파일 처리

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파일 처리 기본

- 파일 처리 기본
  - 내장 메모리 파일 처리
    - 앱을 종료했다가 다음에 다시 실행할 때 사용한 곳부터 이어서 작업을 하고 싶은 경우가 있다. 이럴 때 내장 메모리에 파일을 저장하고 읽어오는 방식이 쓰임

  - 내장 메모리 저장 위치
    - /data/data/패키지명/files 폴더

파일 처리 절차

| ① openFileOutput( ),openFileInput( )으로 파일 열기 | FileOutputStream 또는 FileInputStream을 반환함 |

↓

② read( ) 또는 write( )으로 파일 읽기/쓰기

↓

③ close( )로 파일 닫기

Create New Project

Create Android Project

Application name

File_Test

Company domain

pjoon.example.com

Project location

C:\Users\pjoon\AndroidStudioProjects\File_Test

Package name

com.example.pjoon.file_test   Edit

☐ **Include C++ support**

☐ **Include Kotlin support**

Previous   Next   Cancel   Finish
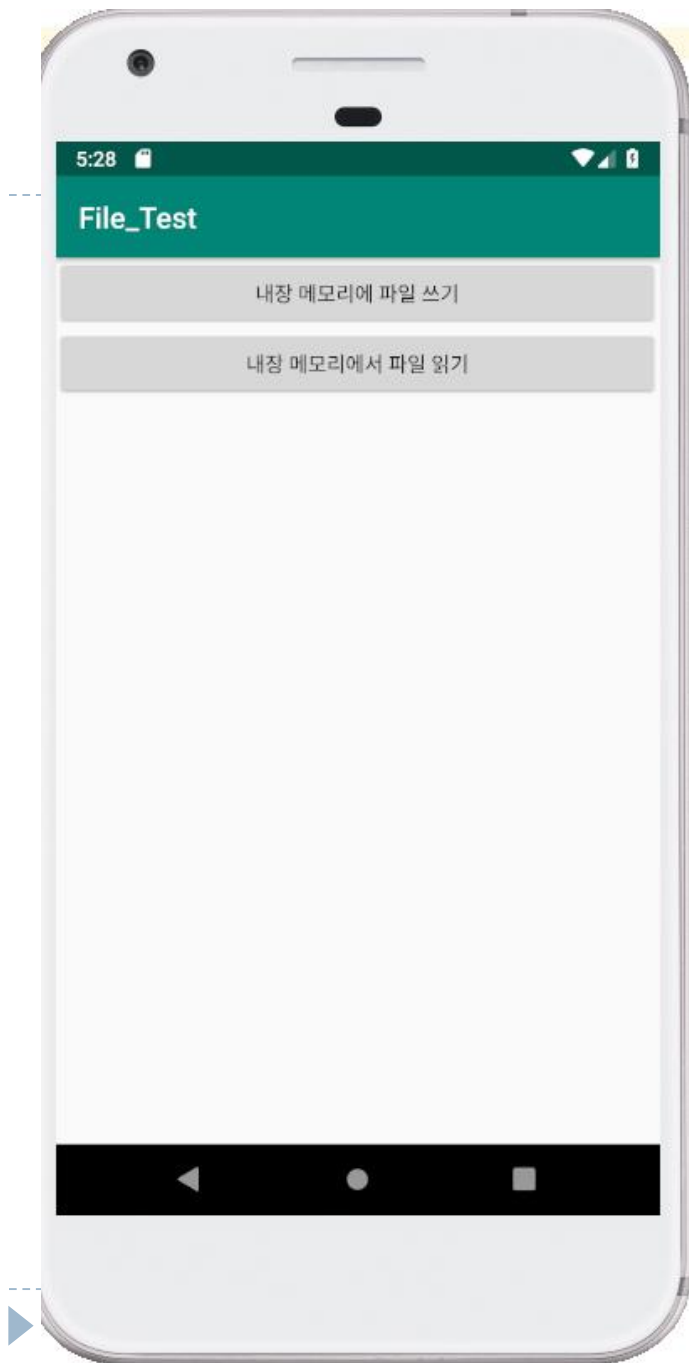
```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="vertical" >

    <Button
        android:id="@+id/btnWrite"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="내장 메모리에 파일 쓰기" />

    <Button
        android:id="@+id/btnRead"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="내장 메모리에서 파일 읽기" />

</LinearLayout>
```

```java
16      @Override
17      protected void onCreate(Bundle savedInstanceState) {
18          super.onCreate(savedInstanceState);
19          setContentView(R.layout.activity_main);
20
21          Button btnRead, btnWrite;
22          btnRead = (Button) findViewById(R.id.btnRead);
23          btnWrite = (Button) findViewById(R.id.btnWrite);
24
25          btnWrite.setOnClickListener(new View.OnClickListener() {
26              public void onClick(View v) {
27                  try {
28                      FileOutputStream outFs = openFileOutput( name: "file.txt", Context.MODE_PRIVATE);
29                      String str = "안드로이드 테스팅";
30                      outFs.write(str.getBytes());
31                      outFs.close();
32                      Toast.makeText(getApplicationContext(), text: "file.txt가 생성됨", Toast.LENGTH_SHORT).show();
33                  } catch (IOException e) {
34                  }
35              }
36          });
37
38          btnRead.setOnClickListener(new View.OnClickListener() {
39              public void onClick(View v) {
40                  try {
41                      FileInputStream inFs = openFileInput( name: "file.txt");
42                      byte[] txt = new byte[30];
43                      inFs.read(txt);
44                      String str = new String(txt);
45                      Toast.makeText(getApplicationContext(), str, Toast.LENGTH_SHORT).show();
46                      inFs.close();
47                  } catch (IOException e) {
48                      Toast.makeText(getApplicationContext(), text: "파일 없음" , Toast.LENGTH_SHORT).show();
49                  }
50              }
51          });
52
```

일기장 앱

▸ 날짜를 선택 → 일기 쓰기 → 일기 보기

```xml
<?xml version="1.0" encoding="utf-8"?>
<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:gravity="center"
    android:orientation="vertical" >

    <DatePicker
        android:datePickerMode="spinner"
        android:id="@+id/datePicker1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:calendarViewShown="false" />

    <EditText
        android:layout_weight="1"
        android:id="@+id/edtDiary"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:background="#00ff00"
        android:lines="8" >
    </EditText>

    <Button
        android:id="@+id/btnWrite"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:enabled="false"
        android:text="Button" />

</LinearLayout>
```

```java
public class MainActivity extends AppCompatActivity {
    DatePicker dp;
    EditText edtDiary;
    Button btnWrite;
    String fileName;

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

        dp = (DatePicker) findViewById(R.id.datePicker1);
        edtDiary = (EditText) findViewById(R.id.edtDiary);
        btnWrite = (Button) findViewById(R.id.btnWrite);
    }
}
```

```java
public class MainActivity extends Activity {

    DatePicker dp;
    EditText edtDiary;
    Button btnWrite;
    String fileName;

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

        dp = (DatePicker) findViewById(R.id.datePicker1);
        edtDiary = (EditText) findViewById(R.id.edtDiary);
        btnWrite = (Button) findViewById(R.id.btnWrite);
    }
```

```java
        Calendar cal = Calendar.getInstance();
        int cYear = cal.get(Calendar.YEAR);
        int cMonth = cal.get(Calendar.MONTH);
        int cDay = cal.get(Calendar.DAY_OF_MONTH);

        dp.init(cYear, cMonth, cDay, new DatePicker.OnDateChangedListener() {
            public void onDateChanged(DatePicker view, int year,
                                      int monthOfYear, int dayOfMonth) {
                fileName = Integer.toString(year) + "_"
                        + Integer.toString( i: monthOfYear + 1) + "_"
                        + Integer.toString(dayOfMonth) + ".txt";
                String str = readDiary(fileName);
                edtDiary.setText(str);
                btnWrite.setEnabled(true);
            }
        });
```

```java
        }

        String readDiary(String fName) {
            String diaryStr = null;
            FileInputStream inFs;
            try {
                inFs = openFileInput(fName);
                byte[] txt = new byte[500];
                inFs.read(txt);
                inFs.close();
                diaryStr = (new String(txt)).trim();
                btnWrite.setText("수정 하기");
            } catch (IOException e) {
                edtDiary.setHint("일기 없음");
                btnWrite.setText("새로 저장");
            }
            return diaryStr;
        }
```

▶ dp.init() 인터페이스 구현 아래 코딩

```java
49
50      btnWrite.setOnClickListener(new View.OnClickListener() {
51          public void onClick(View v) {
52              try {
53                  FileOutputStream outFs = openFileOutput(fileName,
54                          Context.MODE_PRIVATE);
55                  String str = edtDiary.getText().toString();
56                  outFs.write(str.getBytes());
57                  outFs.close();
58                  Toast.makeText(getApplicationContext(),
59                          text fileName + " 이 저장됨", Toast.LENGTH_SHORT).show();
60              } catch (IOException e) {
61              }
62          }
63      });
64
65
66
```

Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

View menu		Tool Windows submenu	
Tool Windows	>	Project	Alt+1
Quick Definition	Ctrl+Shift+I	Favorites	Alt+2
Show Siblings		Run	Alt+4
Quick Documentation	Ctrl+Q	Debug	Alt+5
Parameter Info	Ctrl+P	Logcat	Alt+6
Expression Type	Ctrl+Shift+P	Structure	Alt+7
Context Info	Alt+Q	Version Control	Alt+9
Recent Files	Ctrl+E	Profiler	
Recently Changed Files	Ctrl+Shift+E	Build	
Recent Changes	Alt+Shift+C	Build Variants	
Compare With...	Ctrl+D	Capture Analysis	
Compare with Clipboard		Capture Tool	
Quick Switch Scheme...	Ctrl+`	Captures	
Toolbar		Designer	
Tool Buttons	✓	Device File Explorer	
Status Bar	✓	Event Log	
Navigation Bar	✓	Gradle	
Active Editor	>	Image Layers	
Bidi Text Direction	>	Palette	
Enter Presentation Mode		Preview	
Enter Distraction Free Mode		Terminal	Alt+F12
Enter Full Screen		Theme Preview	
		TODO	

file_test ⓒ MainActivity

```
            le.txt", Context.MODE_PRIVATE);


            e.txt가 생성됨", Toast.LENGTH_SHORT).show();
                }
            });


        btnRead.setOnClickListener(new View.OnClickListener() {
            public void onClick(View v) {
                try {
                    FileInputStream inFs = openFileInput( name: "file.txt");
                    byte[] txt = new byte[30];
                    inFs.read(txt);
                    String str = new String(txt);
                    Toast.makeText(getApplicationContext(), str, Toast.LENGTH_SHORT).show();
                    inFs.close();
                } catch (IOException e) {
                    Toast.makeText(getApplicationContext(), text: "파일 없음" , Toast.LENGTH_SHORT).show();
                }
            }
        });




            }
        }
```

MainActivity

▤ Terminal   ↓⁹₀ Build   ☰ 6: Logcat   ⋒ Profiler   ▶ 4: Run   ☜ TODO

Activate Device File Explorer window

Name	Permissions	Date	Size
> ▸ com.android.storagemanager	drwx------	2019-02-18 02:19	4 KB
> ▸ com.android.systemui	drwx------	2019-02-18 02:19	4 KB
> ▸ com.android.systemui.theme.dark	drwx------	2019-02-18 02:19	4 KB
> ▸ com.android.traceur	drwx------	2019-02-18 02:19	4 KB
> ▸ com.android.vpndialogs	drwx------	2019-02-18 02:19	4 KB
> ▸ com.android.wallpaper.livepicker	drwx------	2019-02-18 02:19	4 KB
> ▸ com.android.wallpaperbackup	drwx------	2019-02-18 02:19	4 KB
> ▸ com.android.wallpapercropper	drwx------	2019-02-18 02:19	4 KB
> ▸ com.android.webview	drwx------	2019-02-18 02:19	4 KB
> ▸ com.example.pjoon.autocomp	drwx------	2019-02-18 02:19	4 KB
> ▸ com.example.pjoon.bar_test	drwx------	2019-02-18 02:28	4 KB
> ▸ com.example.pjoon.contexttest	drwx------	2019-02-22 01:38	4 KB
∨ ▸ com.example.pjoon.daily_test	drwx------	2019-02-22 06:04	4 KB
> ▸ cache	drwxrws--x	2019-02-22 05:52	4 KB
> ▸ code_cache	drwxrws--x	2019-02-22 05:52	4 KB
∨ ▸ files	drwxrwx--x	2019-02-22 06:05	4 KB
2019_2_25.txt	-rw-rw----	2019-02-22 06:05	5 B
> ▸ com.example.pjoon.dialog_test	drwx------	2019-02-22 01:56	4 KB
> ▸ com.example.pjoon.file_test	drwx------	2019-02-22 05:28	4 KB
> ▸ com.example.pjoon.list_dialog	drwx------	2019-02-22 02:28	4 KB
> ▸ com.example.pjoon.menu_test	drwx------	2019-02-20 05:18	4 KB
> ▸ com.example.pjoon.sliding_drwawer_test	drwx------	2019-02-18 02:41	4 KB
> ▸ com.example.pjoon.tabhosttest	drwx------	2019-02-18 03:53	4 KB
> ▸ com.example.pjoon.toast_test	drwx------	2019-02-22 01:49	4 KB
> ▸ com.example.pjoon.userinfo	drwx------	2019-02-22 04:52	4 KB
> ▸ com.example.pjoon.viewflippertest	drwx------	2019-02-18 03:42	4 KB
> ▸ com.example.pjoon.webviewtest	drwx------	2019-02-18 04:20	4 KB
> ▸ org.chromium.webview_shell	drwx------	2019-02-18 02:19	4 KB
> ▸ drm	drwxrwx---	2019-02-18 02:19	4 KB
> ▸ local	drwxr-x--x	2019-02-18 02:19	4 KB
> ▸ lost+found	drwxrwx---	2019-02-18 02:19	4 KB

Device File Explorer

Emulator Pixel2 Android 9, API 28

파일 처리

▶ # Raw 폴더 파일 처리

- ▶ 프로젝트의 /res/raw 폴더에 필요한 파일을 저장해서 사용하는 방법
- ▶ Java 소스에서 소스에서 openRawResource() 메소드를 사용해서 접근할 수 있으며, InputStream 클래스를 사용
- ▶ 프로젝트의 /res/raw 폴더는 프로젝트에 포함된 폴더이므로 읽기 전용으로만 사용 가능
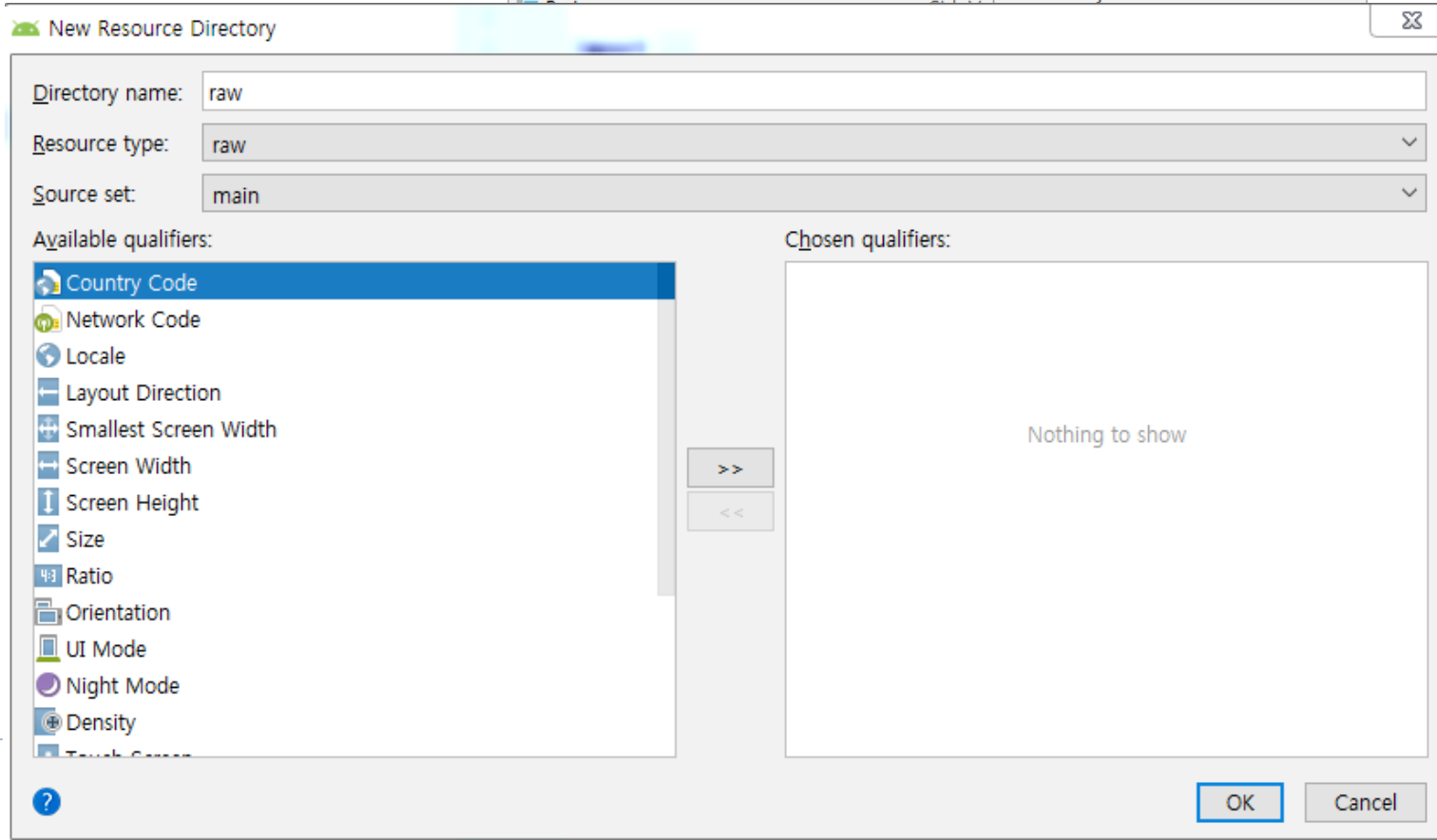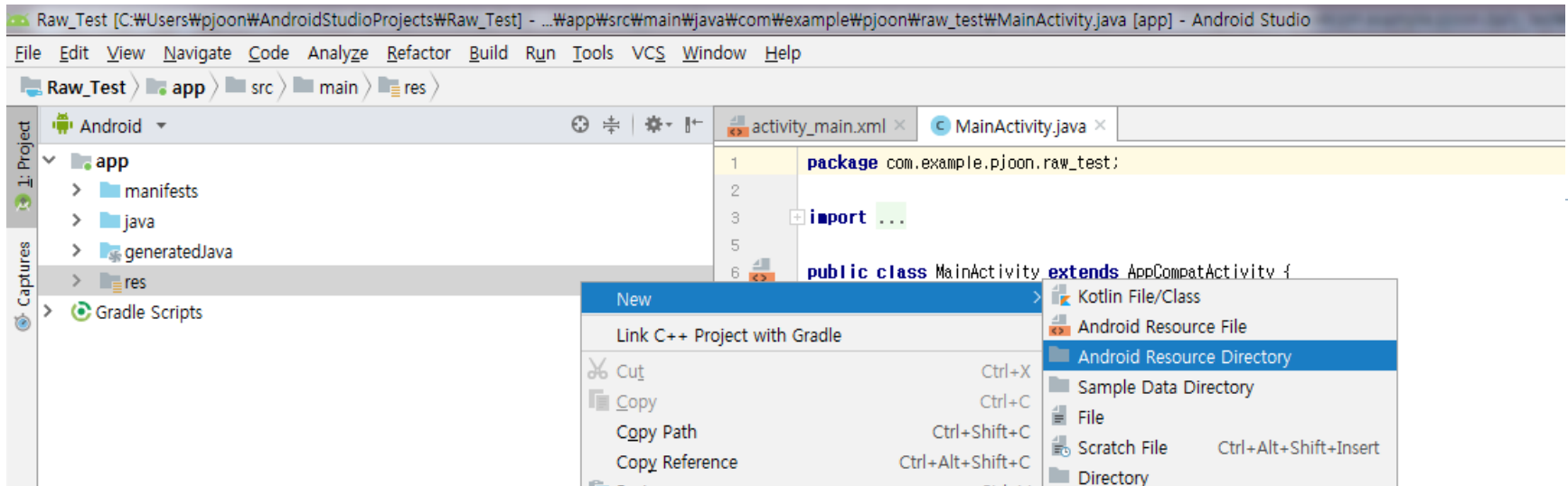- ▶ 쓰기는 내장 메모리나 SD 카드를 사용

Create New Project

Create Android Project

Application name

Raw_Test

Company domain

pjoon.example.com

Project location

C:\Users\pjoon\AndroidStudioProjects\Raw_Test

Package name

com.example.pjoon.raw_test

Edit

☐ **Include C++ support**

☐ **Include Kotlin support**

Previous   Next   Cancel   Finish

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

Raw_Test > app > src > main > res >

Android ▼

- app
  - manifests
  - java
  - generatedJava
  - res
- Gradle Scripts

activity_main.xml ×   MainActivity.java ×

```
1    package com.example.pjoon.raw_test;
2
3    import ...
5
6    public class MainActivity extends AppCompatActivity {
```

New	>
Link C++ Project with Gradle	
Cut	Ctrl+X
Copy	Ctrl+C
Copy Path	Ctrl+Shift+C
Copy Reference	Ctrl+Alt+Shift+C

- Kotlin File/Class
- Android Resource File
- **Android Resource Directory**
- Sample Data Directory
- File
- Scratch File   Ctrl+Alt+Shift+Insert
- Directory

New Resource Directory

Directory name: raw

Resource type: raw ▼

Source set: main ▼

Available qualifiers:

- Country Code
- Network Code
- Locale
- Layout Direction
- Smallest Screen Width
- Screen Width
- Screen Height
- Size
- Ratio
- Orientation
- UI Mode
- Night Mode
- Density

Chosen qualifiers:

Nothing to show

>>
<<

OK   Cancel

```xml
<?xml version="1.0" encoding="utf-8"?>
<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:id="@+id/btnRead"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="/res/raw 에서 파일 읽기" />

    <EditText
        android:id="@+id/edtRaw"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:lines="10" />

</LinearLayout>
```

```java
public class MainActivity extends AppCompatActivity {

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

        Button btnRead;
        final EditText edtRaw;
        btnRead = (Button) findViewById(R.id.btnRead);
        edtRaw = (EditText) findViewById(R.id.edtRaw);

        btnRead.setOnClickListener(new View.OnClickListener() {
            public void onClick(View v) {
                try {
                    InputStream inputS = getResources().openRawResource(
                            R.raw.raw_test);
                    byte[] txt = new byte[inputS.available()];
                    inputS.read(txt);
                    edtRaw.setText(new String(txt));
                    inputS.close();
                } catch (IOException e) {
                }
            }
        });

    }
```

```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" >

    <Button
        android:id="@+id/btnRead"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="/res/raw 에서 파일 읽기" />

    <EditText
        android:id="@+id/edtRaw"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:lines="10" />

</LinearLayout>
```

파일 처리 응용

▶ **SD 카드 파일 읽기**

  ▶ Tools → Android – AVD Manager → Edit 아이콘 클릭 → Show Advanced Settings 클릭

  ▶ 가상의 SD 카드를 확인

ple ⟩ 📁 pjoon ⟩ 📁 raw_test ⟩ © MainActivity

📄 app ⌄   ▶ ⚡ 🐞 ⏸ 🐱 📲 ■ | 🔵 📊 👤 🖥
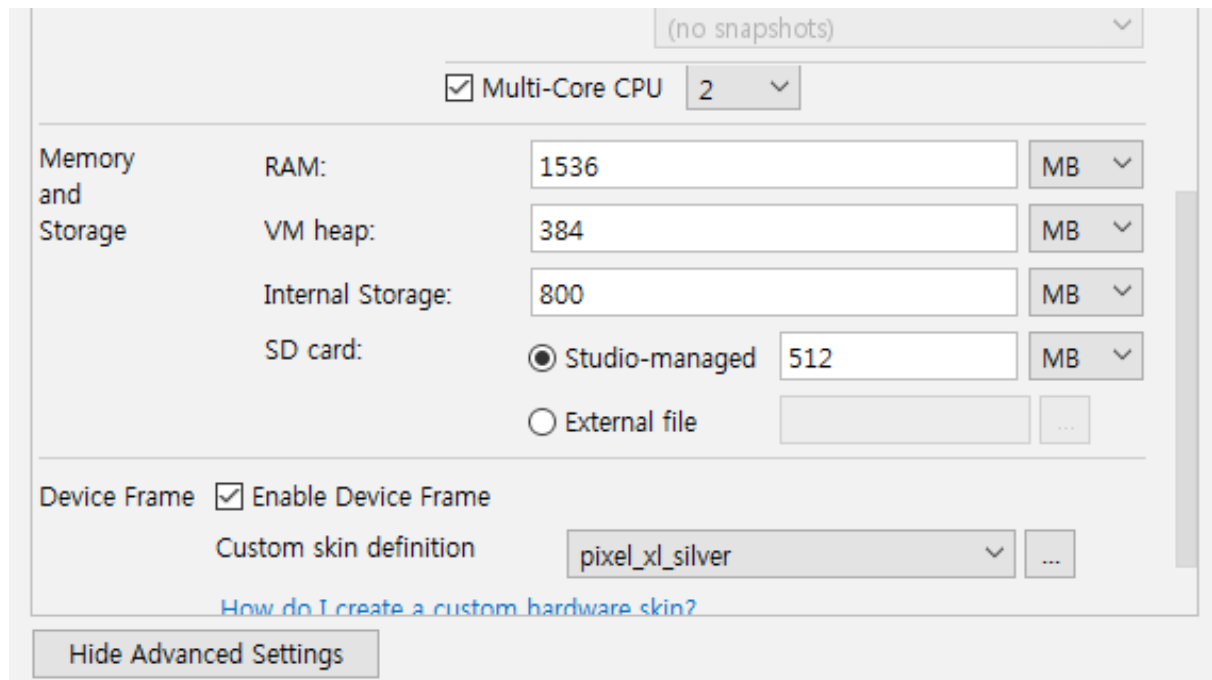
🔷 activity_main.xml ×   © MainActivity.java ×   📄 raw_test ×

```
1        package com.example.pjoon.raw_test;
2
3    ⊞ import ...
11
12 ⊟     public class MainActivity extends AppCompatActivity {
```

Device File Explorer   ⚙⌄

🔲 **Emulator Pixel2** Android 9, API 28

Name	Permissi...	Date	Size
⟩ 📁 acct	dr-xr-xr-x	2019-02-18 02:1	0 B
⟩ 📁 bin	lrw-r--r--	2018-07-31 18:1	11 B
⟩ 📁 cache	drwxrwx---	2018-07-31 17:5	4 KE
⟩ 📁 config	drwxr-xr-x	2019-02-18 02:1	0 B
⟩ 📁 d	lrw-r--r--	2018-07-31 18:1	17 B
⟩ 📁 data	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 dev	drwxr-xr-x	2019-02-18 02:1	2.5 KE
⟩ 📁 etc	lrw-r--r--	2018-07-31 18:1	11 B
⟩ 📁 lost+found	drwx------	2018-07-31 18:1	16 KE
⟩ 📁 metadata	drwxr-xr-x	2018-07-31 17:5	4 KE
⟩ 📁 mnt	drwxr-xr-x	2019-02-18 02:1	240 B
⟩ 📁 odm	drwxr-xr-x	2018-07-31 17:5	4 KE
⟩ 📁 oem	drwxr-xr-x	2018-07-31 17:5	4 KE
⟩ 📁 proc	dr-xr-xr-x	2019-02-18 02:1	0 B
⟩ 📁 product	lrw-r--r--	2018-07-31 18:1	15 B
⟩ 📁 sbin	drwxr-x---	2018-07-31 18:0	4 KE
⌄ 📁 sdcard	lrw-r--r--	2018-07-31 18:1	21 B
⟩ 📁 Alarms	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 DCIM	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 Download	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 Movies	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 Music	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 Notifications	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 Pictures	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 Podcasts	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 Ringtones	drwxrwx--x	2019-02-18 02:1	4 KE
⟩ 📁 storage	drwxr-xr-x	2019-02-18 02:1	100 B
⟩ 📁 sys	dr-xr-xr-x	2019-02-18 02:1	0 B
⟩ 📁 system	drwxr-xr-x	2018-07-31 18:1	4 KE
⟩ 📁 vendor	drwxr-xr-x	2018-07-31 18:0	4 KE

Select Path   ⬚

🏠 ⬚ 🤖 📁 📁 ✖ 🔄 ▦   Hide path

C:¥a¥sd_test.txt   📥

```
⌄ 📁 C:¥
  ⟩ 📁 'J$REGD
  ⟩ 📁 0219
  ⟩ 📁 3DP
  ⌄ 📁 a
        📄 1.py
        📄 sd_test.txt
        📄 url.txt
  ⟩ 📁 APM_Setup
  ⟩ 📁 Documents and Settings
  ⟩ 📁 gpki
  ⟩ 📁 Kings
  ⟩ 📁 kumohsys
  ⟩ 📁 NVIDIA
  ⟩ 📁 PerfLogs
  ⟩ 📁 Program Files
```

Drag and drop a file into the space above to quickly locate it in the tree

❓   OK   Cancel

Create Android Project

Application name

SD_Test

Company domain

pjoon.example.com

Project location

C:\Users\pjoon\AndroidStudioProjects\SD_Test

Package name

com.example.pjoon.sd_test

Edit

☐ **Include C++ support**

☐ **Include Kotlin support**

Previous   Next   Cancel   Finish

```xml
<?xml version="1.0" encoding="utf-8"?>
<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:id="@+id/btnRead"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="SD 카드에서 파일 읽기" />

    <EditText
        android:id="@+id/edtSD"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:lines="10" />

</LinearLayout>
```

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

    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="SD_Test"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme"
        >
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

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

    ActivityCompat.requestPermissions( activity: this, new String[] {android.Manifest.permission.WRITE_EXTERNAL_STORAGE},MODE_PRIVATE);

    Button btnRead;
    final EditText edtSD;
    btnRead = (Button) findViewById(R.id.btnRead);
    edtSD = (EditText) findViewById(R.id.edtSD);

    btnRead.setOnClickListener(new View.OnClickListener() {
        public void onClick(View v) {
            try {
                FileInputStream inFs = new FileInputStream( name: "/storage/emulated/0/sd_test.txt");
                byte[] txt = new byte[inFs.available()];
                inFs.read(txt);
                edtSD.setText(new String(txt));
                inFs.close();
            } catch (IOException e) {
            }
        }
    });
}
```

파일 처리 응용

‣ SD 카드에 폴더 및 파일 생성

- ‣ Environment 클래스의 정적 메소드를 이용해 SD카드의 동작 여부 및 관련 폴더 경로를 구함
- ‣ AndroidManifest.xml 파일에 SD카드에 쓰기가 가능하도록 퍼미션을 지정

```
<uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
```

Create Android Project

Application name

sdTest2

Company domain

pjoon.example.com

Project location

C:\Users\pjoon\AndroidStudioProjects\sdTest2

Package name

com.example.pjoon.sdtest2

Edit

☐ **Include C++ support**

☐ **Include Kotlin support**

ⓘ The application name for most apps begins with an uppercase letter

Previous | Next | Cancel | Finish

```xml
<?xml version="1.0" encoding="utf-8"?>
<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:id="@+id/btnMkdir"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="SD카드에 디렉터리 생성" />

    <Button
        android:id="@+id/btnRmdir"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="SD카드에서 디렉터리 삭제" />

</LinearLayout>
```

```xml
1    <?xml version="1.0" encoding="utf-8"?>
2    <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3        package="com.example.pjoon.sdtest2">
4
5        <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
6        <application
7            android:allowBackup="true"
8            android:icon="@mipmap/ic_launcher"
9            android:label="sdTest2"
10           android:roundIcon="@mipmap/ic_launcher_round"
11           android:supportsRtl="true"
12           android:theme="@style/AppTheme">
13           <activity android:name=".MainActivity">
14           <intent-filter>
15               <action android:name="android.intent.action.MAIN" />
16
17               <category android:name="android.intent.category.LAUNCHER" />
18           </intent-filter>
19       </activity>
20       </application>
21
22   </manifest>
```

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

          ActivityCompat.requestPermissions( activity: this, new String[] {android.Manifest.permission.WRITE_EXTERNAL_STORAGE},MODE_PRIVATE);

          Button btnMkdir, btnRmdir;
          btnMkdir = (Button) findViewById(R.id.btnMkdir);
          btnRmdir = (Button) findViewById(R.id.btnRmdir);

          final String strSDpath = Environment.getExternalStorageDirectory()
                  .getAbsolutePath();
          final File myDir = new File( pathname: strSDpath + "/mydir");

          btnMkdir.setOnClickListener(new View.OnClickListener() {
              public void onClick(View v) {
                  myDir.mkdir();
              }
          });

          btnRmdir.setOnClickListener(new View.OnClickListener() {
              public void onClick(View v) {
                  myDir.delete();
              }
          });
```

sdTest2

SD카드에 디렉터리 생성			
SD카드에서 디렉터리 삭제			
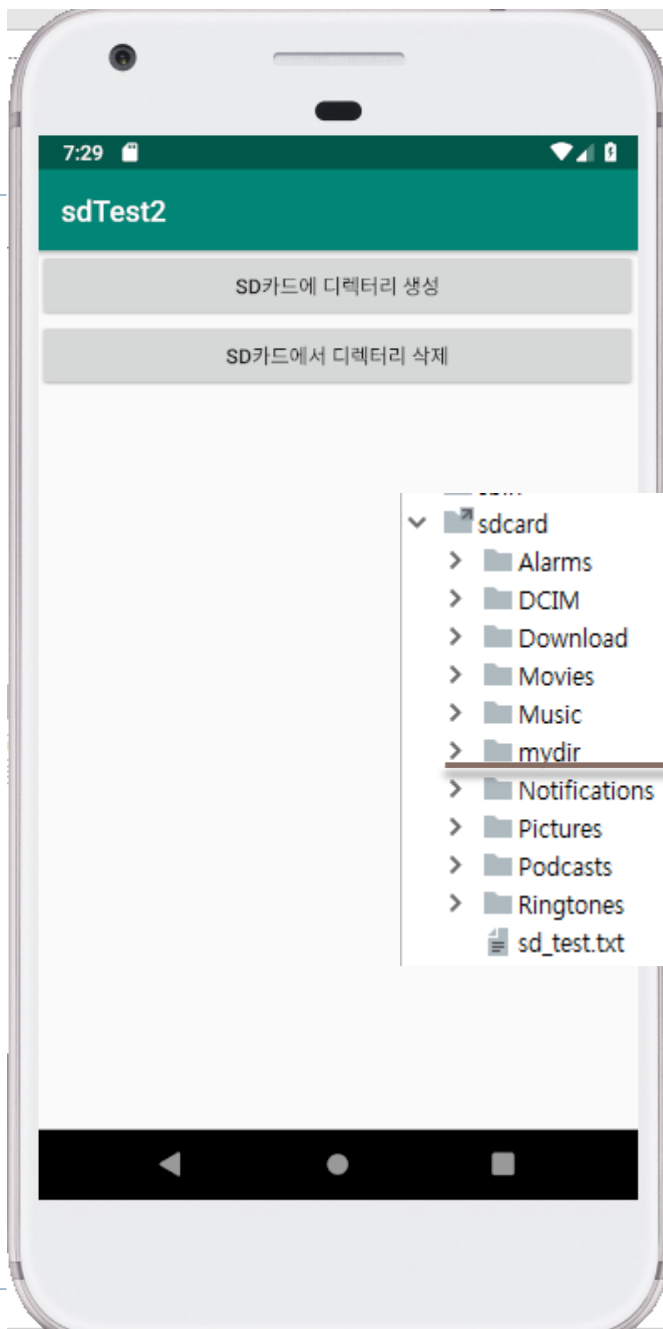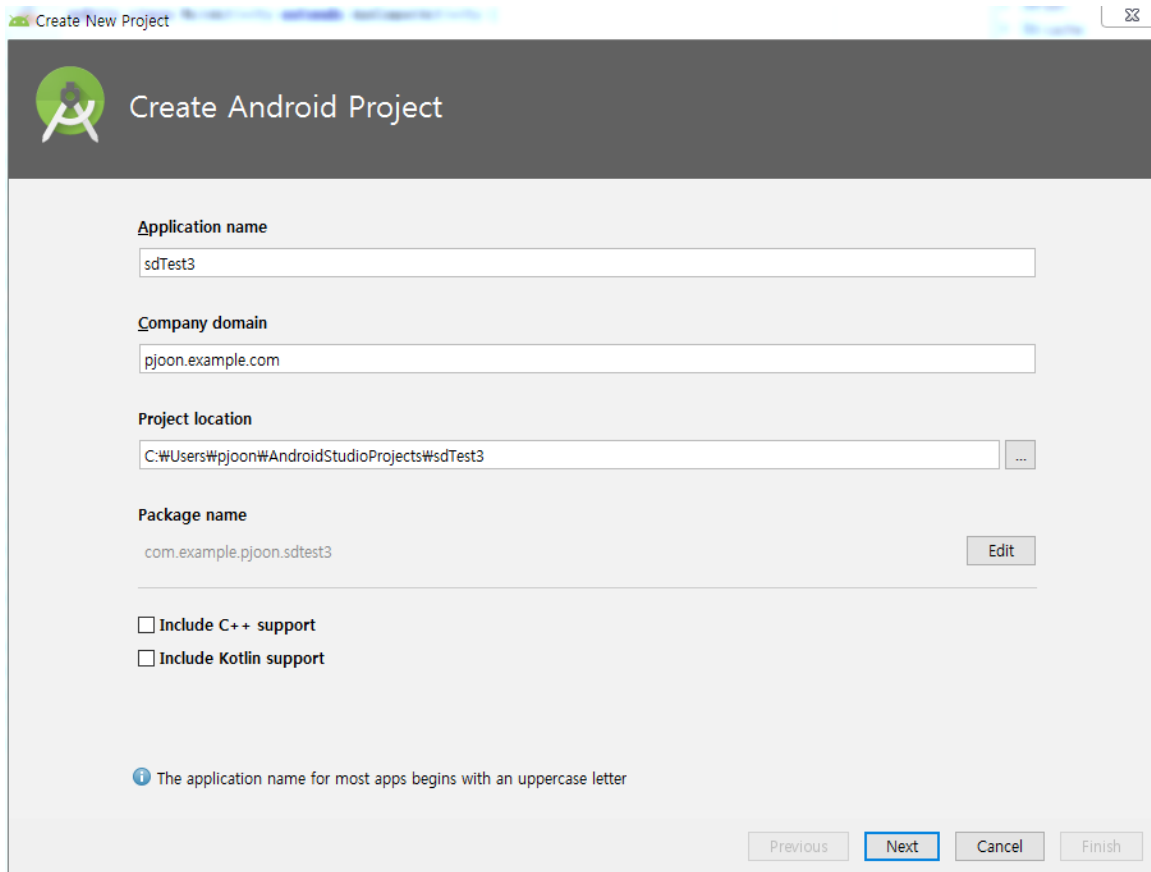
∨ 📁 sdcard	lrw-r--r--	2018-07-31 18:16	21 B
> 📁 Alarms	drwxrwx--x	2019-02-18 02:19	4 KB
> 📁 DCIM	drwxrwx--x	2019-02-18 02:19	4 KB
> 📁 Download	drwxrwx--x	2019-02-18 02:19	4 KB
> 📁 Movies	drwxrwx--x	2019-02-18 02:19	4 KB
> 📁 Music	drwxrwx--x	2019-02-18 02:19	4 KB
> 📁 mydir	drwxrwx--x	2019-02-22 07:28	4 KB
> 📁 Notifications	drwxrwx--x	2019-02-18 02:19	4 KB
> 📁 Pictures	drwxrwx--x	2019-02-18 02:19	4 KB
> 📁 Podcasts	drwxrwx--x	2019-02-18 02:19	4 KB
> 📁 Ringtones	drwxrwx--x	2019-02-18 02:19	4 KB
📄 sd_test.txt	-rw-rw----	2019-02-22 06:48	45 B

파일처리 응용

- 특정 폴더의 하위 폴더 및 파일 목록 접근
  - File.listFiles() 메소드 사용

```xml
<?xml version="1.0" encoding="utf-8"?>
<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:id="@+id/btnFilelist"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="시스템 폴더의 폴더/파일 목록" />

    <EditText
        android:id="@+id/edtFilelist"
        android:layout_width="match_parent"
        android:layout_height="wrap_content" />

</LinearLayout>
```

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

    Button btnFilelist;
    final EditText edtFilelist;
    btnFilelist = (Button) findViewById(R.id.btnFilelist);
    edtFilelist = (EditText) findViewById(R.id.edtFilelist);

    btnFilelist.setOnClickListener(new View.OnClickListener() {
        public void onClick(View v) {
            String sysDir = Environment.getRootDirectory().getAbsolutePath();
            File[] sysFiles = (new File(sysDir).listFiles());

            String strFname;
            for (int i = 0; i < sysFiles.length; i++) {
                if (sysFiles[i].isDirectory() == true)
                    strFname = "<폴더> " + sysFiles[i].toString();
                else
                    strFname = "<파일> " + sysFiles[i].toString();

                edtFilelist.setText(edtFilelist.getText() + "\n" + strFname);
            }
        }
    });
```
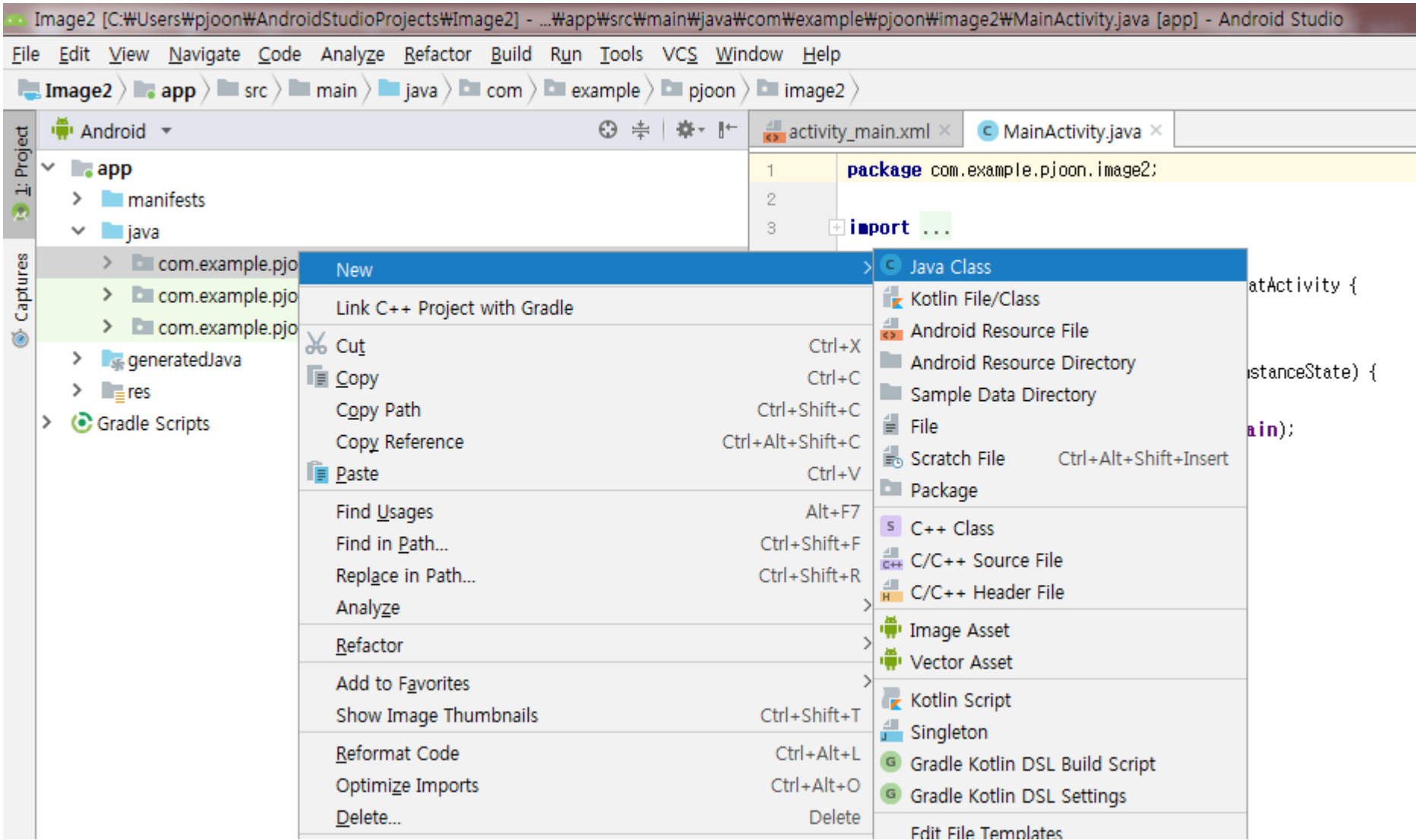
```java
public class MainActivity extends Activity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Button btnFilelist;
        final EditText edtFilelist;
        btnFilelist = (Button) findViewById(R.id.btnFilelist);
        edtFilelist = (EditText) findViewById(R.id.edtFilelist);

        btnFilelist.setOnClickListener(new View.OnClickListener() {

            @Override
            public void onClick(View v) {
                // TODO Auto-generated method stub
                String sysDir = Environment.getRootDirectory().getAbsolutePath();
                File[] sysFiles = (new File(sysDir).listFiles());

                String strFname;
                for (int i = 0; i < sysFiles.length; i++) {
                    if (sysFiles[i].isDirectory() == true)
                        strFname = "<폴더> " + sysFiles[i].toString();
                    else
                        strFname = "<파일> " + sysFiles[i].toString();

                    edtFilelist.setText(edtFilelist.getText() + "\n" + strFname);
                }

            }
        });


    }
```

시스템 폴더의 폴더/파일 목록

<폴더> /system/fonts
<파일> /system/build.prop
<폴더> /system/app
<폴더> /system/priv-app
<폴더> /system/fake-libs
<폴더> /system/product
<폴더> /system/xbin
<폴더> /system/media
<폴더> /system/etc
<폴더> /system/lib
<폴더> /system/framework
<파일> /system/compatibility_matrix.xml
<폴더> /system/bin
<폴더> /system/vendor
<폴더> /system/usr

이미지 뷰어 만들기

```xml
1  <?xml version="1.0" encoding="utf-8"?>
2  <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3      package="com.example.pjoon.image2">
4
5      <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
6
7      <application
8          android:allowBackup="true"
9          android:icon="@mipmap/ic_launcher"
10         android:label="Image2"
11         android:roundIcon="@mipmap/ic_launcher_round"
12         android:supportsRtl="true"
13         android:theme="@style/AppTheme">
14         <activity android:name=".MainActivity">
15             <intent-filter>
16                 <action android:name="android.intent.action.MAIN" />
17
18                 <category android:name="android.intent.category.LAUNCHER" />
19             </intent-filter>
20         </activity>
21     </application>
22
23 </manifest>
```

```java
1    package com.example.pjoon.image2;
2
3    import android.view.View;
4
5    public class myPictureView extends View {
6
7
8    }
9
```

Select Methods to Override/Implement

m	⌐	showContextMenu(x:float, y:float):boolean
m	⌐	startActionMode(callback:Callback):ActionMode
m	⌐	startActionMode(callback:Callback, type:int):ActionMode
m	⌐	startAnimation(animation:Animation):void
m	⌐	startNestedScroll(axes:int):boolean
m	⌐	stopNestedScroll():void
m	⌐	toString():String
m	⌐	unscheduleDrawable(who:Drawable):void
m	⌐	unscheduleDrawable(who:Drawable, what:Runnable):void
m	⌐	verifyDrawable(who:Drawable):boolean
m	⌐	View(context:Context)
m	⌐	View(context:Context, attrs:AttributeSet)
m	⌐	View(context:Context, attrs:AttributeSet, defStyleAttr:int)
m	⌐	View(context:Context, attrs:AttributeSet, defStyleAttr:int, defStyleRes:int)
m	⌐	~~willNotCacheDrawing():boolean~~
m	⌐	willNotDraw():boolean

java.lang.Object

m	⌐	clone():Object
m	⌐	equals(obj:Object):boolean
m	⌐	finalize():void
m	⌐	hashCode():int

☐ Copy JavaDoc

☑ Insert @Override

[OK] [Cancel]

myPictureView

```java
1    package com.example.pjoon.image2;
2
3    import android.content.Context;
4    import android.util.AttributeSet;
5    import android.view.View;
6
7    public class myPictureView extends View {
8
9        public myPictureView(Context context, @an
10           super(context, attrs);
11       }
12
13
14   }
15
```

Select Methods to Override/Implement

⌗% ↓ᵃz Ⓒ ⓘ ≐ ≑

- m 🔒 offsetTopAndBottom(offset:int):void
- m 🔑 onAnimationEnd():void
- m 🔑 onAnimationStart():void
- m 🔒 onApplyWindowInsets(insets:WindowInsets):WindowInsets
- m 🔑 onAttachedToWindow():void
- m 🔒 onCancelPendingInputEvents():void
- m 🔒 onCapturedPointerEvent(event:MotionEvent):boolean
- m 🔒 onCheckIsTextEditor():boolean
- m 🔑 onConfigurationChanged(newConfig:Configuration):void
- m 🔑 onCreateContextMenu(menu:ContextMenu):void
- m 🔑 onCreateDrawableState(extraSpace:int):int[]
- m 🔒 onCreateInputConnection(outAttrs:EditorInfo):InputConnection
- m 🔑 onDetachedFromWindow():void
- m 🔑 onDisplayHint(hint:int):void
- m 🔒 onDragEvent(event:DragEvent):boolean
- m 🔑 onDraw(canvas:Canvas):void
- m 🔒 onDrawForeground(canvas:Canvas):void
- m 🔒 onFilterTouchEventForSecurity(event:MotionEvent):boolean
- m 🔑 onFinishInflate():void
- m 🔒 onFinishTemporaryDetach():void
- m 🔑 onFocusChanged(gainFocus:boolean, direction:int, previouslyFocusedRect:Rect):

☐ Copy JavaDoc

☑ Insert @Override   OK   Cancel

myPictureView

```java
import android.content.Context;
import android.graphics.Bitmap;
import android.graphics.BitmapFactory;
import android.graphics.Canvas;
import android.util.AttributeSet;
import android.view.View;

public class myPictureView extends View {

    //추가
    String imagePath = null;

    public myPictureView(Context context, @androidx.annotation.Nullable AttributeSet attrs) {
        super(context, attrs);
    }

    @Override
    protected void onDraw(Canvas canvas) {
        super.onDraw(canvas);

        if (imagePath != null) {
            Bitmap bitmap = BitmapFactory.decodeFile(imagePath);
            canvas.scale( sx: 2, sy: 2, px: 0, py: 0);
            canvas.drawBitmap(bitmap, left: 0, top: 0, paint: null);
            bitmap.recycle();
        }
    }
}
```

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

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal" >

        <Button
            android:id="@+id/btnPrev"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text=" 이전 그림 " />

        <Button
            android:id="@+id/btnNext"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text=" 다음 그림 " />
    </LinearLayout>

    <com.example.pjoon.image2.myPictureView
        android:id="@+id/myPictureView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content" />

</LinearLayout>
```

```java
public class MainActivity extends AppCompatActivity {

    Button btnPrev, btnNext;
    myPictureView myPicture;
    int curNum;
    File[] imageFiles;
    String imageFname;

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

        setTitle("간단 이미지 뷰어");
        ActivityCompat.requestPermissions( activity: this, new String[] {android.Manifest.permission.WRITE_EXTERNAL_STORAGE},MODE_PRIVATE);

        btnPrev = (Button) findViewById(R.id.btnPrev);
        btnNext = (Button) findViewById(R.id.btnNext);
        myPicture = (myPictureView) findViewById(R.id.myPictureView1);


    }
}
```

```java
32
33            imageFiles = new File( pathname: Environment.getExternalStorageDirectory().getAbsolutePath()+"/Pictures").listFiles();
34            imageFname = imageFiles[0].toString();
35            myPicture.imagePath=imageFname;
36
37
38            btnPrev.setOnClickListener(new View.OnClickListener() {
39                public void onClick(View v) {
40                    if (curNum <= 0) {
41                        Toast.makeText(getApplicationContext(), text: "첫번째 그림입니다", Toast.LENGTH_SHORT)
42                                .show();
43                    } else {
44                        curNum--;
45                        imageFname = imageFiles[curNum].toString();
46                        myPicture.imagePath = imageFname;
47                        myPicture.invalidate();
48                    }
49                }
50            });
51
52            btnNext.setOnClickListener(new View.OnClickListener() {
53                public void onClick(View v) {
54                    if (curNum >= imageFiles.length - 1) {
55                        Toast.makeText(getApplicationContext(), text: "마지막 그림입니다", Toast.LENGTH_SHORT)
56                                .show();
57                    } else {
58                        curNum++;
59                        imageFname = imageFiles[curNum].toString();
60                        myPicture.imagePath = imageFname;
61                        myPicture.invalidate();
62                    }
63                }
64            });
65
66
```