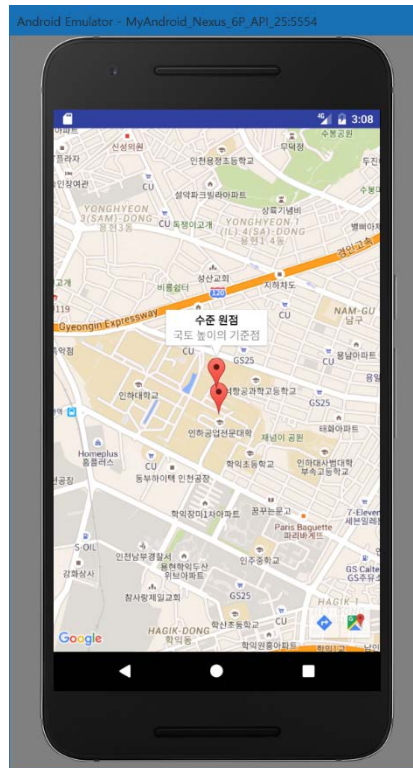




android



Google Map 구현



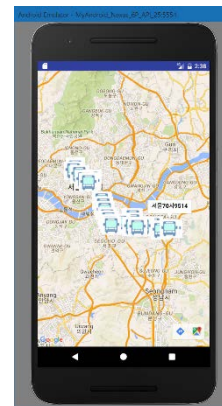
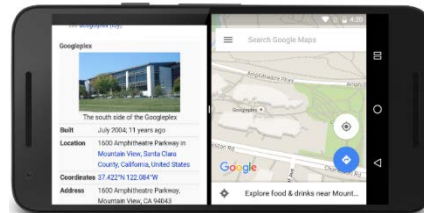


학습 목표

교육 목표

- ❖ Google Map
- ❖ Google Map View
- ❖ Install Google Play Services
- ❖ Google Map 구현
- ❖ Google Map API Key
- ❖ Practice

- ◆ 실습 I: Google Map Type 구현
- ◆ 실습 II: Latitude/Longitude 구현
- ◆ 실습 III: Multi-Marker 구현
- ◆ 실습 IV: Current Position 구현





Google Map 구현 (1)

■ Google Map 구현

❖ Google Maps Android API v1

◆ MapView ^사용

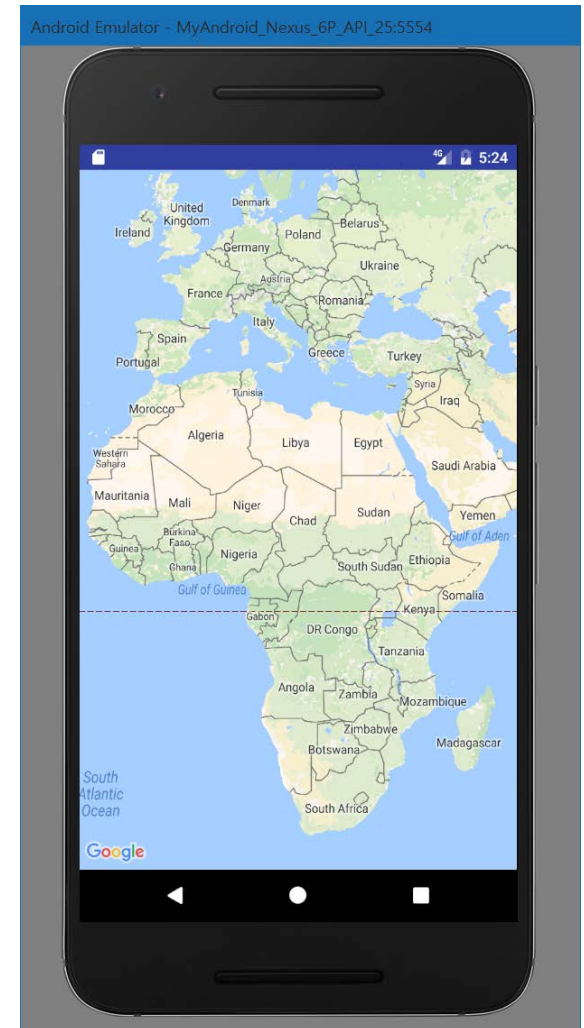
◆ MD5 ^사용

❖ Google Maps Android API v2

◆ Fragment ^사용

◆ SHA1 ^사용

◆ google-play-services



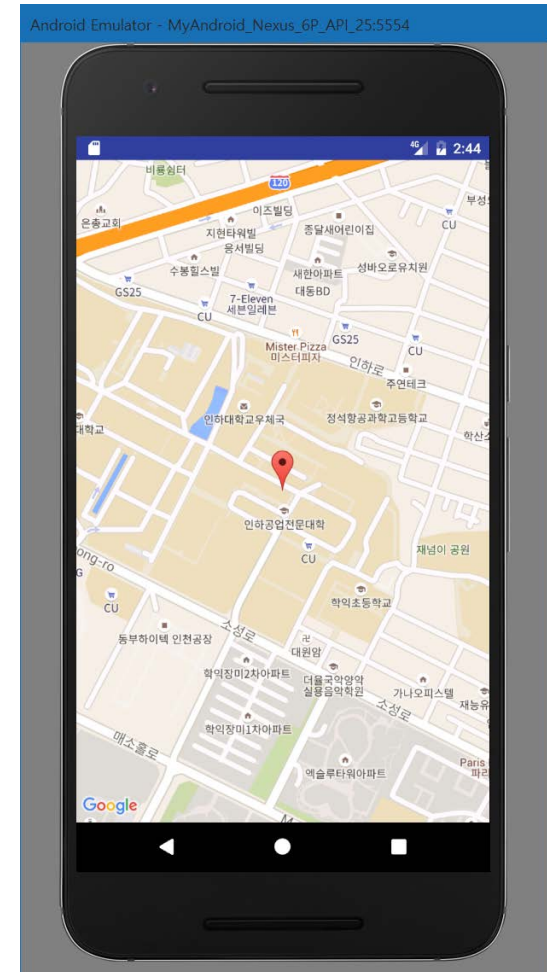


Google Map 구현 (2)

■ Google Map View

❖ 기능

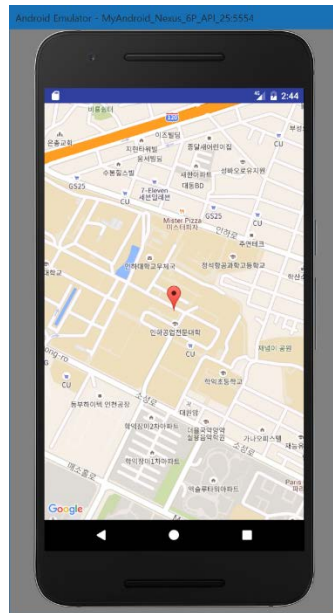
- ◆ Google Map을 보여 주는 기능 제공
- ◆ Google Maps Android API v1 지원



Google Map 구현 (3)

■ MapView 클래스의 Method

Method	설명
setStreetView(boolean)	도로 보기
setTraffic(boolean)	교통 보기
setSatellite(boolean)	위성 사진 모드



위성 사진 모드





Google Map 구현 (4)

■ Map View 클래스

❖ Map 제어 기능

Method	설 명
getController()	MapController 클래스 반환

■ Map Controller 클래스

❖ Map 제어 기능

Method	설 명
animateTo()	Map 이동 기능
setZoom(boolean)	Zoom In 기능





Google Map 구현 (5)

■ Google Maps Android API v2 구현

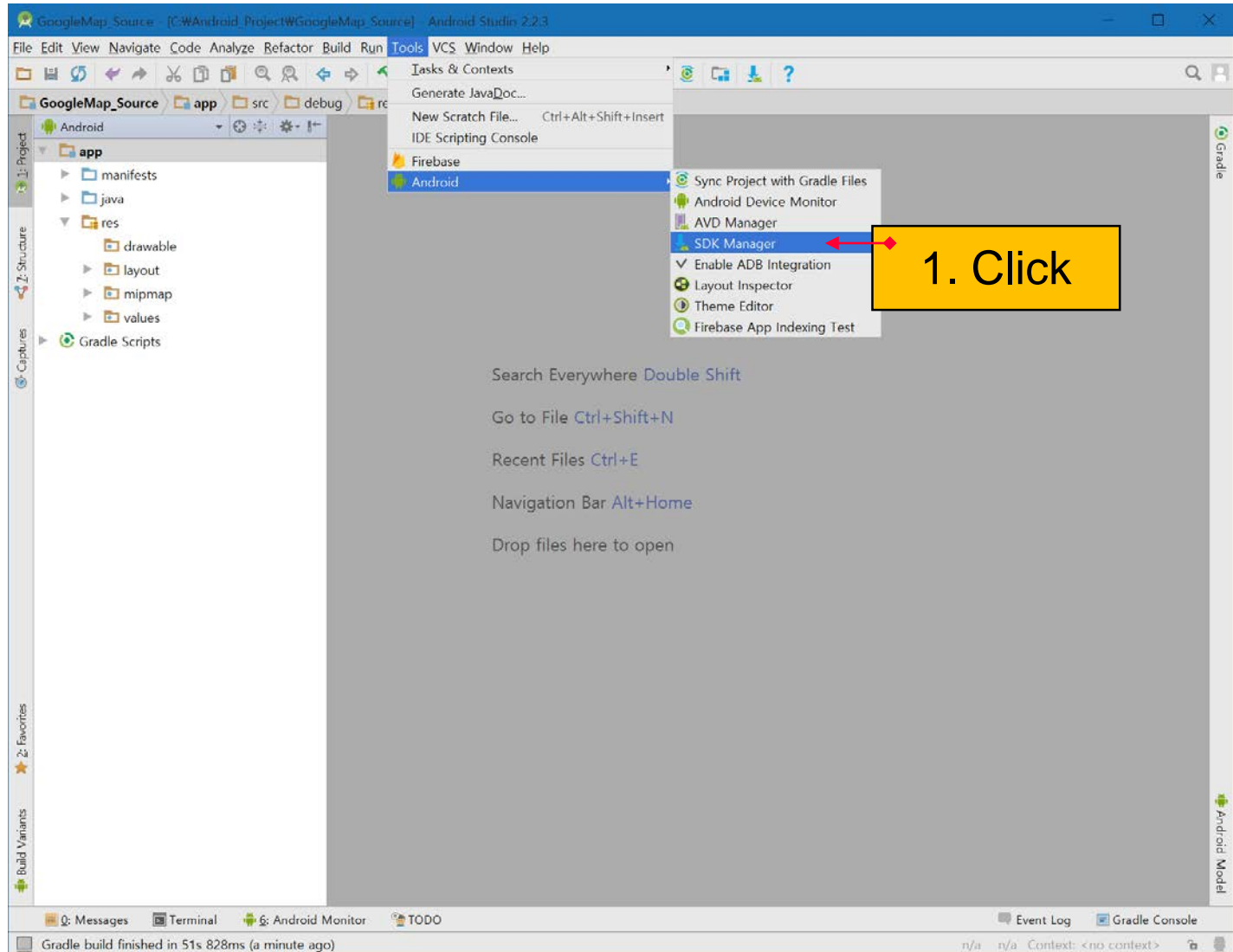
- 1 Install Google Play Services
- 2 Create Project GoogleMap_Source
- 3 Create Google Map API Key
- 4 Paste Google Map API Key To google_maps_api.xml
- 5 Add Uses Permission To Androidmanifest.xml
 - ACCESS_FINE_LOCATION
- 6 Update build.gradle (Module app)
 - compile 'com.google.android.gms:play-services:9.6.0'
- 7 Coding MapsActivity.java





Install Google Play Services (1)

■ [Tools > Android > SDK Manager]





Install Google Play Services (2)

❖ Select [SDK Tools] Tab

Default Settings

Appearance & Behavior

Appearance

Menus and Toolbars

System Settings

Passwords

HTTP Proxy

Updates

Usage Statistics

Android SDK

Notifications

Quick Lists

Path Variables

Keymap

Editor

Plugins

Build, Execution, Deployment

Tools

2. Click

SDK

Manager for the Android SDK

Android SDK Location: C:\Users\Lee_Won_Joo\AppData\Local\Android\Sdk [Edit](#)

SDK Platforms SDK Tools SDK Update Sites

Below are the available SDK developer tools. Once installed, Android Studio will automatically check for updates. Check "show package details" to display available versions of an SDK Tool.

	Name	Version	Status
<input checked="" type="checkbox"/>	Android SDK Build-Tools		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 SDK Platform-Tools 25.0.3	25.0.3	Installed
<input checked="" type="checkbox"/>	Android SDK Tools 25.2.5	25.2.5	Installed
<input checked="" type="checkbox"/>	Documentation for Android SDK	1	Installed
<input type="checkbox"/>	GPU Debugging tools	1.0.3	Not installed
<input type="checkbox"/>	GPU Debugging tools	3.1.0	Not installed
<input type="checkbox"/>	Google Play APK Expansion library	1	Not installed
<input type="checkbox"/>	Google Play Billing Library	5	Not installed
<input type="checkbox"/>	Google Play Licensing Library	1	Not installed
<input type="checkbox"/>	Google Play services	38	Not 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)	6.0.5	Installed
<input type="checkbox"/>	NDK	13.1.3345770	Not installed
<input type="checkbox"/>	Support Repository		

☐ Show Package Details

[Launch Standalone SDK Manager](#)

OK Cancel Apply Help



Install Google Play Services (3)

❖ Select [Google Play Services]

Default Settings

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: C:\Users\Lee_Won_Joo\AppData\Local\Android\Sdk [Edit](#)

SDK Platforms SDK Tools SDK Update Sites

Below are the available SDK developer tools. Once installed, Android Studio will automatically check for updates. Check "show package details" to display available versions of an SDK Tool.

	Name	Version	Status
<input checked="" type="checkbox"/>	Android SDK Build-Tools		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 SDK Platform-Tools 25.0.3	25.0.3	Installed
<input checked="" type="checkbox"/>	Android SDK Tools 25.2.5	25.2.5	Installed
<input checked="" type="checkbox"/>	Documentation for Android SDK	1	Installed
<input type="checkbox"/>	GPU Debugging tools	1.0.3	Not installed
<input type="checkbox"/>	GPU Debugging tools	3.1.0	Not installed
<input type="checkbox"/>	Google Play APK Expansion library	1	Not installed
<input type="checkbox"/>	Google Play Billing Library	5	Not installed
<input type="checkbox"/>	Google Play Licensing Library	1	Not installed
<input checked="" type="checkbox"/>	Google Play services	38	Not 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)	6.0.5	Installed
<input type="checkbox"/>	NDK	13.1.3345770	Not installed
<input type="checkbox"/>	Support Repository		

3. Click

4. Click

[Launch Standalone SDK Manager](#)

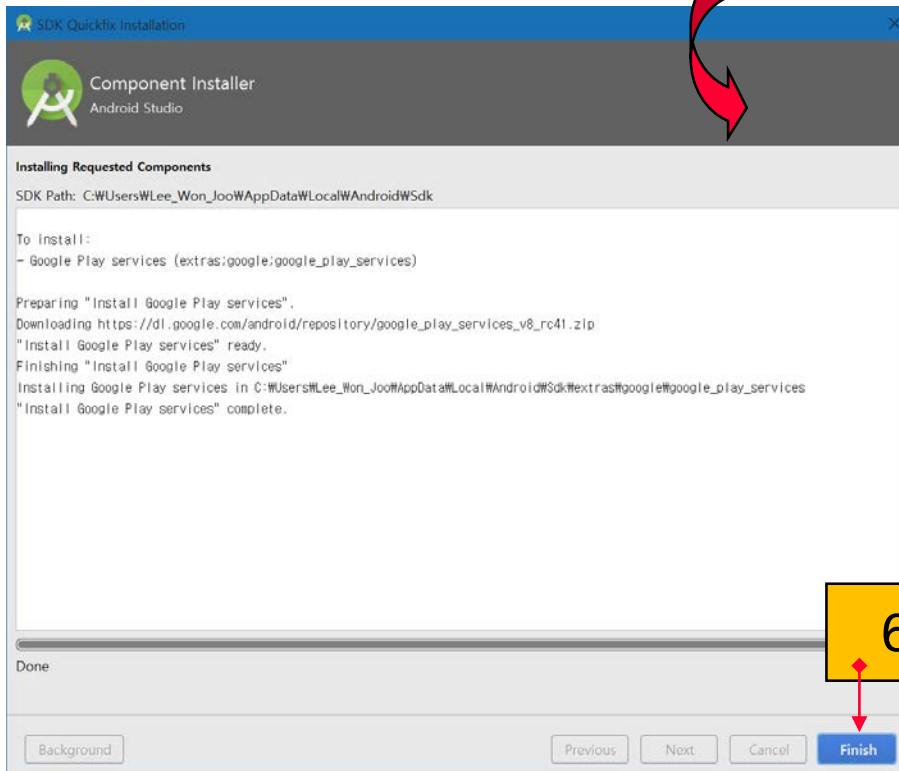
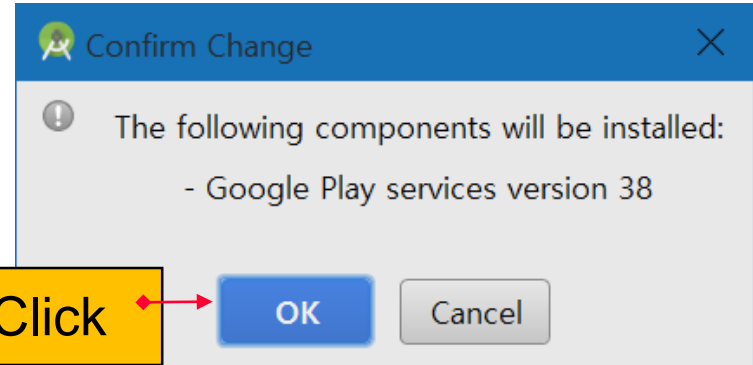
☐ Show Package Details

OK Cancel Apply Help



Install Google Play Services (4)

❖ Install [Google Play Services]

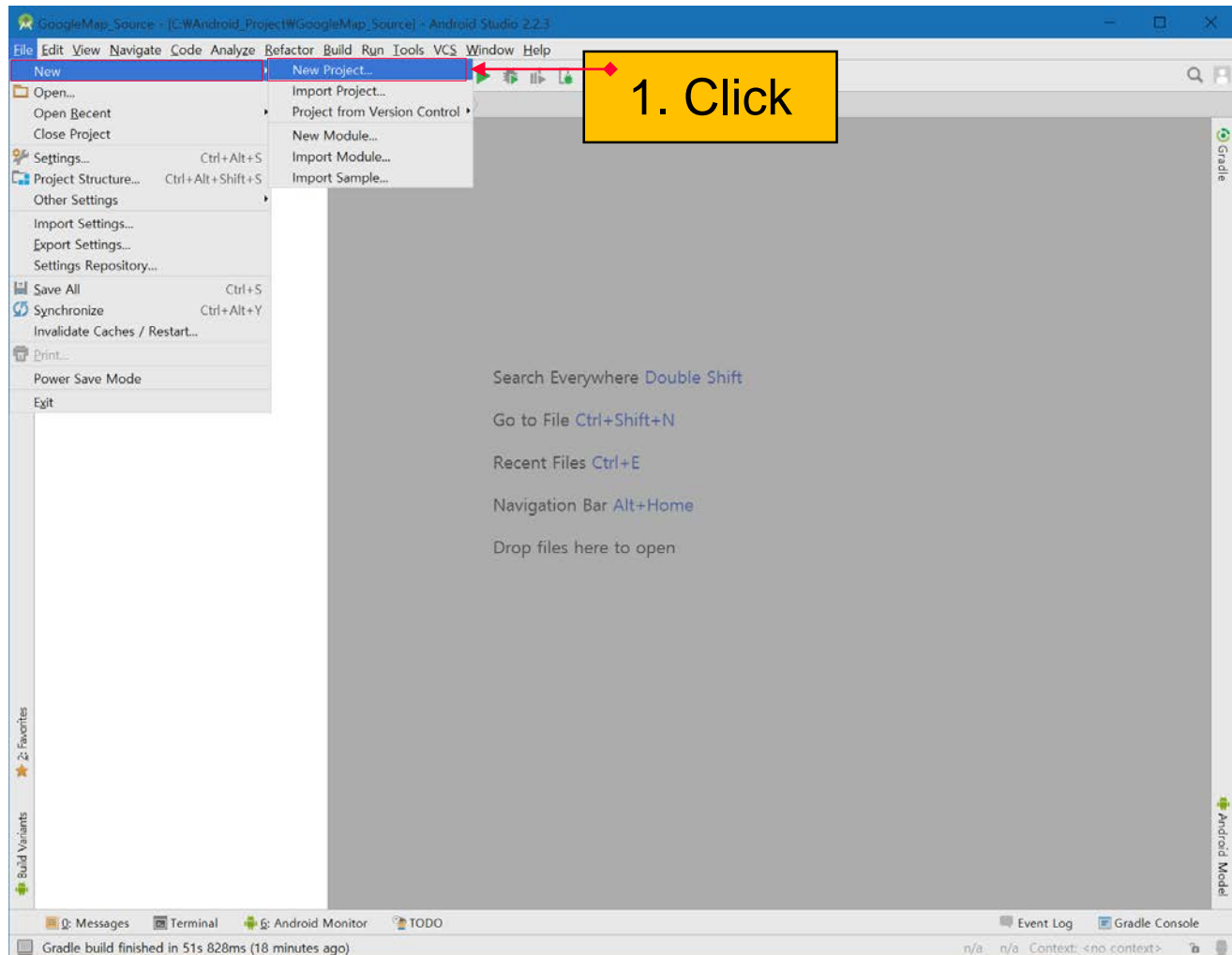




Google Map 구현 (1)

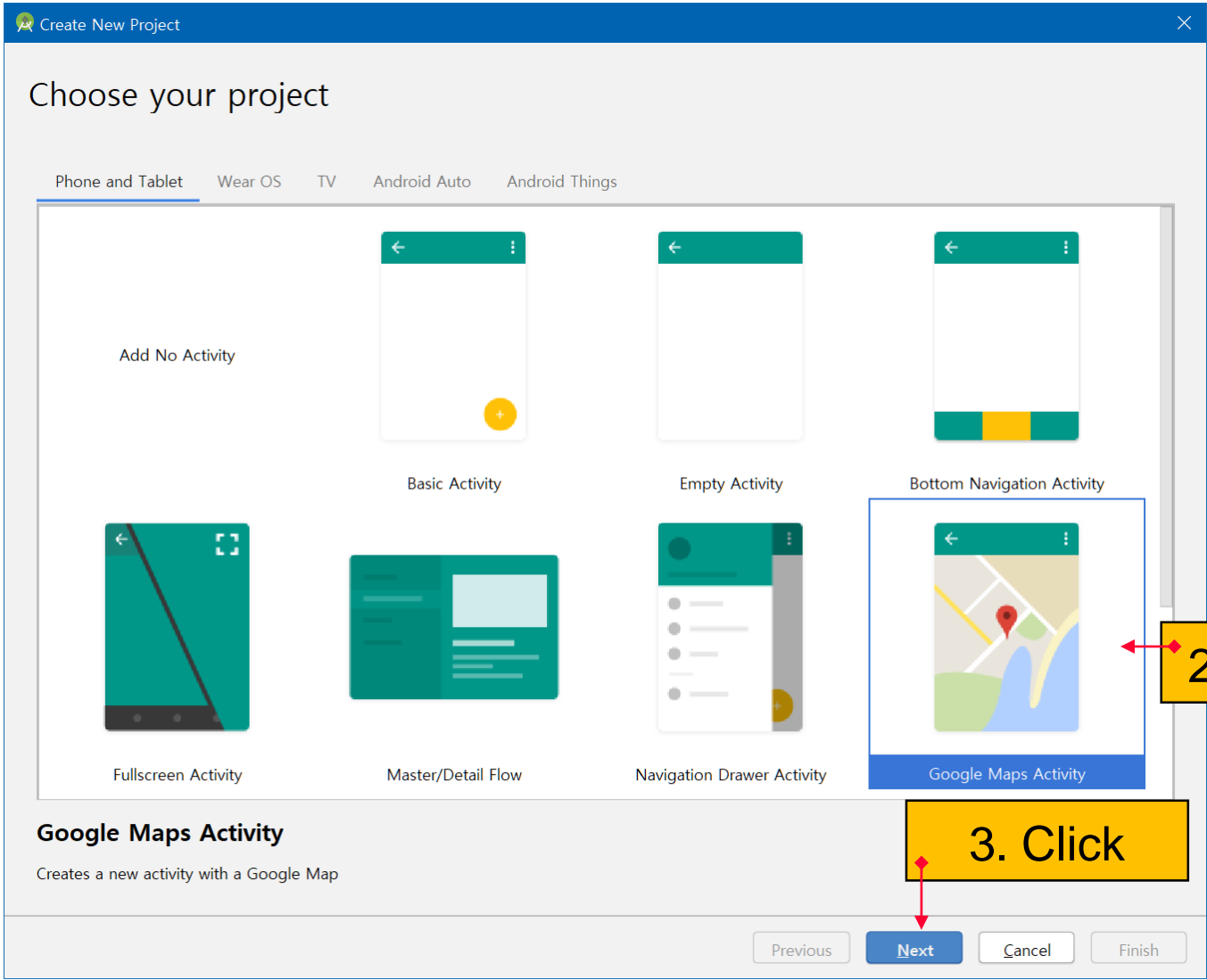
■ Android 프로젝트 생성

❖ 프로젝트 명 : GoogleMap_Source





Google Map 구현 (2)



2. Select

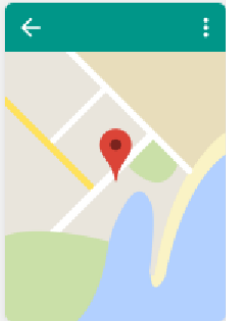
3. Click



Google Map 구현 (3)

Create New Project

Configure your project



Google Maps Activity

Creates a new activity with a Google Map

Name

GoogleMap_Source

Package name

com.inhatc.googlemap_source

Save location

C:\WAndroid_Project\WGoogleMap_Source

Language

Java

Minimum API level

API 28: Android 9.0 (Pie)

Your app will run on < 1% of devices.

[Help me choose](#)

☐ This project will support instant apps

☐ Use androidx.* artifacts

Previous

Next

Cancel

Finish

4. Input "GoogleMap_Source"

5. Input
"com.inhatc.googlemap_source"

6. Select

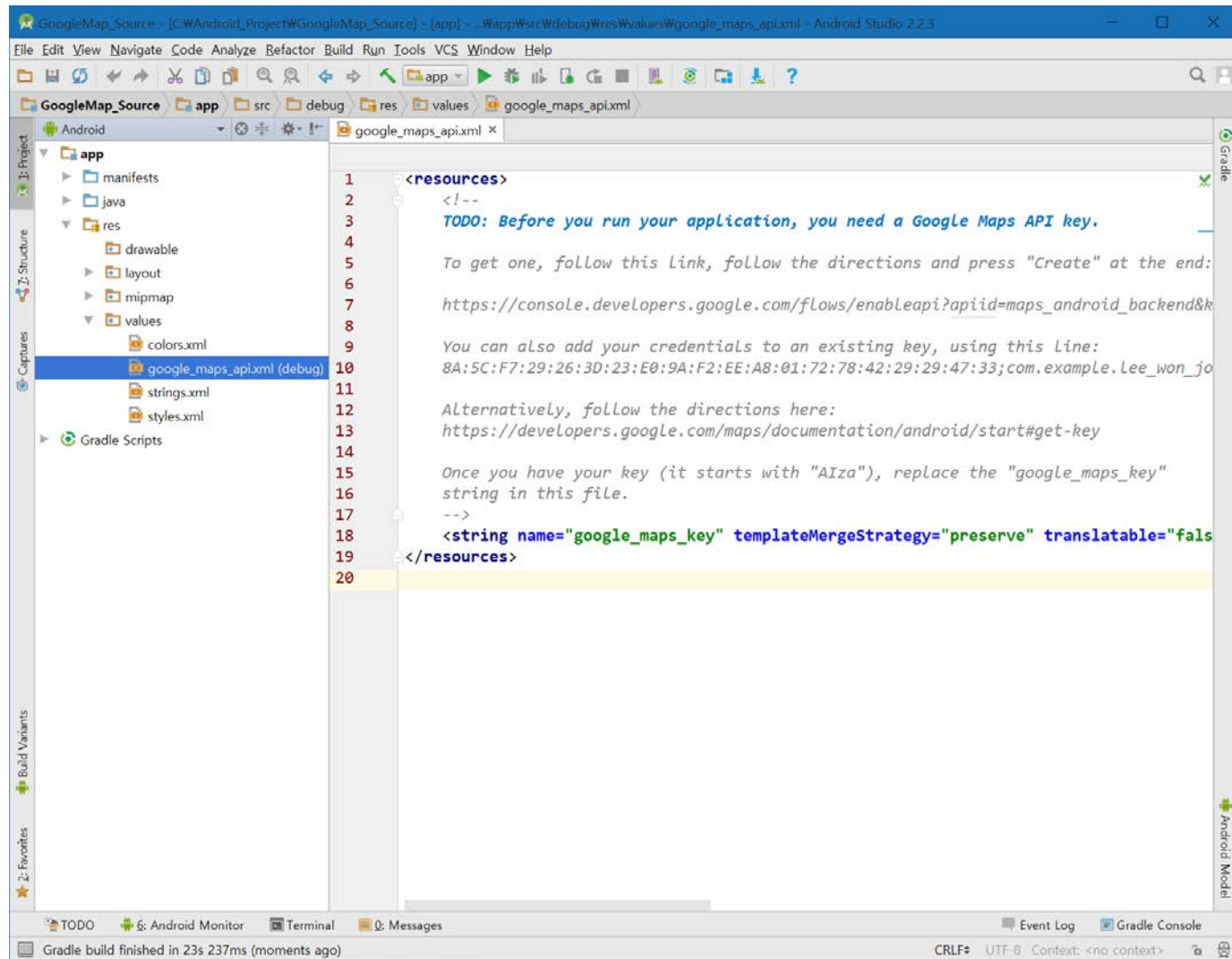
7. Select

8. Click



Google Map 구현 (4)

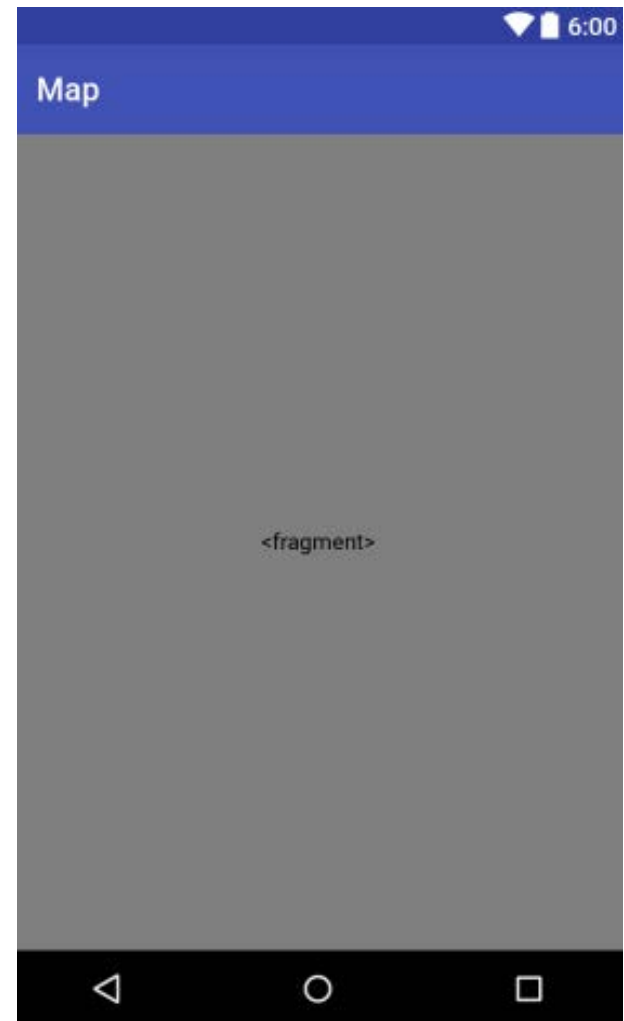
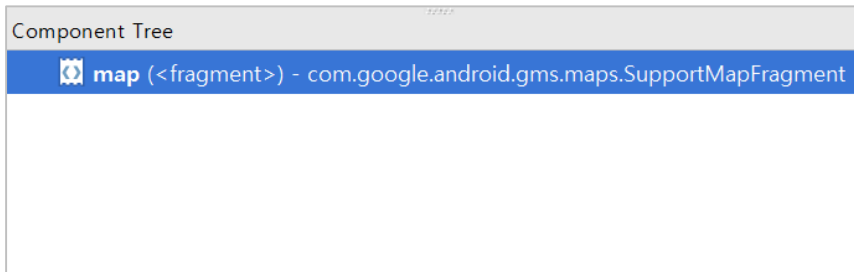
❖ Android 프로젝트 GoogleMap_Source 생성 완료





Google Map 구현 (5)

■ UI 설계





Google Map 구현 (6)

Fragment 추가

❖ activity_maps.xml 수정

```
activity_maps.xml x
1 <fragment xmlns:android="http://schemas.android.com/apk/res/android"
2     xmlns:map="http://schemas.android.com/apk/res-auto"
3     xmlns:tools="http://schemas.android.com/tools"
4     android:id="@+id/map"
5     android:name="com.google.android.gms.maps.SupportMapFragment"
6     android:layout_width="match_parent"
7     android:layout_height="match_parent"
8     tools:context="com.example.lee_won_joo.googlemap_source.MapsActivity" />
9
10
```

Design Text

9. XML code 확인!





Google Map 구현 (7)

AndroidManifest.xml

```
AndroidManifest.xml x
1  <?xml version="1.0" encoding="utf-8"?>
2  <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3    package="com.example.lee_won_joo.googlemap_source">
4
5    <!-- ... -->
10   <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION" />
11
12   <application
13     android:allowBackup="true"
14     android:icon="@mipmap/ic_launcher"
15     android:label="GoogleMap_Source"
16     android:supportsRtl="true"
17     android:theme="@style/AppTheme">
18
19     <!-- ... -->
27     <meta-data
28       android:name="com.google.android.geo.API_KEY"
29       android:value="YOUR_KEY_HERE" />
30
31     <activity
32       android:name=".MapsActivity"
33       android:label="Map">
34       <intent-filter>
35         <action android:name="android.intent.action.MAIN" />
36
37         <category android:name="android.intent.category.LAUNCHER" />
38       </intent-filter>
39     </activity>
40   </application>
41
42 </manifest>
```

10. Uses Permission 확인!





Google Map 구현 (8)

■ AndroidManifest.xml

❖ <uses-permission> Tag

◆ 애플리케이션이 device data에 접근 허가를 얻기 위한 tag

❖ Format

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

Field		설명
android.permission.	INTERNET	인터넷 접속
	RECEIVE_SMS	SMS 메시지
	ACCESS_COARSE_LOCATION	위치정보(Cell-ID, WiFi)
	ACCESS_FINE_LOCATION	위치정보(GPS)





Google Map 구현 (9)

Source

❖ MapsActivity.java

```
1 package com.example.lee_won_joo.googlemap_source;
2
3 import android.support.v4.app.FragmentActivity;
4 import android.os.Bundle;
5
6 import com.google.android.gms.maps.CameraUpdateFactory;
7 import com.google.android.gms.maps.GoogleMap;
8 import com.google.android.gms.maps.OnMapReadyCallback;
9 import com.google.android.gms.maps.SupportMapFragment;
10 import com.google.android.gms.maps.model.LatLng;
11 import com.google.android.gms.maps.model.MarkerOptions;
12
13 public class MapsActivity extends FragmentActivity implements OnMapReadyCallback {
14
15     private GoogleMap mMap; //Google Map object
16
17     @Override
18     protected void onCreate(Bundle savedInstanceState) {
19         super.onCreate(savedInstanceState);
20         setContentView(R.layout.activity_maps);
21
22         // Obtain the SupportMapFragment and get notified when the map is ready to be used.
23         SupportMapFragment mapFragment = (SupportMapFragment) getSupportFragmentManager()
24                                     .findFragmentById(R.id.map);
25         mapFragment.getMapAsync(this);
26     }
27 }
```

11. Source code 확인



Google Map 구현 (10)

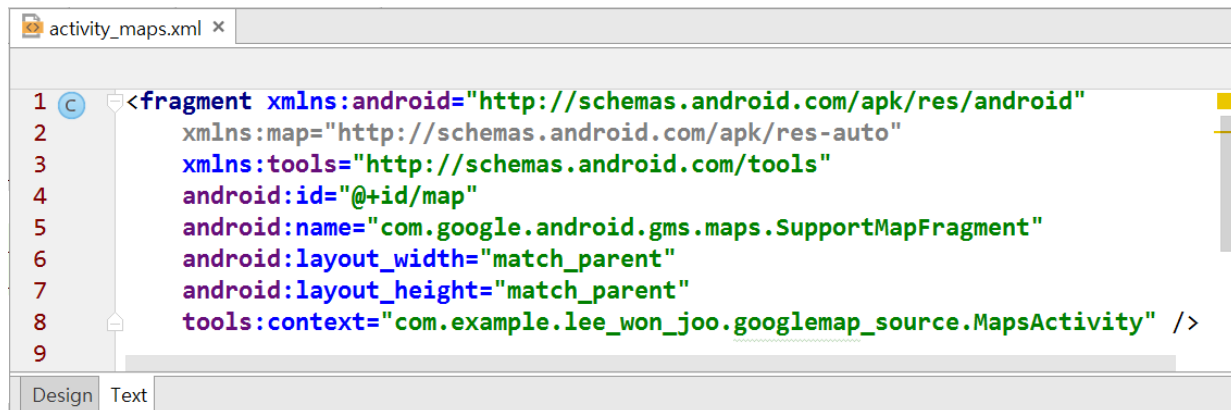
■ Source 분석

❖ SupportMapFragment Class

- ◆ A Map component in an app. This fragment is the simplest way to place a map in an application.

```
static SupportMapFragment newInstance(GoogleMapOptions options)  
Creates a map fragment with the given options.
```

```
static SupportMapFragment newInstance()  
Creates a map fragment, using default options.
```



```
activity_maps.xml ×  
1 <fragment xmlns:android="http://schemas.android.com/apk/res/android"  
2     xmlns:map="http://schemas.android.com/apk/res-auto"  
3     xmlns:tools="http://schemas.android.com/tools"  
4     android:id="@+id/map"  
5     android:name="com.google.android.gms.maps.SupportMapFragment"  
6     android:layout_width="match_parent"  
7     android:layout_height="match_parent"  
8     tools:context="com.example.lee_won_joo.googlemap_source.MapsActivity" />  
9  
Design Text
```

❖ mapFragment.getMapAsync(this);



Google Map 구현 (11)

❖ `mapFragment.getMapAsync(this);`

```
public void getMapAsync (OnMapReadyCallback callback)
```

Sets a callback object which will be triggered when the [GoogleMap](#) instance is ready to be used.

Note that:

- This method must be called from the main thread.
- The callback will be executed in the main thread.
- In the case where Google Play services is not installed on the user's device, the callback will not be triggered until the user installs it.
- In the rare case where the GoogleMap is destroyed immediately after creation, the callback is not triggered.
- The [GoogleMap](#) object provided by the callback is non-null.

Parameters

callback

The callback object that will be triggered when the map is ready to be used.





Google Map 구현 (12)

❖ MapActivity.java

```
27
28
29  /**
30   * Manipulates the map once available.
31   * This callback is triggered when the map is ready to be used.
32   * This is where we can add markers or lines, add listeners or move the camera. In this case,
33   * we just add a marker near Sydney, Australia.
34   * If Google Play services is not installed on the device, the user will be prompted to install
35   * it inside the SupportMapFragment. This method will only be triggered once the user has
36   * installed Google Play services and returned to the app.
37   */
38  @Override
39  public void onMapReady(GoogleMap googleMap) {
40      mMap = googleMap;
41
42      // Add a marker in Sydney and move the camera
43      LatLng sydney = new LatLng(-34, 151);
44      mMap.addMarker(new MarkerOptions().position(sydney).title("Marker in Sydney"));
45      mMap.moveCamera(CameraUpdateFactory.newLatLng(sydney));
46  }
47
48
```

12. Source code 확인





Google Map 구현 (13)

❖ GoogleMap Method()

final Marker	addMarker (MarkerOptions options) Adds a marker to this map.
final CameraPosition	getCameraPosition () Gets the current position of the camera.
IndoorBuilding	getFocusedBuilding () Gets the currently focused building.
final int	getMapType () Gets the type of map that's currently displayed.
final float	getMaxZoomLevel () Returns the maximum zoom level for the current camera position.
final float	getMinZoomLevel () Returns the minimum zoom level.
final Location	getMyLocation () <i>This method was deprecated. use <code>com.google.android.gms.location.FusedLocationProviderApi</code> instead. <code>FusedLocationProviderApi</code> provides improved location finding and power usage and is used by the "My Location" blue dot. See the <code>MyLocationDemoActivity</code> in the sample applications folder for example example code, or the Location Developer Guide.</i>
final void	moveCamera (CameraUpdate update) Repositions the camera according to the instructions defined in the update.





Google Map 구현 (14)

❖ Android 프로젝트 실행

13. Click

Select Deployment Target

No USB devices or running emulators detected [Troubleshoot](#)

Connected Devices
<none>

Available Virtual Devices

MyAndroid_Nexus 6P API 28

MyAndroid_Nexus 6P API 26 (minSdkVersion 26)

Create New Virtual Device

Don't see your device?

☐ Use same selection for future launches

OK Cancel Help

14. Click

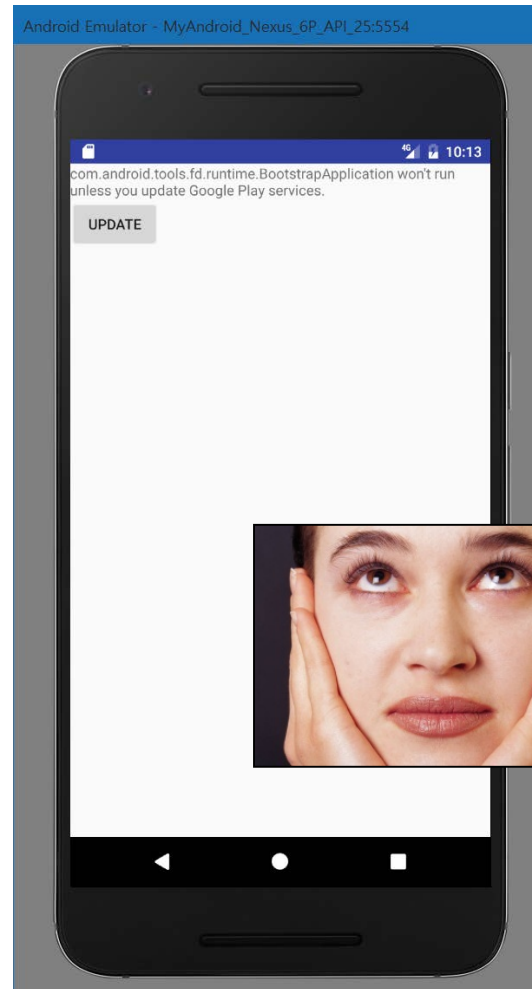
15. Click



Google Map 구현 (15)

❖ 실행 결과

◆ Emulator





Google Map API Key (1)

■ Map API Key 획득 과정

- 1 google_maps_api.xml 에서 URL 복사
- 2 Chrome/Explorer Edge 에 URL 붙여넣기
- 3 Google APIs site에서 License 동의
- 4 API Key 생성
- 5 API Key 복사
- 6 google_maps_api.xml 파일에 API Key 등록





Google Map API Key (2)

Google Map API Key

❖ Google Map 서비스를 App에서 사용할 수 있도록 지원

SHA1 fingerprint

❖ google_maps_api.xml

```
google_maps_api.xml ×
1 <resources>
2   <!--
3     TODO: Before you run your application, you need a Google Maps API key.
4
5     To get one, follow this link, follow the directions and press "Create" at the end:
6
7     https://console.developers.google.com/flows/enableapi?apiid=maps_android_backend&keyType=CLIENT_SIDE_ANDROID&
8
9     You can also add your credentials to an existing key, using this line:
10    8A:5C:F7:12:4A:60:60:9A:38:71:4D:70:1B:31:87:73:74:8D:63:43:63:FB:9:29:47:33:com.example.Lee_won_joo.googlemap_source
11
12    Alternatively, follow the directions here:
13    https://developers.google.com/maps/documentation/android/start#get-key
14
15    Once you have your key (it starts with "AIza"), replace the "google_maps_key"
16    string in this file.
17    -->
18    <string name="google_maps_key" templateMergeStrategy="preserve" translatable="false">YOUR_KEY_HERE</string>
19  </resources>
20
```

1. URL 복사

SHA1 fingerprint





Google Map API Key (3)

■ Explorer Edge

2. URL 붙여넣기

API 사용 설정

console.developers.google.com

☆ Apple ☆ Bing ☆ Facebook Google ☆ iCloud ☆ 네이버

Google API가 마음에 드시나요? Google 인프라도 확인해 보세요. 무료 평가판을 신청하면 60일 동안 사용할 수 있는 크레딧 300 Cloud Platform을 살펴볼 수 있습니다. [자세히 알아보기](#)

Google APIs

Google API 콘솔에 Google Maps Android API용으로 애플리케이션 등록

Google API 콘솔에서 애플리케이션을 관리하고 API 사용량을 모니터링할 수 있습니다.

기존 프로젝트가 없습니다. 이름이 'My Project'인 새 프로젝트가 생성됩니다.

기능 공지사항, 성능 제안사항, 의견 설문조사 및 특별 할인에 대한 새로운 소식을 이메일로 받고 싶습니다.

☒ 예 ☐ 아니요

모든 서비스 및 관련 API 사용 시 해당 서비스 약관을 준수할 것에 동의합니다.

☒ 예 ☐ 아니요

동의 및 계속하기

3. Click

4. Click

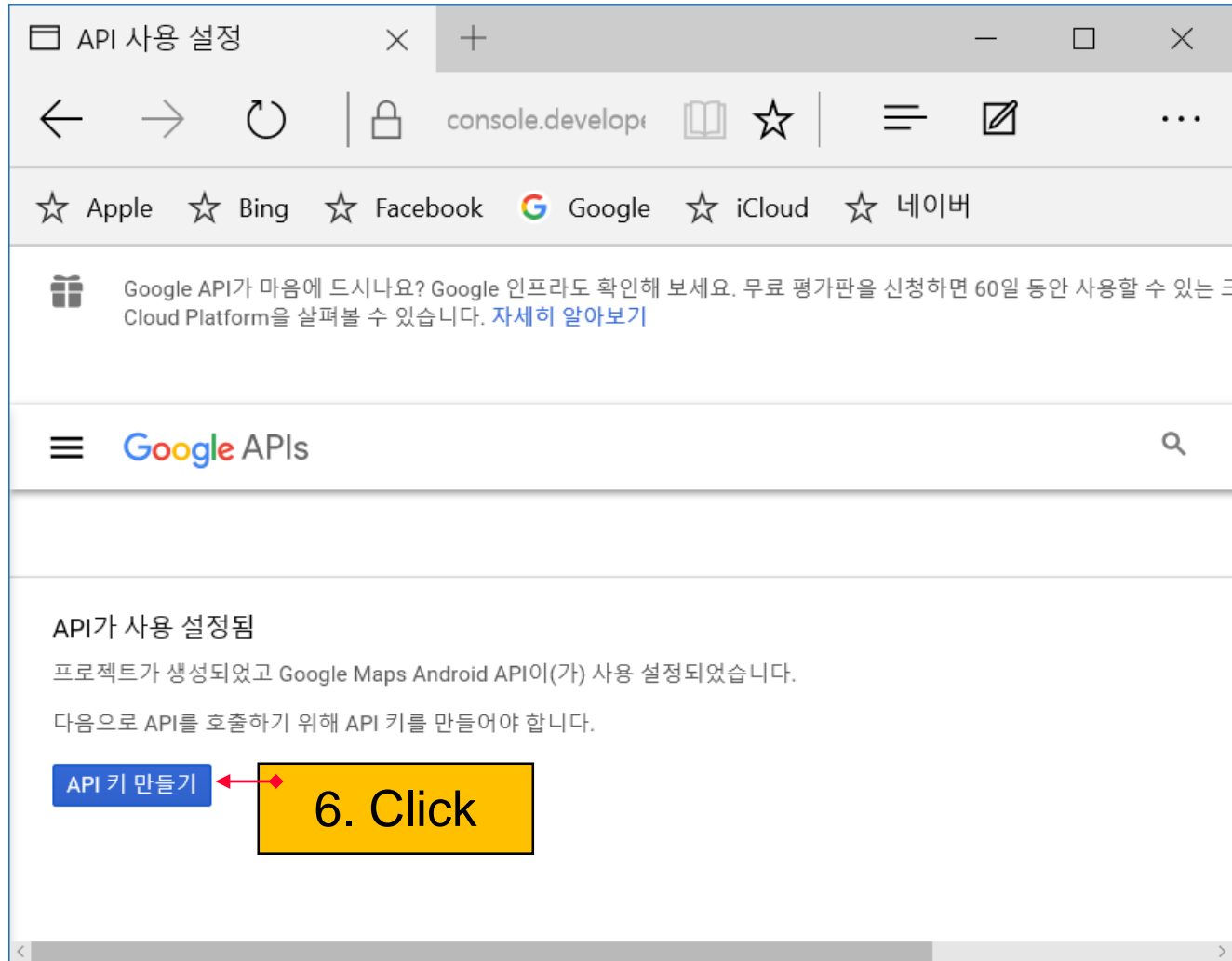
5. Click





Google Map API Key (4)

❖ Create API Key





Google Map API Key (5)

❖ Copy API Key

사용자 인증 정보 - MyI × + - □ ×

← → ↻ | 🔒 console.developers.google.com | 📖 ☆ | ☰ ✎ 👤 ...

☆ Apple ☆ Bing ☆ Facebook 🍌 Google ☆ iCloud ☆ 네이버

📁 Google API가 마음에 드시나요? Google 인프라도 확인해 보세요. 무료 평가판을 신청하면 60일 동안 사용할 수 있는 크레딧 300달러를 사용할 수 있습니다. 자세히 알아보기

☰ Google Cloud

API API 콘솔

대시보드

라이브

사용자 인증 정보

API 키 생성 완료

애플리케이션에서 이 키를 사용하려면 키를 `key=API_KEY` 매개변수로 전달하세요.

API 키

AIzaSyCy [redacted] gw0ZAxm40qrE

📋

⚠ 키를 제한하여 프로덕션 환경에서 무단 사용을 방지하세요.

닫기 키 제한

자세한 내용은 API 키 제한을 참조하세요.

API 키

<input type="checkbox"/> 이름	생성일	제한사항	키
<input type="checkbox"/> API 키 1	2017. 1. 30.	Android 앱	AIzaSyCy1HFC2cUgRcnpc

7. Click



Google Map API Key (6)

❖ 사용자 인증 정보 만들기

사용자 인증 정보 - MyI X

console.developers.google.com/apis/credentials?project=just-oarlock-15721

Google APIs My Project

API 관리자

- 대시보드
- 라이브러리
- 사용자 인증 정보

사용자 인증 정보

사용자 인증 정보 만들기 삭제

사용 설정한 API에 액세스하려면 사용자 인증 정보를 만드세요. 자세한 내용은 [API 문서를 참조](#)하세요.

API 키

<input checked="" type="checkbox"/> 이름	생성일	제한사항	키
<input checked="" type="checkbox"/> API 키 1	2017. 1. 30.	Android 앱	AlzaSyCFiHDfKBGLDH2Rwk2iaK17gZtwDj677kE

8. Click

9. Click



Google Map API Key (7)

API 키 - My Project

console.developers.google.com/apis/credentials/key/262?project=just

☆ Apple ☆ Bing ☆ Facebook Google ☆ iCloud ☆ 네이버

Google APIs My Project

API 관리자 사용자 인증 정보

대시보드 라이브러리 사용자 인증 정보

← 키 다시 생성 삭제

API 키
이 프로젝트 및 이 키를 지원하는 모든 API에서 사용할 수 있는 API 키입니다. 애플리케이션에서 이 키를 사용하려면 키를 `key=API_KEY` 매개변수로 전달하세요.

생성일 2017. 1. 30. 오후 8:49:33
생성자 wonjoo2@gmail.com (나)

API 키
AIzaSyCF1H...7gZtwDj677kE

이름
API 키 1

키 제한사항
키 제한사항을 통해 이 키를 사용할 수 있는 웹사이트, IP 주소 또는 앱을 지정할 수 있습니다. [자세히 알아보기](#)

☐ 없음
☐ HTTP 리퍼러(웹사이트)
☐ IP 주소(웹 서버, 크론 작업 등)
☒ Android 앱
☐ iOS 앱

Android 앱의 사용량 제한 (선택사항)
Android 앱의 사용량을 제한하려면 패키지 이름과 SHA-1 서명 인증서 지문을 추가하세요.
AndroidManifest.xml 파일에서 패키지 이름을 가져온 후 다음 명령어를 사용하여 지문을 가져오세요.

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

패키지 이름 SHA-1 인증서 지문
com.example.lee_won_joo.googlem 8A:5C:F7:29:26:3D:23:E0:9A:F2:EE:A8:01:72:78:42:29:29:47:33

+ 패키지 이름 및 지문 추가

참고: 설정이 적용되는 데 최대 5분이 걸릴 수 있습니다.

저장 취소

10. Click



Google Map API Key (10)

❖ Copy API Key to google_maps_api.xml

```
google_maps_api.xml x
1  <resources>
2      <!-- ... -->
18  <string name="google_maps_key" templateMergeStrategy="preserve"
19      translatable="false">YOUR_KEY_HERE</string>
20  </resources>
21
```

11. Paste

```
google_maps_api.xml x
1  <resources>
2      <!-- ... -->
18  <string name="google_maps_key" templateMergeStrategy="preserve"
19  <string name="google_maps_key" templateMergeStrategy="preserve"
20  translatable="false">AIzaSyCjZAxm4OqrE</string>
21  </resources>
21
```





Google Map API Key (11)

❖ Android 프로젝트 실행

12. Click

Select Deployment Target

No USB devices or running emulators detected [Troubleshoot](#)

Connected Devices
<none>

Available Virtual Devices

13. Click

MyAndroid_Nexus 6P API 28

MyAndroid_Nexus 6P API 26 (*minSdk(API 28) > deviceSdk(API 26)*)

Create New Virtual Device

Don't see your device?

14. Click

OK Cancel Help

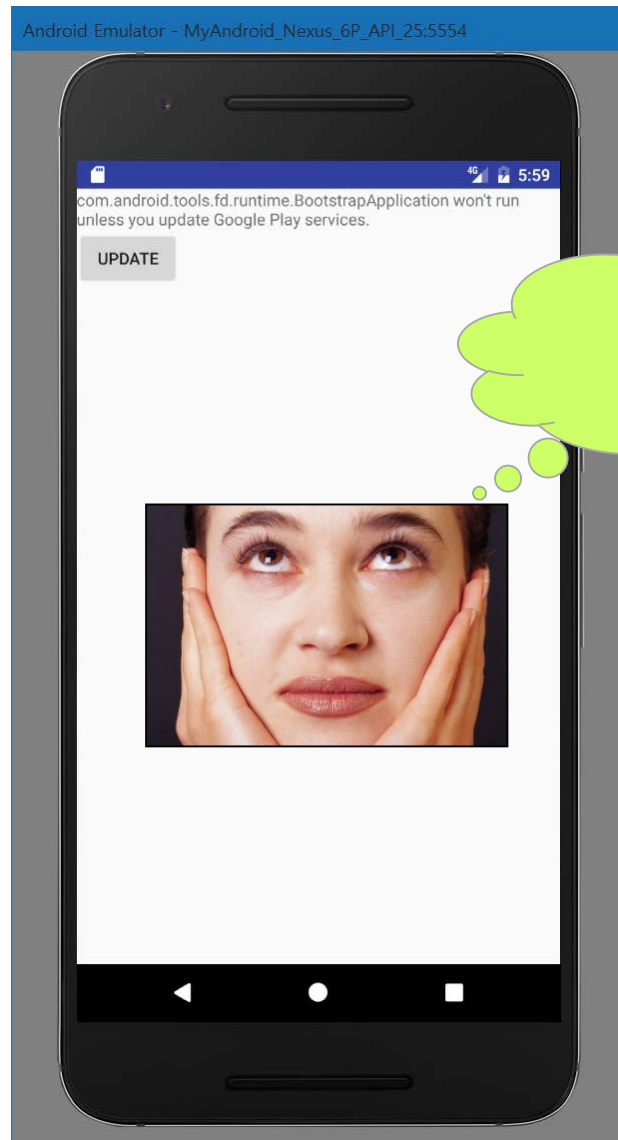
Use same selection for future launches





Google Map API Key (12)

❖ 실행 결과



Why not?





Google Map API Key (13)

❖ Update build.gradle (Module app)

GoogleMap_Source [C:\Android_Project\GoogleMap_Source] - app - Android Studio

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

GoogleMap_Source > app > build.gradle

Project: Android > app > build.gradle (Module: app)

15. Click

```
1  apply plugin: 'com.android.application'
2
3  android {
4      compileSdkVersion 28
5      defaultConfig {
6          applicationId "com.inhatc.googlemap_source"
7          minSdkVersion 28
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-optimize.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.google.android.gms:play-services-maps:16.1.0'
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 }
29
```

Event Log

30:1 CRLF UTF-8 4 spaces



Google Map API Key (14)

❖ Android 프로젝트 실행

18. Click

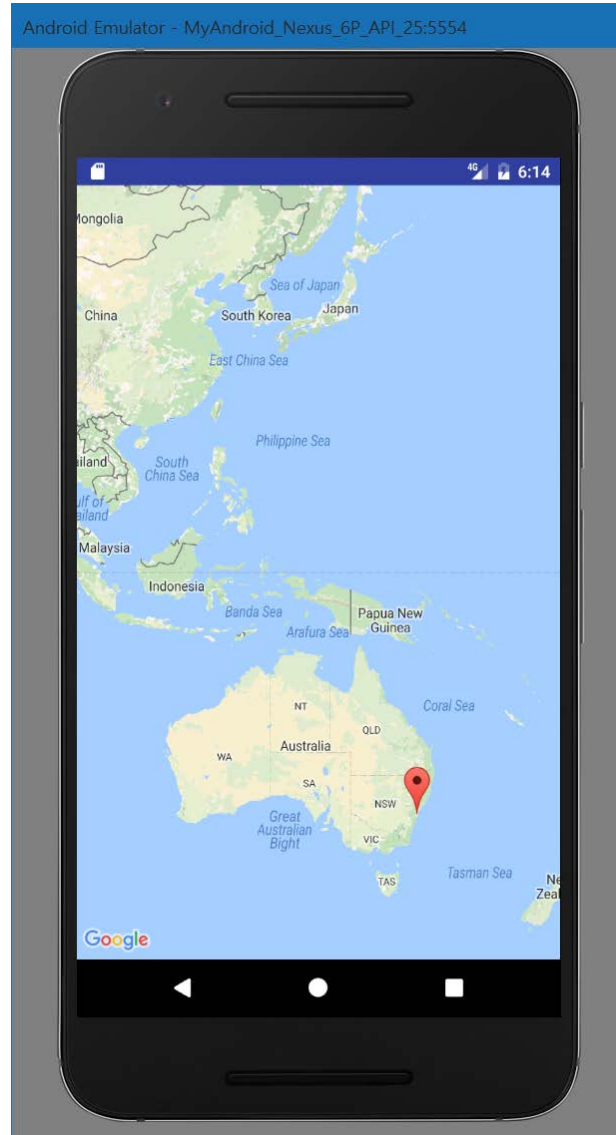
```
1 apply plugin: 'com.android.application'
2
3 android {
4     compileSdkVersion 28
5     defaultConfig {
6         applicationId "com.inhatc.googlemap_source"
7         minSdkVersion 28
8         targetSdkVersion 28
9         versionCode 1
10        versionName "1.0"
11        testInstrumentationRunner "android.support.test.runner.AndroidJUnitRunner"
12    }
13    buildTypes {
14        release {
15            minifyEnabled false
16            proguardFiles getDefaultProguardFile('proguard-android-optimize.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.google.android.gms:play-services-maps:16.1.0'
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 }
29
```

Android Studio interface showing the build.gradle file for the app module. The Run button (a green play icon) is highlighted with a red arrow and a yellow box labeled "18. Click". The interface includes the Project Manager, Resource Manager, and various toolbars at the bottom.



Google Map API Key (15)

❖ 실행 결과



실습 I : Google Map Type 구현

■ Map Type (실습 시간 : 30분)

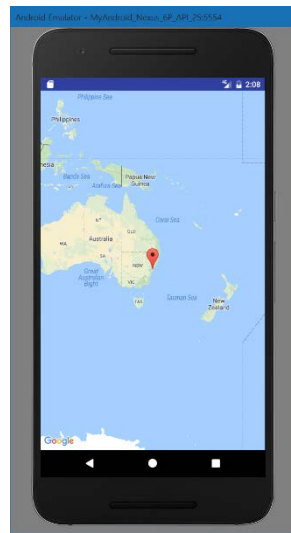
❖ Project Name : GoogleMap_Source

❖ Implementation

◆ 아래 그림과 같이 Map Type을 출력하도록 구현하시오.



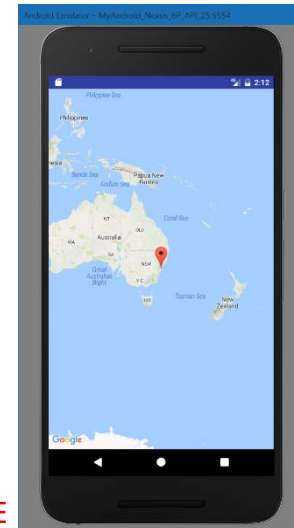
MAP_TYPE_HYBRID



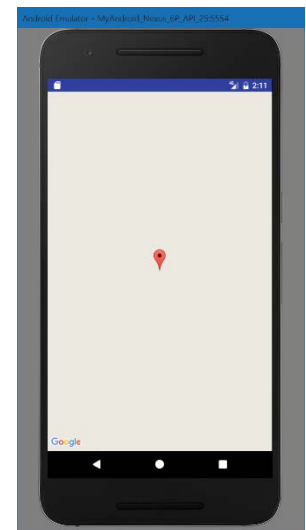
MAP_TYPE_NORMAL



MAP_TYPE_SATELLITE



MAP_TYPE_TERRAIN



MAP_TYPE_NONE

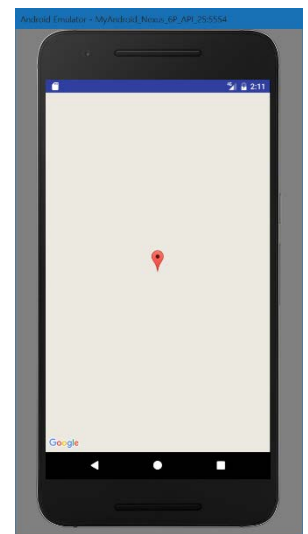
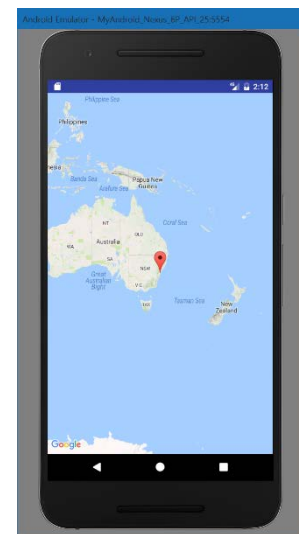
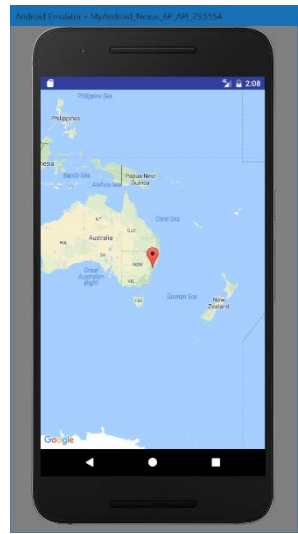




실습 I : Google Map Type 구현 (1)

■ Map Type

Method	Comment
MAP_TYPE_HYBRID	하이브리드 지도: 위성사진 데이터와 지형지물 라벨 표시
MAP_TYPE_NORMAL	일반지도: 로드맵, 도로, 강 위에 지형지물 표시
MAP_TYPE_SATELLITE	위성사진 지도: 위성사진 데이터 표시, 지형지물 라벨 표시 않됨
MAP_TYPE_TERRAIN	지형지도: 지형 데이터, 지도색, 등고선 라벨 표시
MAP_TYPE_NONE	지도 표시되지 않음





실습 I : Google Map Type 구현 (2)

❖ MapsActivity.java

```
MapsActivity.java x
28
29  /** ... */
38  @Override
39  public void onMapReady(GoogleMap googleMap) {
40      mMap = googleMap;
41
42      // Add a marker in Sydney and move the camera
43      LatLng sydney = new LatLng(-34, 151);
44      mMap.addMarker(new MarkerOptions().position(sydney).title("Marker in Sydney"));
45      mMap.moveCamera(CameraUpdateFactory.newLatLng(sydney));
46
47      //Set Satellite Map
48      mMap.setMapType(GoogleMap.MAP_TYPE_SATELLITE);
49  }
50  }
51
```

Coding



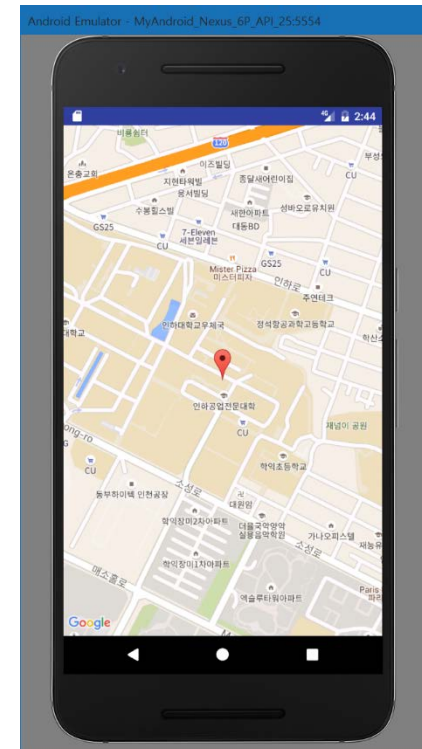


❖ Project Name : GoogleMap_Source

Implementation

◆ 아래 그림과 같이 “인하공업전문대학”을 출력하도록 구현하시오.

- **Latitude: 37.448344**
- **Longitude: 126.657474**





실습 II : Latitude/Longitude 구현

❖ MapsActivity.java

```
MapsActivity.java x
29
30  /** ... */
39  @Override
40  public void onMapReady(GoogleMap googleMap) {
41      mMap = googleMap;
42
43      double latitude = 37.448344;
44      double longitude = 126.657474;
45      LatLng objLocation;
46
47      objLocation = new LatLng(latitude, longitude);
48
49      // Add a marker in Inha Technical College and move the camera
50      mMap.addMarker(new MarkerOptions().position(objLocation).title("Inha Technical College"));
51      mMap.moveCamera(CameraUpdateFactory.newLatLng(objLocation));
52      mMap.moveCamera(CameraUpdateFactory.zoomTo(16));
53
54      //Set Satellite Map
55      mMap.setMapType(GoogleMap.MAP_TYPE_NORMAL);
56  }
57
58
```

Coding





실습 III : Multi-Marker 구현

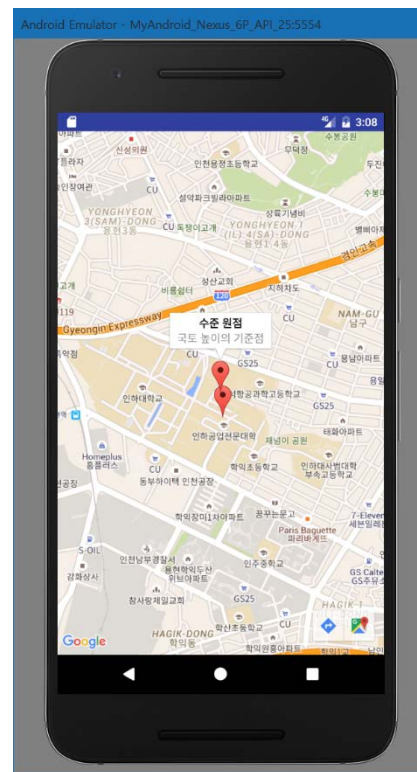
■ Multi-Marker (실습 시간 : 30분)

❖ Project Name : GoogleMap_Source

❖ Implementation

◆ 아래 그림과 같이 “인하공업전문대학” 과 “수준 원점”을 Multi-Marker로 출력하도록 구현하시오.

- Latitude: 37.449402
- Longitude: 126.657348





실습 III : Multi-Marker 구현

❖ MapsActivity.java

```
29
30  /**...*/
31  @Override
32  public void onMapReady(GoogleMap googleMap) {
33      mMap = googleMap;
34
35      double latitude = 37.448344;
36      double longitude = 126.657474;
37      LatLng objLocation;
38
39      objLocation = new LatLng(latitude, longitude);
40
41      // Add a marker in Inha Technical College and move the camera
42      Marker objMK1 = mMap.addMarker(new MarkerOptions()
43          .position(objLocation)
44          .title("Inha Technical College")
45          .snippet("INHATC"));
46
47      latitude = 37.449402;
48      longitude = 126.657348;
49      objLocation = new LatLng(latitude, longitude);
50
51      // Add a marker in Inha Technical College and move the camera
52      Marker objMK2 = mMap.addMarker(new MarkerOptions()
53          .position(objLocation)
54          .title("수준 원점")
55          .snippet("국토 높이의 기준점"));
56
57      objMK2.showInfoWindow();
58      mMap.moveCamera(CameraUpdateFactory.newLatLng(objLocation));
59      mMap.moveCamera(CameraUpdateFactory.zoomTo(15));
60
61      //Set Satellite Map
62      mMap.setMapType(GoogleMap.MAP_TYPE_NORMAL);
63  }
64
65
66
67
68
69
70
71
72
73
```

Coding



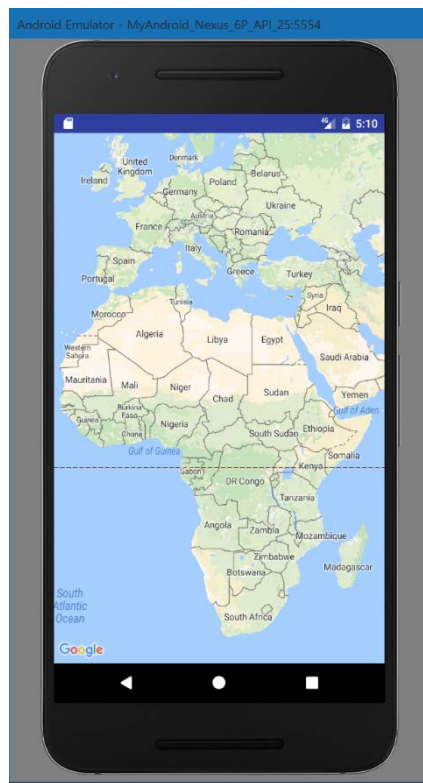
실습 IV : Current Position 구현

■ Current Position (실습 시간 : 60분)

❖ Project Name : GoogleMap_Source

❖ Implementation

◆ 아래 그림과 같이 현재 위치를 실시간으로 출력하도록 구현하시오.





실습 IV : Current Position 구현 (1)

❖ MapActivity.java

```
MapsActivity.java x
1 package com.example.lee_won_joo.googlemap_source;
2
3 import ...
22
23 public class MapsActivity extends FragmentActivity implements OnMapReadyCallback {
24
25     private GoogleMap mMap; //Google Map object
26
27     @Override
28     protected void onCreate(Bundle savedInstanceState) {
29         super.onCreate(savedInstanceState);
30         setContentView(R.layout.activity_maps);
31
32         // Obtain the SupportMapFragment and get notified when the map is ready to be used.
33         SupportMapFragment mapFragment = (SupportMapFragment) getSupportFragmentManager()
34             .findFragmentById(R.id.map);
35         mapFragment.getMapAsync(this);
36
37     }
38
```

1. Coding





실습 IV : Current Position 구현 (2)



```
MapsActivity.java x
49 public void onMapReady(GoogleMap googleMap) {
50     mMap = googleMap;
51     long minTime = 1000;
52     float minDistance = 1;
53
54     mMap.setMapType(GoogleMap.MAP_TYPE_NORMAL);
55
56     LocationManager locationManager = (LocationManager) this.
57         getSystemService(Context.LOCATION_SERVICE);
58
59     //Event Handler
60     LocationListener locationListener = new LocationListener() {
61         //Automatically calling when current position changed
62         public void onLocationChanged(Location location) {
63             updateMap(location);
64         }
65         //Automatically calling when provider status changed
66         public void onStatusChanged(String provider, int status, Bundle extras) {
67             alertStatus(provider);
68         }
69         //Automatically calling when provider enable status
70         public void onProviderEnabled(String provider) {
71             alertProvider(provider);
72         }
73         //Automatically calling when provider disable status
74         public void onProviderDisabled(String provider) {
75             checkProvider(provider);
76         }
77     };
78
79     String strLocationProvider = LocationManager.NETWORK_PROVIDER;
80     if (ActivityCompat.checkSelfPermission(this,
81         android.Manifest.permission.ACCESS_COARSE_LOCATION) !=
82         PackageManager.PERMISSION_GRANTED) {
83         return;
84     }
85     locationManager.requestLocationUpdates(strLocationProvider,
86         minTime, minDistance, locationListener);
87 }
88
```

2. Coding



실습 IV : Current Position 구현 (3)

3. Coding

```
MapsActivity.java ×
88
89 public void updateMap(Location location) {
90     double latitude = location.getLatitude();
91     double longitude = location.getLongitude();
92     final LatLng objLocation = new LatLng(latitude, longitude);
93
94     mMap.animateCamera(CameraUpdateFactory.newLatLngZoom(objLocation, 15));
95     Marker objMK = mMap.addMarker(new MarkerOptions()
96         .position(objLocation)
97         .title("Current Position"));
98     objMK.showInfoWindow();
99 }
100
101 public void checkProvider(String strProvider) {
102     Toast.makeText(this, strProvider + "에 의한 turn off position service. " +
103         "Please Turn on position service...", Toast.LENGTH_SHORT).show();
104     //Create Intent to setting provider
105     Intent objIntent = new Intent(android.provider.Settings.ACTION_LOCATION_SOURCE_SETTINGS);
106     startActivity(objIntent);
107 }
108
109 public void alertProvider(String strProvider) {
110     Toast.makeText(this, strProvider + "Starting Position service !",
111         Toast.LENGTH_LONG).show();
112 }
113
114 public void alertStatus(String strProvider) {
115     Toast.makeText(this, "Changing position service : " + strProvider,
116         Toast.LENGTH_LONG).show();
117 }
118 }
119
```



학습 요약

- ❖ Google Map
- ❖ Google Map View
- ❖ Install Google Play Services
- ❖ Google Map 구현
- ❖ Google Map API Key
- ❖ Practice



- ◆ 실습 I: Google Map Type 구현
- ◆ 실습 II: Latitude/Longitude 구현
- ◆ 실습 III: Multi-Marker 구현
- ◆ 실습 IV: Current Position 구현



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