


Android Locations
Android Smartphone Programming

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Outline

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- 1 Internet
- 2 Location
- 3 Summary



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Internet

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- Internet connection useful for many applications.
- Examples: Loading ads or interact with *Google APIs* on a server.
- Application needs permission for internet usage[1].
- Extend application manifest:

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



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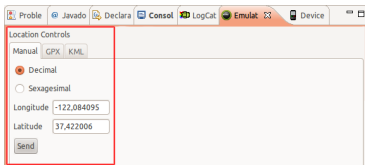
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- GPS can be used to obtain user location.
- Problem: Works only outdoors and drains battery.
- Better: Android's *Network Location Provider*^[4].
- Works indoors and outdoors, is faster and uses less battery power.
- Combination of both techniques also possible.
- Similar usage: Request location updates from *LocationManager* and what type of location provider to use.
 - *LocationManager.NETWORK_PROVIDER* for Network Location Provider.
 - *LocationManager.GPS_PROVIDER* for GPS Location Provider.



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- Emulator in Android Studio can be fed mock GPS data.^[5]
- Start emulator, then open emulator control.
- Can be found at *Tools > Android > Android Device Monitor > Emulator Control*.



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- *Geocoder* used to transform address into a coordinate (latitude and longitude)^[2].
- *Reverse geocoding* is transforming a coordinate into an address.
- Needs internet permission to access backend service.
- Part of the external *Google Maps library*.
- Can be given a locale to provide better results, for example *Locale.GERMANY* or *Locale.US*.
- Extend application manifest:

```
1 <uses-library android:name="com.google.android.maps" />
```



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Location

Geocoder Code Snippets
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■ Geocoding

```
1 List<Address> Geocoder.getFromLocationName(  
    String locationName, int maxResults)
```

■ Example string to describe location

```
1 "Georges-Koehler-Allee_101_79110_Freiburg"
```

■ Reverse geocoding

```
1 List<Address> Geocoder.getFromLocation(double  
    latitude, double longitude, int  
    maxResults)
```



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Maps
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■ Class *MapView* included in external Google Maps library^[3].

■ Easy way to display a map obtained from the Google Maps service.

■ Enables similar user interaction as known from <http://maps.google.com>.

■ *Maps API Key* needed to display data in a *MapView* object.

■ Registration at Google Maps service mandatory to obtain the key.



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Maps Examples
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■ Example code can be found at `<sdk>/add-ons/google_apis-<api-level>/samples/MapsDemo`.

■ Displaying a map using XML layout:

```
1 <LinearLayout xmlns:android="http://schemas.  
    android.com/apk/res/android" ...>  
2 <com.google.android.maps.MapView  
3 android:id="@+id/map_view"  
4 android:layout_width="..."  
5 android:layout_height="..."  
6 android:enabled="true"  
7 android:clickable="true"  
8 android:apiKey="myapikey" />  
9 </LinearLayout>
```



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Example obtaining coordinates from MapView
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- Obtaining coordinates from MapView: Override method `dispatchTouchEvent`

```
1 @Override
2 public boolean dispatchTouchEvent(MotionEvent
3     ev){
4     if (ev.getAction() == MotionEvent.ACTION_UP
5     ){
6         Projection p = mapView.getProjection();
7         GeoPoint loc = p.fromPixels((int)ev.getX
8         (), (int)ev.getY());
9         Double longitude = ((double)loc.
10            getLongitudeE6())/1000000;
11         Double latitude = ((double)loc.
12            getLatitudeE6())/1000000;
13     }
14     return super.dispatchTouchEvent(ev);
15 }
```



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18. Dezember 2017

10 / 13

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- Class `Location` has a method `distanceTo(Location destination)` to approximate a distance in meters.



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18. Dezember 2017

11 / 13

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Summary

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- Internet connection opens new possibilities for applications.
- User location can be obtained using a `Network Location Provider` and/or GPS.
- Mock GPS data can be created to test location functionality in emulator.
- A `Geocoder` translates between addresses and coordinates using an internet connection.
- External `Google Maps library` provides easy to use map functionality.








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Android Locations

18. Dezember 2017

12 / 13

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-  ANDROID DEVELOPERS.
Connecting to the Network.
<http://developer.android.com/training/basics/network-ops/connecting.html>.
-  ANDROID DEVELOPERS.
Geocoder Class Overview.
<http://developer.android.com/reference/android/location/Geocoder.html>.
-  ANDROID DEVELOPERS.
Location and Maps.
<http://developer.android.com/guide/topics/location/index.html>.
-  ANDROID DEVELOPERS.
Obtaining User Location.
<http://developer.android.com/guide/topics/location/obtaining-user-location.html>.
-  ANDROID DEVELOPERS.
Providing Mock Location Data.
<http://developer.android.com/guide/topics/location/obtaining-user-location.html#MockData>.



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