a recursive Fibonacci calculation with memoization using a HashMap. It includes declarations for views, a memoization map, and logic for advancing the current index and updating the display. The code is annotated with comments explaining each step.

```

package com.example.myapplication;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.Button;
import android.widget.TextView;
import java.util.HashMap;

public class MainActivity extends AppCompatActivity {

    // 1. Declaramos Vistas y variables de estado
    private TextView tvFibonacciResult;
    private Button btnNext, btnPrevious;

    // Esta es la "memoria" para guardar cálculos.
    // Usamos Long porque la secuencia Fibonacci crece muy rápido.
    private HashMap<Long, Long> memoCache = new HashMap<>();

    // Esta variable rastrea nuestra posición actual en la secuencia
    // Empezamos en 1 (F(1)) según tu ejemplo.
    private int currentIndex = 1;

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

        // 2. Conectar las Vistas del XML
        tvFibonacciResult = findViewById(R.id.tv_fibonacci_result);
        btnNext = findViewById(R.id.btn_next);
        btnPrevious = findViewById(R.id.btn_previous);

        // 3. Configurar los Listener (eventos de click)
        setupListeners();
    }

    // 4. Mostrar el valor inicial (F(1) = 1)
    updateFibonacciDisplay();

    /**
     * Configura los clicks de los botones
     */
}

```

The screenshot continues the MainActivity.java code. It adds logic for the 'next' button to increment the current index and update the display. It also adds logic for the 'previous' button to decrement the current index and update the display, ensuring it stays within bounds. Base cases for F(0) and F(1) are defined at the bottom of the function.

```

    /**
     * Configura los clicks de los botones
     */
}

private void setupListeners() {
    // 5. Lógica del botón de AVANCE
    btnNext.setOnClickListener(v -> {
        currentIndex++;
        updateFibonacciDisplay();
    });

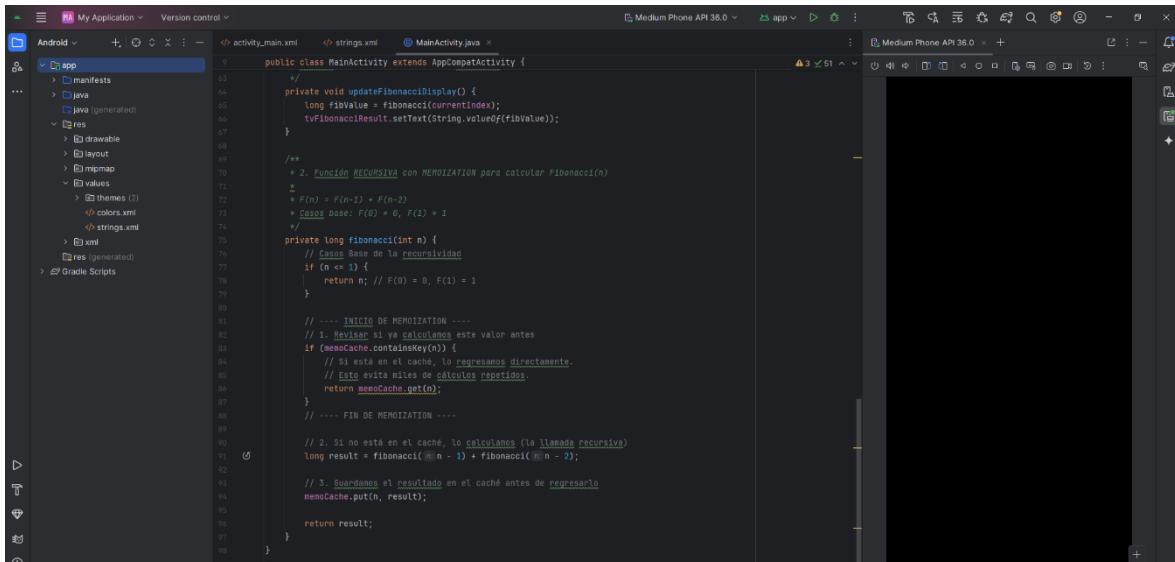
    // 6. Lógica del botón de RETROCESO
    btnPrevious.setOnClickListener(v -> {
        // No permitimos retroceder más allá de 1
        if (currentIndex > 1) {
            currentIndex--;
            updateFibonacciDisplay();
        }
    });
}

// Calcula el valor de Fibonacci y actualiza el TextView
private void updateFibonacciDisplay() {
    long fibValue = fibonacci(currentIndex);
    tvFibonacciResult.setText(String.valueOf(fibValue));
}

/**
 * 2. Función RECURSIVA con MEMORIZACIÓN para calcular Fibonacci(n)
 *
 * F(n) = F(n-1) + F(n-2)
 * Caso base: F(0) = 0, F(1) = 1
 */
private long fibonacci(int n) {
    // Caso Base de la recursividad
    if (n <= 1) {
        return n; // F(0) = 0, F(1) = 1
    }

    // ---- INICIO DE MEMORIZACIÓN ----
    // 1. Revisar si ya calculamos este valor antes
}

```



The screenshot shows the Android Studio interface with the project 'My Application' open. The left sidebar shows the project structure with 'app' selected. The main editor window displays the 'MainActivity.java' file. The code implements a recursive function for calculating Fibonacci numbers with memoization. It includes comments explaining the steps: checking if the result is already in the cache, calculating it if not, and then putting it in the cache before returning.

```
public class MainActivity extends AppCompatActivity {
    ...
    private void updateFibonacciDisplay() {
        long fibValue = fibonacci(currentIndex);
        tvFibonacciResult.setText(String.valueOf(fibValue));
    }

    /**
     * 2. Función RECURSIVA con MEMORIZACIÓN para calcular Fibonacci(n)
     */
    long F(n) {
        if (n < 1) {
            return n; // Caso base: F(0) = 0, F(1) = 1
        }
        // ---- INICIO DE MEMORIZACIÓN ----
        // 1. Revisar si ya calculamos este valor antes
        if (memoCache.containsKey(n)) {
            // Si está en el caché, lo regresamos directamente.
            // Esto evita miles de cálculos repetidos.
            return memoCache.get(n);
        }
        // ---- FIN DE MEMORIZACIÓN ----

        // 2. Si no está en el caché, lo calculamos (la llamada recursiva)
        long result = fibonacci(n - 1) + fibonacci(n - 2);

        // 3. Guardamos el resultado en el caché antes de regresarlo
        memoCache.put(n, result);
        return result;
    }
}
```

```
<?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:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="16dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

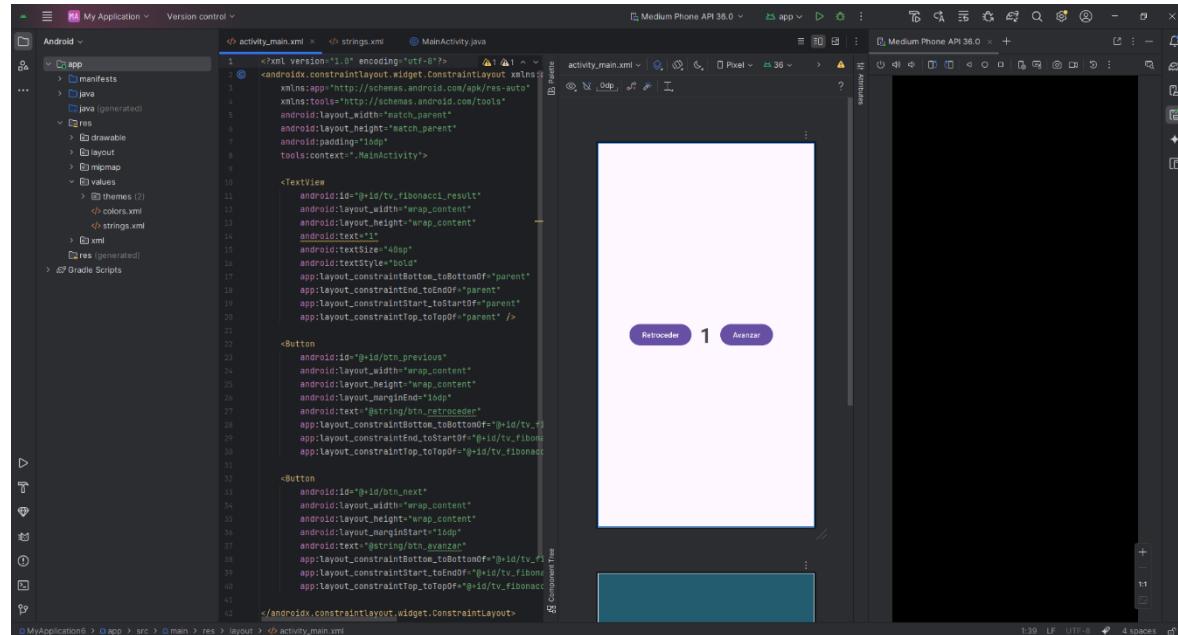
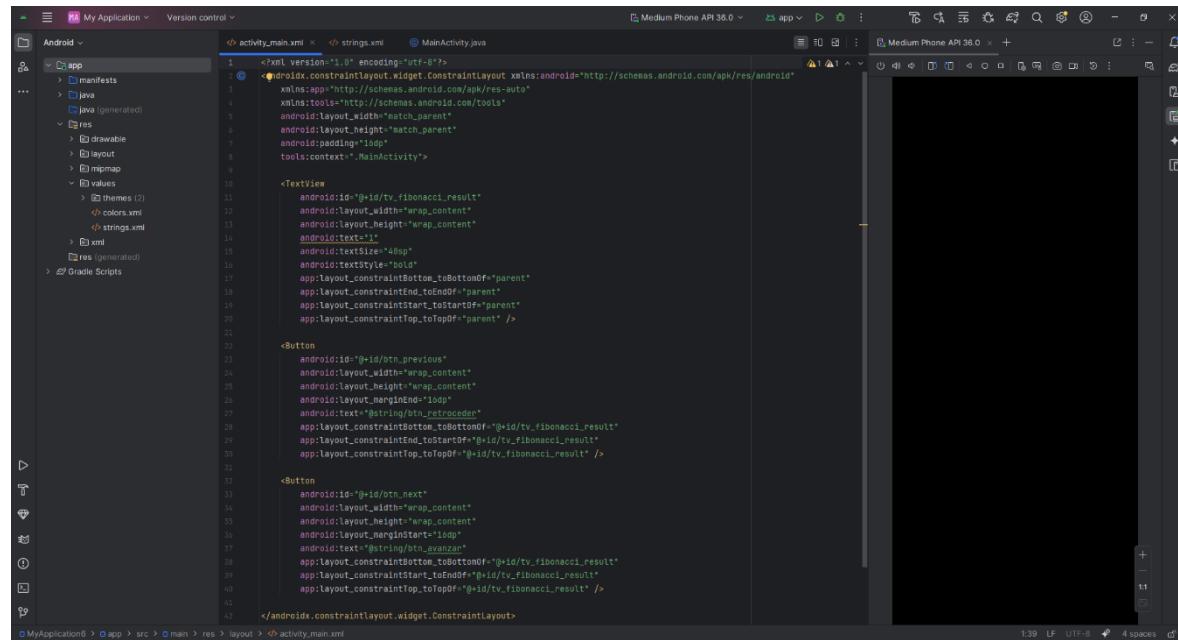
    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:text="@string/btn_avanzar"
```

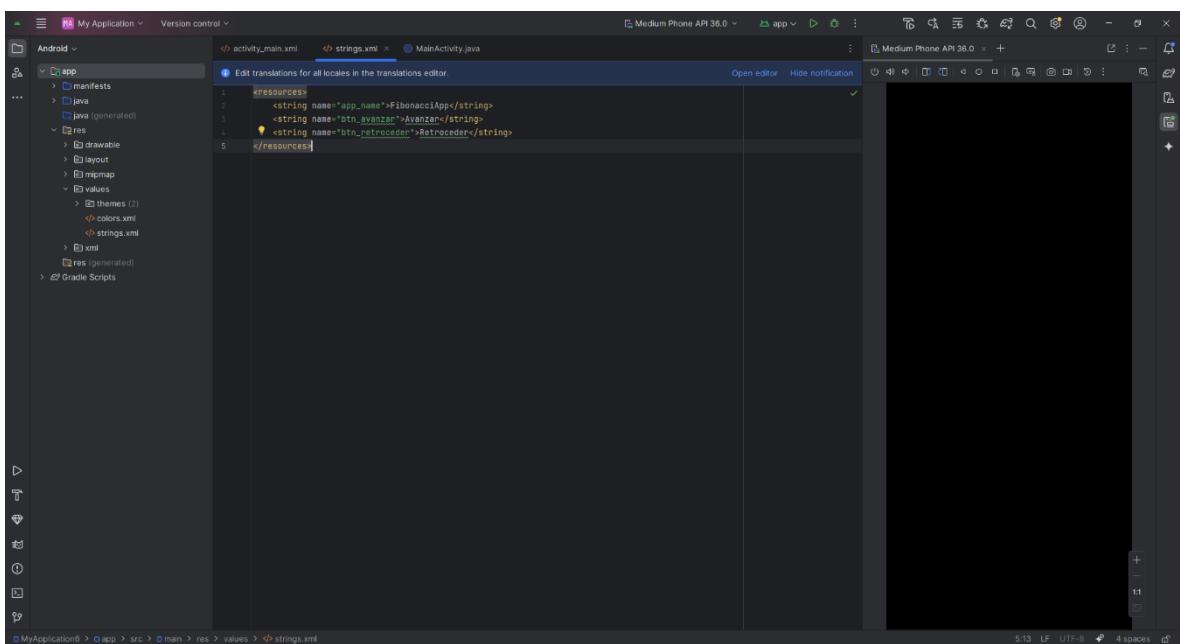
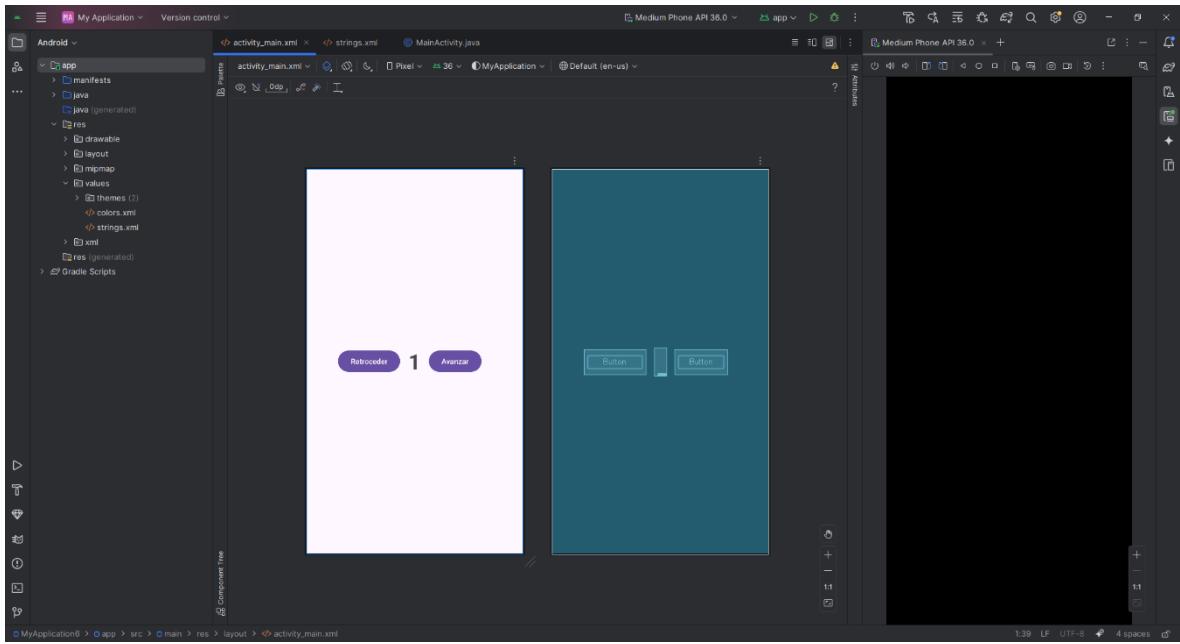
```

        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    </androidx.constraintlayout.widget.ConstraintLayout>

```





Avanzar.

This screenshot shows the Android Studio interface with the XML code for the main activity's layout. The code defines a ConstraintLayout with two TextViews and two Buttons. The first TextView displays the Fibonacci result, and the second TextView displays the previous number. The first Button is labeled 'previous' and the second Button is labeled 'next'. The layout uses wrap_content for most dimensions and matches_parent for the width of the TextViews.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    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:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanzar"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

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

This screenshot shows the same XML code for activity_main.xml as the previous one, but with a numerical value of '2' displayed at the bottom right instead of '1'. This indicates a change in the state or a step in a process, likely related to the Fibonacci sequence calculation.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    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:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanzar"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

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

This screenshot shows the Android Studio interface with the XML code for the main activity's layout. The code defines a ConstraintLayout with two buttons and one TextView. The first button is labeled 'Anterior' and the second is labeled 'Siguiente'. Both buttons have their text color set to white. The TextView displays the Fibonacci result. The layout uses wrap_content for most dimensions and specific padding values.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retsodecer"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanzar"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

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

This screenshot shows the same XML code for activity_main.xml as the previous one, but with a different visual representation of the layout. The layout consists of three main components: a TextView at the top, a Button labeled 'Anterior' below it, and a Button labeled 'Siguiente' at the bottom. The 'Anterior' button is positioned to the left of the 'Siguiente' button, and both are aligned vertically with the TextView above them.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retsodecer"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanzar"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

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

This screenshot shows the Android Studio interface with the XML code for the main activity's layout. The code defines a ConstraintLayout with two buttons and one TextView. The first button is labeled 'previous' and the second is labeled 'next'. Both buttons have their text color set to green. The TextView displays the Fibonacci result. The layout uses wrap_content for most dimensions and specific padding values.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanzar"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toStartOf="@+id/tv_fibonacci_result" />

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

This screenshot shows the same XML code for activity_main.xml as the previous one, but with a different cursor position. The number '13' is displayed at the bottom center, indicating the current line of code being edited or focused.

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanzar"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toStartOf="@+id/tv_fibonacci_result" />

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

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="1"
        android:textSize="40dp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanza"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

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

21

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="1"
        android:textSize="40dp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

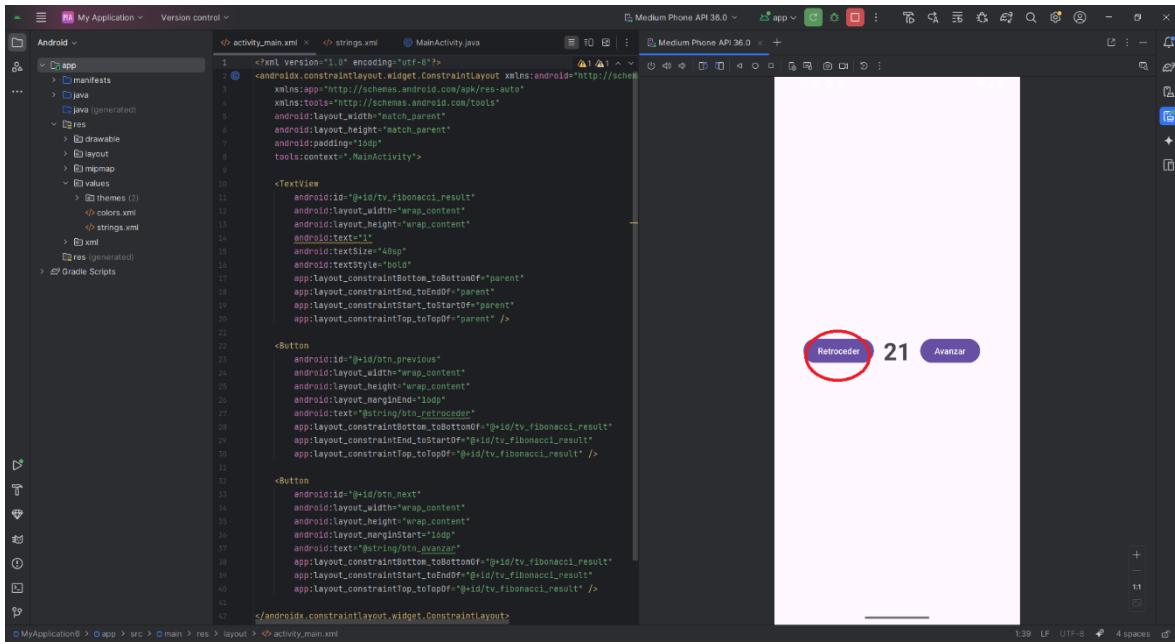
    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanza"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

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

34

Retroceder.



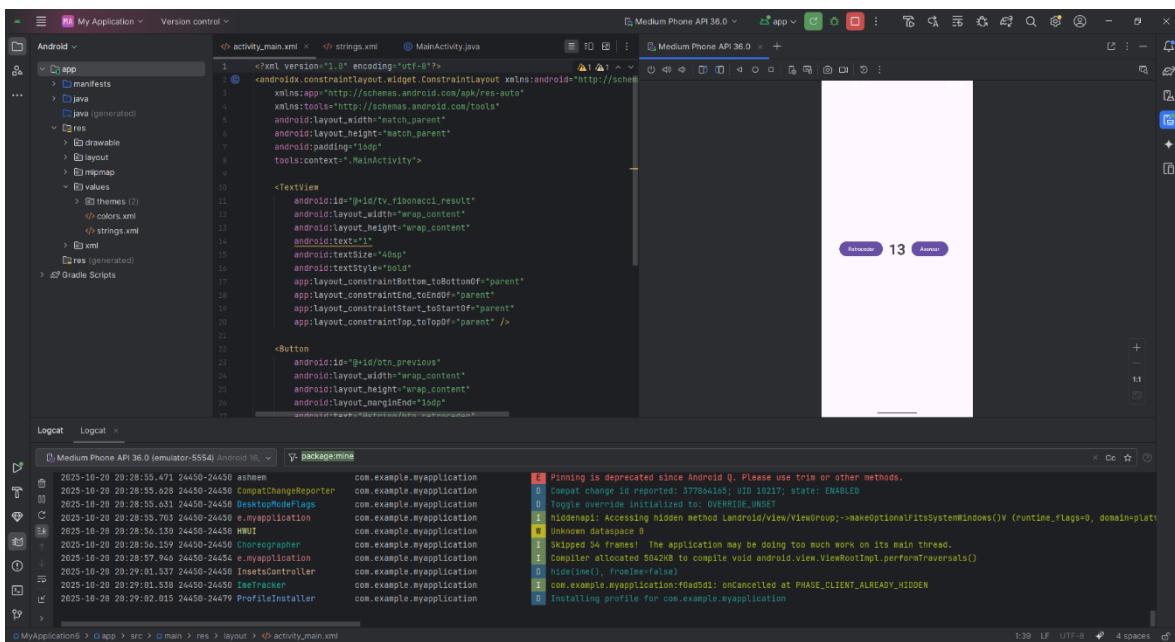
```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanzar"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

```



```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    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:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="@string/btn_retroceder"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintEnd_toStartOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

    <Button
        android:id="@+id/btn_next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="10dp"
        android:text="@string/btn_avanzar"
        app:layout_constraintBottom_toBottomOf="@+id/tv_fibonacci_result"
        app:layout_constraintStart_toEndOf="@+id/tv_fibonacci_result"
        app:layout_constraintTop_toTopOf="@+id/tv_fibonacci_result" />

```

Logcat

Time	Message
2025-10-20 20:28:55.471 24450-24450 ashmen	com.example.myapplication
2025-10-20 20:28:55.628 24450-24450 CompatChangeReporter	com.example.myapplication
2025-10-20 20:28:55.631 24450-24450 DesktopModeFlags	com.example.myapplication
2025-10-20 20:28:56.130 24450-24450 HUI	com.example.myapplication
2025-10-20 20:28:56.159 24450-24450 e.myapplication	com.example.myapplication
2025-10-20 20:28:57.940 24450-24450 Choreographer	com.example.myapplication
2025-10-20 20:29:01.337 24450-24450 InsetsController	com.example.myapplication
2025-10-20 20:29:01.530 24450-24450 ImeTracker	com.example.myapplication
2025-10-20 20:29:02.015 24450-24479 ProfileInstaller	com.example.myapplication

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:layout_marginBottom="10dp"
        android:onClick="fibonacciResult" />

```

```
2025-10-20 20:28:55.471 24450-24450 ashmen com.example.myapplication
2025-10-20 20:28:55.628 24450-24450 CompatChangeReporter com.example.myapplication
2025-10-20 20:28:55.703 24450-24450 DesktopModeFlags com.example.myapplication
2025-10-20 20:28:55.731 24450-24450 e.myapplication com.example.myapplication
2025-10-20 20:28:56.159 24450-24450 HWUI com.example.myapplication
2025-10-20 20:28:56.159 24450-24450 Choreographer com.example.myapplication
2025-10-20 20:28:57.946 24450-24450 e.myapplication com.example.myapplication
2025-10-20 20:29:15.537 24450-24450 InsetsController com.example.myapplication
2025-10-20 20:29:15.538 24450-24450 InputTracker com.example.myapplication
2025-10-20 20:29:15.915 24450-24450 ProfileInstaller com.example.myapplication

I/Pinning is deprecated since Android Q. Please use trim or other methods.
D/Compat change id reported: 377864165; UID 10217; state: ENABLED
D/Toggle override initialized to: OVERRIDE_UNSET
I/hidempi: Accessing hidden method Landroid/view/ViewGroup;->makeOptionalFitsSystemWindows()V (runtime_flags=0, domain=platform)
W/Unknown datasource 0
I/Skipped 54 frames! The application may be doing too much work on its main thread.
I/Compiler allocated 5042KB to compile void android.view.ViewRootImpl.performTraversals()
D/hide(ime(), fromImeValue)
I/com.example.myapplication:f@ad5d5: onCancelled at PHASE_CLIENT_ALREADY_HIDDEN
D/Installing profile for com.example.myapplication
```

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:layout_marginBottom="10dp"
        android:onClick="fibonacciResult" />
```

```
2025-10-20 20:28:55.471 24450-24450 ashmen com.example.myapplication
2025-10-20 20:28:55.628 24450-24450 CompatChangeReporter com.example.myapplication
2025-10-20 20:28:55.703 24450-24450 DesktopModeFlags com.example.myapplication
2025-10-20 20:28:55.731 24450-24450 e.myapplication com.example.myapplication
2025-10-20 20:28:56.159 24450-24450 HWUI com.example.myapplication
2025-10-20 20:28:56.159 24450-24450 Choreographer com.example.myapplication
2025-10-20 20:28:57.946 24450-24450 e.myapplication com.example.myapplication
2025-10-20 20:29:15.537 24450-24450 InsetsController com.example.myapplication
2025-10-20 20:29:15.538 24450-24450 InputTracker com.example.myapplication
2025-10-20 20:29:15.915 24450-24450 ProfileInstaller com.example.myapplication

I/Pinning is deprecated since Android Q. Please use trim or other methods.
D/Compat change id reported: 377864165; UID 10217; state: ENABLED
D/Toggle override initialized to: OVERRIDE_UNSET
I/hidempi: Accessing hidden method Landroid/view/ViewGroup;->makeOptionalFitsSystemWindows()V (runtime_flags=0, domain=platform)
W/Unknown datasource 0
I/Skipped 54 frames! The application may be doing too much work on its main thread.
I/Compiler allocated 5042KB to compile void android.view.ViewRootImpl.performTraversals()
D/hide(ime(), fromImeValue)
I/com.example.myapplication:f@ad5d5: onCancelled at PHASE_CLIENT_ALREADY_HIDDEN
D/Installing profile for com.example.myapplication
```

The screenshot shows the Android Studio interface. The top navigation bar includes 'My Application', 'Version control', and tabs for 'activity_main.xml', 'strings.xml', and 'MainActivity.java'. The main area displays the XML code for 'activity_main.xml':

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res-auto"
    xmlns:app="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="10dp"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/tv_fibonacci_result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="1"
        android:textSize="40sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_previous"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="10dp"
        android:text="Previous" />

```

The bottom section shows the Logcat tab with the title 'Medium Phone API 36.0 (emulator-5554) Android 10'. It lists numerous log entries, many of which are related to system processes like 'CompatChangeReporter', 'DesktopModeFlags', and 'HwUI'. A message from 'com.example.myapplication' indicates that 'Pinning is deprecated since Android Q. Please use trim or other methods.'

This screenshot is nearly identical to the one above, showing the same code editor for 'activity_main.xml' and the same Logcat output for 'Medium Phone API 36.0 (emulator-5554) Android 10'. The log entries are identical, including the deprecation warning about pinning.

The screenshot shows the Android Studio interface with the following components:

- Code Editor:** Displays the `activity_main.xml` file, which contains XML code for a UI layout. The code includes constraints for a `Textview` and a `Button`.
- Layout Editor:** Shows a visual representation of the layout defined in `activity_main.xml`.
- Logcat:** Shows log messages from the emulator. One message is highlighted in yellow:

```
2025-10-20 20:28:55.471 24450-24450 ashmen com.example.myapplication
    I Pinning is deprecated since Android Q. Please use trim or other methods.
```
- Bottom Status Bar:** Shows the time (1:39), battery level (LF), and other system status indicators.