


Android Locations  
Introduction to Android Smartphone Programming

University of Freiburg

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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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- GPS can be used to obtain user location.
- Problem: Works only outdoors and drains battery.
- Better: Android's *Network Location Provider*<sup>[4]</sup>.
- 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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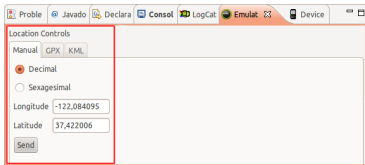
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- Emulator in Eclipse can be fed mock GPS data.<sup>[5]</sup>
- Start emulator, then open emulator control.
- Can be found at *Window > Show View > Other > Emulator Control*.



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- *Geocoder* used to transform address into a coordinate (latitude and longitude)<sup>[2]</sup>.
- *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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## Location

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### ■ Class *MapView* included in external Google Maps library<sup>[3]</sup>.

### ■ 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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## Location

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="mymapapikey" />  
9 </LinearLayout>
```



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## Location

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

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



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## Location

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



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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 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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