

# 멀티미디어와 지도

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# 구글 지도

## ▶ SDK Manager 에서 Google Play Service 설치 확인

The screenshot shows the Android Studio interface with the 'Appearance & Behavior' > 'System Settings' > 'Android SDK' path selected. The 'Android SDK Location' is set to 'C:\Users\pjoon\AppData\Local\Android\Sdk'. The 'SDK Tools' tab is active, displaying a list of available SDK developer tools. The 'Support Repository' is expanded, showing four installed components: 'ConstraintLayout for Android', 'Solver for ConstraintLayout', 'Android Support Repository', and 'Google Repository'.

Name	Version	Status
<input checked="" type="checkbox"/> Android SDK Build-Tools		Installed
<input type="checkbox"/> GPU Debugging tools		Not Installed
<input type="checkbox"/> CMake		Not Installed
<input type="checkbox"/> LLDB		Not Installed
<input type="checkbox"/> Android Auto API Simulators	1	Not installed
<input type="checkbox"/> Android Auto Desktop Head Unit emulator	1.1	Not installed
<input checked="" type="checkbox"/> Android Emulator	28.0.23	Installed
<input checked="" type="checkbox"/> Android SDK Platform-Tools	28.0.1	Installed
<input checked="" type="checkbox"/> Android SDK Tools	26.1.1	Installed
<input type="checkbox"/> Documentation for Android SDK	1	Not installed
<input type="checkbox"/> Google Play APK Expansion library	1	Not installed
<input type="checkbox"/> Google Play Instant Development SDK	1.6.0	Not installed
<input type="checkbox"/> Google Play Licensing Library	1	Not installed
<input checked="" type="checkbox"/> Google Play services	49	Installed
<input type="checkbox"/> Google USB Driver	11	Not installed
<input type="checkbox"/> Google Web Driver	2	Not installed
<input checked="" type="checkbox"/> Intel x86 Emulator Accelerator (HAXM installer)	7.3.2	Installed
<input type="checkbox"/> NDK	19.1.5304403	Not installed
<input checked="" type="checkbox"/> Support Repository		
<input checked="" type="checkbox"/> ConstraintLayout for Android		Installed
<input checked="" type="checkbox"/> Solver for ConstraintLayout		Installed
<input checked="" type="checkbox"/> Android Support Repository	47.0.0	Installed
<input checked="" type="checkbox"/> Google Repository	58	Installed

☐ Show Package Details

## ▶ 인증을 위한 SHA1 코드 확인

```
C:\Program Files\Android\Android Studio\jre\bin>keytool.exe -list -v -keystore C:\Users\wpjoon\android\debug.keystore
```

키 저장소 비밀번호 입력:

키 저장소 유형: JKS

키 저장소 제공자: SUN

키 저장소에 1개의 항목이 포함되어 있습니다.

별칭 이름: androiddebugkey

생성 날짜: 2019. 2. 13

항목 유형: PrivateKeyEntry

인증서 체인 길이: 1

인증서 [1]:

소유자: C=US, O=Android, CN=Android Debug

발행자: C=US, O=Android, CN=Android Debug

일련 번호: 1

적합한 시작 날짜: Wed Feb 13 15:33:44 KST 2019, 종료 날짜: Fri Feb 05 15:33:44 KST 2049

인증서 지문:

MD5: 97:2F:BA:A3:93:CB:A5:9C:D9:62:AE:B0:D5:51:7F:56

SHA1: 1F [REDACTED] :2C



# Create Android Project

**Application name****Company domain****Project location****Package name**☐ Include C++ support☐ Include Kotlin support

## ▶ 인증을 위한 SHA1 코드 확인

```
C:\Program Files\Android\Android Studio\jre\bin>keytool.exe -list -v -keystore C:\Users\wpjoon\.android\debug.keystore
```

키 저장소 비밀번호 입력:

키 저장소 유형: JKS

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소유자: C=US, O=Android, CN=Android Debug

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일련 번호: 1


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MD5: 97:2F:BA:A3:93:CB:A5:9C:D9:62:AE:B0:D5:51:7F:56


SHA1: 1F [REDACTED] :2C

접속: <https://code.google.com/apis/console>



---


## New Project



You have 23 projects remaining in your quota. Request an increase or delete projects. [Learn more](#)


[MANAGE QUOTAS](#)

Project Name \*

GMapTest 

Project ID: gmaptest-232903. It cannot be changed later. [EDIT](#)

Location \*


 No organization [BROWSE](#)


Parent organization or folder


[CREATE](#) [CANCEL](#)







 APIs & Services >

 Billing

 Support

 IAM & admin >

 Google Maps >

 CREATE PROJECT

 DELETE

Dashboard

Library

Credentials

Project ID

api-project-401792104021

gmaptest-232903

my-project-01-230305

Columns ▾

Select

PERMIS

 PI



Browse the [marketplace](#) to find and use Maps APIs and services.

## Maps APIs and services



**Distance Matrix API**  
Google

Travel time and distance for multiple destinations.



**Places API**  
Google

Get detailed information about 100 million places



**Maps SDK for Android**  
Google

Maps for your native Android app.



**Maps Embed API**  
Google

Make places easily discoverable with interactive Google Maps.



**Street View API**  
Google

Real-world imagery and panoramas.



**Maps JavaScript API**  
Google

Maps for your website



**Maps Elevation API**  
Google

Elevation data for any point in the world.



**Roads API**  
Google

Snap-to-road functionality to accurately trace GPS breadcrumbs.



**Geolocation API**  
Google

Location data from cell towers and WiFi nodes.



**Maps SDK for iOS**  
Google

Maps for your native iOS app.



**Maps Static API**  
Google

Simple, embeddable map image with minimal code.



**Directions API**  
Google

Directions between multiple locations.



**Time Zone API**  
Google

Time zone data for anywhere in the world.



**Geocoding API**  
Google

Convert between addresses and geographic coordinates.



API

APIs & Services

Dashboard

Library

Credentials

Credentials

OAuth consent screen

Domain verification

APIs

Credentials

You need credentials to access APIs. [Enable the APIs you plan to use](#) and then create the credentials they require. Depending on the API, you need an API key, a service account, or an OAuth 2.0 client ID. For more information, see the [authentication documentation](#).

Create credentials ▾

API key

Identifies your project using a simple API key to check quota and access

OAuth client ID

Requests user consent so your app can access the user's data

Service account key

Enables server-to-server, app-level authentication using robot accounts

Help me choose

Asks a few questions to help you decide which type of credential to use

APIs

Credentials

You need credentials to access APIs. [Enable the APIs you plan to use](#) and then create the credentials they require. Depending on the API, you need an API key, a service account, or an OAuth 2.0 client ID. For more information, see the [authentication documentation](#).

Create credentials ▾



This API key can be used in this project and with any API that supports it. To use this key in your application, pass it with the `key=API_KEY` parameter.

Creation date Feb 26, 2019, 12:46:04 PM  
Created by joons50@gmail.com (you)

#### API key

AIz [redacted]

#### Name

API key 1

#### Key restrictions

This key is unrestricted. To prevent unauthorized use and quota theft, restrict y

⚠ Application restrictions: None ⚠ API restrictions: None

[Application restrictions](#) [API restrictions](#)

Application restrictions specify which web sites, IP addresses, or apps can use restriction type per key.

#### Application restrictions

- ☐ None  
☐ HTTP referrers (web sites)  
☐ IP addresses (web servers, cron jobs, etc.)  
☒ Android apps  
☐ iOS apps

#### Restrict usage to your Android apps (Optional)

Add your package name and SHA-1 signing-certificate fingerprint to restrict usage to your Android apps. Get the package name from your AndroidManifest.xml file. Then use the following command to get the fingerprint:

```
$ keytool -list -v -keystore mystore.keystore
```

[+ Add package name and fingerprint](#)

Note: It may take up to 5 minutes for settings to take effect

[Save](#) [Cancel](#)

#### Key restrictions

Restrictions prevent unauthorized use and quota theft. [Learn more](#)

Application restrictions: Android apps ⚠ API restrictions: None

[Application restrictions](#) [API restrictions](#)

Application restrictions specify which web sites, IP addresses, or apps can use this key. You can set one restriction type per key.

#### Application restrictions

- ☐ None  
☐ HTTP referrers (web sites)  
☐ IP addresses (web servers, cron jobs, etc.)  
☒ Android apps  
☐ iOS apps

#### Restrict usage to your Android apps (Optional)

Add your package name and SHA-1 signing-certificate fingerprint to restrict usage to your Android apps. Get the package name from your AndroidManifest.xml file. Then use the following command to get the fingerprint:

```
$ keytool -list -v -keystore mystore.keystore
```

Package name SHA-1 certificate fingerprint

com.example.pjoon.gmaptest

1F: [redacted] 2C

[+ Add package name and fingerprint](#)

Note: It may take up to 5 minutes for settings to take effect

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

    <uses-feature android:required="true" android:glEsVersion="0x00020000" />
    <permission android:name="com.cookandroid.cookmap.permission.MAPS_RECEIVE" android:label="signature"></permission>
    <uses-permission android:name="android.permission.INTERNET" />
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE" />
    <uses-permission android:name="android.permission.ACCESS_NETWORK_STATE" />
    <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION" />
    <uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />
    <uses-permission android:name="com.google.android.providers.gsf.permission.READ_GSERVICES" />
    <meta-data android:name="com.google.android.gms.version" android:value="@integer/google_play_services_version" />

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="GmapTest"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportRtl="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>
        <meta-data android:name="com.google.android.maps.v2.API_KEY" android:value="자신의 API 인증키" />
        <uses-library android:name="org.apache.http.legacy" android:required="false" />
    </application>

</manifest>
```

## build.gradle (Module: app) 에 추가

```
1  apply plugin: 'com.android.application'
2
3  android {
4      compileSdkVersion 28
5      defaultConfig {
6          applicationId "com.example.pjoon.gmaptest"
7          minSdkVersion 15
8          targetSdkVersion 28
9          versionCode 1
10         versionName "1.0"
11         testInstrumentationRunner "android.support.test.runner.AndroidJUnitRunner"
12     }
13     buildTypes {
14         release {
15             minifyEnabled false
16             proguardFiles getDefaultProguardFile('proguard-android.txt'), 'proguard-rules.pro'
17         }
18     }
19 }
20
21 dependencies {
22     implementation fileTree(dir: 'libs', include: ['*.jar'])
23     implementation 'com.android.support:appcompat-v7:28.0.0'
24     implementation 'com.android.support.constraint:constraint-layout:1.1.3'
25     testImplementation 'junit:junit:4.12'
26     androidTestImplementation 'com.android.support.test:runner:1.0.2'
27     androidTestImplementation 'com.android.support.test.espresso:espresso-core:3.0.2'
28     implementation 'com.google.android.gms:play-services-location:16.0.0'
29     implementation 'com.google.android.gms:play-services-maps:16.0.0'
30 }
31
```

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <android.support.constraint.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
3     xmlns:app="http://schemas.android.com/apk/res-auto"
4     xmlns:tools="http://schemas.android.com/tools"
5     android:layout_width="match_parent"
6     android:layout_height="match_parent"
7     tools:context=".MainActivity">
8
9     <fragment xmlns:android="http://schemas.android.com/apk/res/android"
10         xmlns:map="http://schemas.android.com/apk/res-auto"
11         android:id="@+id/map"
12         android:name="com.google.android.gms.maps.MapFragment"
13         android:layout_width="match_parent"
14         android:layout_height="match_parent"
15         map:cameraTargetLat="37.541"
16         map:cameraTargetLng="126.986"
17         map:cameraZoom="15" />
18
19
20 </android.support.constraint.ConstraintLayout>
```



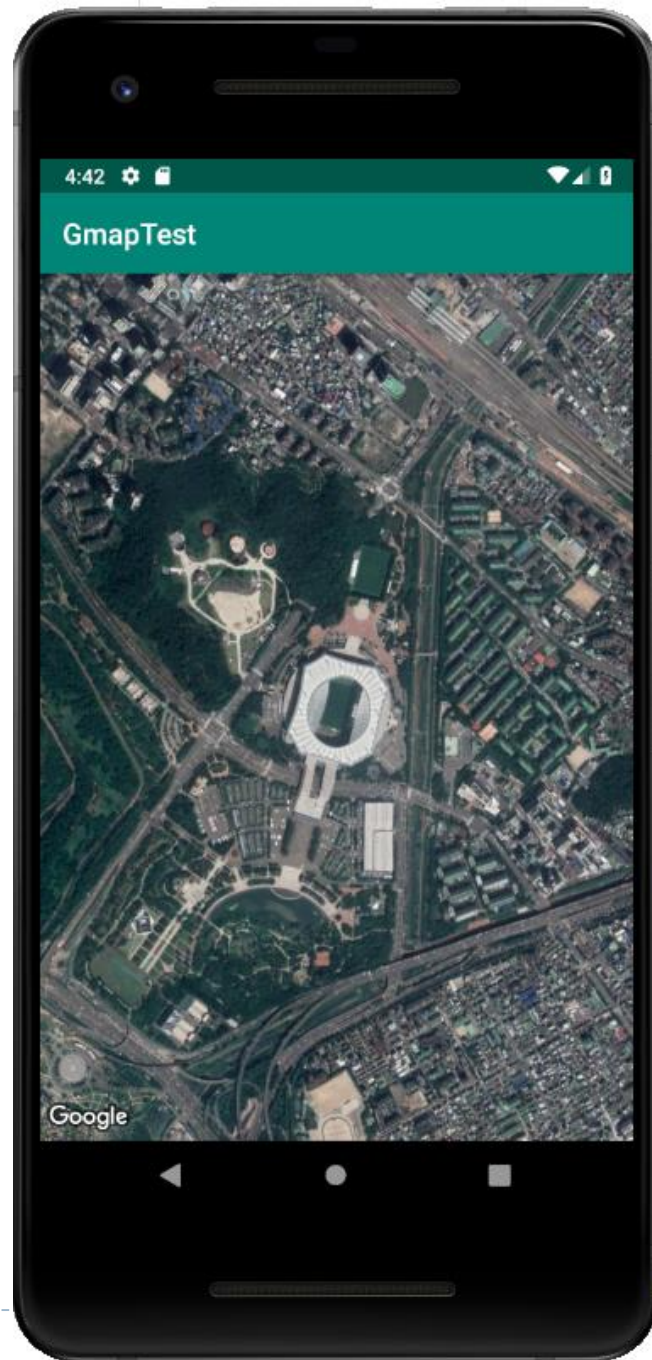
# 구글 지도 응용1 – 위성 지도

---

- ▶ 확대, 축소, 이동 → 기본 제공
- ▶ 추가적인 기능 필요시 → GroundOverlay 활용





```
1 package com.example.pjoon.gmaptest;
2
3 import ...
4
12
13 public class MainActivity extends AppCompatActivity implements OnMapReadyCallback {
14
15     GoogleMap gMap;
16     MapFragment mapFrag;
17     GroundOverlayOptions videoMark;
18
19     @Override
20     protected void onCreate(Bundle savedInstanceState) {
21         super.onCreate(savedInstanceState);
22         setContentView(R.layout.activity_main);
23
24         mapFrag = (MapFragment) getFragmentManager().findFragmentById(R.id.map);
25         mapFrag.getMapAsync(onMapReadyCallback this);
26
27     }
28
29     @Override
30     public void onMapReady(GoogleMap googleMap) {
31
32         gMap = googleMap;
33         gMap.setMapType(GoogleMap.MAP_TYPE_SATELLITE);
34         gMap.moveCamera(CameraUpdateFactory.newLatLngZoom(new LatLng(v. 37.568256, v1: 126.897240), v. 15));
35
36     }
37 }
38
```





## 구글 지도 응용2 – 메뉴 추가

- ▶ 메뉴 버튼 클릭시 – 위성지도, 일반지도, 월드컵 경기장 바로가기

```
39
40
41  
42
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52
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56
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59
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61
62
63
64
```

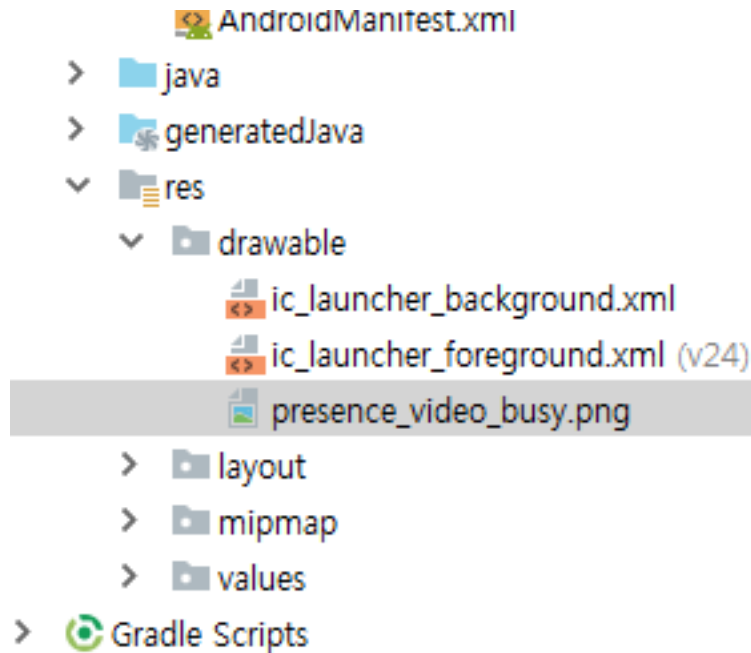
```
@Override
public boolean onCreateOptionsMenu(Menu menu) {
    super.onCreateOptionsMenu(menu);
    menu.add( groupId: 0, itemId: 1, order: 0, title: "위성 지도");
    menu.add( groupId: 0, itemId: 2, order: 0, title: "일반 지도");
    menu.add( groupId: 0, itemId: 3, order: 0, title: "월드컵경기장 바로가기");
    return true;
}

@Override
public boolean onOptionsItemSelected(MenuItem item) {
    switch (item.getItemId()) {
        case 1:
            gMap.setMapType(GoogleMap.MAP_TYPE_HYBRID);
            return true;
        case 2:
            gMap.setMapType(GoogleMap.MAP_TYPE_NORMAL);
            return true;
        case 3:
            gMap.moveCamera(CameraUpdateFactory.newLatLngZoom(new LatLng(
                v: 37.568256, v1: 126.897240), v: 15));
            return true;
    }
    return false;
}
```



# 구글 지도 응용 3- 지도에 아이콘 표시

---



32 @Override

33 public void onMapReady(GoogleMap googleMap) {

34 gMap = googleMap;

35 gMap.setMapType(GoogleMap.MAP\_TYPE\_SATELLITE);

36 gMap.moveCamera(CameraUpdateFactory.newLatLngZoom(new LatLng(v. 37.568256, v1: 126.897240), v. 15));

37 gMap.getUiSettings().setZoomControlsEnabled(true);

38 gMap.setOnMapClickListener(new GoogleMap.OnMapClickListener() {

39 @Override

40 public void onMapClick(LatLng point) {

41 videoMark = new GroundOverlayOptions().image(BitmapDescriptorFactory.fromResource(R.drawable.presence\_video\_busy))  
42 .position(point, v. 100f, v1: 100f);

43 gMap.addGroundOverlay(videoMark);

44 }

45 });

46 }

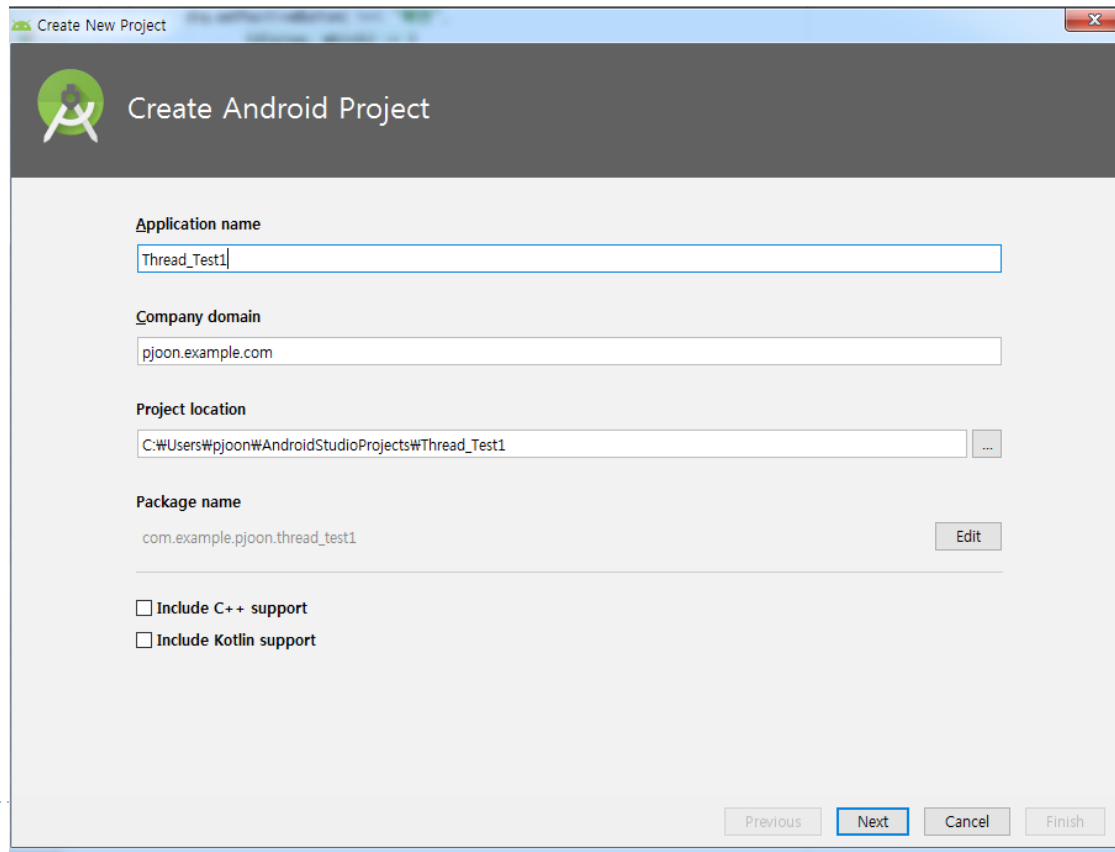
5:22

GmapTest



# 스레드

- ▶ 프로그레스바와 시크바가 많이 사용
  - ▶ 프로그레스바: 작업의 진행 사항 확인
  - ▶ 시크바 – 음악이나 동영상 재생 위치 지정



```

1  <?xml version="1.0" encoding="utf-8"?>
2  <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
3      xmlns:tools="http://schemas.android.com/tools"
4      android:layout_width="fill_parent"
5      android:layout_height="fill_parent"
6      android:layout_margin="20dp"
7      android:orientation="vertical" >
8
9      <ProgressBar
10         android:id="@+id/progressBar1"
11         style="?android:attr/progressBarStyleHorizontal"
12         android:layout_width="match_parent"
13         android:layout_height="wrap_content"
14         android:max="100"
15         android:progress="20" />
16
17         <Button
18             android:id="@+id/btnInc"
19             android:layout_width="match_parent"
20             android:layout_height="wrap_content"
21             android:text="10씩 증가" />
22
23         <Button
24             android:id="@+id/btnDec"
25             android:layout_width="match_parent"
26             android:layout_height="wrap_content"
27             android:text="10씩 감소" />
28

```

```

28
29     <TextView
30         android:id="@+id/tvSeek"
31         android:layout_width="match_parent"
32         android:layout_height="wrap_content"
33         android:gravity="center"
34         android:textSize="20dp" />
35
36     <SeekBar
37         android:id="@+id/seekBar1"
38         android:layout_width="match_parent"
39         android:layout_height="wrap_content" />
40
41 </LinearLayout>

```

```
11  <> public class MainActivity extends AppCompatActivity {
12
13      @Override
14      protected void onCreate(Bundle savedInstanceState) {
15          super.onCreate(savedInstanceState);
16          setContentView(R.layout.activity_main);
17
18          final ProgressBar pb1;
19          Button btnInc, btnDec;
20
21          pb1 = (ProgressBar) findViewById(R.id.progressBar1);
22          btnInc = (Button) findViewById(R.id.btnInc);
23          btnDec = (Button) findViewById(R.id.btnDec);
24
25          btnInc.setOnClickListener(new View.OnClickListener() {
26              public void onClick(View v) {
27                  pb1.incrementProgressBy(diff: 10);
28              }
29          });
30
31          btnDec.setOnClickListener(new View.OnClickListener() {
32              public void onClick(View v) {
33                  pb1.incrementProgressBy(diff: -10);
34              }
35          });
36
```



```
36
37
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```

```
final TextView tvSeek = (TextView) findViewById(R.id.tvSeek);
SeekBar seekBar1 = (SeekBar) findViewById(R.id.seekBar1);

seekBar1.setOnSeekBarChangeListener(new SeekBar.OnSeekBarChangeListener() {
    public void onStopTrackingTouch(SeekBar seekBar) {
    }

    public void onStartTrackingTouch(SeekBar seekBar) {
    }

    public void onProgressChanged(SeekBar seekBar, int progress,
                                  boolean fromUser) {
        tvSeek.setText("진행률 : " + progress + " %");
    }
});
```

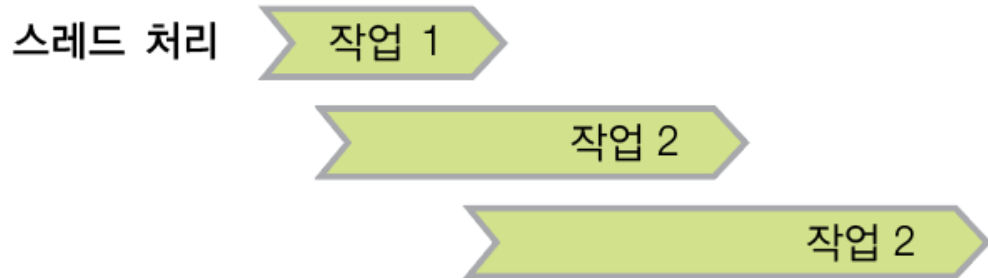




# 스레드

---

- ▶ 스레드: 스레드(Thread)는 동시에 여러 작업을 수행하기 위해 사용되는 개념
  - ▶ 함수는 하나의 작업이 끝나야 다음 작업이 진행
  - ▶ 스레드는 하나의 작업이 끝나기 전 다른 작업을 동시에 진행시킬 수 있음





# Create Android Project

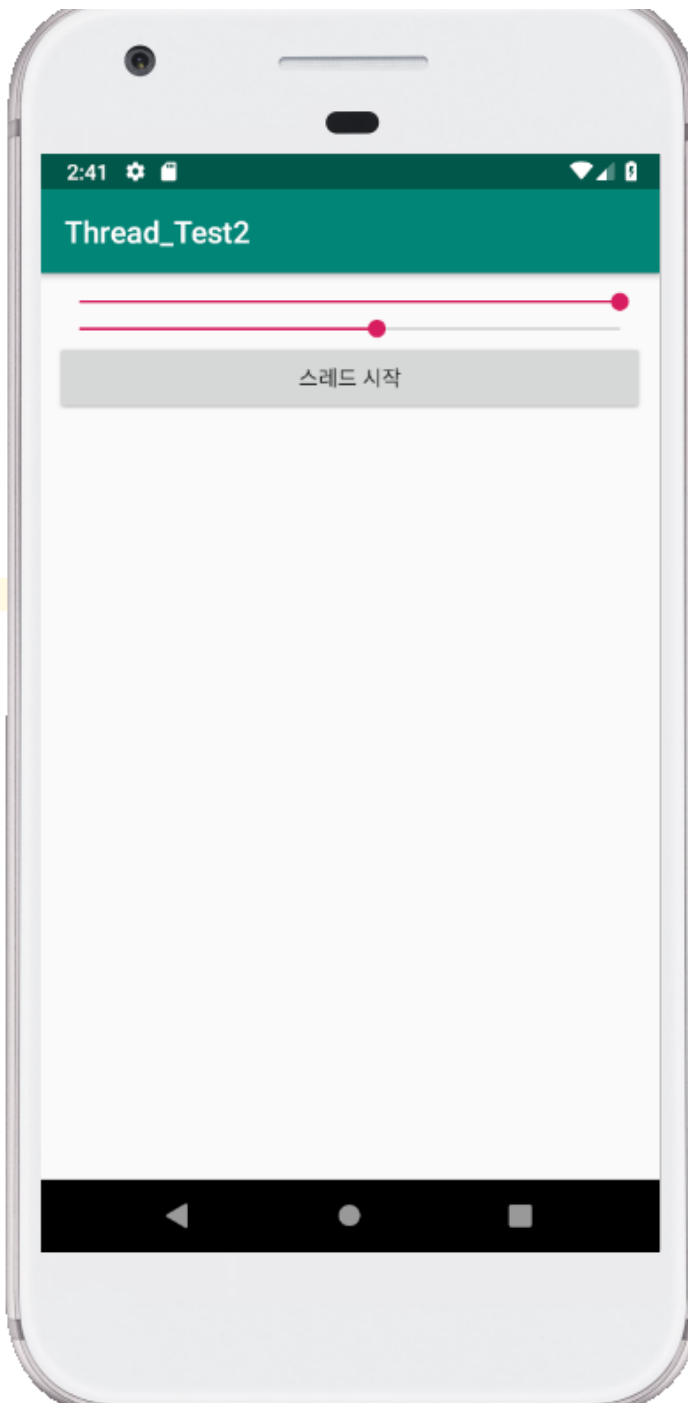
**Application name****Company domain****Project location****Package name**☐ Include C++ support☐ Include Kotlin support

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
3   xmlns:tools="http://schemas.android.com/tools"
4   android:layout_width="fill_parent"
5   android:layout_height="fill_parent"
6   android:layout_margin="10dp"
7   android:orientation="vertical" >
8
9   <SeekBar
10     android:id="@+id/pb1"
11     android:layout_width="match_parent"
12     android:layout_height="wrap_content"
13     android:max="100"
14     android:progress="10" />
15
16   <SeekBar
17     android:id="@+id/pb2"
18     android:layout_width="match_parent"
19     android:layout_height="wrap_content"
20     android:max="100"
21     android:progress="30" />
22
23   <Button
24     android:id="@+id/button1"
25     android:layout_width="match_parent"
26     android:layout_height="wrap_content"
27     android:text="스레드 시작" />
28
29
30 </LinearLayout>
```

12  
13  
14  
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16  
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19  
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21  
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43  
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45

evening

```
protected void onCreate(Bundle savedInstanceState) {  
    super.onCreate(savedInstanceState);  
    setContentView(R.layout.activity_main);  
  
    final ProgressBar pb1, pb2;  
    final Button btn;  
    pb1 = (ProgressBar) findViewById(R.id.pb1);  
    pb2 = (ProgressBar) findViewById(R.id.pb2);  
    btn = (Button) findViewById(R.id.button1);  
  
    btn.setOnClickListener(new View.OnClickListener() {  
        public void onClick(View v) {  
            new Thread() {  
                public void run() {  
                    for (int i = pb1.getProgress(); i < 100; i = i + 2) {  
                        pb1.setProgress(pb1.getProgress() + 2);  
                        SystemClock.sleep(ms: 100);  
                    }  
                }  
            }.start();  
  
            new Thread() {  
                public void run() {  
                    for (int i = pb2.getProgress(); i < 100; i++) {  
                        pb2.setProgress(pb2.getProgress() + 1);  
                        SystemClock.sleep(ms: 100);  
                    }  
                }  
            }.start();  
        }  
    });  
}
```



# UI 스레드

---

- ▶ UI(User Interface) 스레드는 화면의 위젯을 변경할 때 사용
  - ▶ 일반적인 스레드는 스레드 안에서 필요한 내용을 계산하는 것만 가능하며, 화면의 다른 위젯을 변경할 수 없음

```
runOnUiThread(new Runnable() {  
    public void run() {  
        // 위젯을 변경하는 코드는 이곳에 넣으면 됨.  
    }  
});
```







## Create Android Project

### Application name

### Company domain

### Project location



### Package name

☐ Include C++ support

☐ Include Kotlin support

```

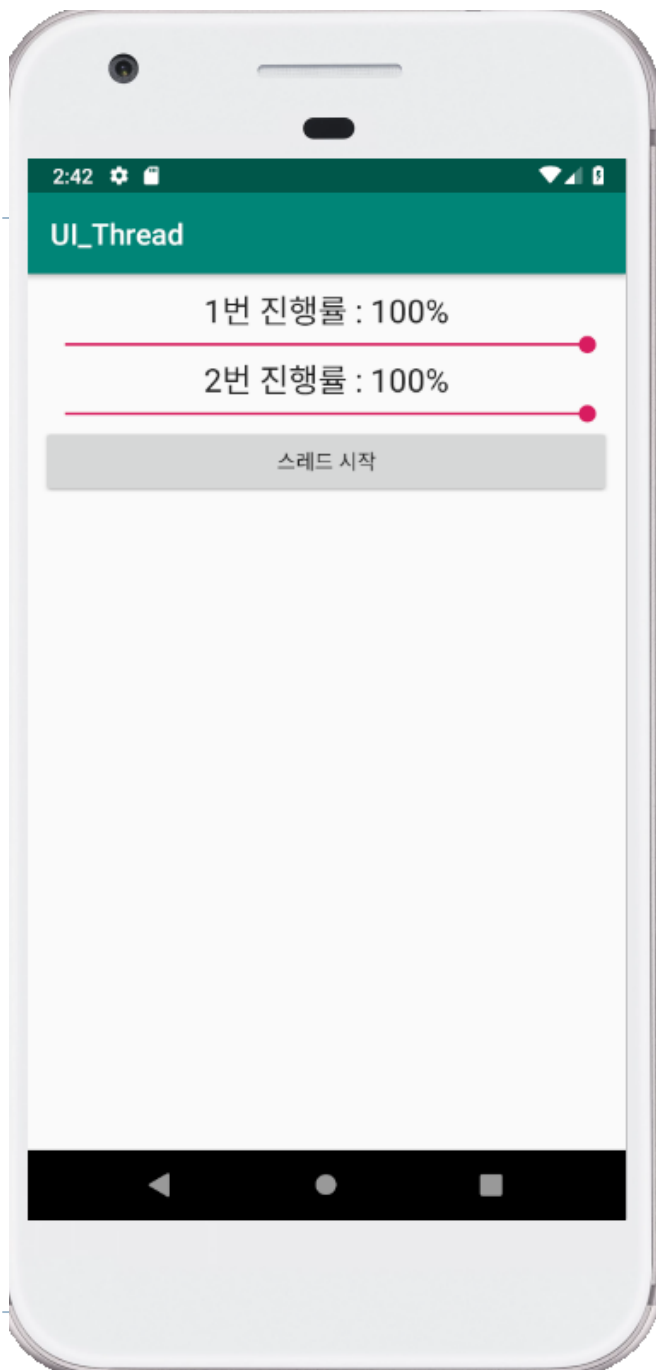
1 <?xml version="1.0" encoding="utf-8"?>
2 <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
3   xmlns:tools="http://schemas.android.com/tools"
4   android:layout_width="fill_parent"
5   android:layout_height="fill_parent"
6   android:layout_margin="10dp"
7   android:orientation="vertical" >
8
9   <TextView
10     android:id="@+id/tv1"
11     android:layout_width="wrap_content"
12     android:layout_height="wrap_content"
13     android:layout_gravity="center_horizontal"
14     android:text="1번 진행률 :"
15     android:textAppearance="?android:attr/textAppearanceLarge" />
16
17   <SeekBar
18     android:id="@+id/pb1"
19     android:layout_width="match_parent"
20     android:layout_height="wrap_content"
21     android:max="100"
22     android:progress="10" />
23
24   <TextView
25     android:id="@+id/tv2"
26     android:layout_width="wrap_content"
27     android:layout_height="wrap_content"
28     android:layout_gravity="center_horizontal"
29     android:text="2번 진행률 :"
30     android:textAppearance="?android:attr/textAppearanceLarge" />
31

```

```

31
32   <SeekBar
33     android:id="@+id/pb2"
34     android:layout_width="match_parent"
35     android:layout_height="wrap_content"
36     android:max="100"
37     android:progress="30" />
38
39   <Button
40     android:id="@+id/button1"
41     android:layout_width="match_parent"
42     android:layout_height="wrap_content"
43     android:text="스레드 시작" />
44
45 </LinearLayout>

```



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UI\_Thread

1번 진행률 : 100%



2번 진행률 : 100%



스레드 시작

