기본 위젯

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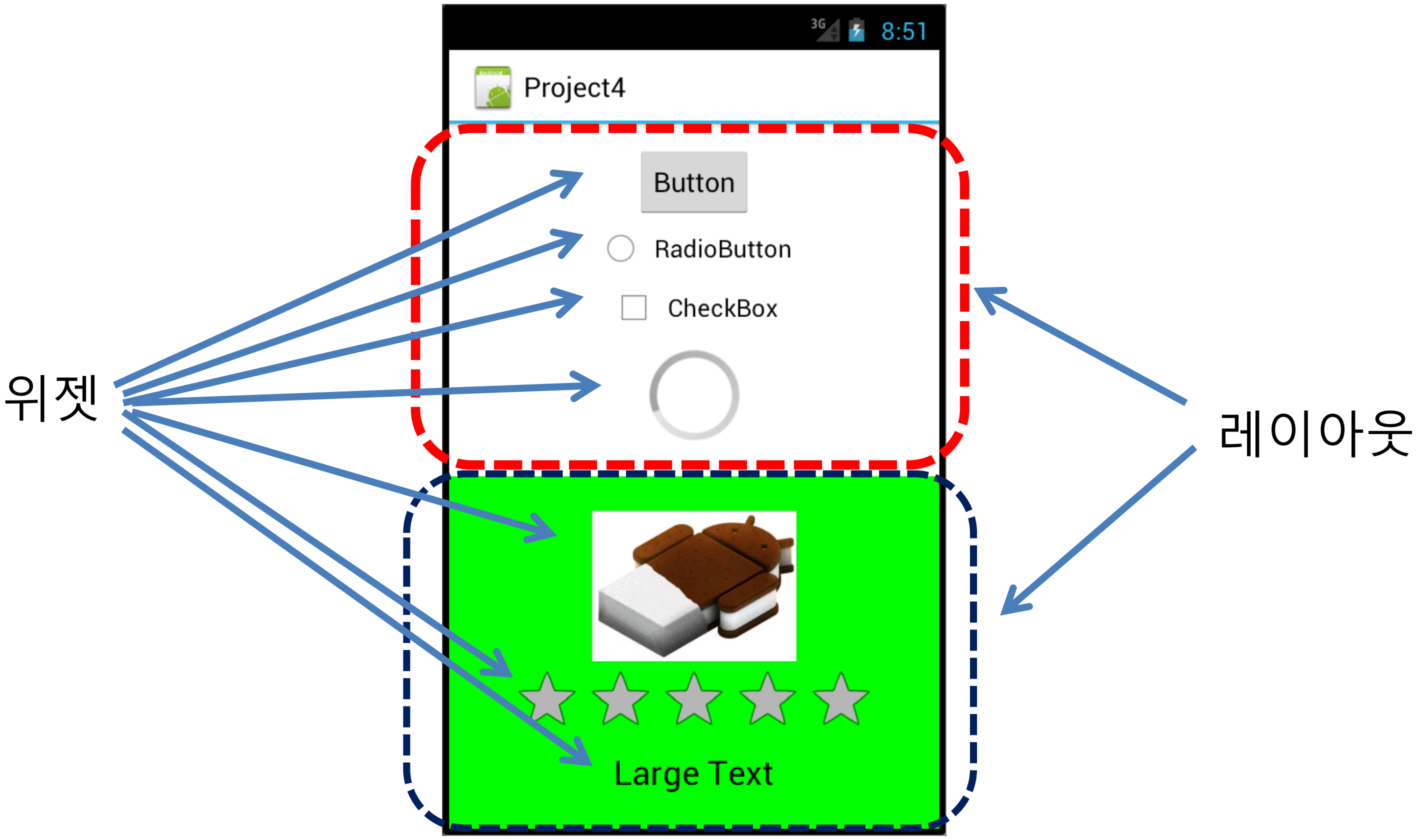
뷰와 레이아웃

- 뷰란?
  - 앱 실행 화면을 구성하는 요소 중에서 가장 상위에 있는 클래스
    - Ex: 텍스트 뷰, 버튼, 체크 박스 등 → 모두 뷰 클래스에서 상속
  - 뷰 클래스에서 상속을 받은 클래스 위젯(또는 뷰)로 지칭
- 레이아웃
  - 다른 위젯을 담을 수 있는 클래스

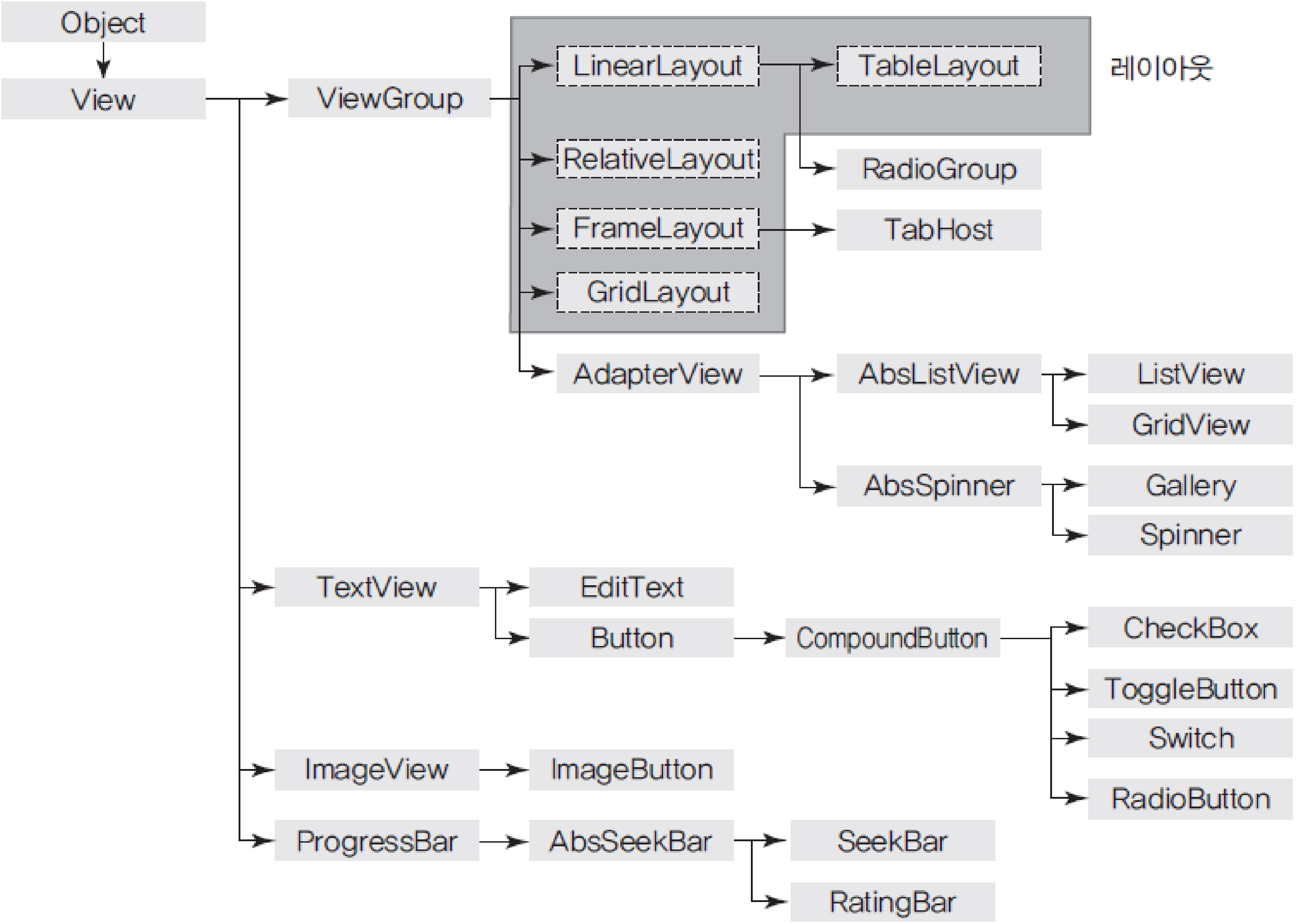
뷰와 레이아웃



위젯

레이아웃

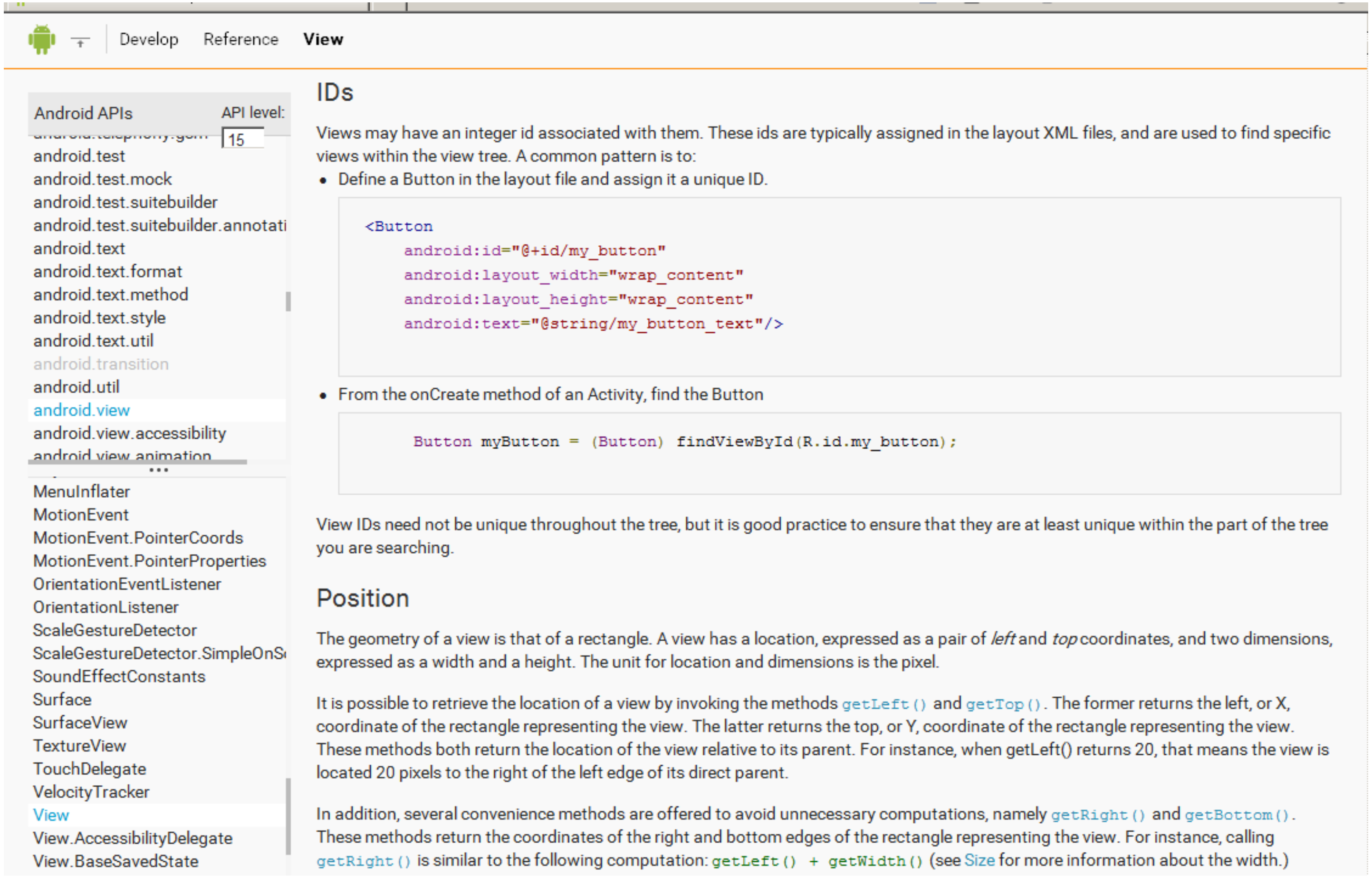
뷰 클래스 계층도



Object
View
ViewGroup
LinearLayout
TableLayout
레이아웃
RelativeLayout
RadioGroup
FrameLayout
TabHost
GridLayout
AdapterView
AbsListView
ListView
GridView
AbsSpinner
Gallery
Spinner
TextView
EditText
Button
CompoundButton
CheckBox
ToggleButton
Switch
RadioButton
ImageView
ImageButton
ProgressBar
AbsSeekBar
SeekBar
RatingBar

뷰 클래스의 상속 관계

- http://developer.android.com



IDs

Views may have an integer id associated with them. These ids are typically assigned in the layout XML files, and are used to find specific views within the view tree. A common pattern is to:

- Define a Button in the layout file and assign it a unique ID.

```
<Button
    android:id="@+id/my_button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/my_button_text"/>
```

- From the onCreate method of an Activity, find the Button

```
     Button myButton = (Button) findViewById(R.id.my_button);
```

View IDs need not be unique throughout the tree, but it is good practice to ensure that they are at least unique within the part of the tree you are searching.

Position

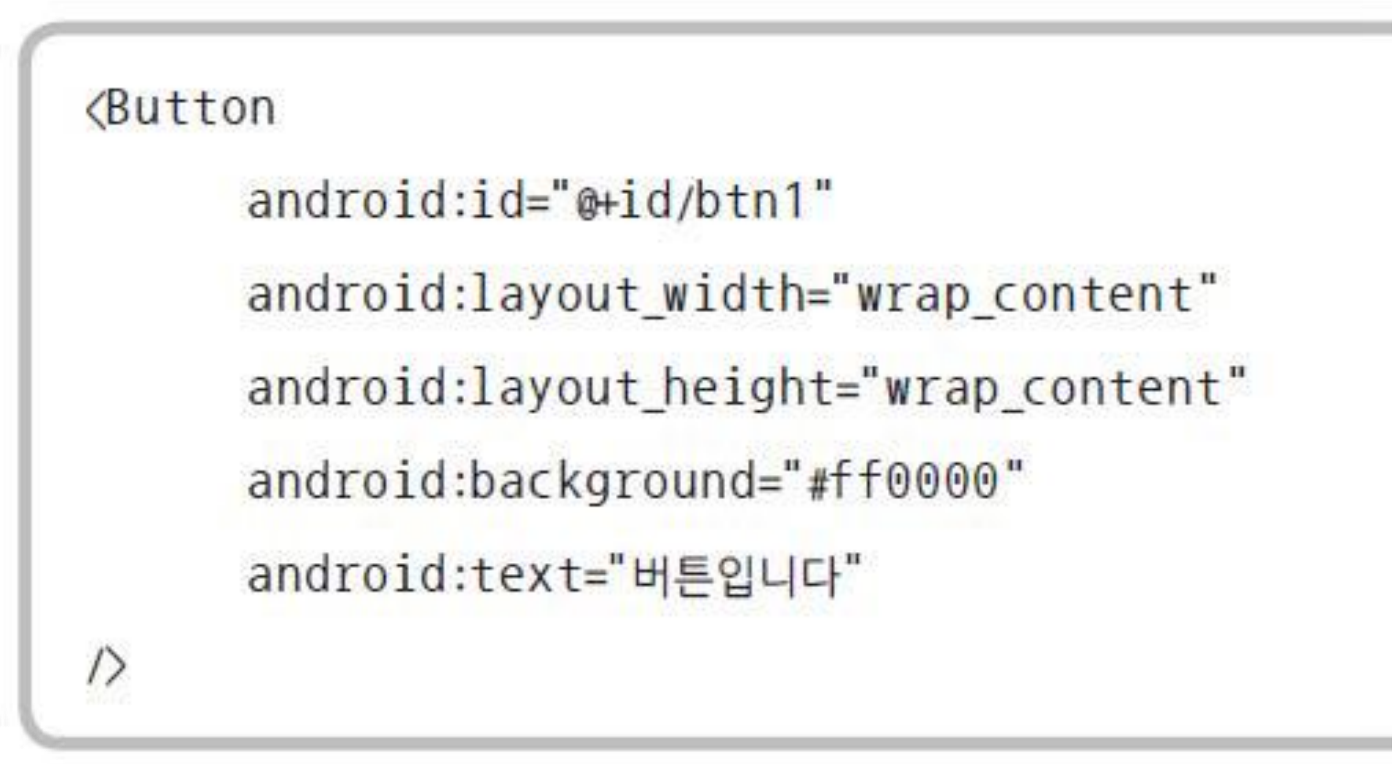
The geometry of a view is that of a rectangle. A view has a location, expressed as a pair of *left* and *top* coordinates, and two dimensions, expressed as a width and a height. The unit for location and dimensions is the pixel.

It is possible to retrieve the location of a view by invoking the methods `getLeft()` and `getTop()`. The former returns the left, or X, coordinate of the rectangle representing the view. The latter returns the top, or Y, coordinate of the rectangle representing the view. These methods both return the location of the view relative to its parent. For instance, when getLeft() returns 20, that means the view is located 20 pixels to the right of the left edge of its direct parent.

In addition, several convenience methods are offered to avoid unnecessary computations, namely `getRight()` and `getBottom()`. These methods return the coordinates of the right and bottom edges of the rectangle representing the view. For instance, calling `getRight()` is similar to the following computation: `getLeft() + getWidth()` (see Size for more information about the width.)

뷰 클래스 XML 속성

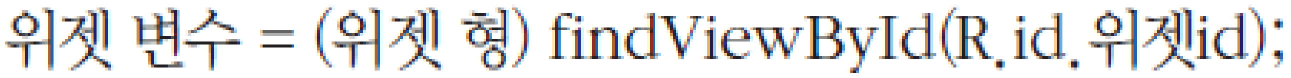
- 위젯과 레이아웃 등은 모두 View 클래스의 속성과 메소드를 상속받음



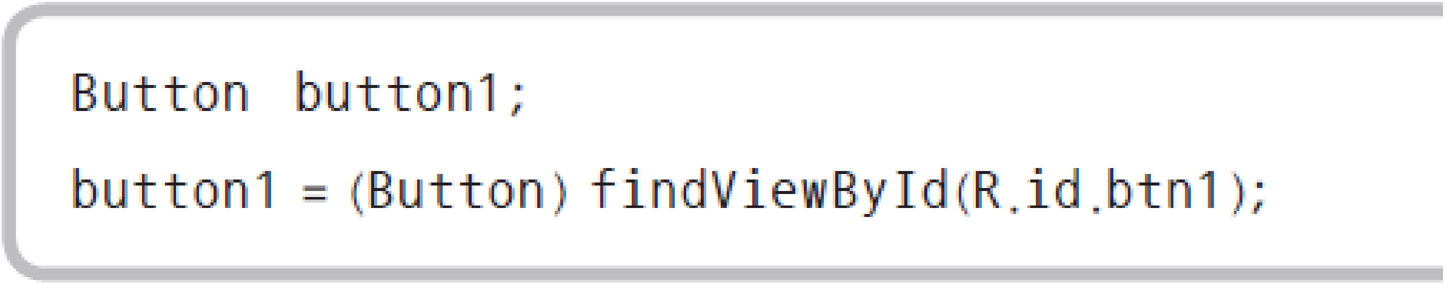
```
<Button
        android:id="@+id/btn1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:background="#ff0000"
        android:text="버튼입니다"
/>
```

뷰 클래스의 XML 속성

- id
  - 위젯의 아이디
  - Java 코드에서 위젯에 접근할 때 id 속성에 지정한 아이디 사용



위젯 변수 = (위젯 형) findViewById(R.id.위젯id);



```
Button  button1;
button1 = (Button) findViewById(R.id.btn1);
```

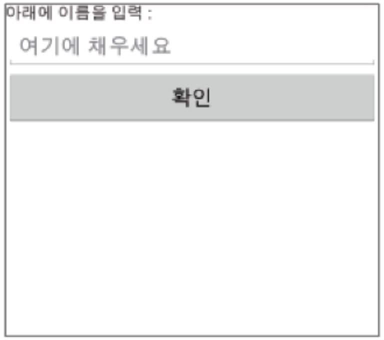
뷰 클래스의 XML 속성

- layout_width, layout_height
  - 위젯의 폭과 높이
  - 속성값 match_parent(=fill_parent)는 이름 그대로 자신의 부모(대개는 레이아웃)에 폭이나 높이를 맞춘다는 의미
  - 속성값 wrap_content는 자신의 폭이나 높이를 자신 안의 글자가 꼭 들어갈 정도로 설정한다는 의미

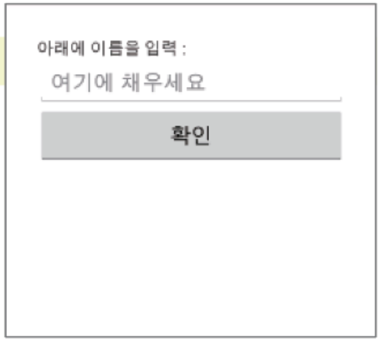
뷰 클래스 XML 속성

- padding
  - 위젯의 경계선으로부터 위젯 안의 요소가 떨어지도록 설정

```
<LinearLayout >
    <TextView
        android:text="아래에 이름을 입력 :" />
    <EditText
        android:hint="여기에 채우세요" />
    <Button
        android:text="확인" />
</LinearLayout>
```

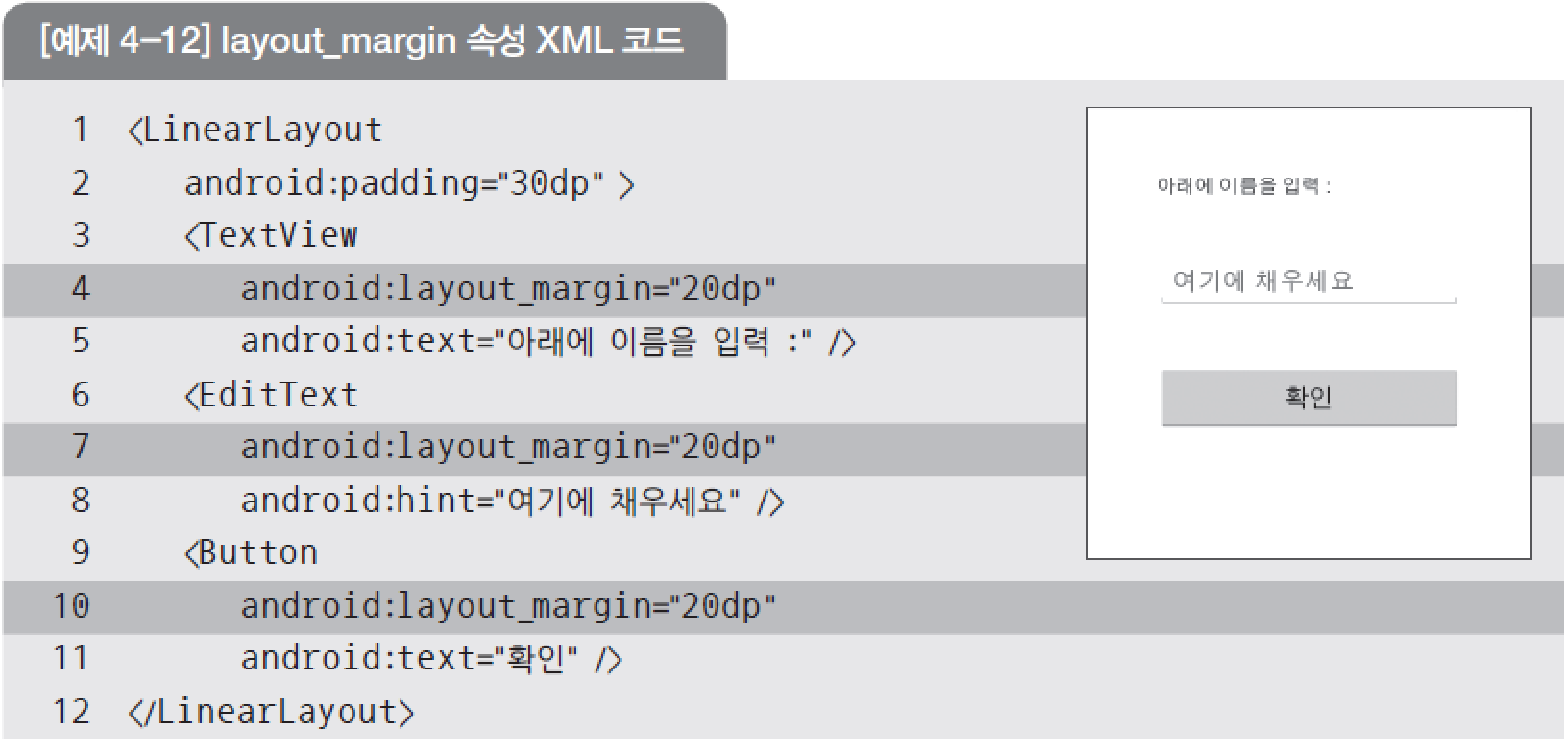


```
<LinearLayout
    android:padding="30dp"  >
    <TextView
        android:text="아래에 이름을 입력 :" />
    <EditText
        android:hint="여기에 채우세요" />
    <Button
        android:text="확인" />
</LinearLayout>
```



뷰 클래스의 XML 속성

- layout_margin
  - 위젯과 위젯 사이에 여백 설정

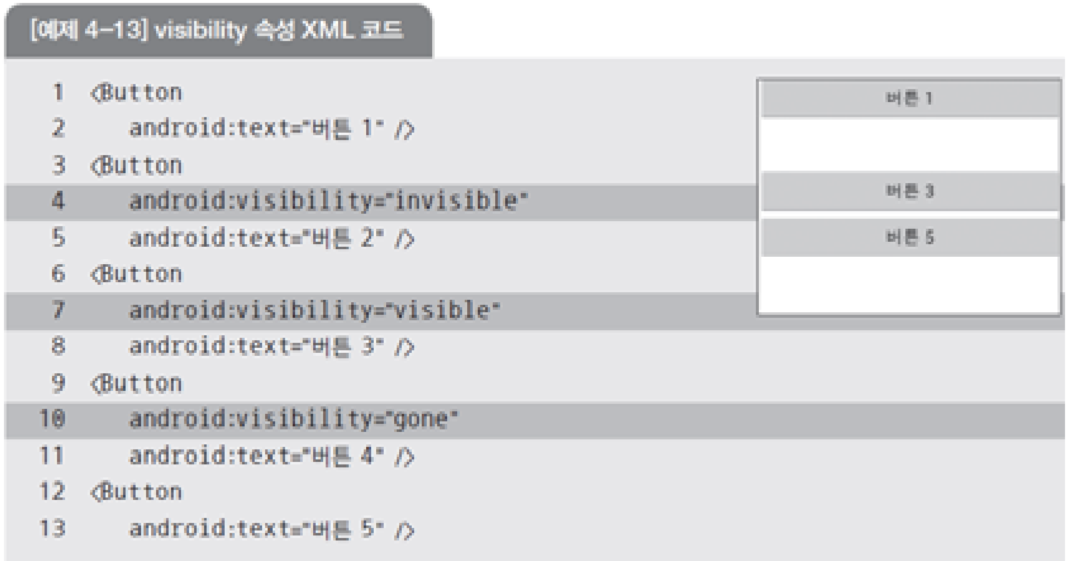


[예제 4-12] layout_margin 속성 XML 코드

```
<LinearLayout
    android:padding="30dp" >
    <TextView
        android:layout_margin="20dp"
        android:text="아래에 이름을 입력 :" />
    <EditText
        android:layout_margin="20dp"
        android:hint="여기에 채우세요" />
    <Button
        android:layout_margin="20dp"
        android:text="확인" />
</LinearLayout>
```

뷰 클래스의 XML 속성

- visibility
  - 위젯을 보일 것인지 여부 결정
  - visible → 보이는 상태 (default)
  - invisible → 보이지 않는 상태 (원래 자리는 유지)
  - gone → 보이지 않는 상태 (원래 자리도 없어짐)



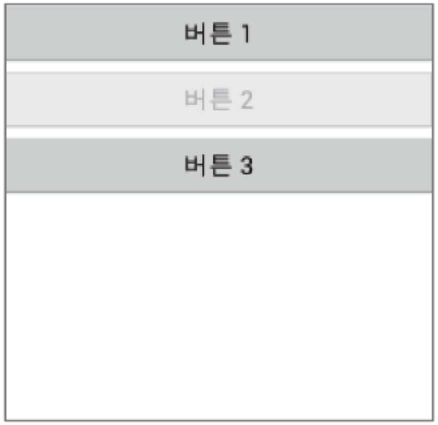
[예제 4-13] visibility 속성 XML 코드

```
<Button
    android:text="버튼 1" />
<Button
    android:visibility="invisible"
    android:text="버튼 2" />
<Button
    android:visibility="visible"
    android:text="버튼 3" />
<Button
    android:visibility="gone"
    android:text="버튼 4" />
<Button
    android:text="버튼 5" />
```

뷰 클래스의 XML 속성

- enable
  - 위젯의 동작 여부
- cllickable
  - 클릭이나 터치가 가능하도록 설정

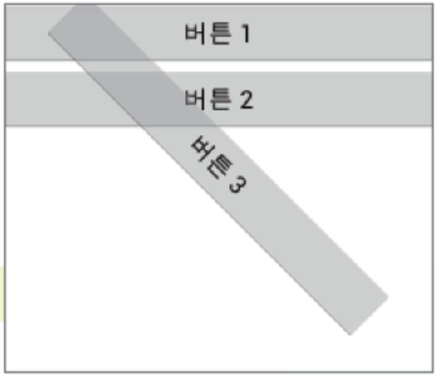
```
<Button
      android:text="버튼 1" />
<Button
      android:enabled="false"
      android:text="버튼 2" />
<Button
      android:clickable="false"
      android:text="버튼 3" />
```

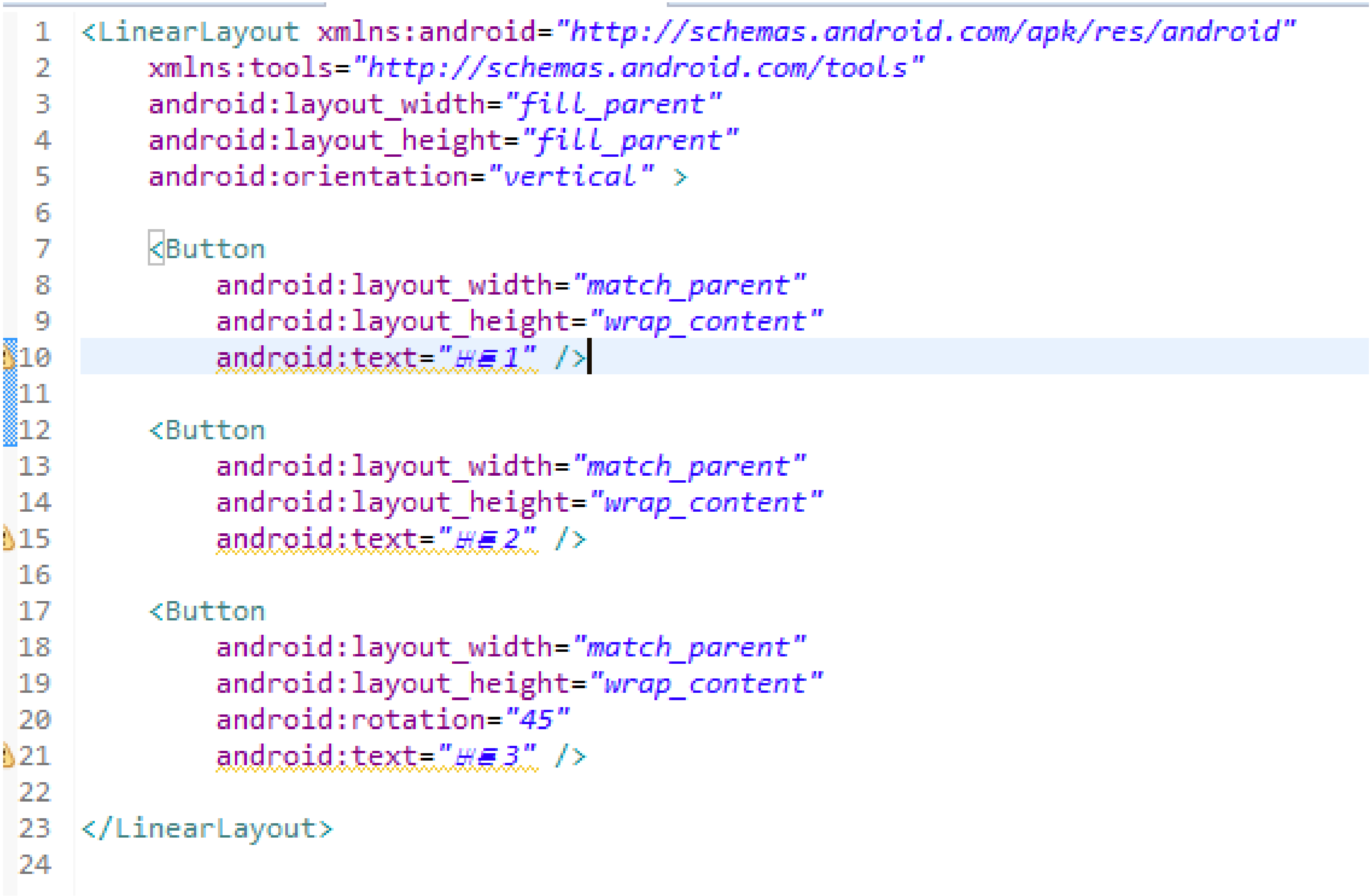


뷰 클래스의 XML 속성

- rotation
  - 위젯을 회전시켜 출력
    - 값은 각도로 지정

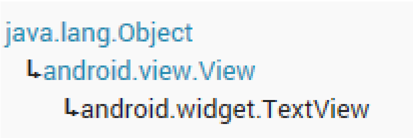
```
<Button
      android:text="버튼 1" />
<Button
      android:text="버튼 2" />
<Button
      android:rotation="45"
      android:text="버튼 3" />
```



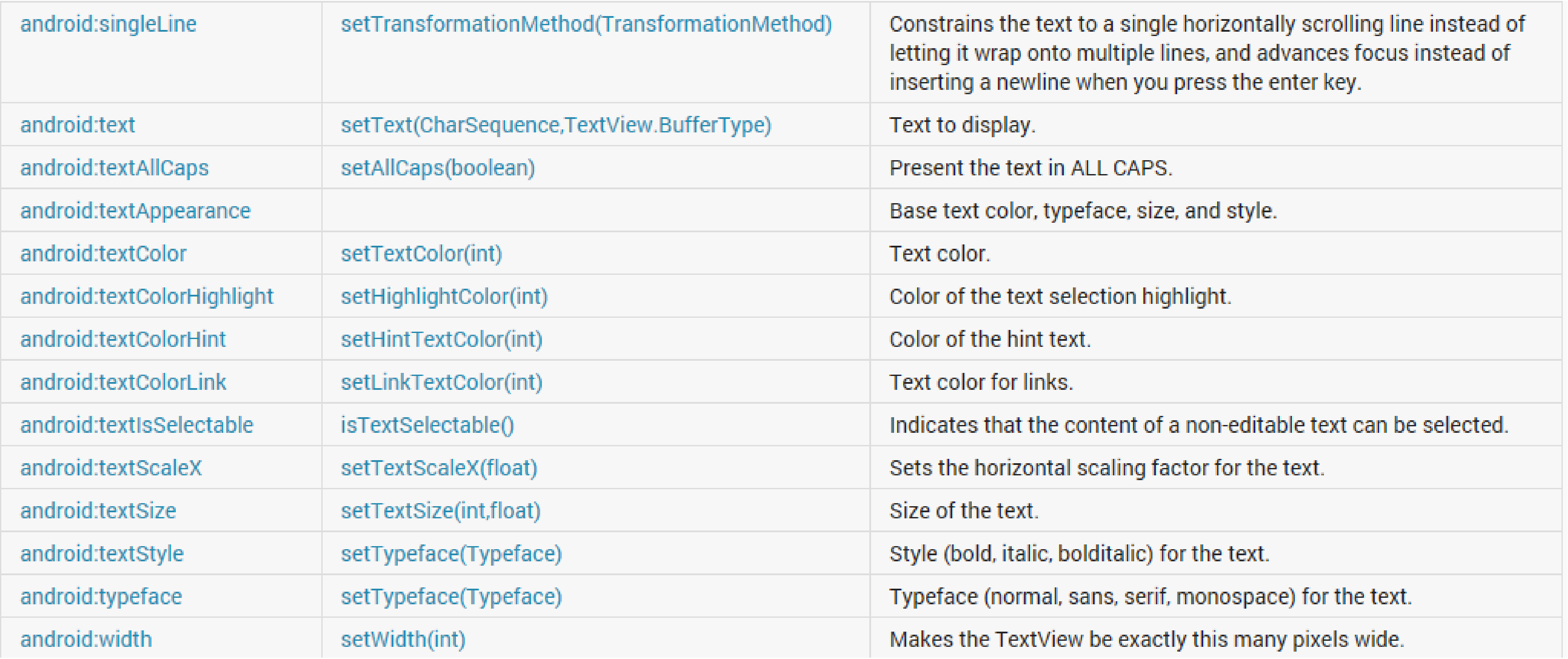


```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="vertical" >

    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="버튼1" />

    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="버튼2" />

    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:rotation="45"
        android:text="버튼3" />

</LinearLayout>

```

텍스트 뷰

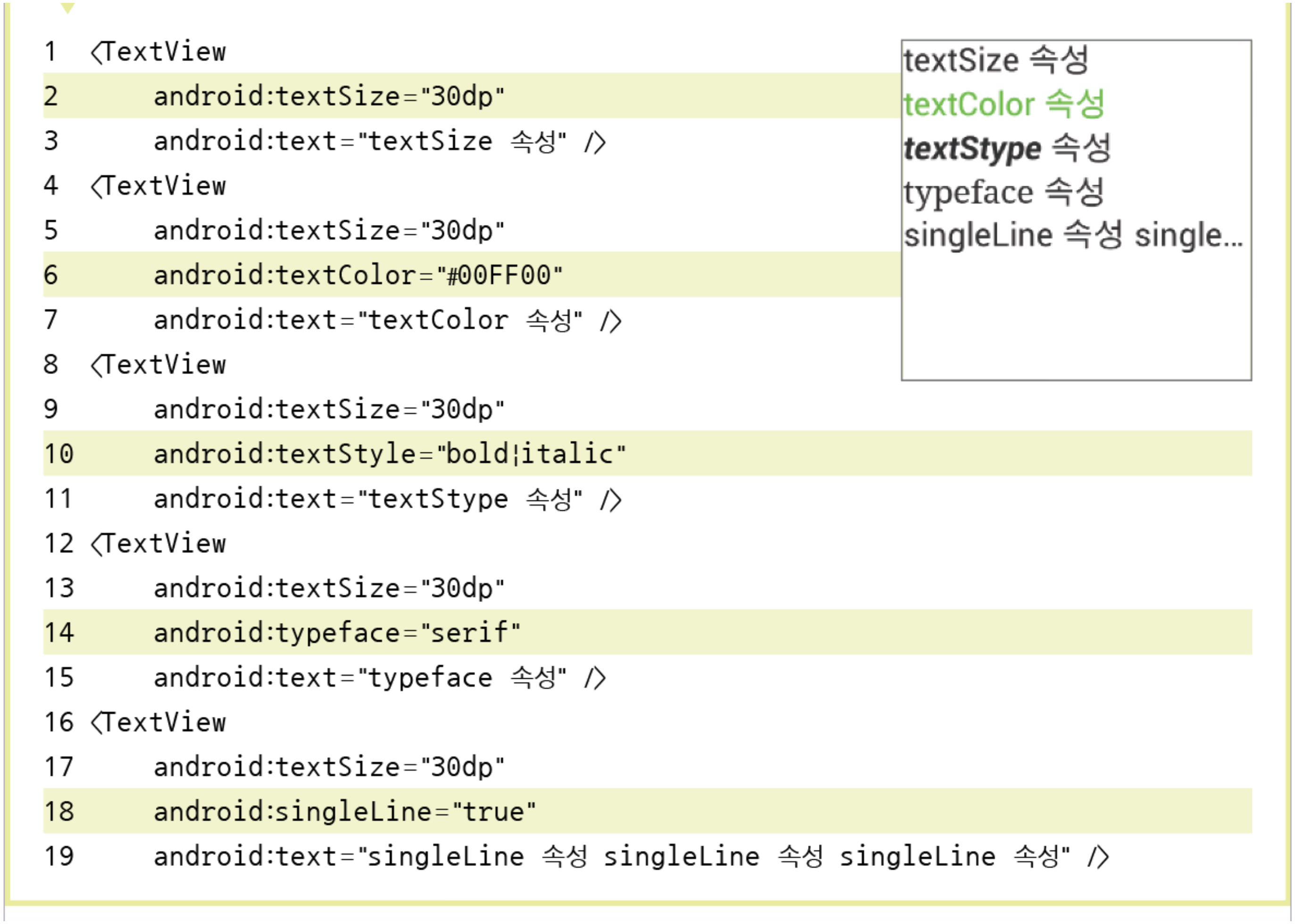


java.lang.Object
  ↳android.view.View
    ↳android.widget.TextView



android:singleLine	setTransformationMethod(TransformationMethod)	Constrains the text to a single horizontally scrolling line instead of letting it wrap onto multiple lines, and advances focus instead of inserting a newline when you press the enter key.
android:text	setText(CharSequence,TextView.BufferType)	Text to display.
android:textAllCaps	setAllCaps(boolean)	Present the text in ALL CAPS.
android:textAppearance		Base text color, typeface, size, and style.
android:textColor	setTextColor(int)	Text color.
android:textColorHighlight	setHighlightColor(int)	Color of the text selection highlight.
android:textColorHint	setHintTextColor(int)	Color of the hint text.
android:textColorLink	setLinkTextColor(int)	Text color for links.
android:textIsSelectable	isTextSelectable()	Indicates that the content of a non-editable text can be selected.
android:textScaleX	setTextScaleX(float)	Sets the horizontal scaling factor for the text.
android:textSize	setTextSize(int,float)	Size of the text.
android:textStyle	setTypeface(Typeface)	Style (bold, italic, bolditalic) for the text.
android:typeface	setTypeface(Typeface)	Typeface (normal, sans, serif, monospace) for the text.
android:width	setWidth(int)	Makes the TextView be exactly this many pixels wide.

텍스트 뷰



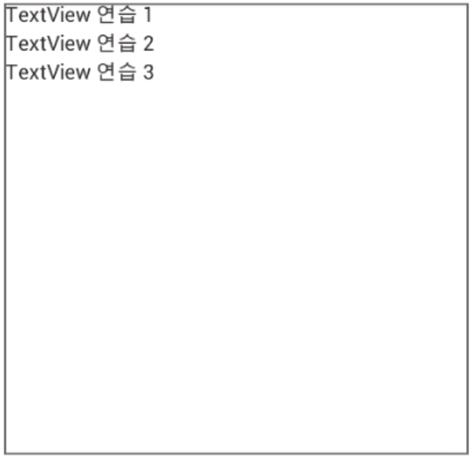
```
<TextView
      android:textSize="30dp"
      android:text="textSize 속성" />
<TextView
      android:textSize="30dp"
      android:textColor="#00FF00"
      android:text="textColor 속성" />
<TextView
      android:textSize="30dp"
      android:textStyle="bold|italic"
      android:text="textStype 속성" />
<TextView
      android:textSize="30dp"
      android:typeface="serif"
      android:text="typeface 속성" />
<TextView
      android:textSize="30dp"
      android:singleLine="true"
      android:text="singleLine 속성 singleLine 속성 singleLine 속성" />
```

```
textSize 속성
textColor 속성
textStype 속성
typeface 속성
singleLine 속성 single...
```

텍스트 뷰

- ## XML 속성 설정

```
<TextView
      android:text="TextView 연습 1"
      android:id="@+id/textView1" />
<TextView
      android:text="TextView 연습 2"
      android:id="@+id/textView2" />
<TextView
      android:text="TextView 연습 3"
      android:id="@+id/textView3" />
```

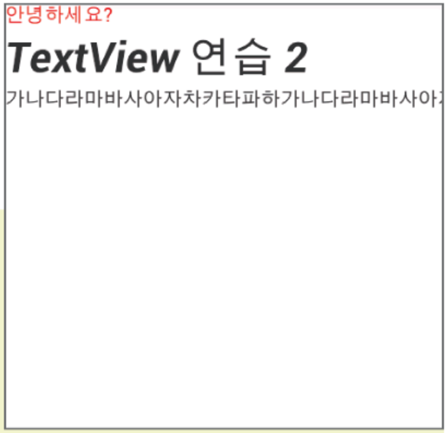


```
TextView 연습 1
TextView 연습 2
TextView 연습 3
```

텍스트 뷰

- XML 속성을 변경하는 코드 – Java

```java
public void onCreate(Bundle savedInstanceState) {
   super.onCreate(savedInstanceState);
   setContentView(R.layout.main);

   TextView tv1, tv2, tv3;
   tv1  = (TextView) findViewById(R.id.textView1);
   tv2  = (TextView) findViewById(R.id.textView2);
   tv3  = (TextView) findViewById(R.id.textView3);

   tv1.setText("안녕하세요?");
   tv1.setTextColor(Color.RED);
   tv2.setTextSize(30);
   tv2.setTypeface(Typeface.SANS_SERIF, Typeface.BOLD_ITALIC);
   tv3.setText("가나다라마바사아자차카타파하가나다라마바사아자차카타파하");
   tv3.setSingleLine();
}
```

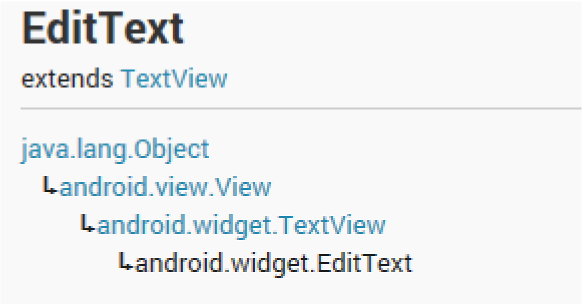


안녕하세요?

TextView 연습 2

가나다라마바사아자차카타파하가나다라마바사아

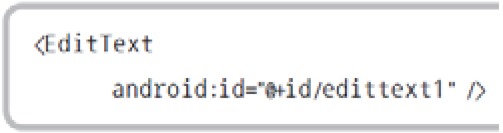
에디트 텍스트



EditText

extends TextView

java.lang.Object
  ↳android.view.View
    ↳android.widget.TextView
      ↳android.widget.EditText



```
<EditText
      android:id="@+id/edittext1" />
```

① 에디트텍스트 변수 선언

```
EditText  myEdit;
```

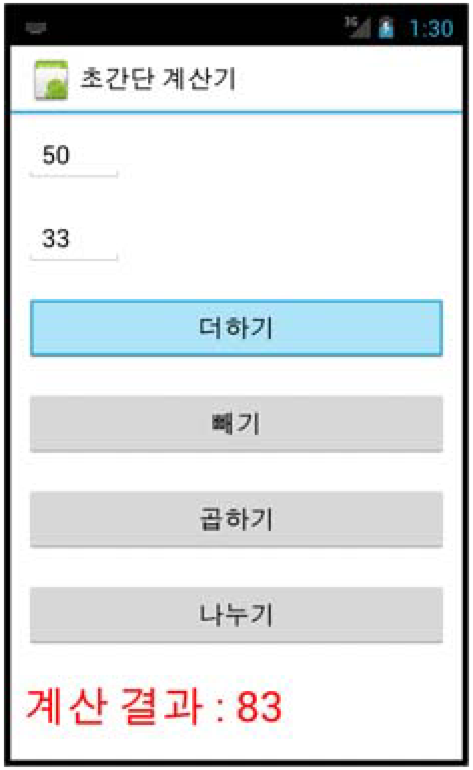
② 변수에 에디트텍스트 위젯 대입

```
myEdit = (EditText) findViewById(R.id.edittext1);
```

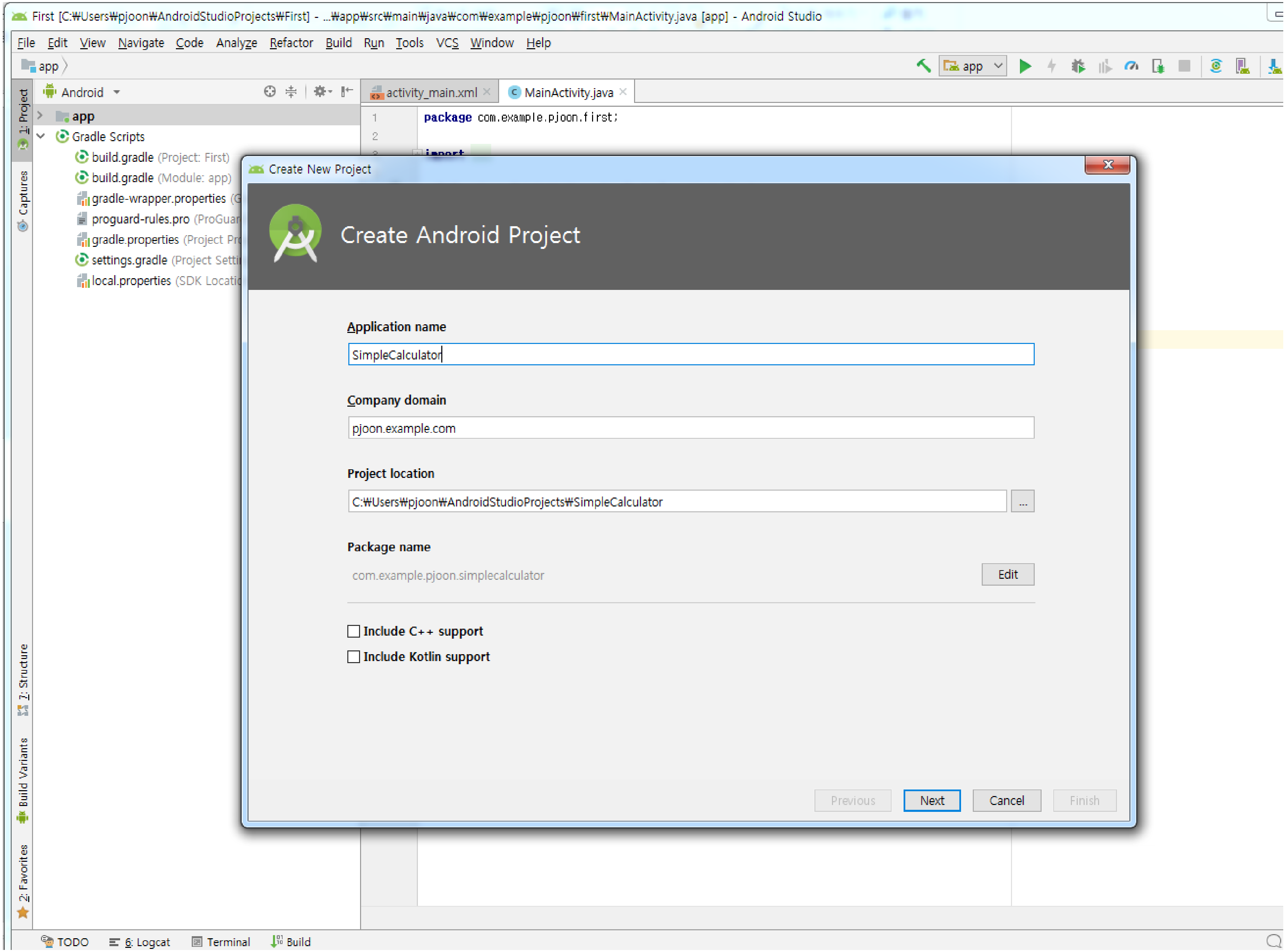
③ 에디트텍스트에 입력된 값을 가져오기

```
String myStr = myEdit.getText( ).toString( );
```

계산기 만들기



에디트텍스트 2개
버튼 4개
텍스트뷰 1개



First [C:₩Users₩pjoon₩AndroidStudioProjects₩First] - ...₩app₩src₩main₩java₩com₩example₩pjoon₩first₩MainActivity.java [app] - Android Studio

```
package com.example.pjoon.first;

import
```

Create New Project

Create Android Project

Application name: SimpleCalculator

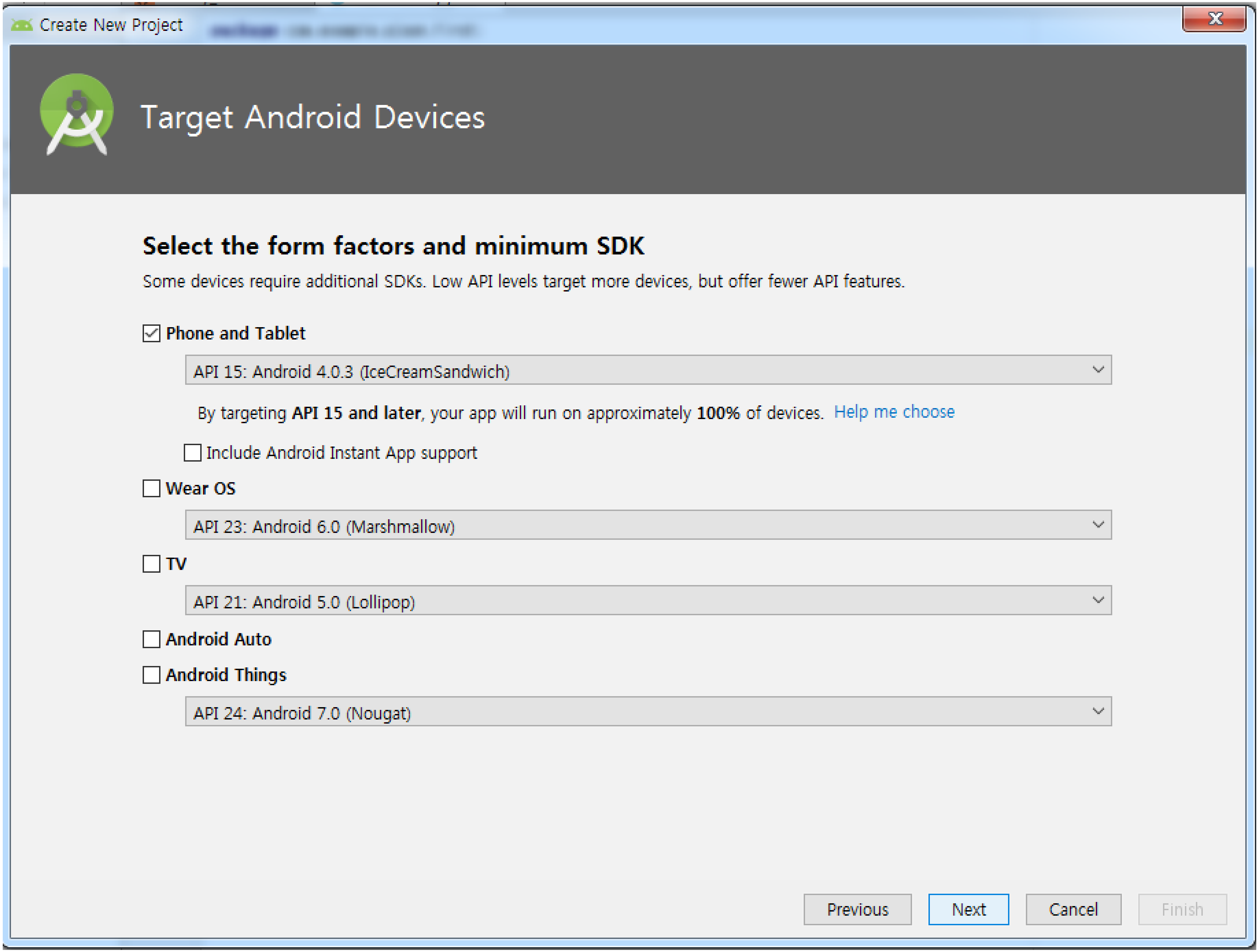
Company domain: pjoon.example.com

Project location: C:₩Users₩pjoon₩AndroidStudioProjects₩SimpleCalculator

Package name: com.example.pjoon.simplecalculator

□ Include C++ support

□ Include Kotlin support



Create New Project [redacted]

Target Android Devices

Select the form factors and minimum SDK

Some devices require additional SDKs. Low API levels target more devices, but offer fewer API features.

☑ **Phone and Tablet**

API 15: Android 4.0.3 (IceCreamSandwich)

By targeting **API 15 and later**, your app will run on approximately **100%** of devices. Help me choose

☐ Include Android Instant App support

☐ **Wear OS**

API 23: Android 6.0 (Marshmallow)

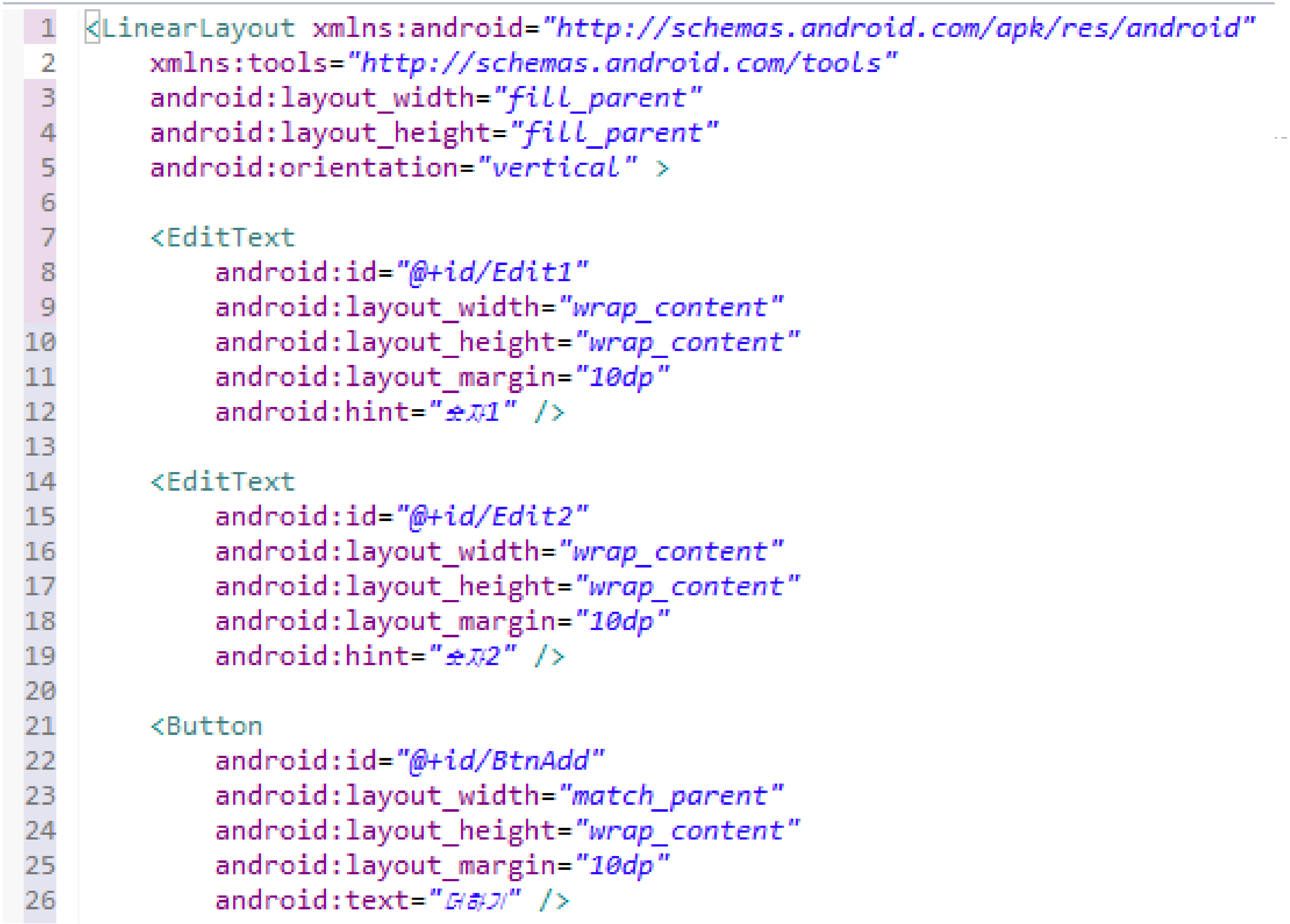
☐ **TV**

API 21: Android 5.0 (Lollipop)

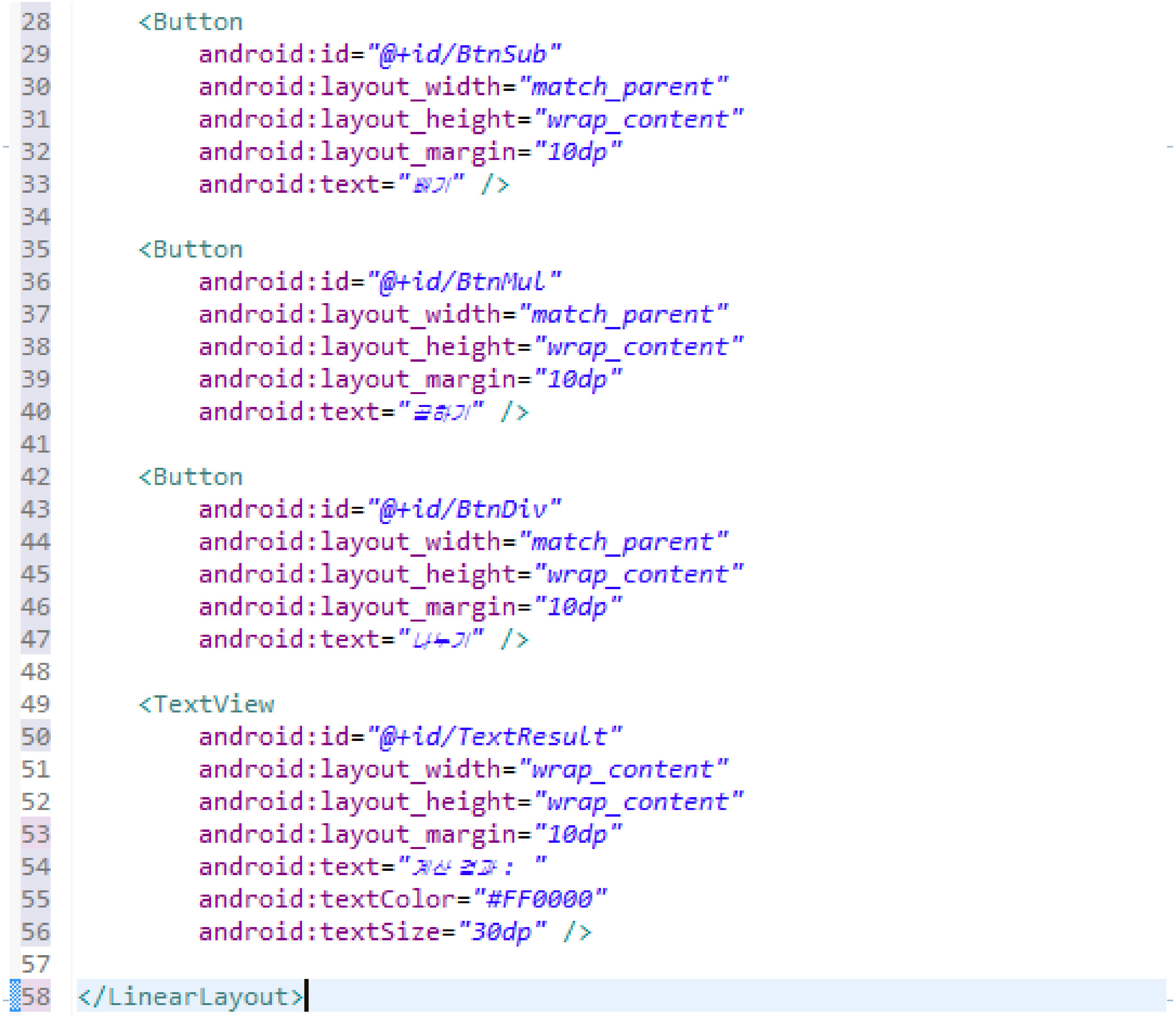
☐ **Android Auto**

☐ **Android Things**

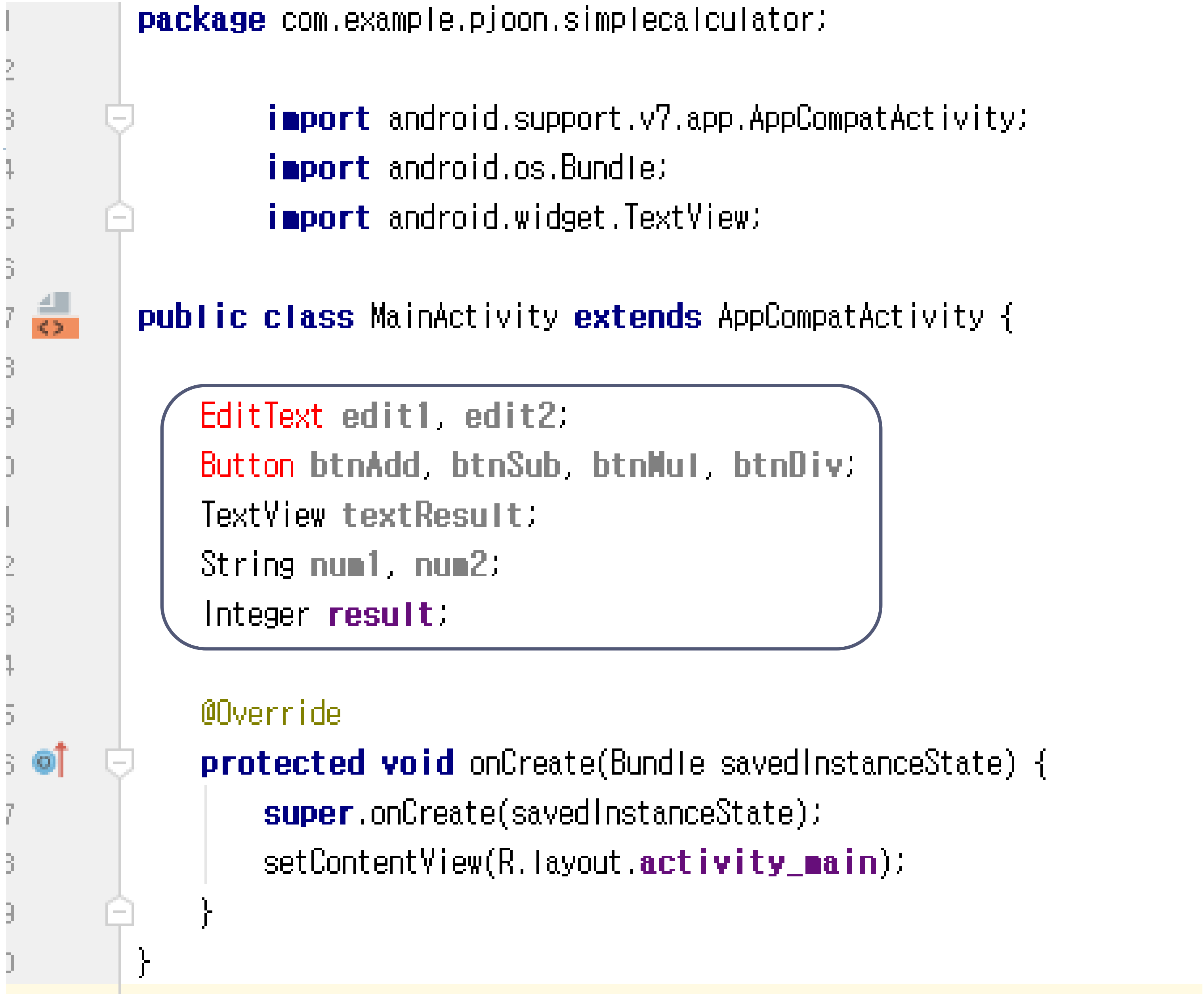
API 24: Android 7.0 (Nougat)



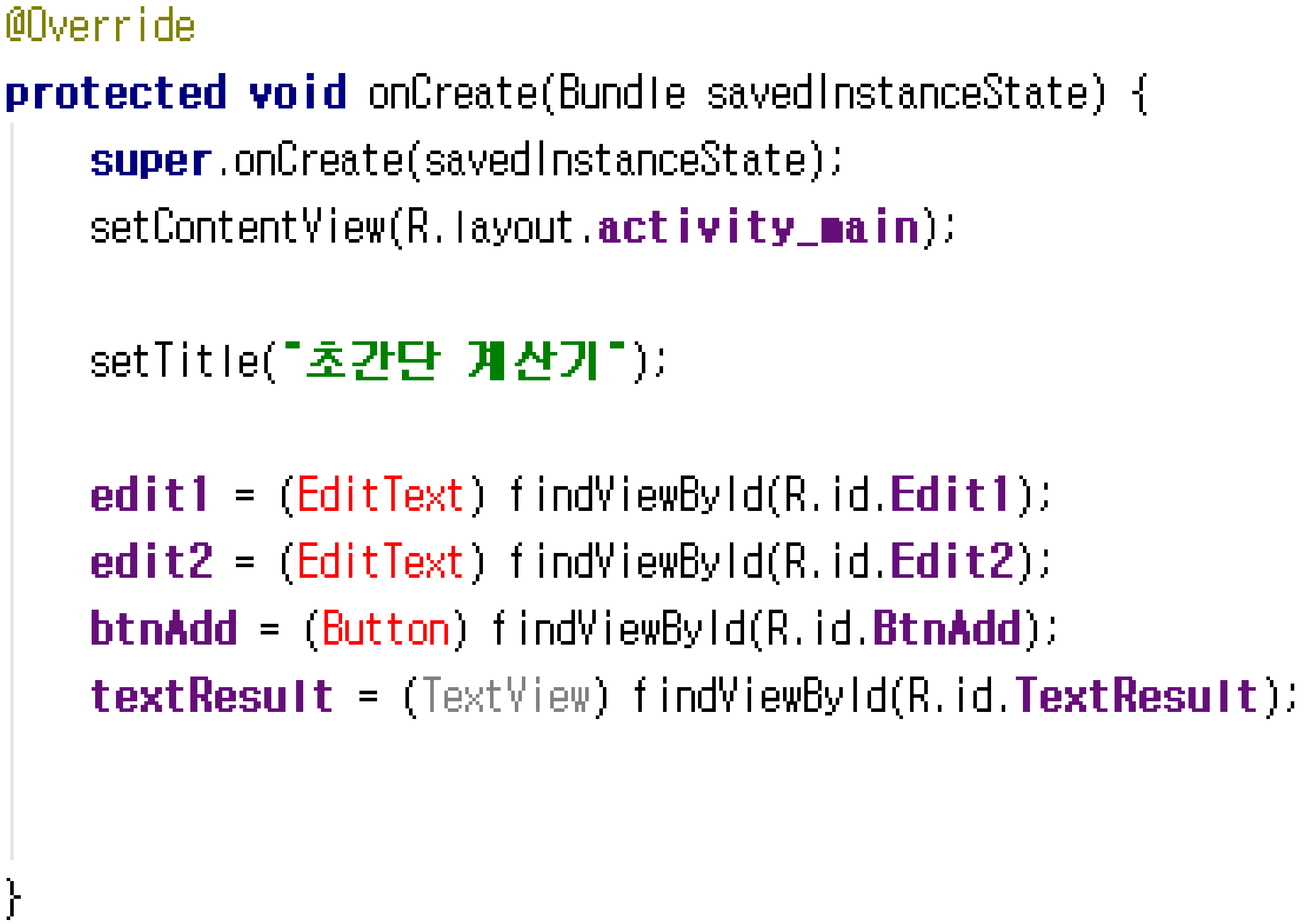
```xml
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="vertical" >

    <EditText
        android:id="@+id/Edit1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:hint="숫자1" />

    <EditText
        android:id="@+id/Edit2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:hint="숫자2" />

    <Button
        android:id="@+id/BtnAdd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="더하기" />
```



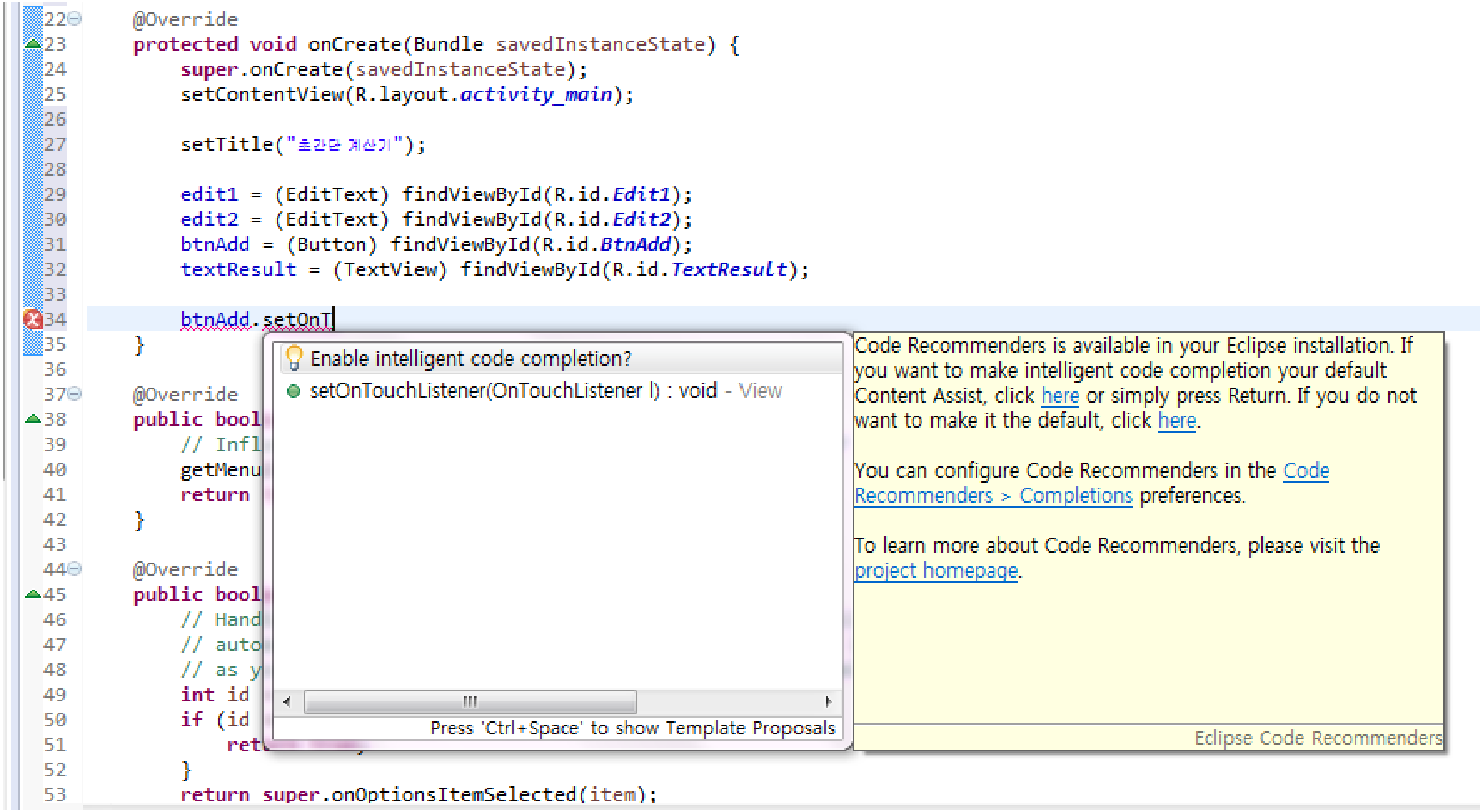
```
    <Button
        android:id="@+id/BtnSub"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="빼기" />

    <Button
        android:id="@+id/BtnMul"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="곱하기" />

    <Button
        android:id="@+id/BtnDiv"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="나누기" />

    <TextView
        android:id="@+id/TextResult"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:text="계산 결과 : "
        android:textColor="#FF0000"
        android:textSize="30dp" />

</LinearLayout>
```



```
package com.example.pjoon.simplecalculator;

        import android.support.v7.app.AppCompatActivity;
        import android.os.Bundle;
        import android.widget.TextView;

public class MainActivity extends AppCompatActivity {

    EditText edit1, edit2;
    Button btnAdd, btnSub, btnMul, btnDiv;
    TextView textResult;
    String num1, num2;
    Integer result;

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



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

    setTitle("초간단 계산기");

    edit1 = (EditText) findViewById(R.id.Edit1);
    edit2 = (EditText) findViewById(R.id.Edit2);
    btnAdd = (Button) findViewById(R.id.BtnAdd);
    textResult = (TextView) findViewById(R.id.TextResult);


}
```



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

        setTitle("초간단 계산기");

        edit1 = (EditText) findViewById(R.id.Edit1);
        edit2 = (EditText) findViewById(R.id.Edit2);
        btnAdd = (Button) findViewById(R.id.BtnAdd);
        textResult = (TextView) findViewById(R.id.TextResult);

        btnAdd.setOnT
    }

    @Override
    public bool
        // Infl
        getMenu
        return
    }

    @Override
    public bool
        // Hand
        // auto
        // as y
        int id
        if (id
            ret
        }
        return super.onOptionsItemSelected(item);
```

Enable intelligent code completion?

● setOnTouchListener(OnTouchListener l) : void - View

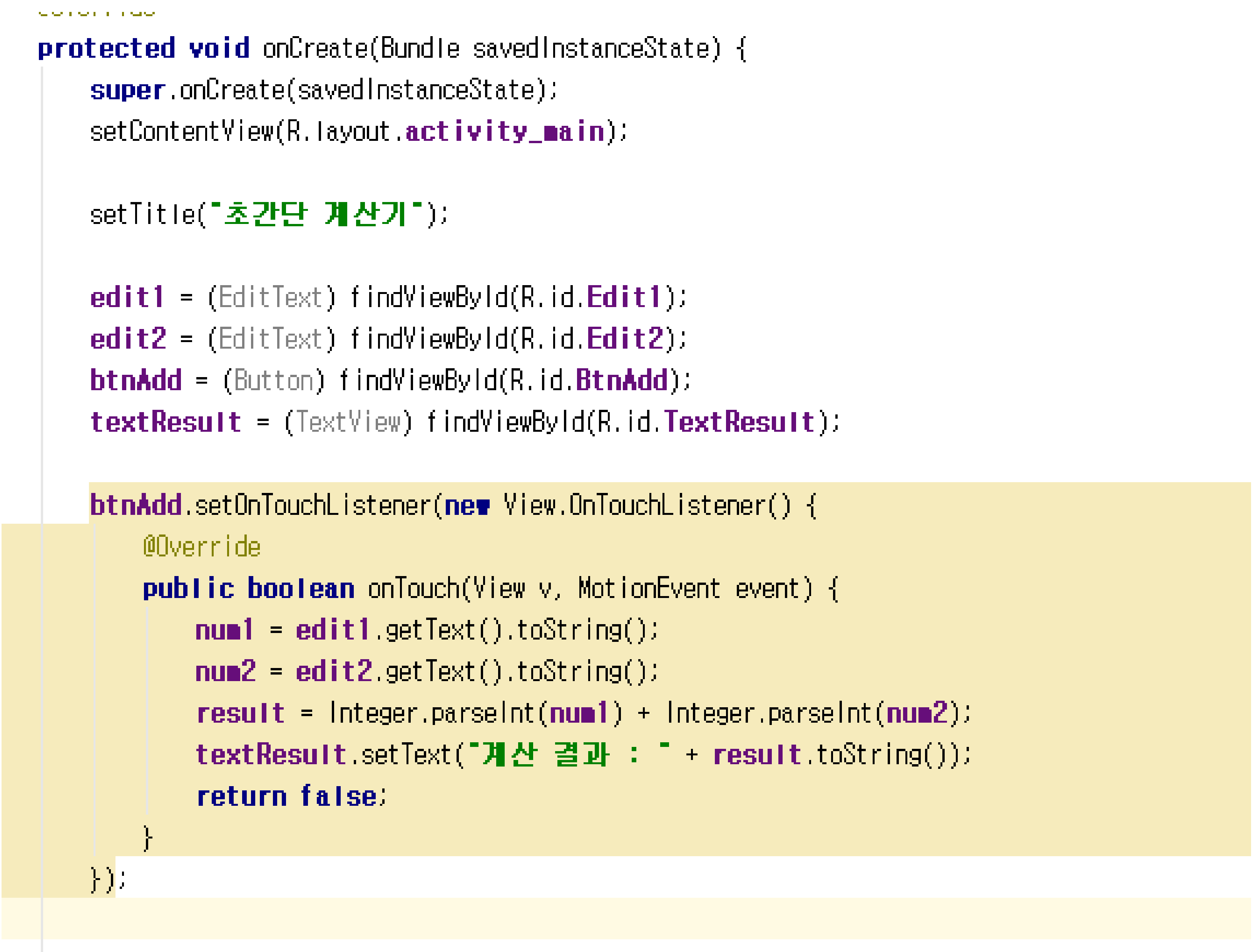
Press 'Ctrl+Space' to show Template Proposals

Code Recommenders is available in your Eclipse installation. If you want to make intelligent code completion your default Content Assist, click here or simply press Return. If you do not want to make it the default, click here.

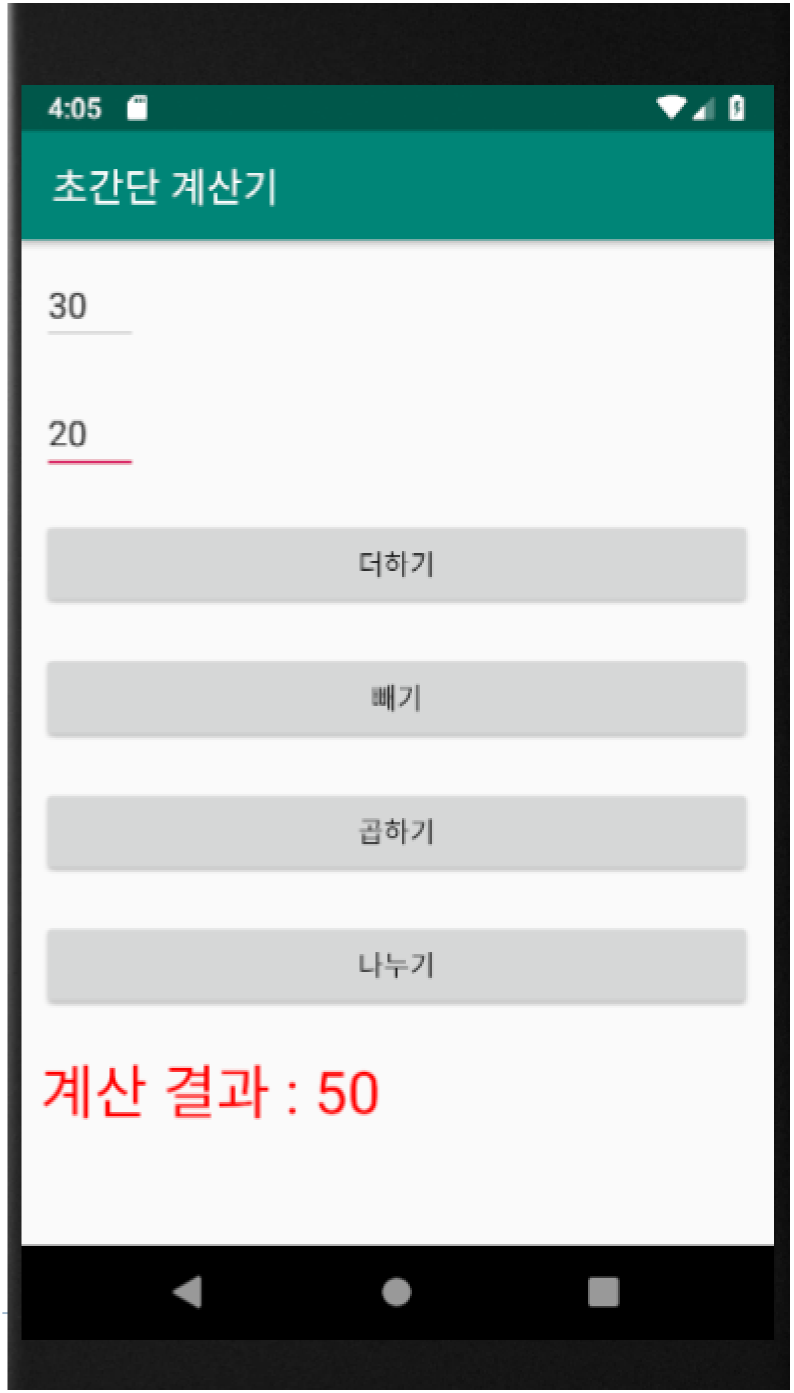
You can configure Code Recommenders in the Code Recommenders > Completions preferences.

To learn more about Code Recommenders, please visit the project homepage.

Eclipse Code Recommenders



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

    setTitle("초간단 계산기");

    edit1 = (EditText) findViewById(R.id.Edit1);
    edit2 = (EditText) findViewById(R.id.Edit2);
    btnAdd = (Button) findViewById(R.id.BtnAdd);
    textResult = (TextView) findViewById(R.id.TextResult);

    btnAdd.setOnTouchListener(new View.OnTouchListener() {
        @Override
        public boolean onTouch(View v, MotionEvent event) {
            num1 = edit1.getText().toString();
            num2 = edit2.getText().toString();
            result = Integer.parseInt(num1) + Integer.parseInt(num2);
            textResult.setText("계산 결과 : " + result.toString());
            return false;
        }
    });
```



초간단 계산기

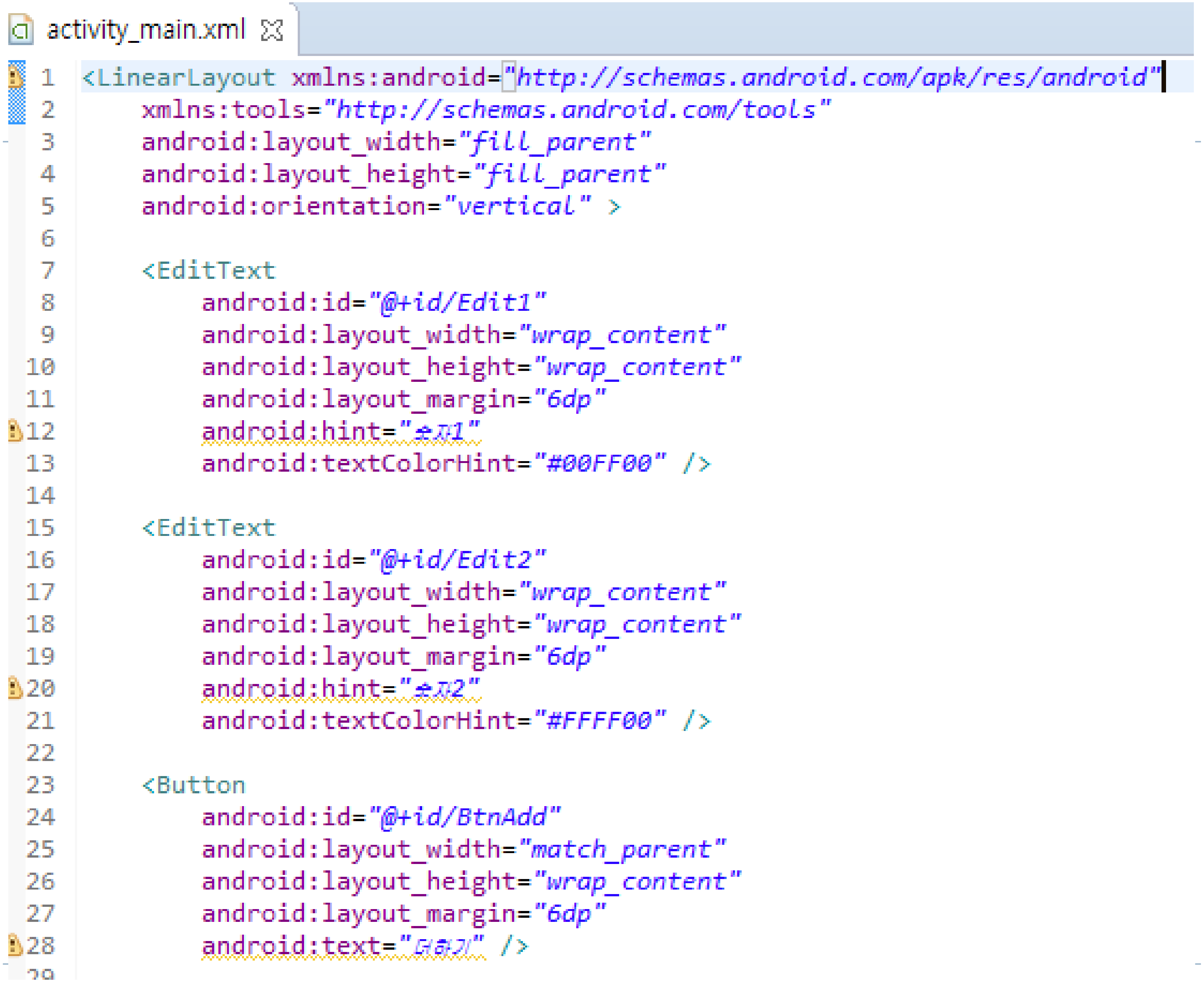
30

20

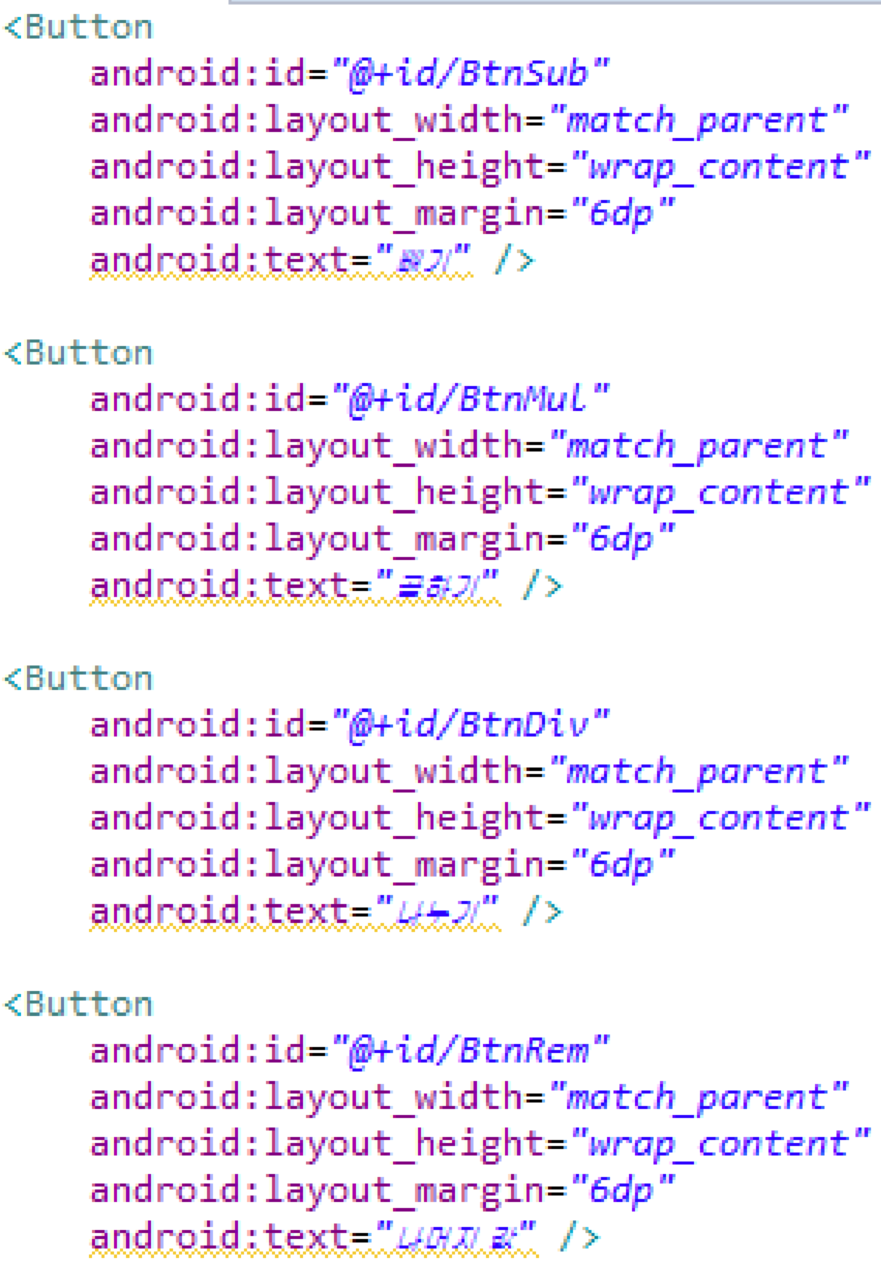
계산 결과 : 50

계산기 확장

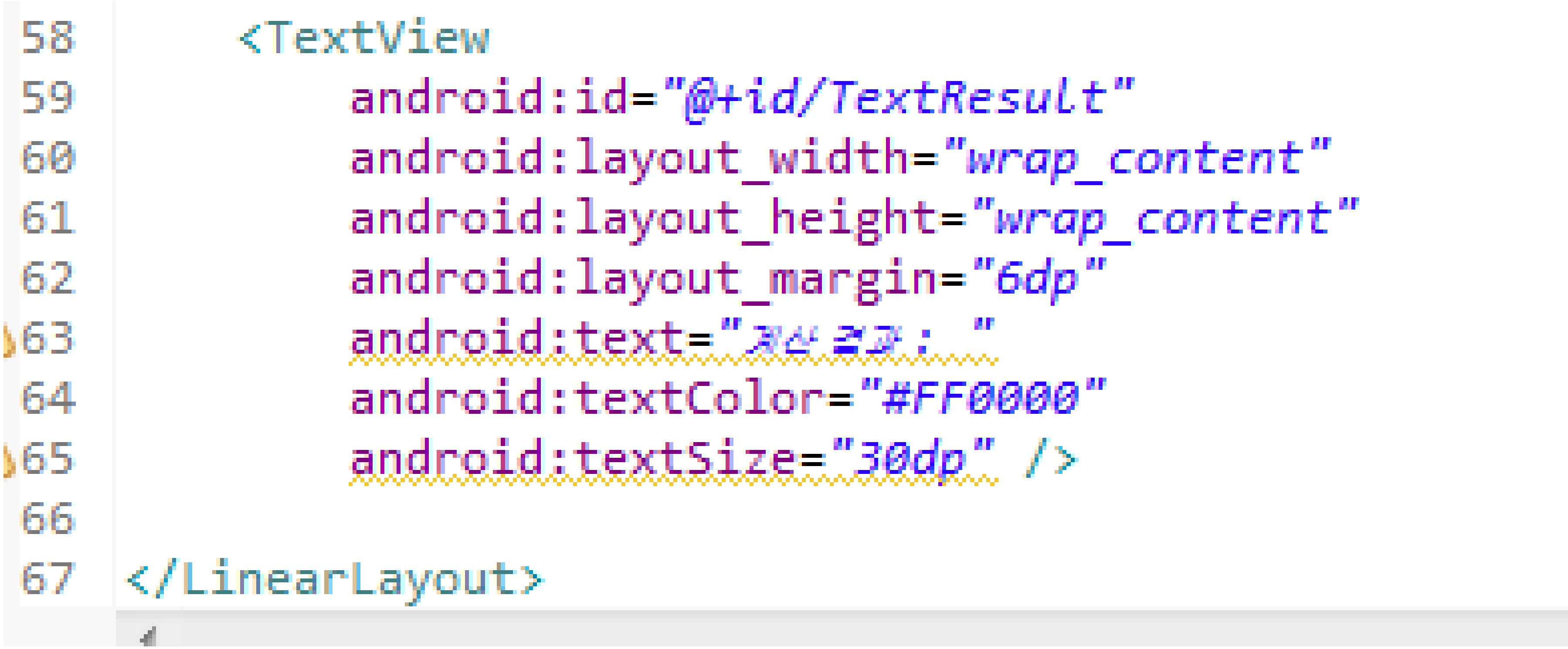
- 터치가 아닌 클릭으로 변경
- 나머지 값 구하기 버튼 추가
- 값을 입력하지 않고, 버튼을 클릭할 때 오류 메시지를 토스트로 나타내기
- 실수 값 계산하기
- 0으로 나누면 토스트 메시지를 나타내고 계산하지 않기



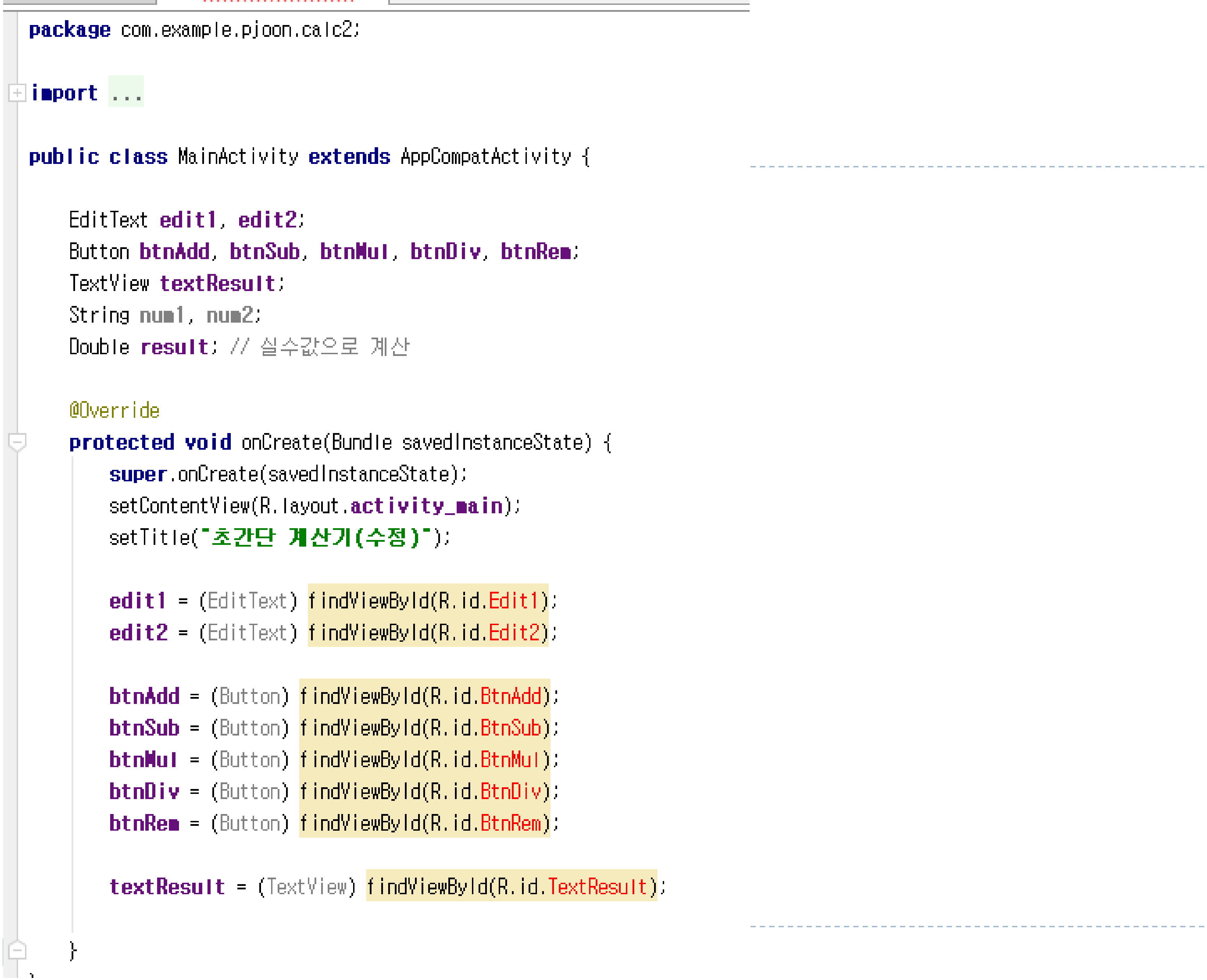
```xml
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="vertical" >

    <EditText
        android:id="@+id/Edit1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="6dp"
        android:hint="숫자1"
        android:textColorHint="#00FF00" />

    <EditText
        android:id="@+id/Edit2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="6dp"
        android:hint="숫자2"
        android:textColorHint="#FFFF00" />

    <Button
        android:id="@+id/BtnAdd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="6dp"
        android:text="더하기" />
```



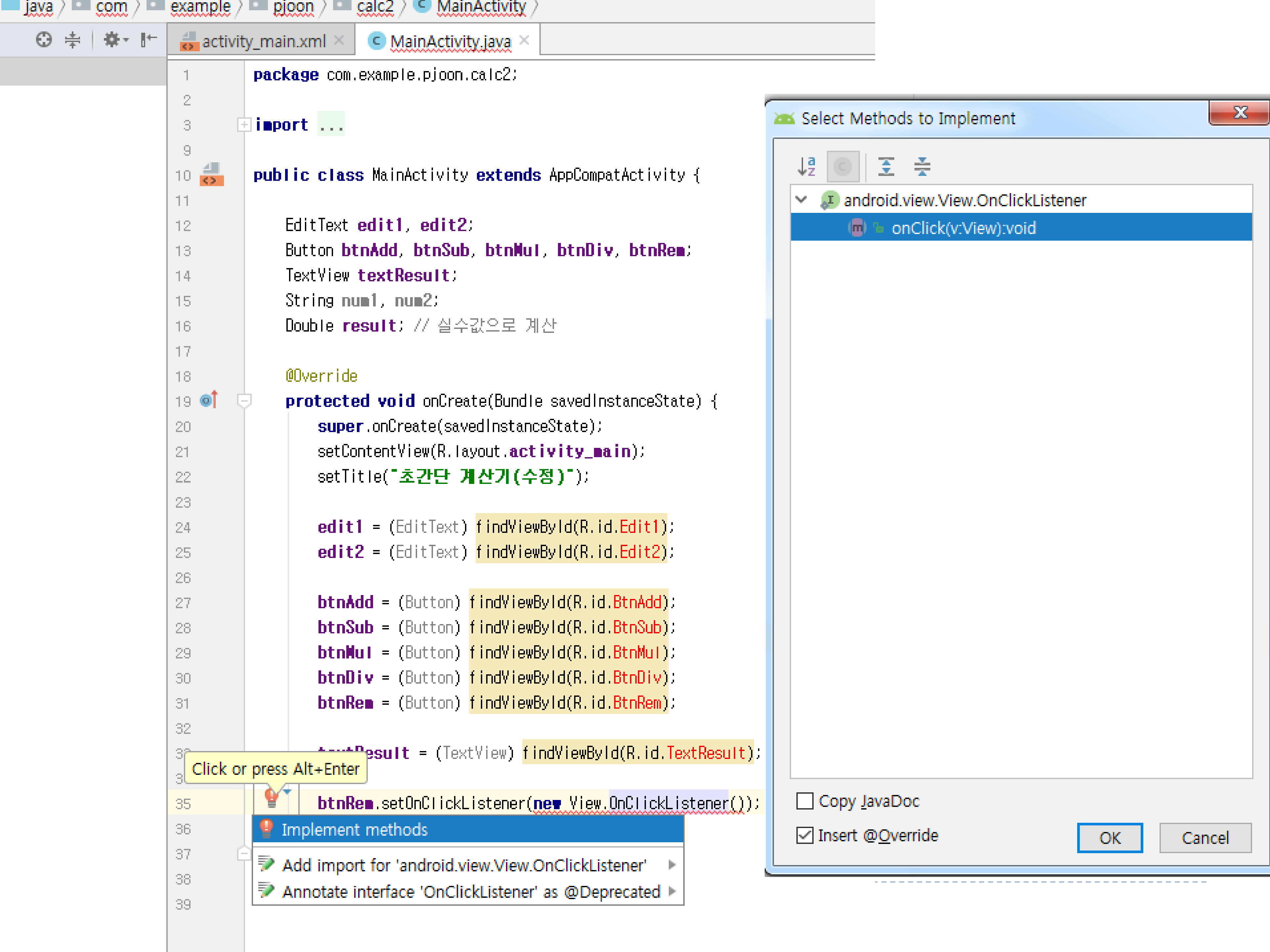
```
<Button
    android:id="@+id/BtnSub"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="6dp"
    android:text="빼기" />

<Button
    android:id="@+id/BtnMul"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="6dp"
    android:text="곱하기" />

<Button
    android:id="@+id/BtnDiv"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="6dp"
    android:text="나누기" />

<Button
    android:id="@+id/BtnRem"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="6dp"
    android:text="나머지 값" />
```



```xml
    <TextView
        android:id="@+id/TextResult"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="6dp"
        android:text="계산 결과 : "
        android:textColor="#FF0000"
        android:textSize="30dp" />

</LinearLayout>
```



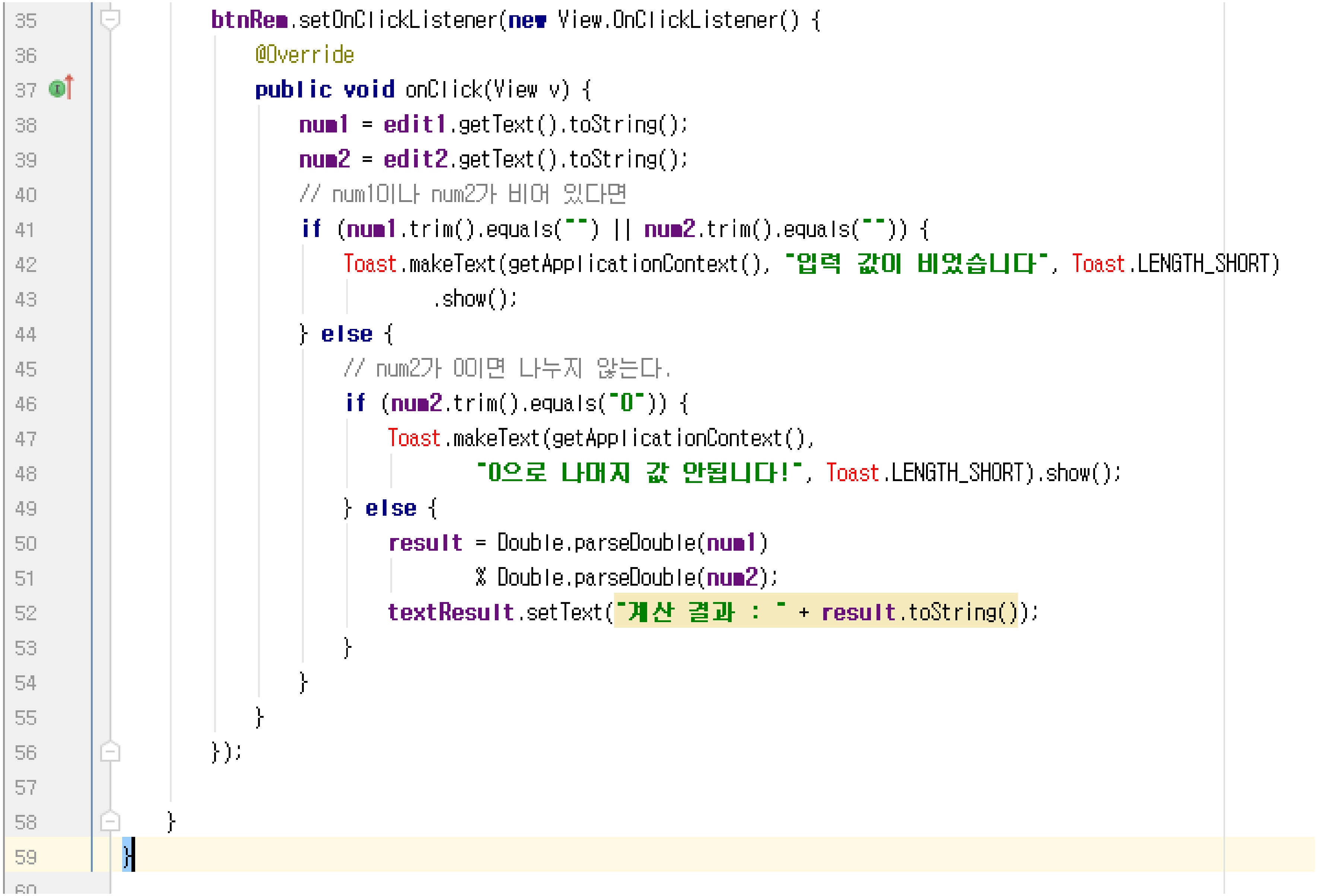
```
package com.example.pjoon.calc2;

import ...

public class MainActivity extends AppCompatActivity {

    EditText edit1, edit2;
    Button btnAdd, btnSub, btnMul, btnDiv, btnRem;
    TextView textResult;
    String num1, num2;
    Double result; // 실수값으로 계산

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        setTitle("초간단 계산기(수정)");

        edit1 = (EditText) findViewById(R.id.Edit1);
        edit2 = (EditText) findViewById(R.id.Edit2);

        btnAdd = (Button) findViewById(R.id.BtnAdd);
        btnSub = (Button) findViewById(R.id.BtnSub);
        btnMul = (Button) findViewById(R.id.BtnMul);
        btnDiv = (Button) findViewById(R.id.BtnDiv);
        btnRem = (Button) findViewById(R.id.BtnRem);

        textResult = (TextView) findViewById(R.id.TextResult);

    }
}
```


java 〉 com 〉 example 〉 pjoon 〉 calc2 〉 MainActivity 〉
activity_main.xml ×
MainActivity.java ×
Click or press Alt+Enter
Implement methods
Add import for 'android.view.View.OnClickListener'
Annotate interface 'OnClickListener' as @Deprecated
Select Methods to Implement
android.view.View.OnClickListener
onClick(v:View):void
OK
Cancel

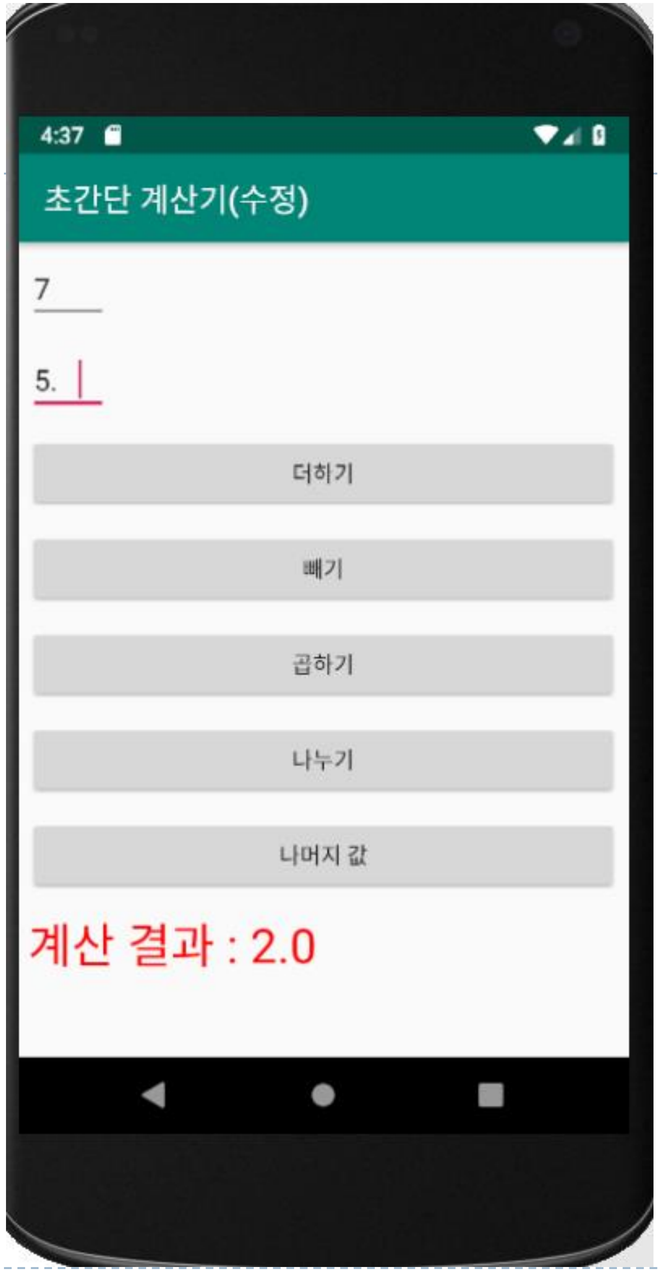
```
package com.example.pjoon.calc2;

import ...

public class MainActivity extends AppCompatActivity {

    EditText edit1, edit2;
    Button btnAdd, btnSub, btnMul, btnDiv, btnRem;
    TextView textResult;
    String num1, num2;
    Double result; // 실수값으로 계산

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        setTitle("초간단 계산기(수정)");

        edit1 = (EditText) findViewById(R.id.Edit1);
        edit2 = (EditText) findViewById(R.id.Edit2);

        btnAdd = (Button) findViewById(R.id.BtnAdd);
        btnSub = (Button) findViewById(R.id.BtnSub);
        btnMul = (Button) findViewById(R.id.BtnMul);
        btnDiv = (Button) findViewById(R.id.BtnDiv);
        btnRem = (Button) findViewById(R.id.BtnRem);

        textResult = (TextView) findViewById(R.id.TextResult);

        btnRem.setOnClickListener(new View.OnClickListener());
```

□ Copy JavaDoc

☑ Insert @Override



```java
        btnRem.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                num1 = edit1.getText().toString();
                num2 = edit2.getText().toString();
                // num1이나 num2가 비어 있다면
                if (num1.trim().equals("") || num2.trim().equals("")) {
                    Toast.makeText(getApplicationContext(), "입력 값이 비었습니다", Toast.LENGTH_SHORT)
                            .show();
                } else {
                    // num2가 0이면 나누지 않는다.
                    if (num2.trim().equals("0")) {
                        Toast.makeText(getApplicationContext(),
                                "0으로 나머지 값 안됩니다!", Toast.LENGTH_SHORT).show();
                    } else {
                        result = Double.parseDouble(num1)
                                % Double.parseDouble(num2);
                        textResult.setText("계산 결과 : " + result.toString());
                    }
                }
            }
        });

    }
}
```



초간단 계산기(수정)

7

5.

계산 결과 : 2.0