Android Locations
Android Smartphone Programming

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Outline
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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:

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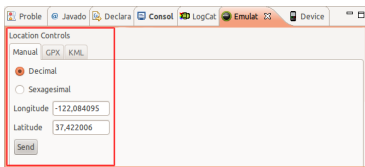```

## Location
### Obtaining user location
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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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## Location
### Using GPS in Emulator
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- 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*.

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## Location
### Geocoder
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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 permisson 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" />
```

Location
Geocoder Code Snippets

- 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)
```

Location
Maps

- 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

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

```java
@Override
public boolean dispatchTouchEvent(MotionEvent
    ev){
  if (ev.getAction() == MotionEvent.ACTION_UP
    ){
    Projection p = mapView.getProjection();
    GeoPoint loc = p.fromPixels((int)ev.getX
      (), (int)ev.getY());
    Double longitude = ((double)loc.
      getLongitudeE6())/1000000;
    Double latitude = ((double)loc.
      getLatitudeE6())/1000000;
  }
  return super.dispatchTouchEvent(ev);
}
```

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

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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Bibliography

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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