Universidad Nacional
Jorge Basadre Grohmann

PROGRAMACIÓN PARA DISPOSITIVOS MÓVILES: ANDROID
Parte III

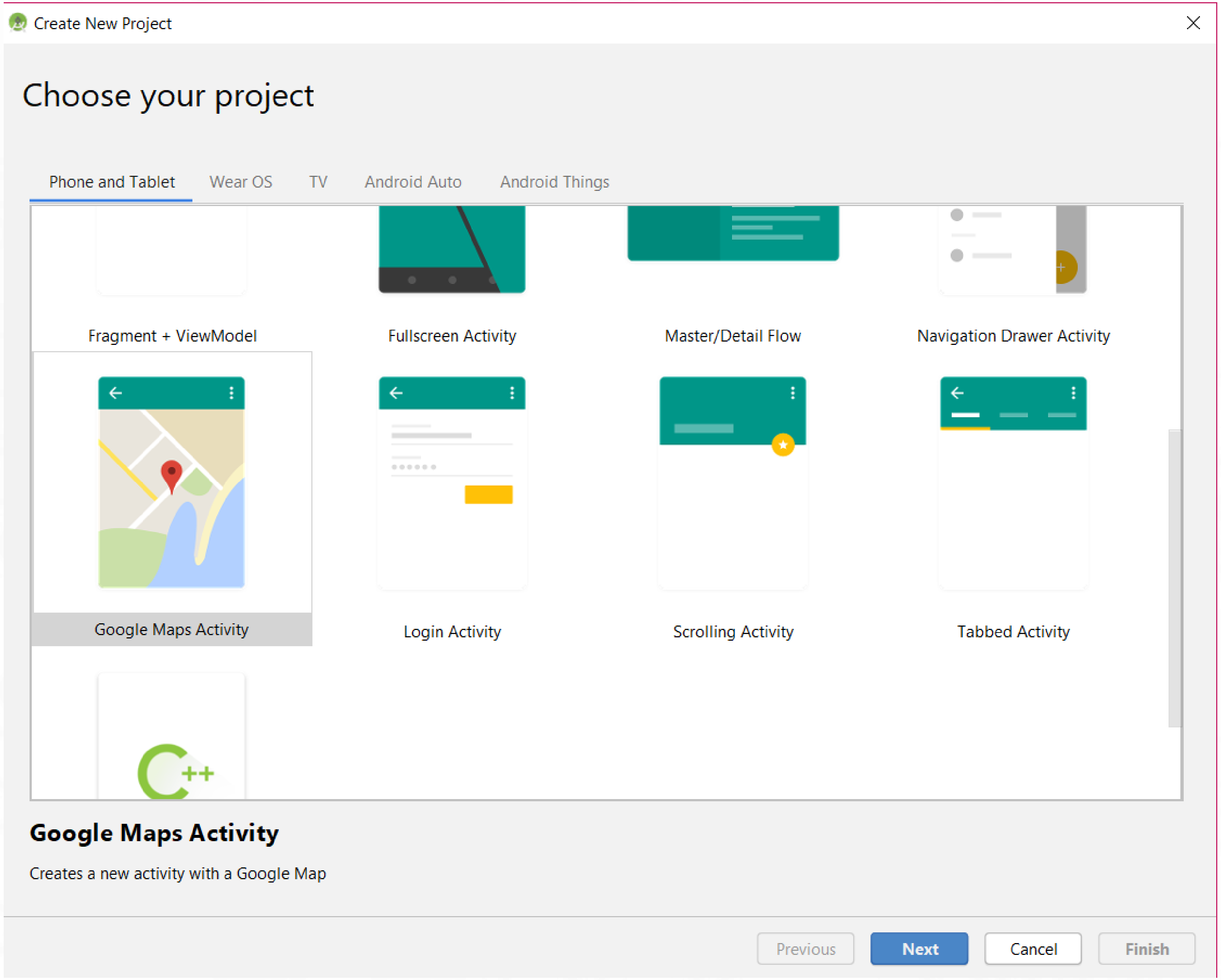
MSc. ING. WILSON CÉSAR CALLISAYA CHOQUECOTA

TEMARIO

- Uso de Api de Google maps
- Localización

Uso de Google Maps

Mapa Básico

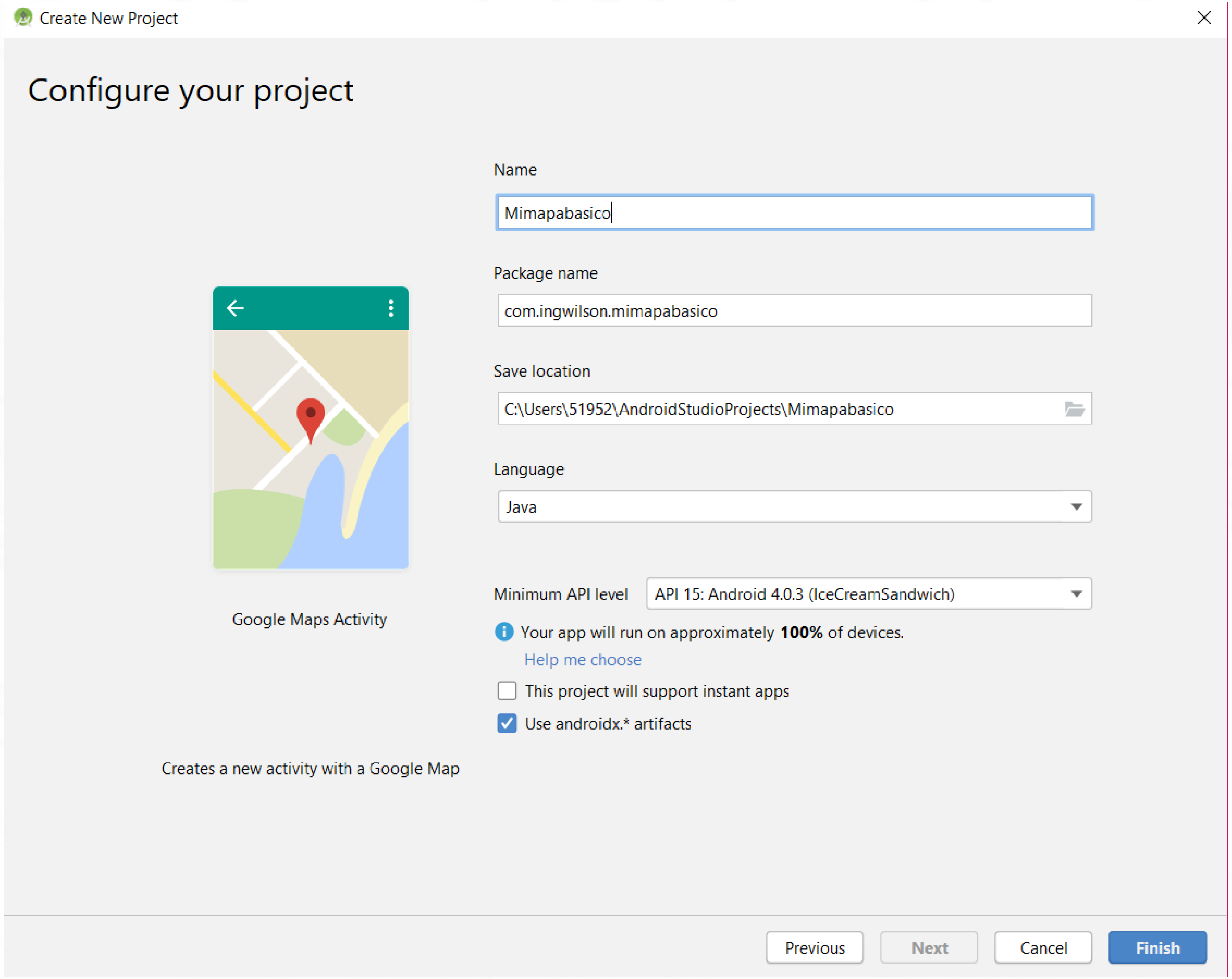


Create New Project

Choose your project

Google Maps Activity

Creates a new activity with a Google Map



Configure your project

Name: Mimapabasico

Package name: com.ingwilson.mimapabasico

Save location: C:\Users\51952\AndroidStudioProjects\Mimapabasico

Language: Java

Minimum API level: API 15: Android 4.0.3 (IceCreamSandwich)

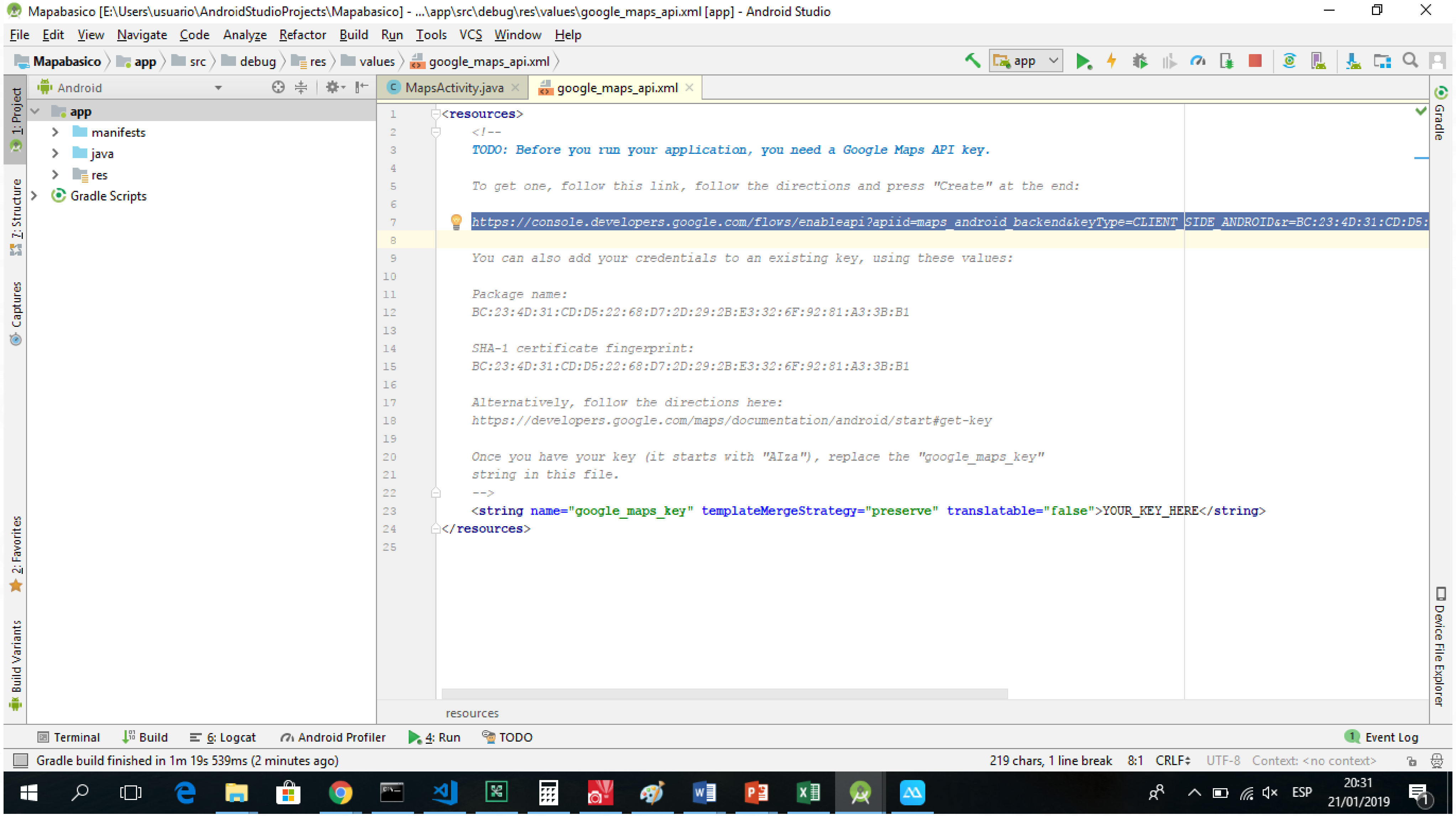
Your app will run on approximately **100%** of devices.

□ This project will support instant apps

☑ Use androidx.* artifacts

Creates a new activity with a Google Map

EJECUTEMOS HASTA AQUI

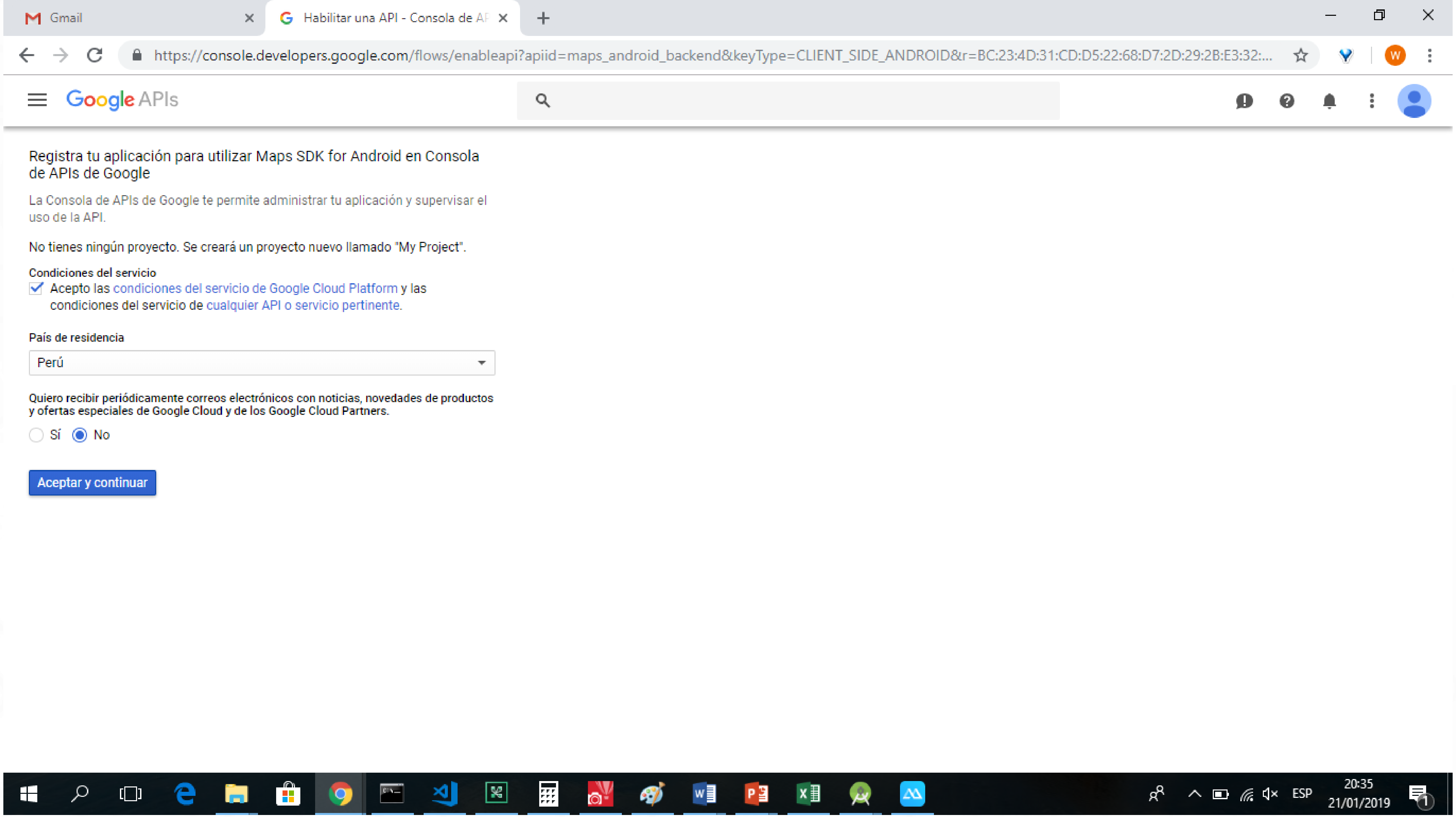


Mapabasico [E:\Users\usuario\AndroidStudioProjects\Mapabasico] - ...\app\src\debug\res\values\google_maps_api.xml [app] - Android Studio

```xml
<resources>
    <!--
    TODO: Before you run your application, you need a Google Maps API key.

    To get one, follow this link, follow the directions and press "Create" at the end:

    https://console.developers.google.com/flows/enableapi?apiid=maps_android_backend&keyType=CLIENT_SIDE_ANDROID&r=BC:23:4D:31:CD:D5:

    You can also add your credentials to an existing key, using these values:

    Package name:
    BC:23:4D:31:CD:D5:22:68:D7:2D:29:2B:E3:32:6F:92:81:A3:3B:B1

    SHA-1 certificate fingerprint:
    BC:23:4D:31:CD:D5:22:68:D7:2D:29:2B:E3:32:6F:92:81:A3:3B:B1

    Alternatively, follow the directions here:
    https://developers.google.com/maps/documentation/android/start#get-key

    Once you have your key (it starts with "AIza"), replace the "google_maps_key"
    string in this file.
    -->
    <string name="google_maps_key" templateMergeStrategy="preserve" translatable="false">YOUR_KEY_HERE</string>
</resources>
```

Gradle build finished in 1m 19s 539ms (2 minutes ago)

219 chars, 1 line break   8:1   CRLF÷   UTF-8   Context: <no context>



https://console.developers.google.com/flows/enableapi?apiid=maps_android_backend&keyType=CLIENT_SIDE_ANDROID&r=BC:23:4D:31:CD:D5:22:68:D7:2D:29:2B:E3:32:...

Registra tu aplicación para utilizar Maps SDK for Android en Consola de APIs de Google

La Consola de APIs de Google te permite administrar tu aplicación y supervisar el uso de la API.

No tienes ningún proyecto. Se creará un proyecto nuevo llamado "My Project".

Condiciones del servicio

☑ Acepto las condiciones del servicio de Google Cloud Platform y las condiciones del servicio de cualquier API o servicio pertinente.

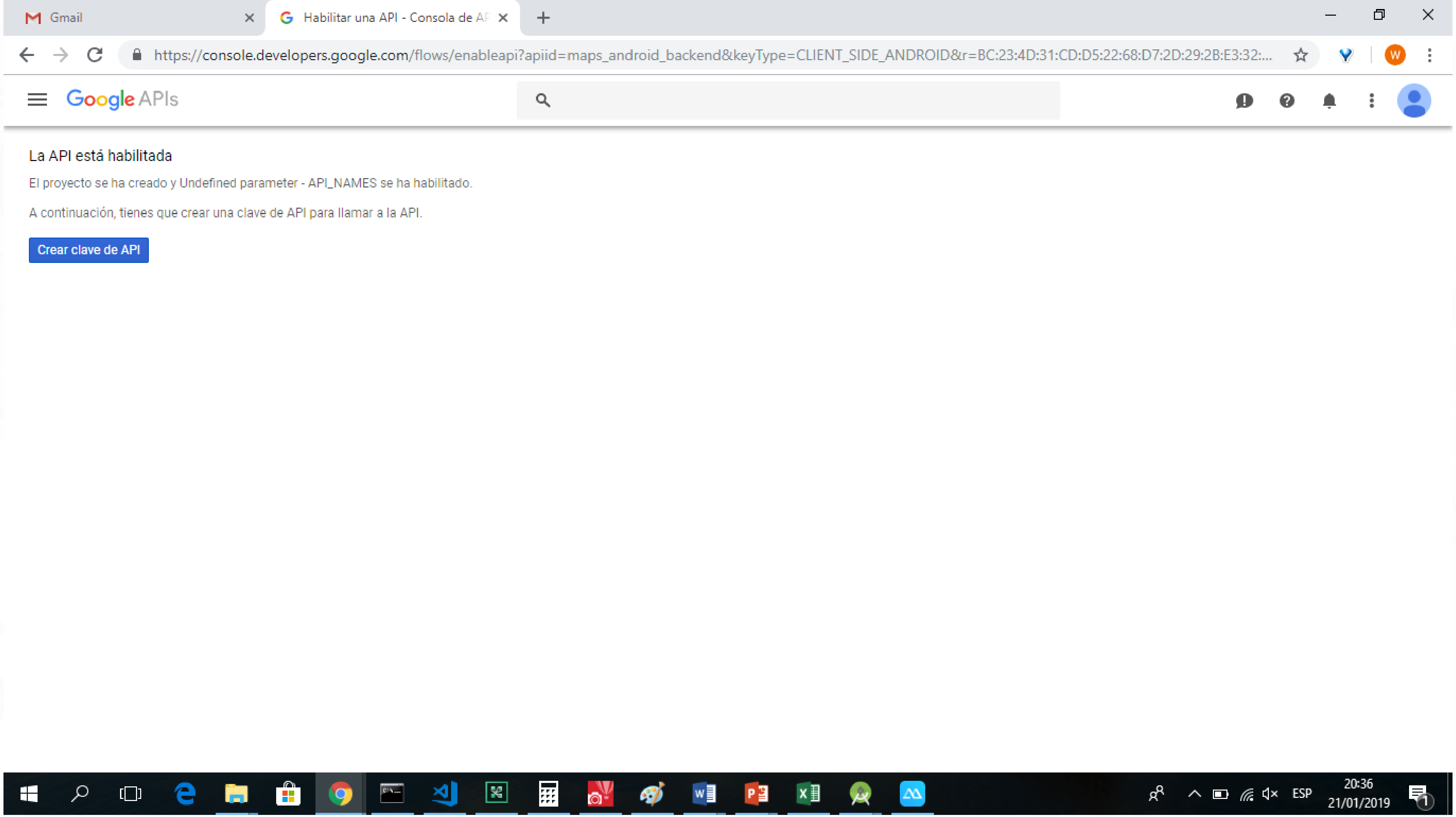
País de residencia

Perú

Quiero recibir periódicamente correos electrónicos con noticias, novedades de productos y ofertas especiales de Google Cloud y de los Google Cloud Partners.

○ Sí ● No

Aceptar y continuar



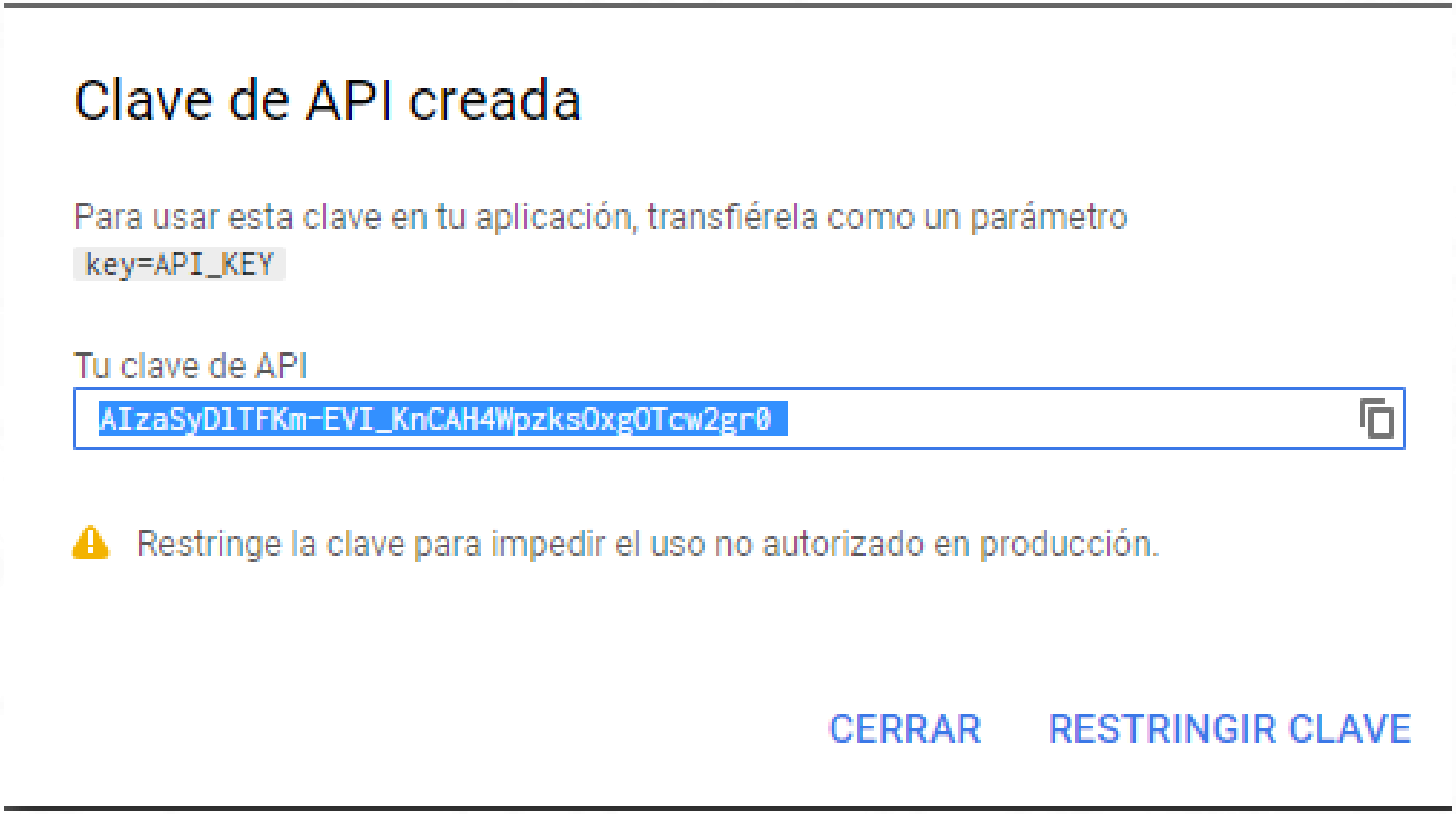
Gmail
Habilitar una API - Consola de AP
https://console.developers.google.com/flows/enableapi?apiid=maps_android_backend&keyType=CLIENT_SIDE_ANDROID&r=BC:23:4D:31:CD:D5:22:68:D7:2D:29:2B:E3:32:...
Google APIs

La API está habilitada

El proyecto se ha creado y Undefined parameter - API_NAMES se ha habilitado.

A continuación, tienes que crear una clave de API para llamar a la API.

Crear clave de API
ESP
20:36
21/01/2019



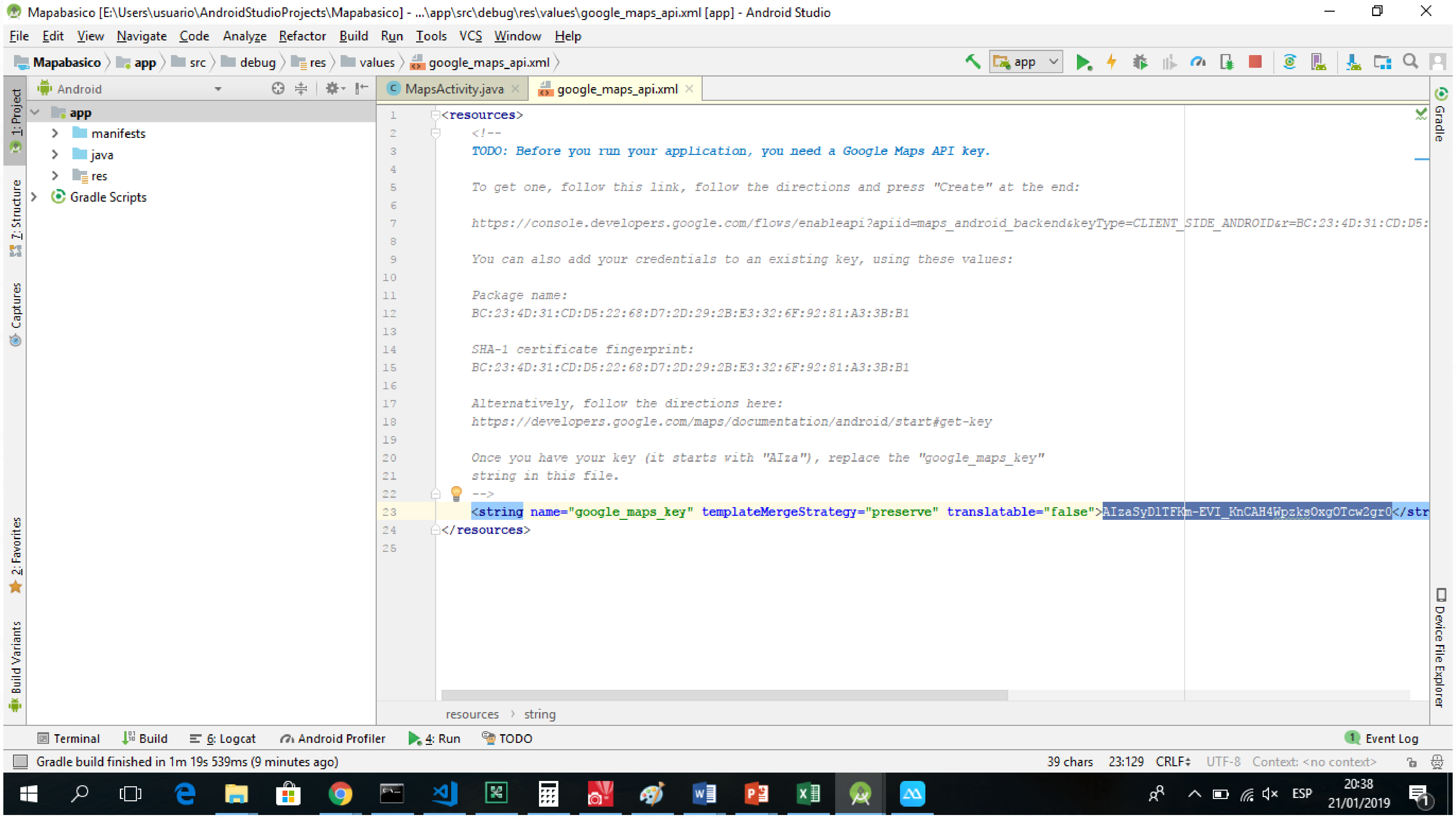
Clave de API creada

Para usar esta clave en tu aplicación, transfiérela como un parámetro `key=API_KEY`

Tu clave de API

```
AIzaSyD1TFKm-EVI_KnCAH4WpzksOxgOTcw2gr0
```

⚠ Restringe la clave para impedir el uso no autorizado en producción.



Mapabasico [E:\Users\usuario\AndroidStudioProjects\Mapabasico] - ...\app\src\debug\res\values\google_maps_api.xml [app] - Android Studio

```
<resources>
    <!--
    TODO: Before you run your application, you need a Google Maps API key.

    To get one, follow this link, follow the directions and press "Create" at the end:

    https://console.developers.google.com/flows/enableapi?apiid=maps_android_backend&keyType=CLIENT_SIDE_ANDROID&r=BC:23:4D:31:CD:D5:

    You can also add your credentials to an existing key, using these values:

    Package name:
    BC:23:4D:31:CD:D5:22:68:D7:2D:29:2B:E3:32:6F:92:81:A3:3B:B1

    SHA-1 certificate fingerprint:
    BC:23:4D:31:CD:D5:22:68:D7:2D:29:2B:E3:32:6F:92:81:A3:3B:B1

    Alternatively, follow the directions here:
    https://developers.google.com/maps/documentation/android/start#get-key

    Once you have your key (it starts with "AIza"), replace the "google_maps_key"
    string in this file.
    -->
    <string name="google_maps_key" templateMergeStrategy="preserve" translatable="false">AIzaSyDlTFKm-EVI_KnCAH4WpzksOxgOTcw2gr0</str
</resources>
```

Gradle build finished in 1m 19s 539ms (9 minutes ago)

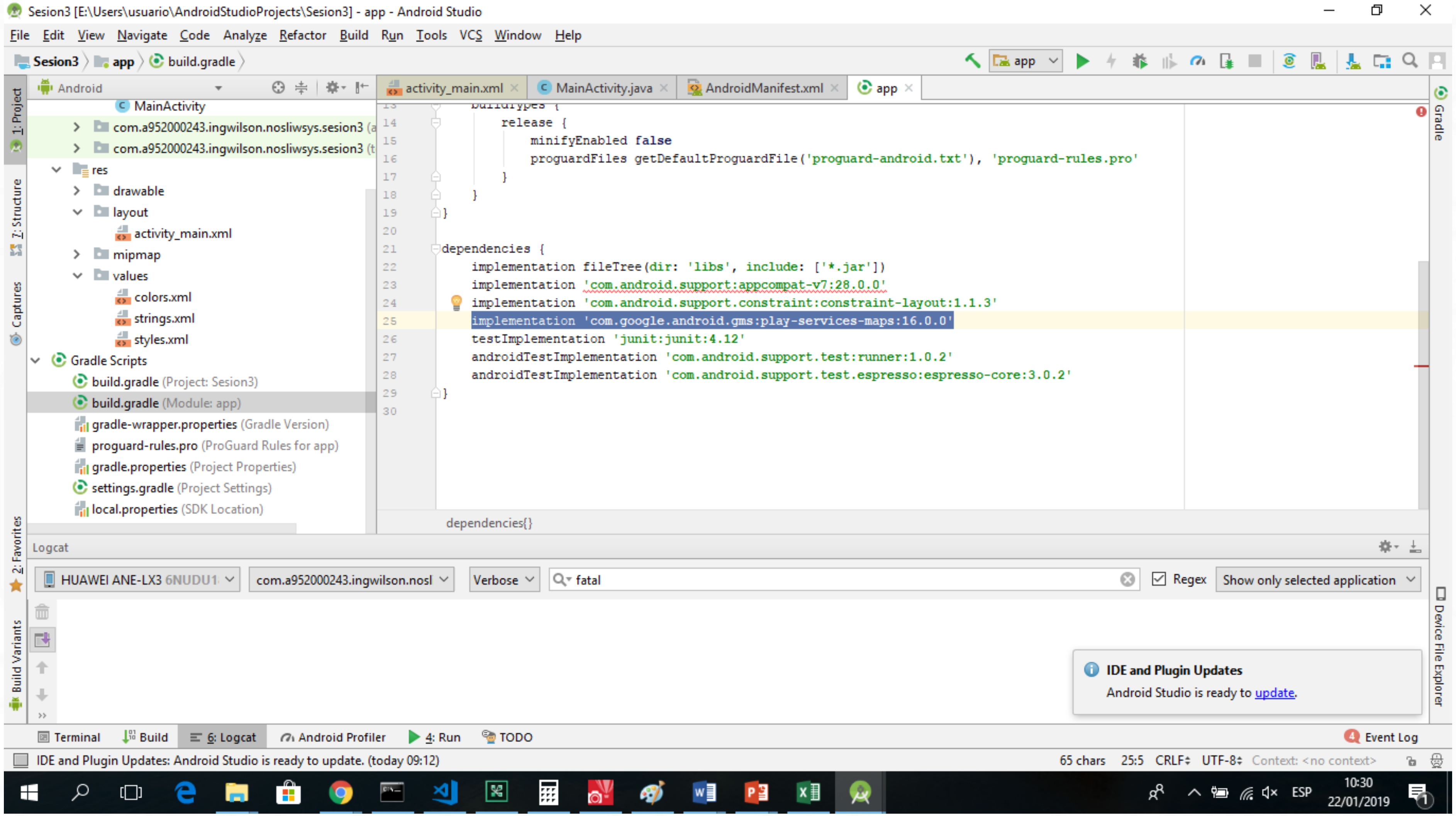
39 chars 23:129 CRLF UTF-8 Context: <no context>

ESP 20:38 21/01/2019

Mapa básico paso a paso

CREAMOS UN NUEVO PROYECTO Parte3
Empty Activity
Valores por defecto

```
implementation 'com.google.android.gms:play-services-maps:16.0.0'
```



Sesion3 [E:\Users\usuario\AndroidStudioProjects\Sesion3] - app - Android Studio

```
    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android.txt'), 'proguard-rules.pro'
        }
    }
}

dependencies {
    implementation fileTree(dir: 'libs', include: ['*.jar'])
    implementation 'com.android.support:appcompat-v7:28.0.0'
    implementation 'com.android.support.constraint:constraint-layout:1.1.3'
    implementation 'com.google.android.gms:play-services-maps:16.0.0'
    testImplementation 'junit:junit:4.12'
    androidTestImplementation 'com.android.support.test:runner:1.0.2'
    androidTestImplementation 'com.android.support.test.espresso:espresso-core:3.0.2'
}
```

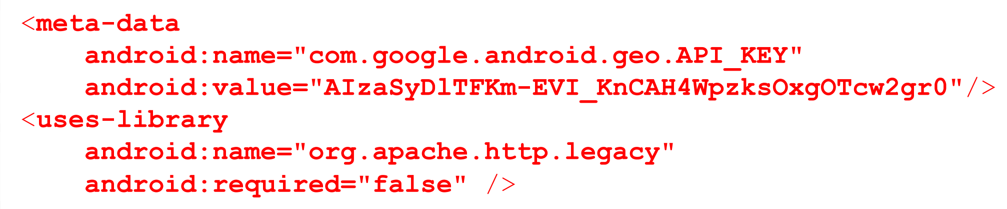
Logcat: HUAWEI ANE-LX3 6NUDU1 | com.a952000243.ingwilson.nosl | Verbose | fatal | ☑ Regex | Show only selected application

IDE and Plugin Updates
Android Studio is ready to update.

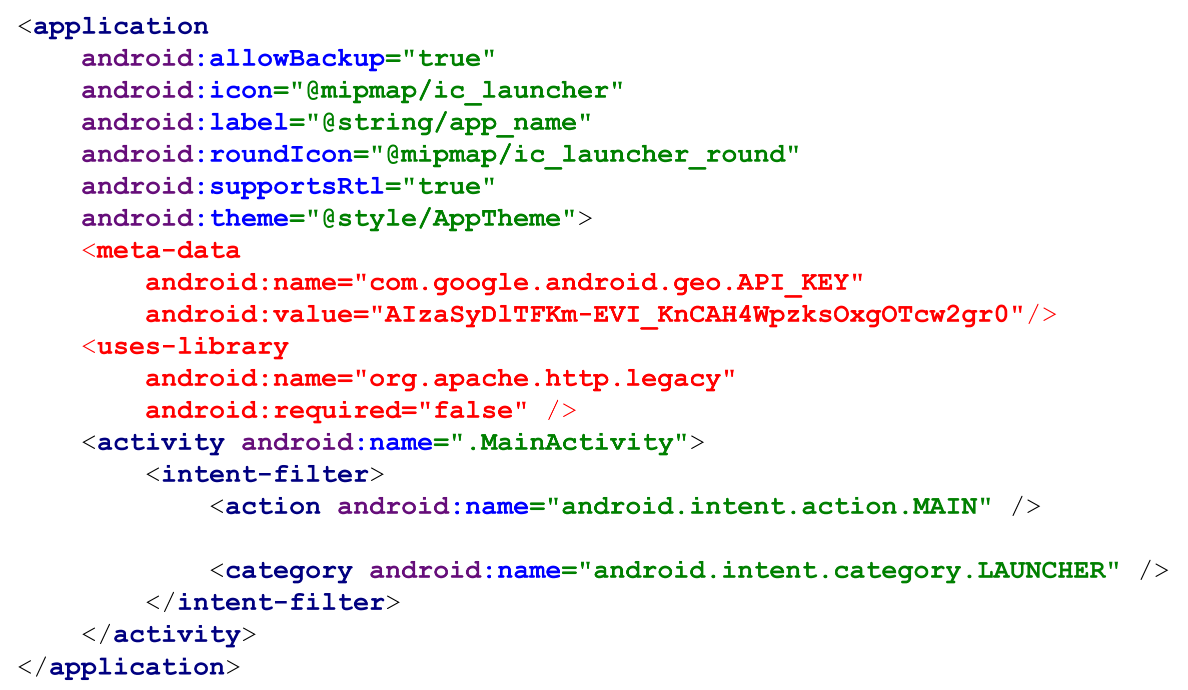
IDE and Plugin Updates: Android Studio is ready to update. (today 09:12)

65 chars 25:5 CRLF UTF-8 Context: <no context>

Añadimos al Manifest con nuestra clave de API de mapa dentro de aplication



```
<meta-data
    android:name="com.google.android.geo.API_KEY"
    android:value="AIzaSyDlTFKm-EVI_KnCAH4WpzksOxgOTcw2gr0"/>
<uses-library
    android:name="org.apache.http.legacy"
    android:required="false" />
```



```
<application
    android:allowBackup="true"
    android:icon="@mipmap/ic_launcher"
    android:label="@string/app_name"
    android:roundIcon="@mipmap/ic_launcher_round"
    android:supportsRtl="true"
    android:theme="@style/AppTheme">
    <meta-data
        android:name="com.google.android.geo.API_KEY"
        android:value="AIzaSyDlTFKm-EVI_KnCAH4WpzksOxgOTcw2gr0"/>
    <uses-library
        android:name="org.apache.http.legacy"
        android:required="false" />
    <activity android:name=".MainActivity">
        <intent-filter>
            <action android:name="android.intent.action.MAIN" />

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

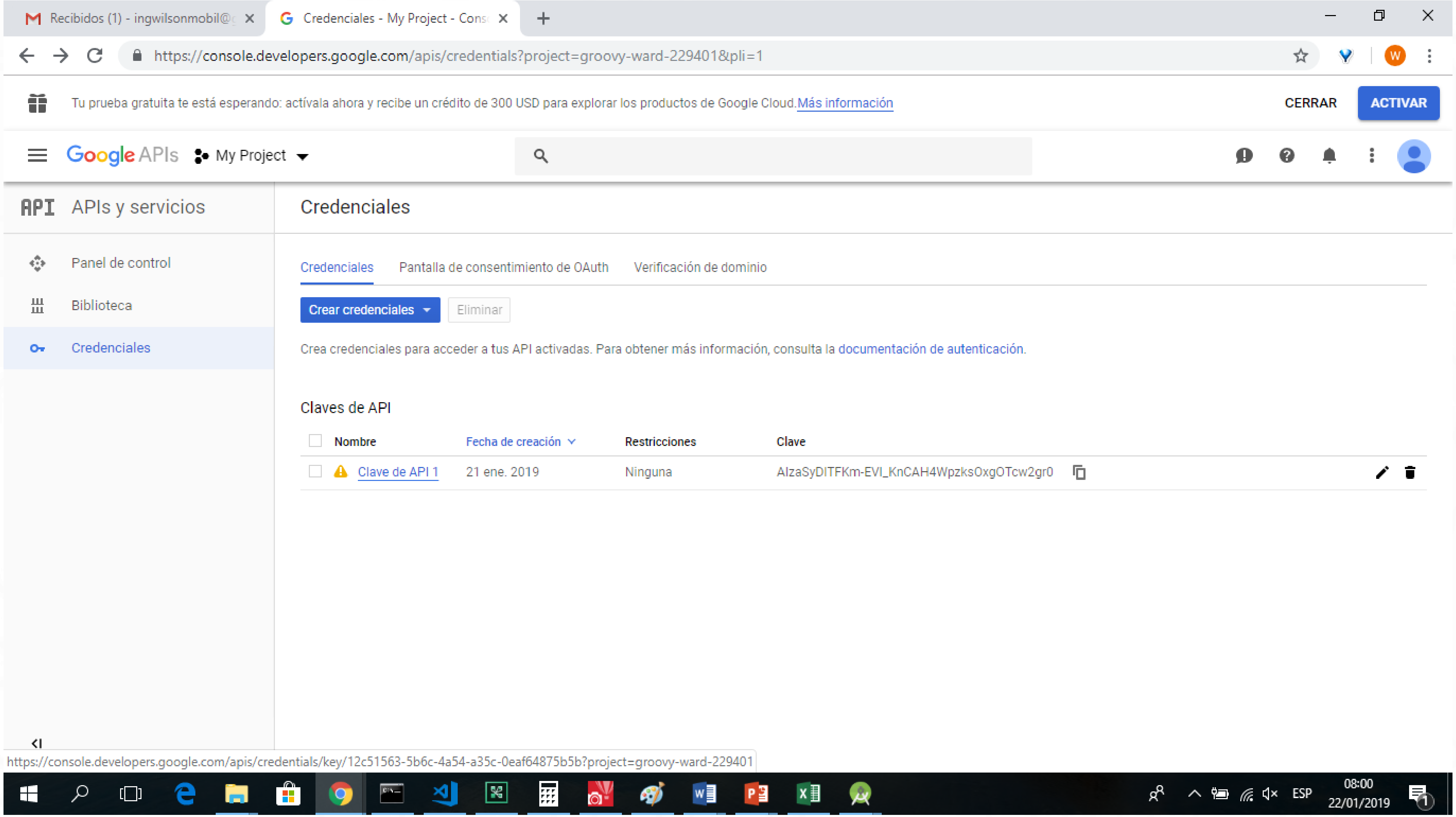
MainActivty.class

```java
public class MainActivity extends FragmentActivity
        implements OnMapReadyCallback {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
// Obtenemos el mapa de forma asíncrona (notificará cuando esté listo)
        SupportMapFragment mapFragment = (SupportMapFragment)
                getSupportFragmentManager().findFragmentById(R.id.mapa);
        mapFragment.getMapAsync(this);
    }
    @Override
    public void onMapReady(GoogleMap googleMap) {
        GoogleMap mapa = googleMap;
        LatLng UPV = new LatLng(-18.013766, -70.255331); //Nos ubicamos en la UNJBG
        mapa.addMarker(new MarkerOptions().position(UPV).title("Marcador Tacna"));
        mapa.moveCamera(CameraUpdateFactory.newLatLng(UPV));
    }
}
```

activity_main.xml

```
<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"
    tools:context=".MainActivity">
    <fragment
        android:id="@+id/mapa"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        class="com.google.android.gms.maps.SupportMapFragment"/>
</LinearLayout>
```

Liberamos la llave – disminuye su seguridad



Recibidos (1) - ingwilsonmobil@
Credenciales - My Project - Cons
https://console.developers.google.com/apis/credentials?project=groovy-ward-229401&pli=1
CERRAR
ACTIVAR
Google APIs
My Project
APIs y servicios
Credenciales
Panel de control
Biblioteca
Credenciales
Credenciales
Pantalla de consentimiento de OAuth
Verificación de dominio
Crear credenciales
Eliminar
ESP
08:00
22/01/2019

Tu prueba gratuita te está esperando: actívala ahora y recibe un crédito de 300 USD para explorar los productos de Google Cloud. Más información

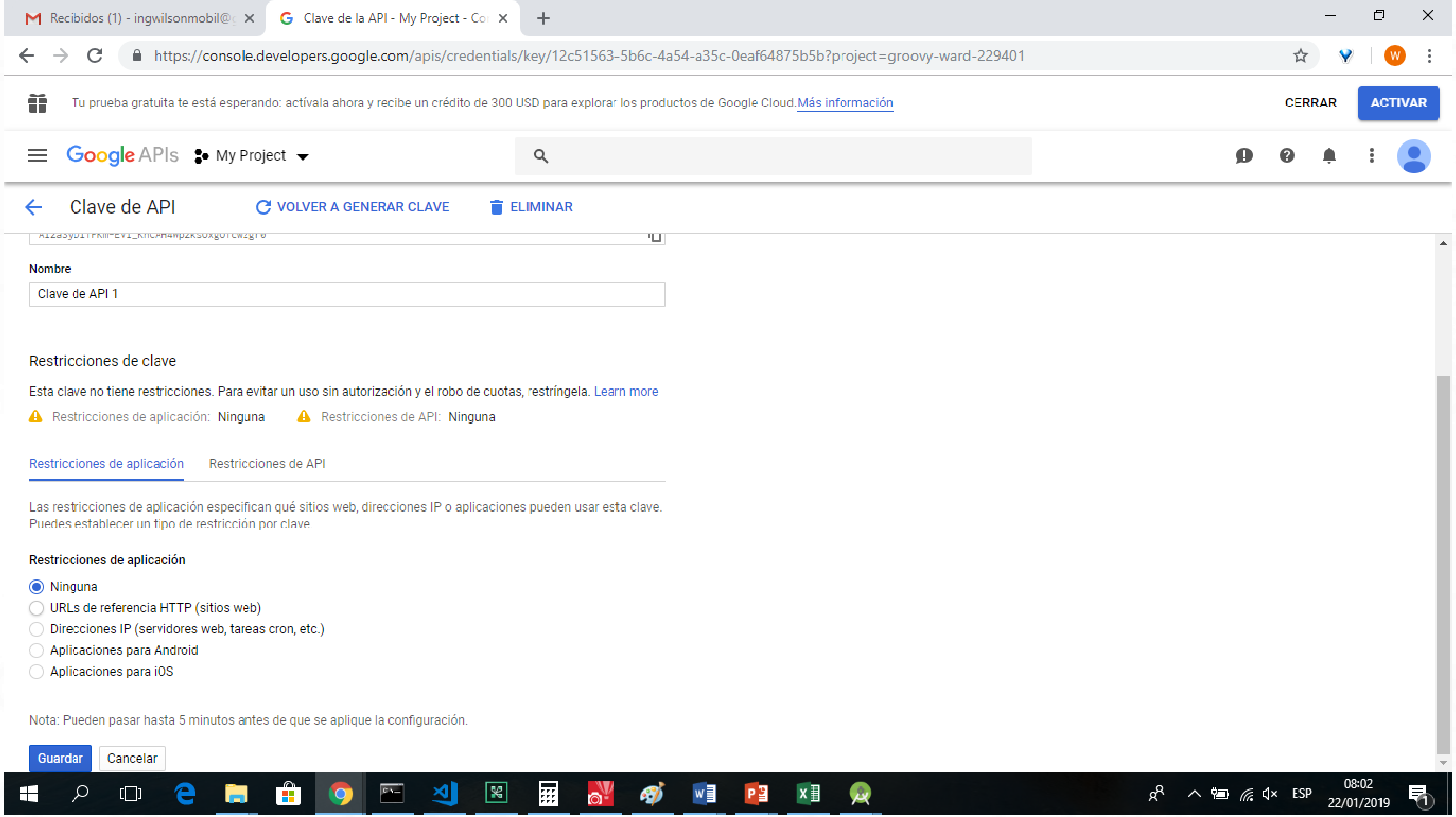
Crea credenciales para acceder a tus API activadas. Para obtener más información, consulta la documentación de autenticación.

Claves de API

	Nombre	Fecha de creación	Restricciones	Clave
□	Clave de API 1	21 ene. 2019	Ninguna	AIzaSyDITFKm-EVI_KnCAH4WpzksOxgOTcw2gr0

https://console.developers.google.com/apis/credentials/key/12c51563-5b6c-4a54-a35c-0eaf64875b5b?project=groovy-ward-229401

Liberamos la llave – disminuye su seguridad


Recibidos (1) - ingwilsonmobil@
Clave de la API - My Project - Co
https://console.developers.google.com/apis/credentials/key/12c51563-5b6c-4a54-a35c-0eaf64875b5b?project=groovy-ward-229401
Tu prueba gratuita te está esperando: actívala ahora y recibe un crédito de 300 USD para explorar los productos de Google Cloud. Más información
CERRAR
ACTIVAR
Google APIs
My Project
ESP
08:02
22/01/2019

Clave de API

VOLVER A GENERAR CLAVE

ELIMINAR

Nombre

Clave de API 1

Restricciones de clave

Esta clave no tiene restricciones. Para evitar un uso sin autorización y el robo de cuotas, restríngela. Learn more

⚠ Restricciones de aplicación: Ninguna ⚠ Restricciones de API: Ninguna

Restricciones de aplicación | Restricciones de API

Las restricciones de aplicación especifican qué sitios web, direcciones IP o aplicaciones pueden usar esta clave. Puedes establecer un tipo de restricción por clave.

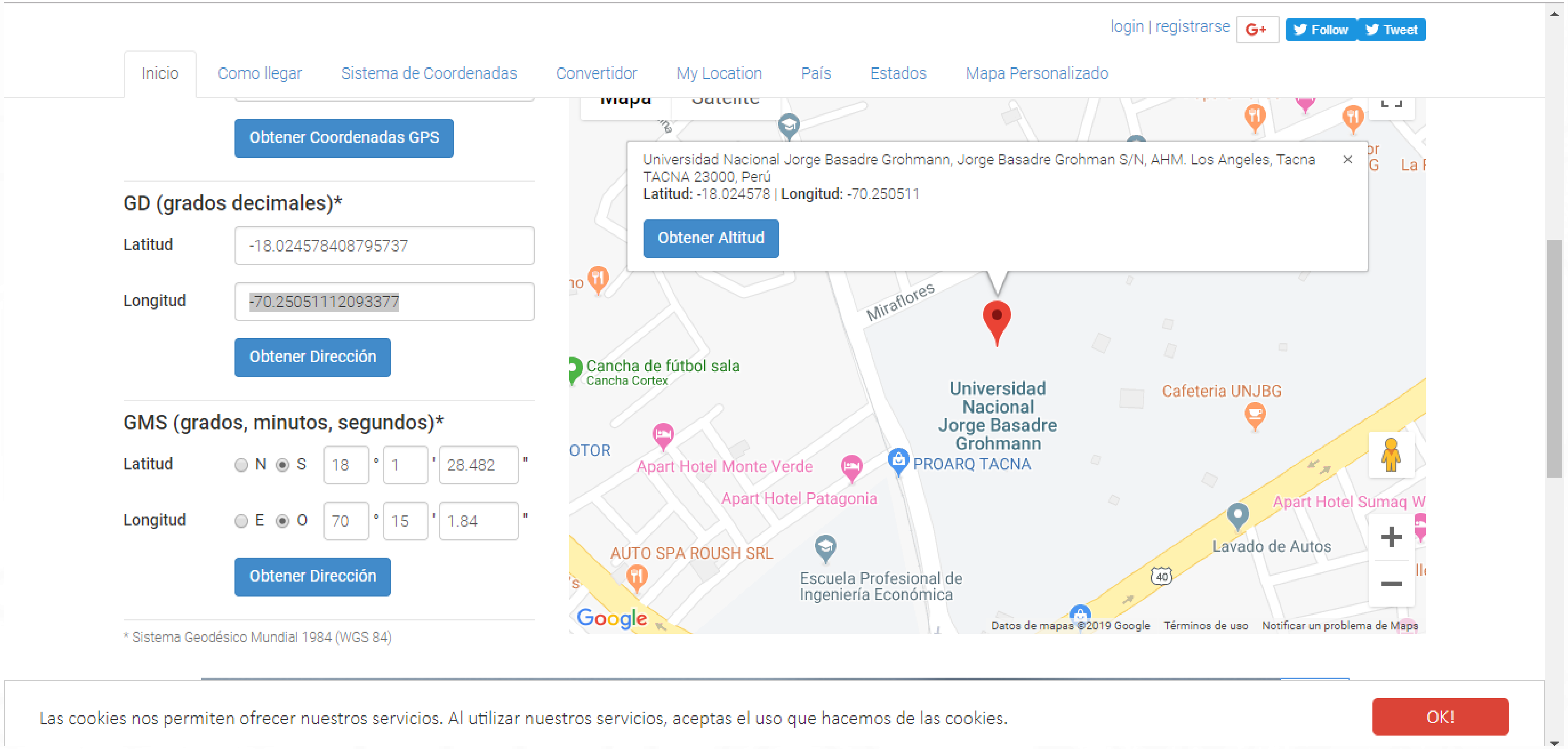
Restricciones de aplicación

- ● Ninguna
- ○ URLs de referencia HTTP (sitios web)
- ○ Direcciones IP (servidores web, tareas cron, etc.)
- ○ Aplicaciones para Android
- ○ Aplicaciones para iOS

Nota: Pueden pasar hasta 5 minutos antes de que se aplique la configuración.

Guardar Cancelar

https://www.coordenadas-gps.com/



GD (grados decimales)*

Latitud	-18.024578408795737
Longitud	-70.25051112093377

GMS (grados, minutos, segundos)*

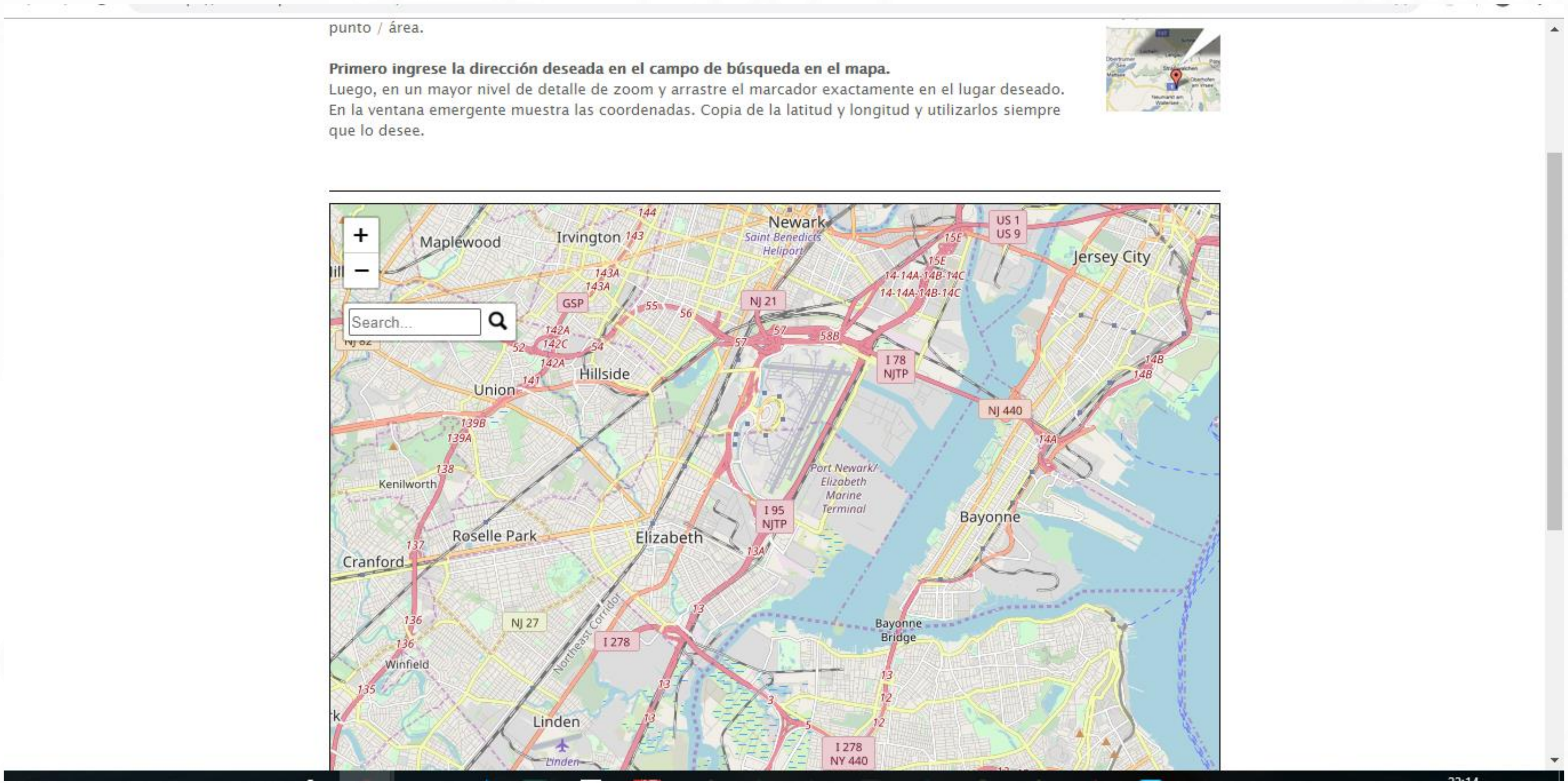
Latitud	○ N ● S	18 °	1 '	28.482 "
Longitud	○ E ● O	70 °	15 '	1.84 "

* Sistema Geodésico Mundial 1984 (WGS 84)

Universidad Nacional Jorge Basadre Grohmann, Jorge Basadre Grohman S/N, AHM. Los Angeles, Tacna TACNA 23000, Perú
Latitud: -18.024578 | **Longitud:** -70.250511

Las cookies nos permiten ofrecer nuestros servicios. Al utilizar nuestros servicios, aceptas el uso que hacemos de las cookies.

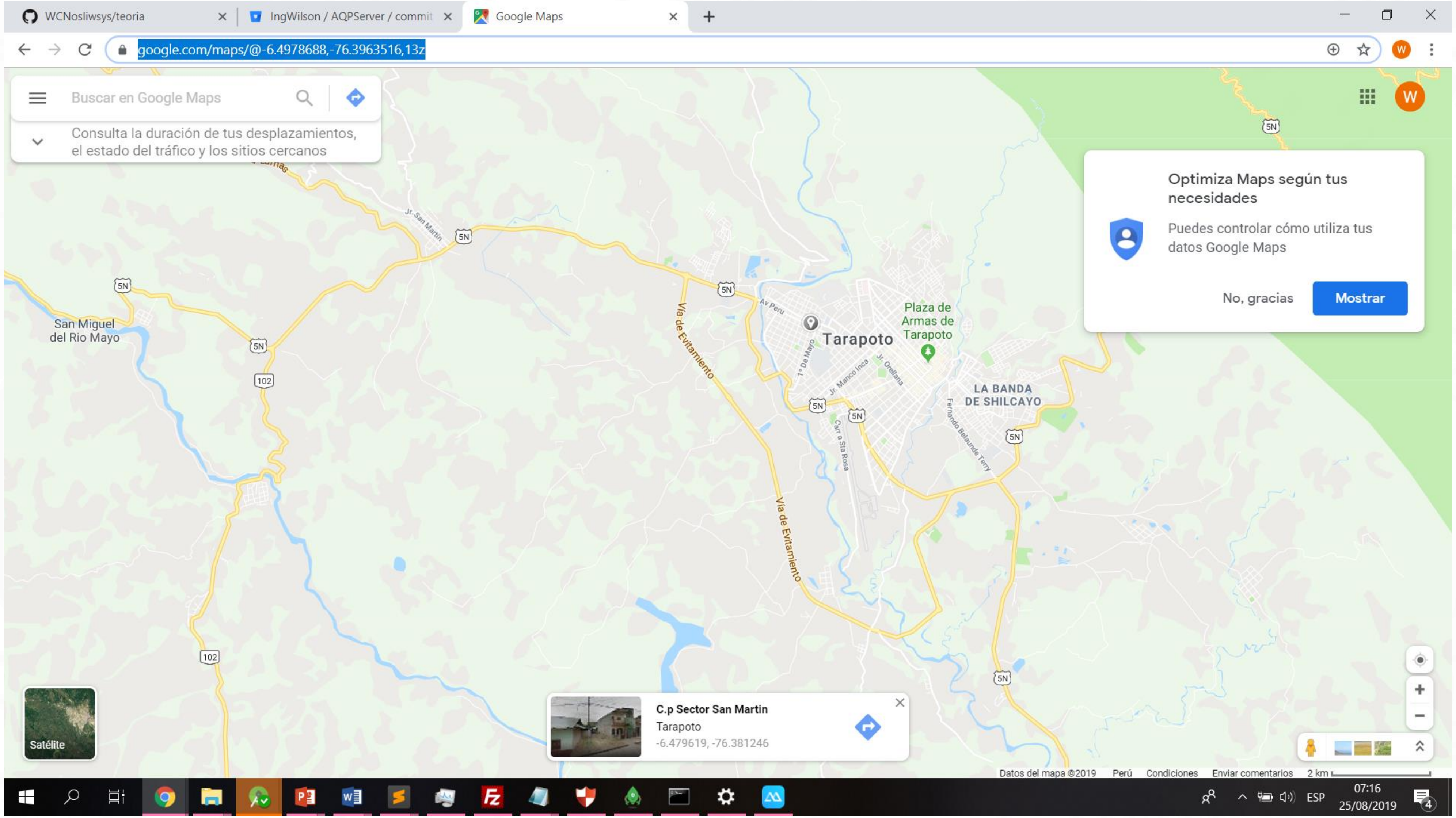
https://www.mapcoordinates.net/es



punto / área.

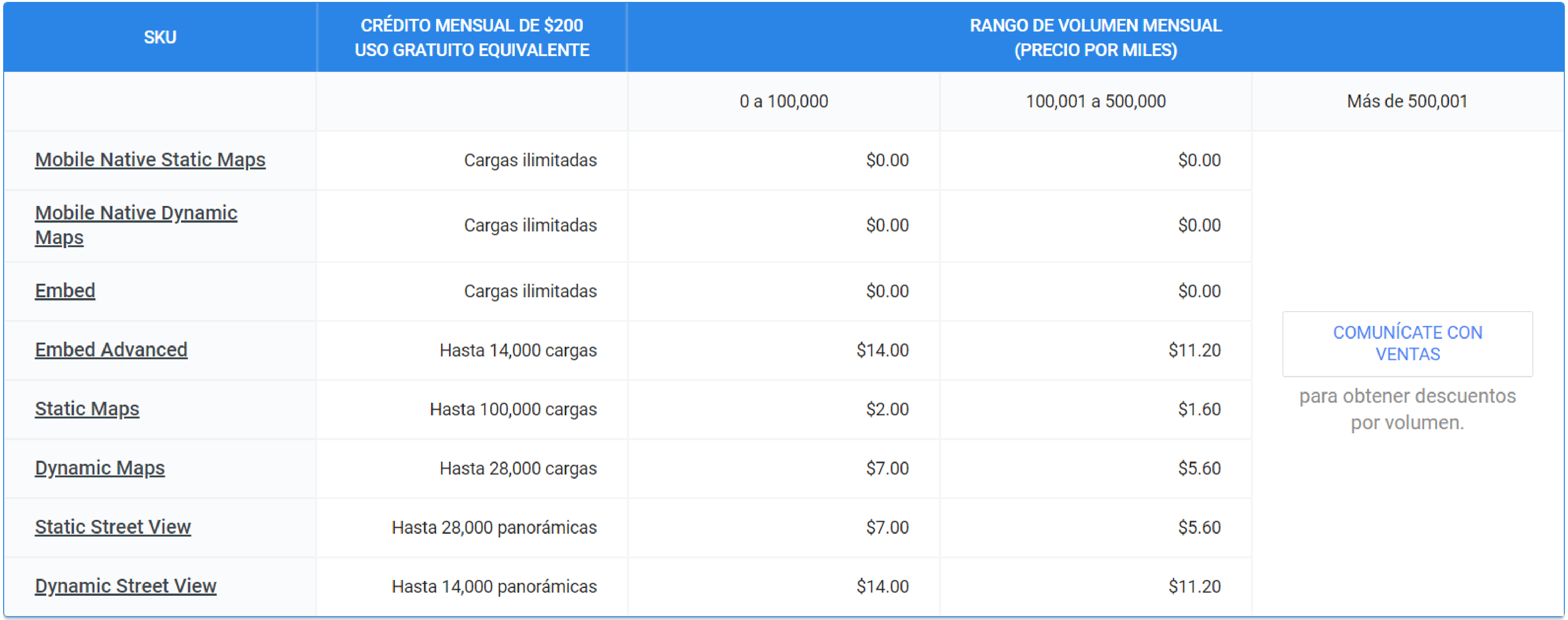
Primero ingrese la dirección deseada en el campo de búsqueda en el mapa.
Luego, en un mayor nivel de detalle de zoom y arrastre el marcador exactamente en el lugar deseado. En la ventana emergente muestra las coordenadas. Copia de la latitud y longitud y utilizarlos siempre que lo desee.

https://www.google.com/maps/@-6.4978688,-76.3963516,13z



WCNosliwsys/teoria
IngWilson / AQPServer / commit
Google Maps
google.com/maps/@-6.4978688,-76.3963516,13z
Buscar en Google Maps
Consulta la duración de tus desplazamientos, el estado del tráfico y los sitios cercanos
Optimiza Maps según tus necesidades
Puedes controlar cómo utiliza tus datos Google Maps
No, gracias
Mostrar
San Miguel del Rio Mayo
Tarapoto
Plaza de Armas de Tarapoto
LA BANDA DE SHILCAYO
Via de Evitamiento
5N
102
C.p Sector San Martin
Tarapoto
-6.479619, -76.381246
Satélite
Datos del mapa ©2019 Perú Condiciones Enviar comentarios 2 km
ESP
07:16
25/08/2019

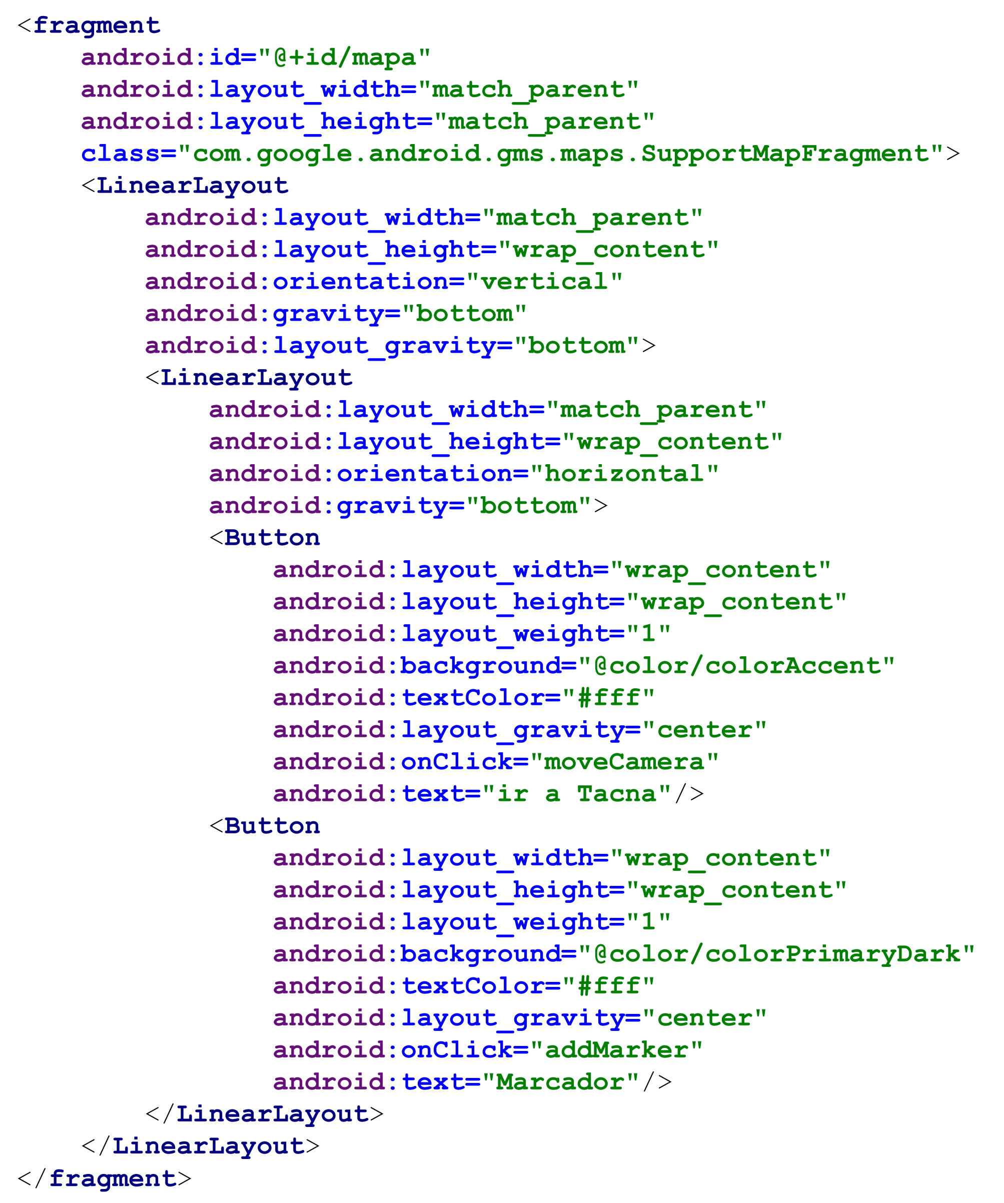
https://cloud.google.com/maps-platform/pricing/sheet/?hl=es-419



SKU	CRÉDITO MENSUAL DE $200 USO GRATUITO EQUIVALENTE	RANGO DE VOLUMEN MENSUAL (PRECIO POR MILES)		
		0 a 100,000	100,001 a 500,000	Más de 500,001
Mobile Native Static Maps	Cargas ilimitadas	$0.00	$0.00	COMUNÍCATE CON VENTAS para obtener descuentos por volumen.
Mobile Native Dynamic Maps	Cargas ilimitadas	$0.00	$0.00	
Embed	Cargas ilimitadas	$0.00	$0.00	
Embed Advanced	Hasta 14,000 cargas	$14.00	$11.20	
Static Maps	Hasta 100,000 cargas	$2.00	$1.60	
Dynamic Maps	Hasta 28,000 cargas	$7.00	$5.60	
Static Street View	Hasta 28,000 panorámicas	$7.00	$5.60	
Dynamic Street View	Hasta 14,000 panorámicas	$14.00	$11.20	

Manipulando Mapa

Reemplazamos el fragment de activity_main.xml

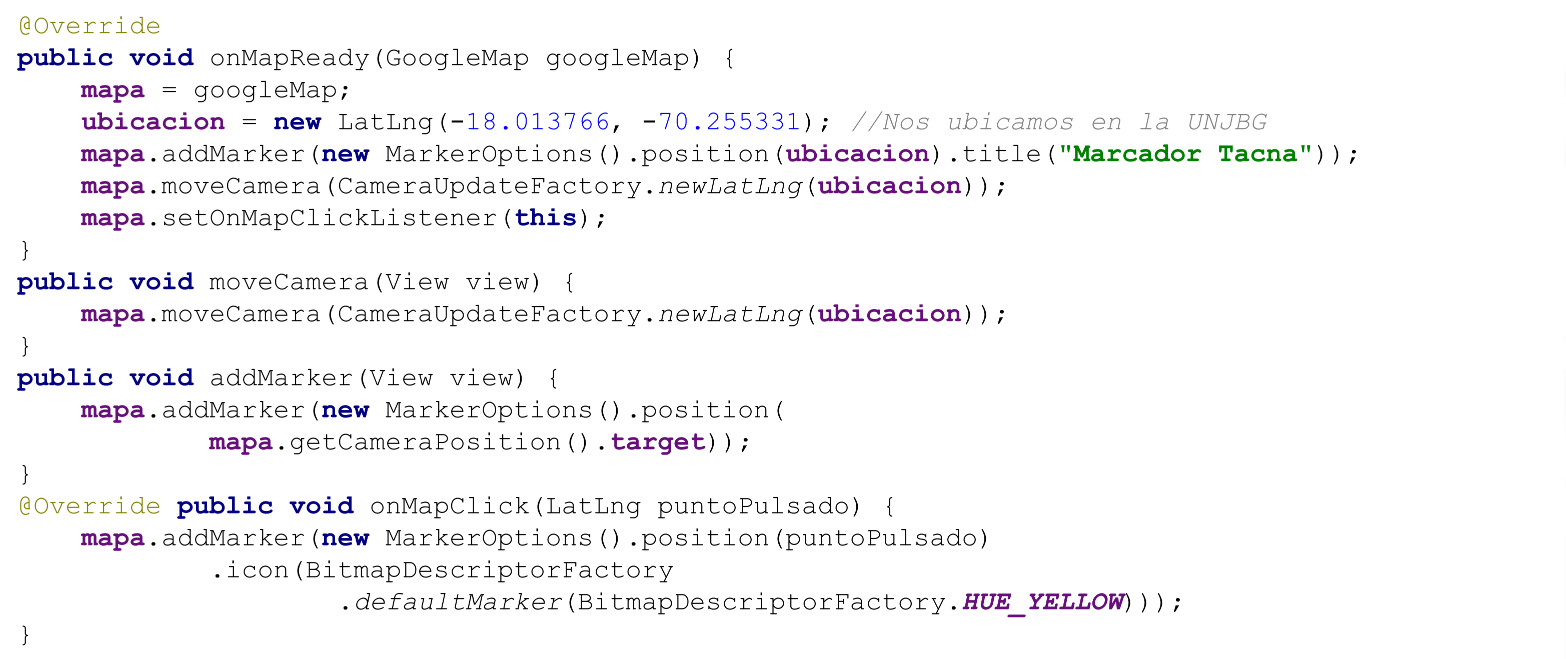


```
<fragment
    android:id="@+id/mapa"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    class="com.google.android.gms.maps.SupportMapFragment">
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:gravity="bottom"
        android:layout_gravity="bottom">
        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="horizontal"
            android:gravity="bottom">
            <Button
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:background="@color/colorAccent"
                android:textColor="#fff"
                android:layout_gravity="center"
                android:onClick="moveCamera"
                android:text="ir a Tacna"/>
            <Button
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:background="@color/colorPrimaryDark"
                android:textColor="#fff"
                android:layout_gravity="center"
                android:onClick="addMarker"
                android:text="Marcador"/>
        </LinearLayout>
    </LinearLayout>
</fragment>
```

En MainActivity.class añadimos

```java
public class MainActivity extends FragmentActivity
        implements OnMapReadyCallback, GoogleMap.OnMapClickListener  {
      GoogleMap mapa;
      LatLng ubicacion;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        // Obtenemos el mapa de forma asíncrona (notificará cuando esté listo)
        SupportMapFragment mapFragment = (SupportMapFragment)
                getSupportFragmentManager().findFragmentById(R.id.mapa);
        mapFragment.getMapAsync(this);
    }
```

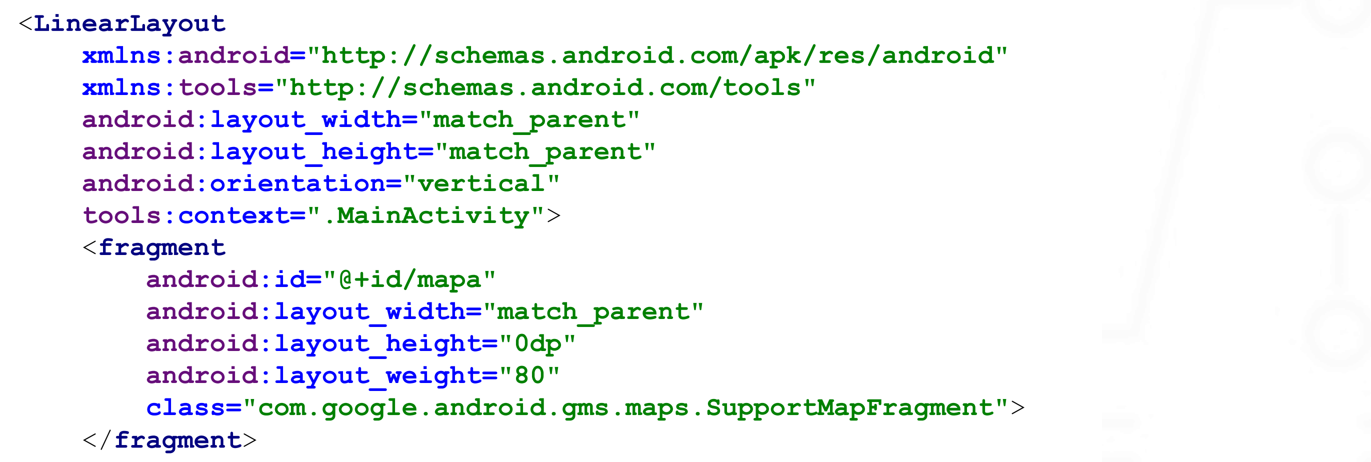
MainActivity.class modificamos el onMapReady y añadimos los métodos
 movecamera, addmarker y onMapClick



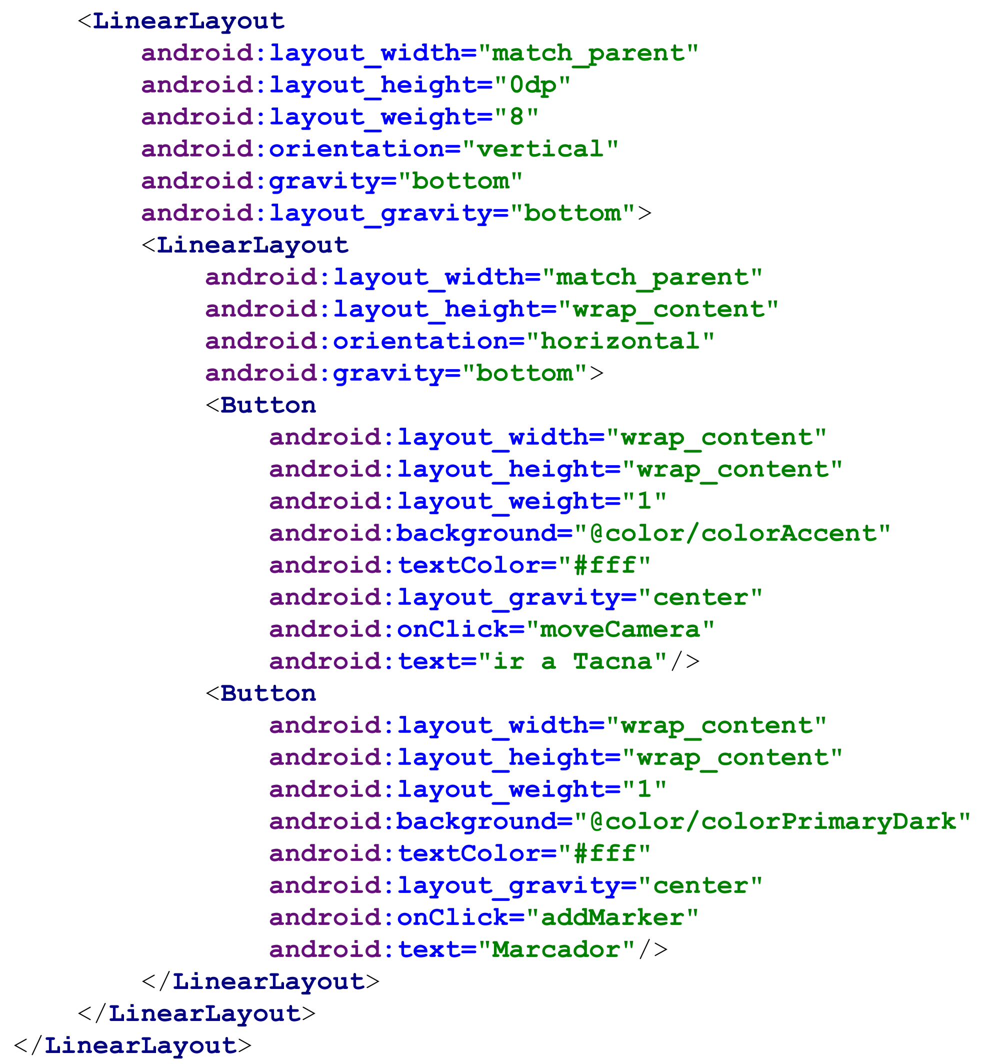
```
@Override
public void onMapReady(GoogleMap googleMap) {
    mapa = googleMap;
    ubicacion = new LatLng(-18.013766, -70.255331); //Nos ubicamos en la UNJBG
    mapa.addMarker(new MarkerOptions().position(ubicacion).title("Marcador Tacna"));
    mapa.moveCamera(CameraUpdateFactory.newLatLng(ubicacion));
    mapa.setOnMapClickListener(this);
}
public void moveCamera(View view) {
    mapa.moveCamera(CameraUpdateFactory.newLatLng(ubicacion));
}
public void addMarker(View view) {
    mapa.addMarker(new MarkerOptions().position(
            mapa.getCameraPosition().target));
}
@Override public void onMapClick(LatLng puntoPulsado) {
    mapa.addMarker(new MarkerOptions().position(puntoPulsado)
            .icon(BitmapDescriptorFactory
                    .defaultMarker(BitmapDescriptorFactory.HUE_YELLOW)));
}
```

Añadiendo un marcador fijo en el mapa

Modificar activity_main.xml con los bloques siguientes de código ejecutar, comparar el resultado

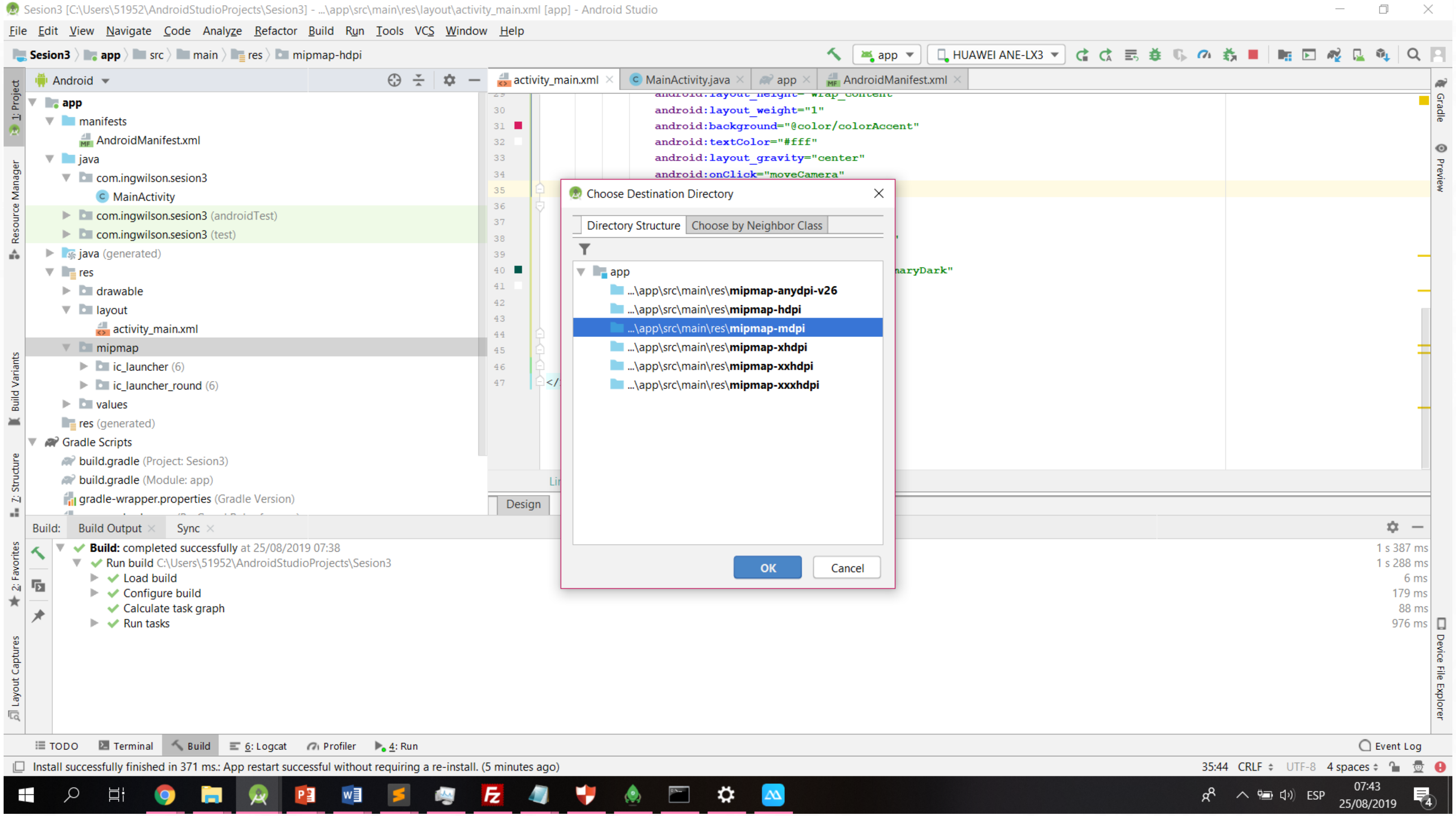


```xml
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">
    <fragment
        android:id="@+id/mapa"
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="80"
        class="com.google.android.gms.maps.SupportMapFragment">
    </fragment>
```



```xml
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="8"
        android:orientation="vertical"
        android:gravity="bottom"
        android:layout_gravity="bottom">
        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="horizontal"
            android:gravity="bottom">
            <Button
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:background="@color/colorAccent"
                android:textColor="#fff"
                android:layout_gravity="center"
                android:onClick="moveCamera"
                android:text="ir a Tacna"/>
            <Button
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:background="@color/colorPrimaryDark"
                android:textColor="#fff"
                android:layout_gravity="center"
                android:onClick="addMarker"
                android:text="Marcador"/>
        </LinearLayout>
    </LinearLayout>
</LinearLayout>
```

Añadir markermap y markera a mipmap



Sesion3 [C:\Users\51952\AndroidStudioProjects\Sesion3] - ...\app\src\main\res\layout\activity_main.xml [app] - Android Studio

```
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:background="@color/colorAccent"
        android:textColor="#fff"
        android:layout_gravity="center"
        android:onClick="moveCamera"
aryDark"
</
```

Choose Destination Directory

- app
  - ...\app\src\main\res\mipmap-anydpi-v26
  - ...\app\src\main\res\mipmap-hdpi
  - ...\app\src\main\res\mipmap-mdpi
  - ...\app\src\main\res\mipmap-xhdpi
  - ...\app\src\main\res\mipmap-xxhdpi
  - ...\app\src\main\res\mipmap-xxxhdpi

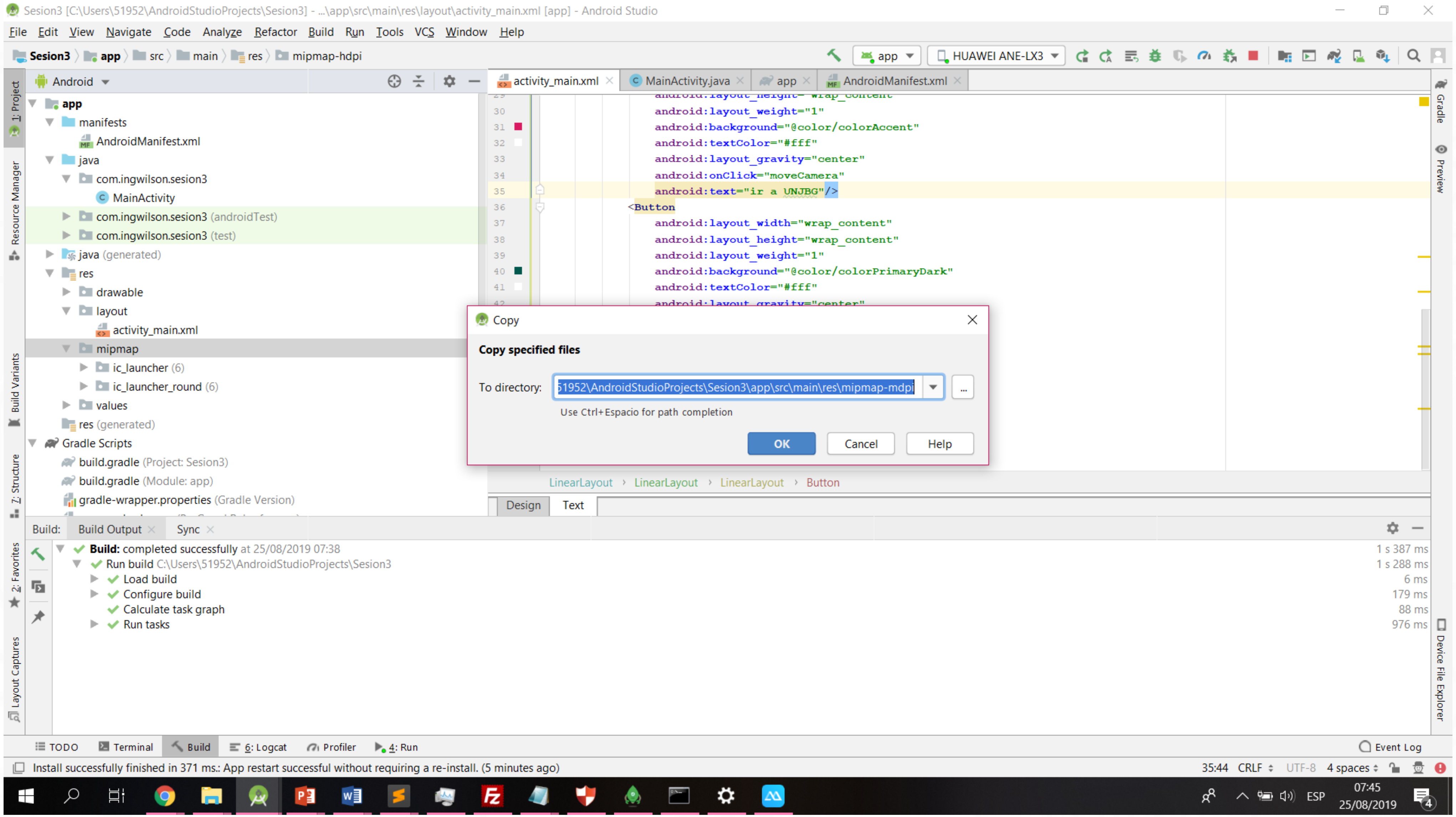
```
Build: completed successfully at 25/08/2019 07:38          1 s 387 ms
  Run build C:\Users\51952\AndroidStudioProjects\Sesion3   1 s 288 ms
    Load build                                             6 ms
    Configure build                                        179 ms
    Calculate task graph                                   88 ms
    Run tasks                                              976 ms
```

Install successfully finished in 371 ms.: App restart successful without requiring a re-install. (5 minutes ago)

35:44 CRLF UTF-8 4 spaces

ESP 07:43 25/08/2019

Añadir markermap y markera a mipmap



Sesion3 [C:\Users\51952\AndroidStudioProjects\Sesion3] - ...\app\src\main\res\layout\activity_main.xml [app] - Android Studio

```
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:background="@color/colorAccent"
            android:textColor="#fff"
            android:layout_gravity="center"
            android:onClick="moveCamera"
            android:text="ir a UNJBG"/>
        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:background="@color/colorPrimaryDark"
            android:textColor="#fff"
            android:layout_gravity="center"
```

Copy

Copy specified files

To directory: 51952\AndroidStudioProjects\Sesion3\app\src\main\res\mipmap-mdpi

Use Ctrl+Espacio for path completion

OK Cancel Help

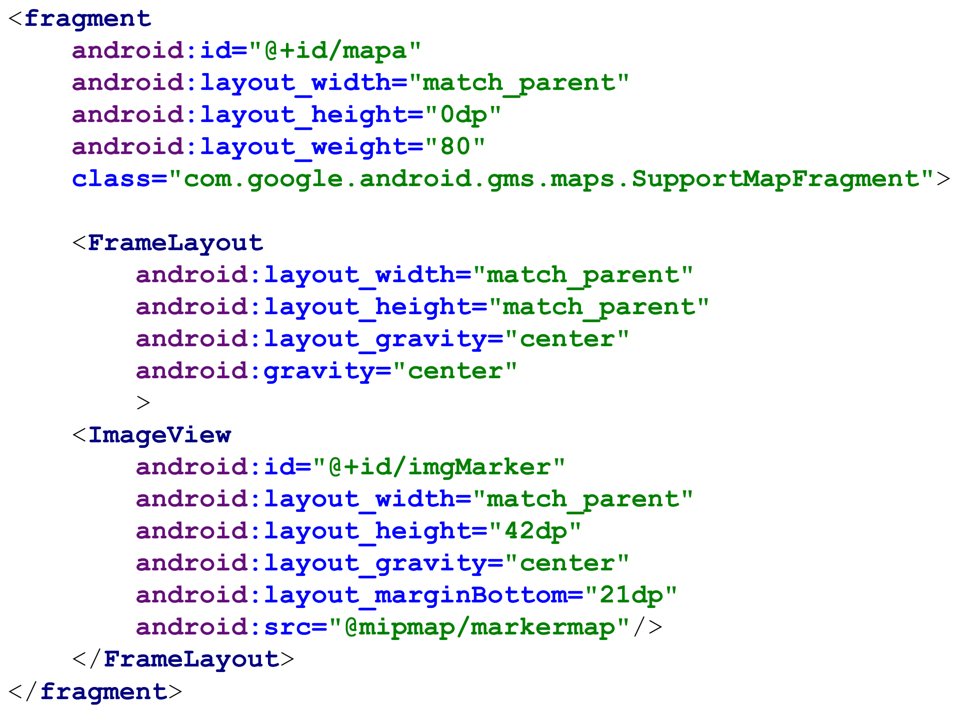
```
Build: completed successfully at 25/08/2019 07:38          1 s 387 ms
  Run build C:\Users\51952\AndroidStudioProjects\Sesion3   1 s 288 ms
    Load build                                                  6 ms
    Configure build                                           179 ms
    Calculate task graph                                       88 ms
    Run tasks                                                 976 ms
```

Install successfully finished in 371 ms.: App restart successful without requiring a re-install. (5 minutes ago)

35:44 CRLF UTF-8 4 spaces

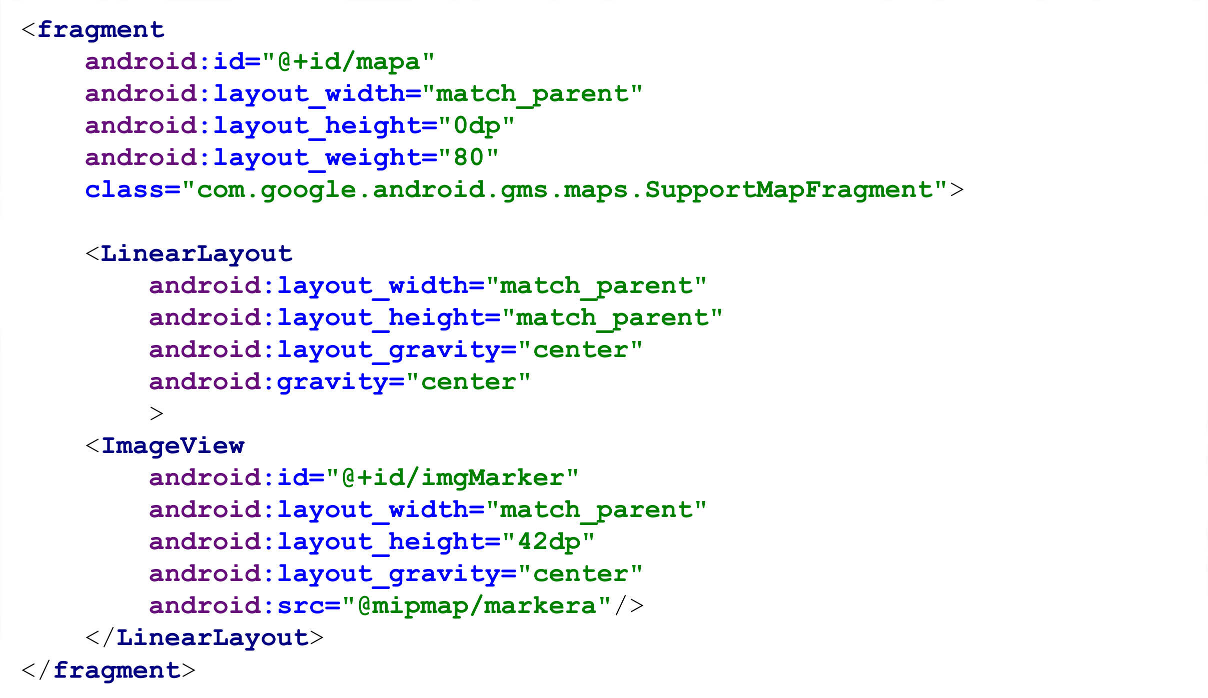
ESP 07:45 25/08/2019

Cambiar en activity_main.xml el fragment y ejecutar, comparar el resultado



```
<fragment
    android:id="@+id/mapa"
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="80"
    class="com.google.android.gms.maps.SupportMapFragment">

    <FrameLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_gravity="center"
        android:gravity="center"
        >
    <ImageView
        android:id="@+id/imgMarker"
        android:layout_width="match_parent"
        android:layout_height="42dp"
        android:layout_gravity="center"
        android:layout_marginBottom="21dp"
        android:src="@mipmap/markermap"/>
    </FrameLayout>
</fragment>
```

Cambiar en activity_main.xml el fragment y ejecutar, comparar el resultado



```
<fragment
    android:id="@+id/mapa"
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="80"
    class="com.google.android.gms.maps.SupportMapFragment">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_gravity="center"
        android:gravity="center"
        >
    <ImageView
        android:id="@+id/imgMarker"
        android:layout_width="match_parent"
        android:layout_height="42dp"
        android:layout_gravity="center"
        android:src="@mipmap/markera"/>
    </LinearLayout>
</fragment>
```

LOCALIZACION

Añadiendo localización al Mapa

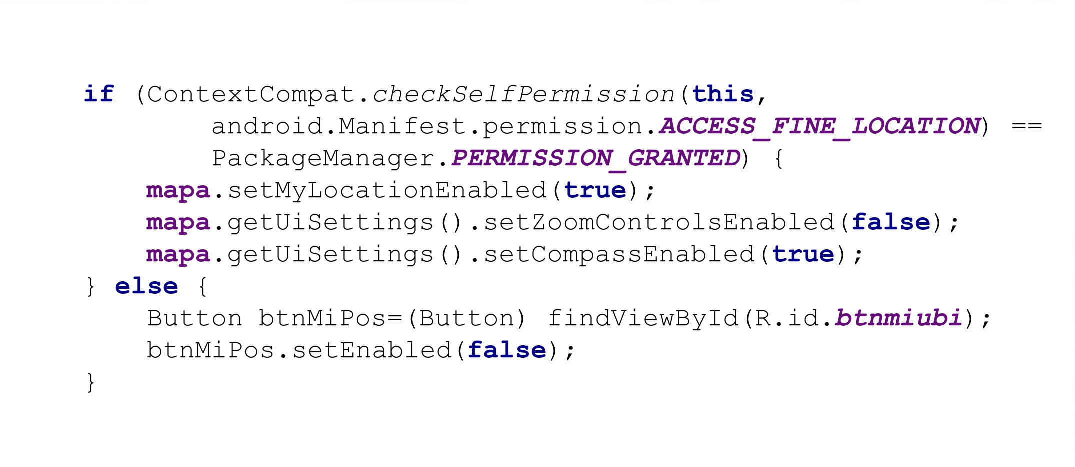
Añadir permisos y aviso de uso de hardware

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.a952000243.ingwilson.nosliwsys.sesion3">

      <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>
      <uses-feature android:name="android.hardware.location.gps" />

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher‟
……………….
……….
```

activity_main.xml → Añadimos el siguiente botón

```
<Button
    android:id="@+id/btnmiubi"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_weight="1"
    android:background="@color/colorPrimaryDark"
    android:textColor="#fff"
    android:layout_gravity="center"
    android:onClick="ubicacion"
    android:text="Mi ubicacion"/>
```

MainActivity.class -→ Añadimos al final del onMapReady



```
if (ContextCompat.checkSelfPermission(this,
        android.Manifest.permission.ACCESS_FINE_LOCATION) ==
        PackageManager.PERMISSION_GRANTED) {
    mapa.setMyLocationEnabled(true);
    mapa.getUiSettings().setZoomControlsEnabled(false);
    mapa.getUiSettings().setCompassEnabled(true);
} else {
    Button btnMiPos=(Button) findViewById(R.id.btnmiubi);
    btnMiPos.setEnabled(false);
}
```

MainActivity.class -→ Añadimos el método ubicacion

```java
public void ubicacion(View view) {
    if (mapa.getMyLocation() != null)
        mapa.animateCamera(CameraUpdateFactory.newLatLngZoom(
                new LatLng(mapa.getMyLocation().getLatitude(),
                        mapa.getMyLocation().getLongitude()), 15));
}
```

Añadiendo localización Seguimiento

activity_main.xml -→ Añadimos otro boton

```
<Button
    android:id="@+id/btnseguir"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_weight="1"
    android:background="@color/colorPrimaryDark"
    android:textColor="#fff"
    android:layout_gravity="center"
    android:onClick="Seguir"
    android:text="OFF seguir"/>
```

MainActivity.class -→ Añadimos un nuevo método para activar y desactivar el seguimiento

```java
int checkseguir=0;
public void Seguir(View view) {
    Button btnseguir=findViewById(R.id.btnseguir);
    if (checkseguir==0) {
        checkseguir = 1;
        btnseguir.setText("OFF seguir");
        Toast.makeText(this, "Se Activo el seguimiento", Toast.LENGTH_SHORT).show();
    }
    else{
        checkseguir = 0;
        btnseguir.setText("ON seguir");
        Toast.makeText(this, "Se desactivo el seguimiento", Toast.LENGTH_SHORT).show();
    }
}
```

MainActivity.class -→ Añadimos al final del onCreate

```
LocationManager locationManager = (LocationManager) this.getSystemService(Context.LOCATION_SERVICE);
if (locationManager.isProviderEnabled(LocationManager.GPS_PROVIDER))
{
    Toast.makeText(this, "GPS available", Toast.LENGTH_LONG).show();
}
else
{
    Toast.makeText(this, "GPS not available", Toast.LENGTH_LONG).show();
}
```

MainActivity.class -→ Añadimos al final del onCreate

```java
LocationListener locationListener = new LocationListener()
{
    public void onLocationChanged(Location location)
    {
        Toast.makeText(getApplicationContext(), "Se cambio de posicion", Toast.LENGTH_SHORT).show();
        Double latitude=location.getLatitude();
        Double longitude=location.getLatitude();
        Toast.makeText(getApplicationContext(), "latitud: "+ latitude.toString()+ " longitud: "+ longitude.toString(), Toast.LENGTH_SHORT).show();
        if(checkseguir==1)
            if (mapa.getMyLocation() != null)
                mapa.animateCamera(CameraUpdateFactory.newLatLngZoom(
                        new LatLng(mapa.getMyLocation().getLatitude(),
                                mapa.getMyLocation().getLongitude()), 15));
    }

    public void onStatusChanged(String provider, int status, Bundle extras)
    {
    }

    public void onProviderEnabled(String provider)
    {
    }

    public void onProviderDisabled(String provider)
    {
    }
};

locationManager.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0, 0, locationListener);
```

Fused Location Api

Creamos la actividad MiFusedLocation

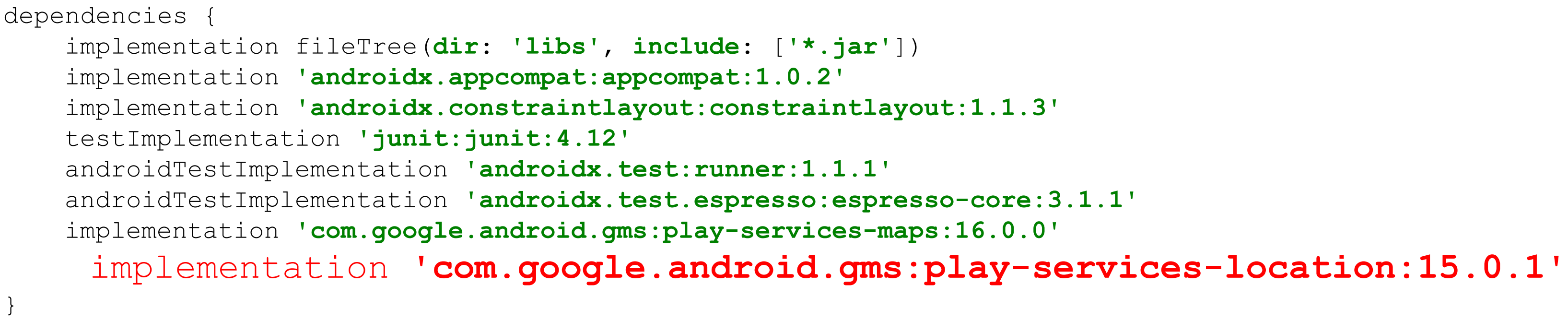
Modificamos al final del main_activity.xml

```
        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="horizontal"
            android:gravity="bottom">
            <Button
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:background="@color/colorPrimaryDark"
                android:textColor="#fff"
                android:layout_gravity="center"
                android:onClick="mifusedlocation"
                android:text="Fused location"/>
            <Button
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:background="@color/colorAccent"
                android:textColor="#fff"
                android:layout_gravity="center"
                android:onClick="migoogleapiclient"
                android:text="Google api client"/>
        </LinearLayout>
    </LinearLayout>
</LinearLayout>
```

Añadimos el método del llamado a MIFusedLocation

```
public void mifusedlocation(View view) {
    startActivity(new Intent(this, MiFusedLocation.class));
}
```

AÑADIMOS AL Gradle

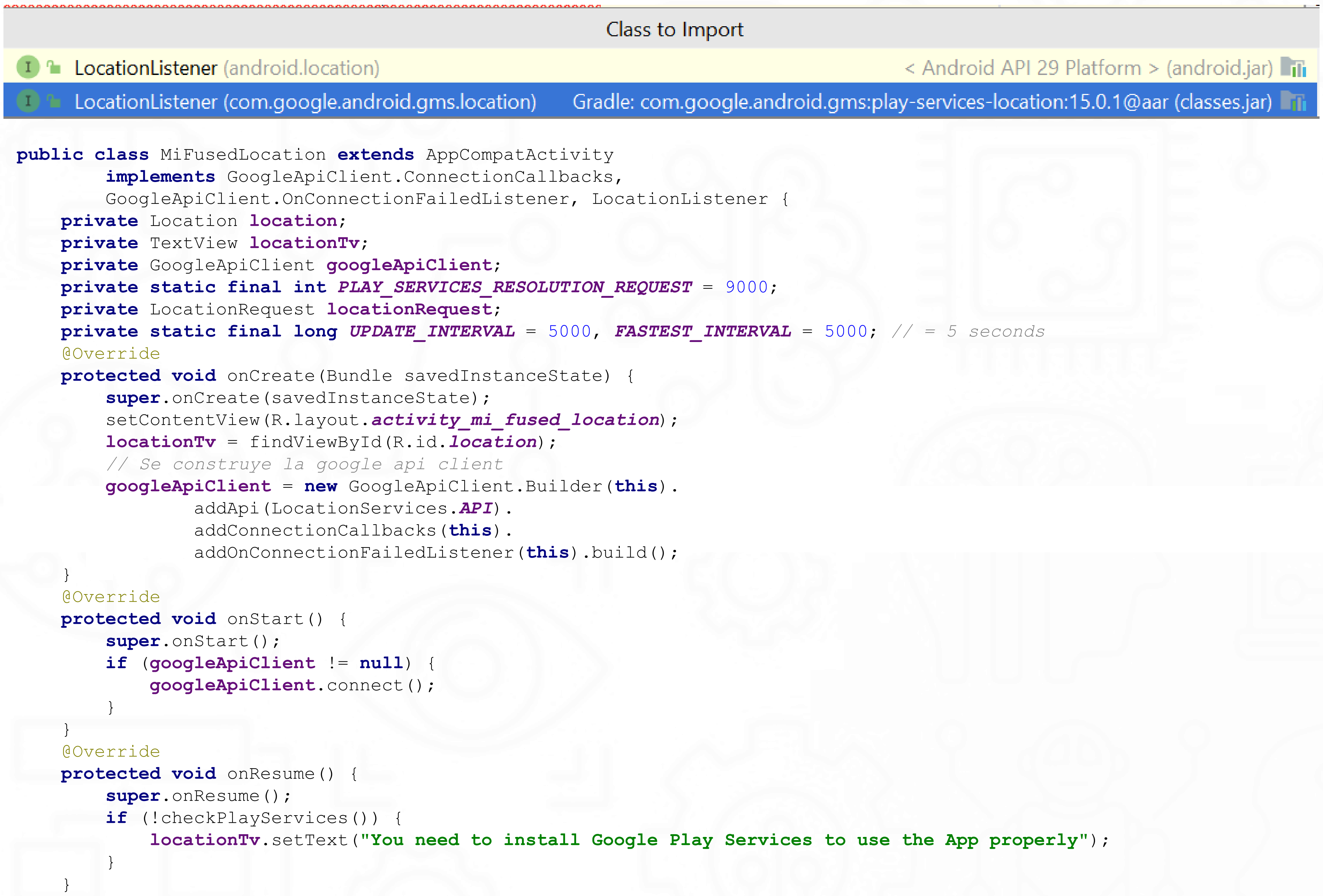


```
dependencies {
    implementation fileTree(dir: 'libs', include: ['*.jar'])
    implementation 'androidx.appcompat:appcompat:1.0.2'
    implementation 'androidx.constraintlayout:constraintlayout:1.1.3'
    testImplementation 'junit:junit:4.12'
    androidTestImplementation 'androidx.test:runner:1.1.1'
    androidTestImplementation 'androidx.test.espresso:espresso-core:3.1.1'
    implementation 'com.google.android.gms:play-services-maps:16.0.0'
     implementation 'com.google.android.gms:play-services-location:15.0.1'
}
```

activity_mi_fused_location.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/currentLocation"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="8dp"
        android:layout_marginLeft="8dp"
        android:layout_marginRight="8dp"
        android:layout_marginStart="8dp"
        android:layout_marginTop="80dp"
        android:text="Localizacion actual"
        android:textSize="25sp"
        android:textStyle="bold"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
    <TextView
        android:id="@+id/location"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="8dp"
        android:layout_marginLeft="8dp"
        android:layout_marginRight="8dp"
        android:layout_marginStart="8dp"
        android:layout_marginTop="50dp"
        android:textSize="23sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/currentLocation"
        android:gravity="center_horizontal"/>
</androidx.constraintlayout.widget.ConstraintLayout>
```

MiFusedLocation.class



Class to Import

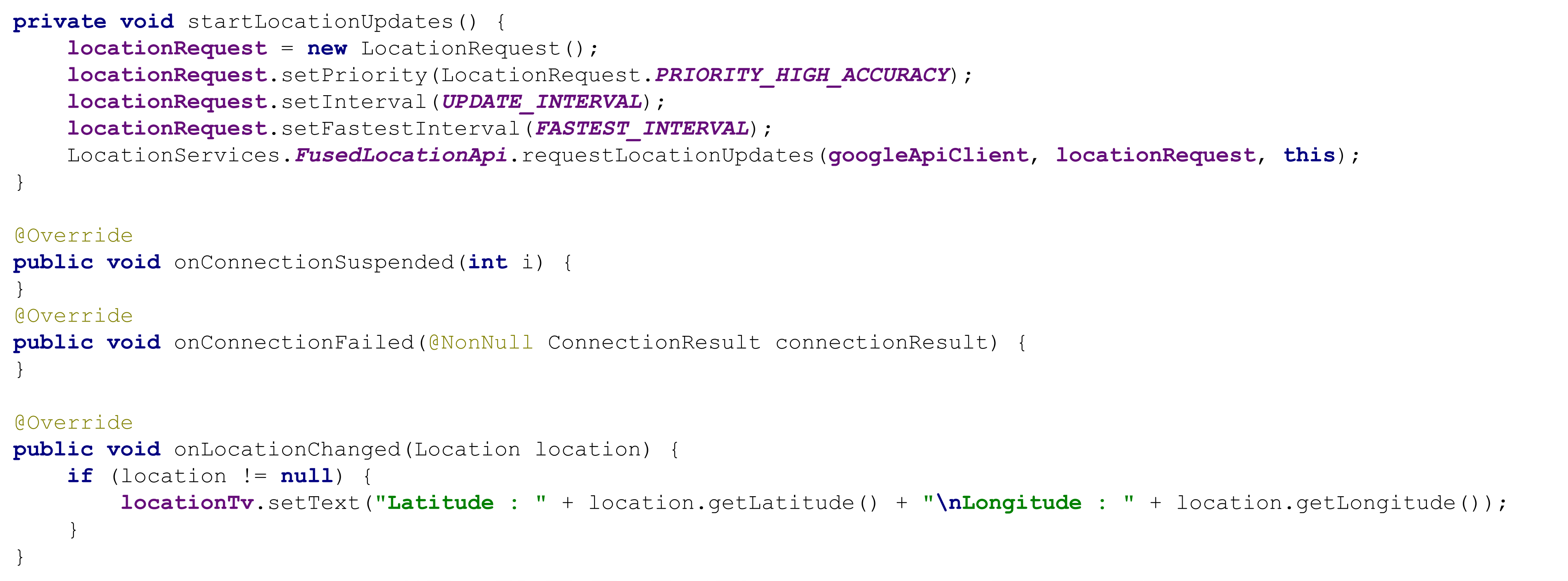
LocationListener (android.location)	< Android API 29 Platform > (android.jar)
LocationListener (com.google.android.gms.location)	Gradle: com.google.android.gms:play-services-location:15.0.1@aar (classes.jar)

```java
public class MiFusedLocation extends AppCompatActivity
        implements GoogleApiClient.ConnectionCallbacks,
        GoogleApiClient.OnConnectionFailedListener, LocationListener {
    private Location location;
    private TextView locationTv;
    private GoogleApiClient googleApiClient;
    private static final int PLAY_SERVICES_RESOLUTION_REQUEST = 9000;
    private LocationRequest locationRequest;
    private static final long UPDATE_INTERVAL = 5000, FASTEST_INTERVAL = 5000; // = 5 seconds
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_mi_fused_location);
        locationTv = findViewById(R.id.location);
        // Se construye la google api client
        googleApiClient = new GoogleApiClient.Builder(this).
                addApi(LocationServices.API).
                addConnectionCallbacks(this).
                addOnConnectionFailedListener(this).build();
    }
    @Override
    protected void onStart() {
        super.onStart();
        if (googleApiClient != null) {
            googleApiClient.connect();
        }
    }
    @Override
    protected void onResume() {
        super.onResume();
        if (!checkPlayServices()) {
            locationTv.setText("You need to install Google Play Services to use the App properly");
        }
    }
```

MiFusedLocation.class

```java
private boolean checkPlayServices() {
    GoogleApiAvailability apiAvailability = GoogleApiAvailability.getInstance();
    int resultCode = apiAvailability.isGooglePlayServicesAvailable(this);
    if (resultCode != ConnectionResult.SUCCESS) {
        if (apiAvailability.isUserResolvableError(resultCode)) {
            apiAvailability.getErrorDialog(this, resultCode, PLAY_SERVICES_RESOLUTION_REQUEST);
        } else {
            finish();
        }
        return false;
    }
    return true;
}
@Override
protected void onPause() {
    super.onPause();
    if (googleApiClient != null && googleApiClient.isConnected()) {
        LocationServices.FusedLocationApi.removeLocationUpdates(googleApiClient, this);
        googleApiClient.disconnect();
    }
}
@Override
public void onConnected(@Nullable Bundle bundle) {
    location = LocationServices.FusedLocationApi.getLastLocation(googleApiClient);
    if (location != null) {
        locationTv.setText("Latitude : " + location.getLatitude() + "\nLongitude : " + location.getLongitude());
    }
    startLocationUpdates();
}
```

MiFusedLocation.class

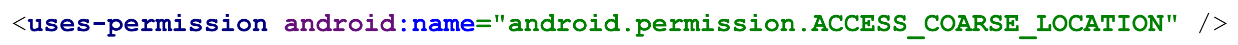


```java
private void startLocationUpdates() {
    locationRequest = new LocationRequest();
    locationRequest.setPriority(LocationRequest.PRIORITY_HIGH_ACCURACY);
    locationRequest.setInterval(UPDATE_INTERVAL);
    locationRequest.setFastestInterval(FASTEST_INTERVAL);
    LocationServices.FusedLocationApi.requestLocationUpdates(googleApiClient, locationRequest, this);
}

@Override
public void onConnectionSuspended(int i) {
}
@Override
public void onConnectionFailed(@NonNull ConnectionResult connectionResult) {
}

@Override
public void onLocationChanged(Location location) {
    if (location != null) {
        locationTv.setText("Latitude : " + location.getLatitude() + "\nLongitude : " + location.getLongitude());
    }
}
```

Fused Location Client

Creamos la actividad MiFusedLocationClient

Añadimos al Manifest

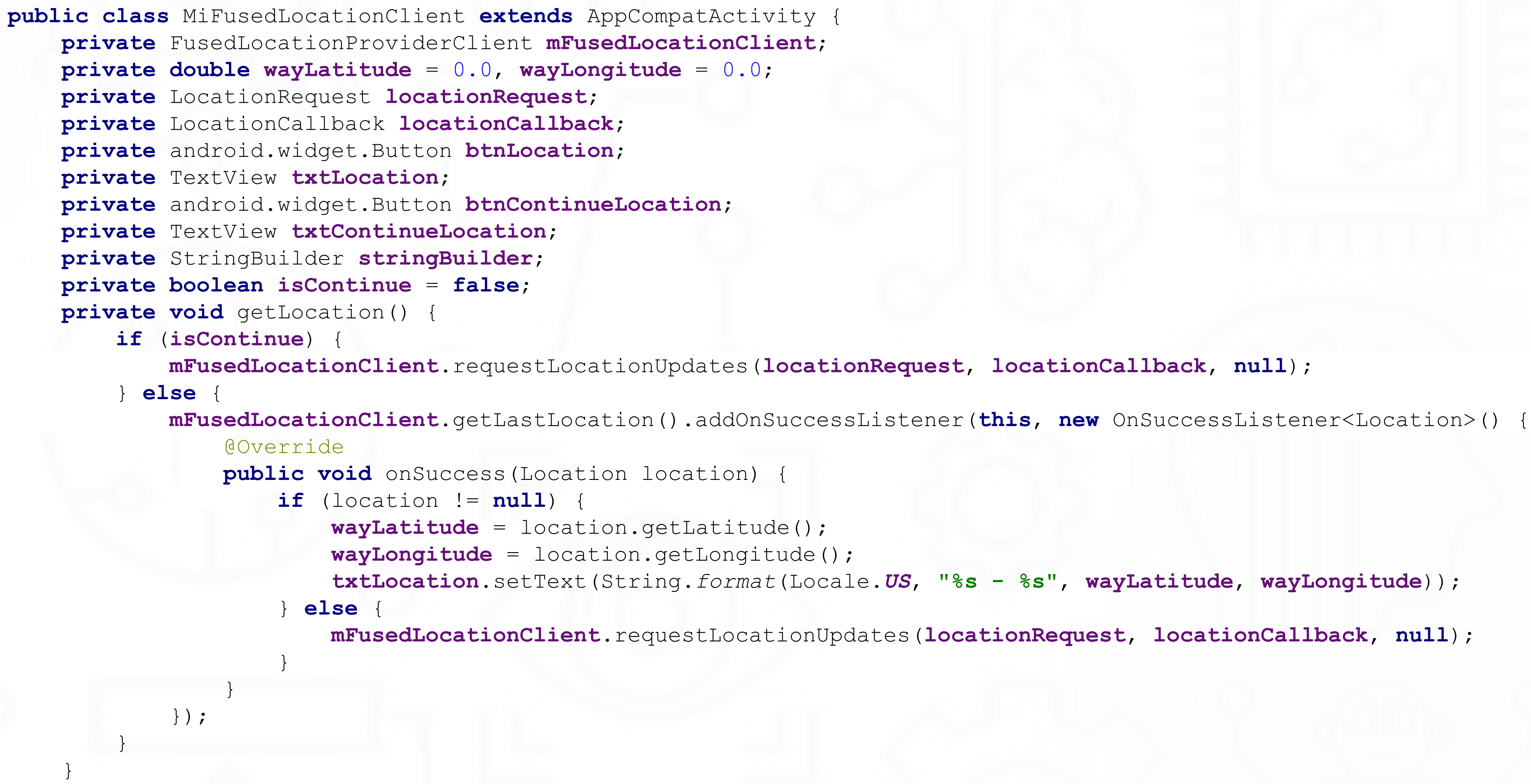


```
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />
```

activity_mi_fused_location_client.xml

```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="horizontal"
    android:padding="8dp"
    tools:context=".MainActivity">
    <LinearLayout
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_margin="8dp"
        android:layout_weight="1"
        android:orientation="vertical">
        <Button
            android:id="@+id/btnLocation"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:background="@color/colorPrimary"
            android:paddingEnd="16dp"
            android:paddingStart="16dp"
            android:text="One time location"
            android:textAllCaps="false"
            android:textColor="#ffffff" />
        <TextView
            android:id="@+id/txtLocation"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:gravity="center"
            android:textColor="#000" />
    </LinearLayout>
    <LinearLayout
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_margin="8dp"
        android:layout_weight="1"
        android:orientation="vertical">
        <Button
            android:id="@+id/btnContinueLocation"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:background="@color/colorPrimary"
            android:paddingEnd="16dp"
            android:paddingStart="16dp"
            android:text="Continuous Location"
            android:textAllCaps="false"
            android:textColor="#ffffff" />
        <TextView
            android:id="@+id/txtContinueLocation"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:gravity="center"
            android:textColor="#000" />
    </LinearLayout>
</LinearLayout>
```

MiFusedLocationClient.class



```java
public class MiFusedLocationClient extends AppCompatActivity {
    private FusedLocationProviderClient mFusedLocationClient;
    private double wayLatitude = 0.0, wayLongitude = 0.0;
    private LocationRequest locationRequest;
    private LocationCallback locationCallback;
    private android.widget.Button btnLocation;
    private TextView txtLocation;
    private android.widget.Button btnContinueLocation;
    private TextView txtContinueLocation;
    private StringBuilder stringBuilder;
    private boolean isContinue = false;
    private void getLocation() {
        if (isContinue) {
            mFusedLocationClient.requestLocationUpdates(locationRequest, locationCallback, null);
        } else {
            mFusedLocationClient.getLastLocation().addOnSuccessListener(this, new OnSuccessListener<Location>() {
                @Override
                public void onSuccess(Location location) {
                    if (location != null) {
                        wayLatitude = location.getLatitude();
                        wayLongitude = location.getLongitude();
                        txtLocation.setText(String.format(Locale.US, "%s - %s", wayLatitude, wayLongitude));
                    } else {
                        mFusedLocationClient.requestLocationUpdates(locationRequest, locationCallback, null);
                    }
                }
            });
        }
    }
```

MiFusedLocationClient.class

```java
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_mi_fused_location_client);
    this.txtContinueLocation = (TextView) findViewById(R.id.txtContinueLocation);
    this.btnContinueLocation = (Button) findViewById(R.id.btnContinueLocation);
    this.txtLocation = (TextView) findViewById(R.id.txtLocation);
    this.btnLocation = (Button) findViewById(R.id.btnLocation);
    mFusedLocationClient = LocationServices.getFusedLocationProviderClient(this);
    locationRequest = LocationRequest.create();
    locationRequest.setPriority(LocationRequest.PRIORITY_HIGH_ACCURACY);
    locationRequest.setInterval(10 * 1000); // 10 seconds
    locationRequest.setFastestInterval(5 * 1000); // 5 seconds
    locationCallback = new LocationCallback() {
        @Override
        public void onLocationResult(LocationResult locationResult) {
            if (locationResult == null) {
                return;
            }
            for (Location location : locationResult.getLocations()) {
                if (location != null) {
                    wayLatitude = location.getLatitude();
                    wayLongitude = location.getLongitude();
                    if (!isContinue) {
                        txtLocation.setText(String.format(Locale.US, "%s - %s", wayLatitude, wayLongitude));
                    } else {
                        stringBuilder.append(wayLatitude);
                        stringBuilder.append("-");
                        stringBuilder.append(wayLongitude);
                        stringBuilder.append("\n\n");
                        txtContinueLocation.setText(stringBuilder.toString());
                    }
                    if (!isContinue && mFusedLocationClient != null) {
                        mFusedLocationClient.removeLocationUpdates(locationCallback);
                    }
                }
            }
        }
    };
```

MiFusedLocationClient.class

```java
btnLocation.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        isContinue = false;
        MiFusedLocationClient.this.getLocation();
    }
});
btnContinueLocation.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        isContinue = true;
        stringBuilder = new StringBuilder();
        MiFusedLocationClient.this.getLocation();
    }
});
```

Universidad Nacional
Jorge Basadre Grohmann

Gracias por su atención.

MSc. Ing. Wilson César Callisaya Choquecota
nosliwsys@gmail.com
952000243 – Tacna Perú