

Android Locations

Introduction to Android Smartphone Programming

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Outline

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- 1 Internet
- 2 Location
- 3 Summary





- 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" />
```

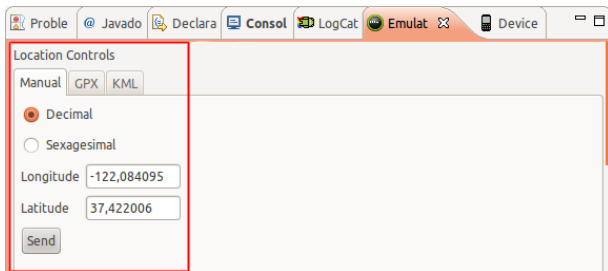




- GPS can be used to obtain user location.
- Problem: Works only outdoors and drains battery.
- Better: Android's *Network Location Provider*^[4].
- Works indoors and outdoors, is faster and uses less battery power.
- Combination of both techniques also possible.
- Similar usage: Request location updates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



- Emulator in Eclipse can be fed mock GPS data.[5].
- Start emulator, then open emulator control.
- Can be found at *Window > Show View > Other > Emulator Control*.



- *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" />
```





■ 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)
```





- 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.



- 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>
```



- 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 }
```





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





- 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.






 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>.

