

# **Mensch-Maschine-Interaktion 2**

## **Übung 12**

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# Preview

Android Development Tips

Location-Based Services and Maps

Media Framework

# Android Development Tips

# Logging

## android.util.Log

API for sending log output.

Log.d(...)	DEBUG
Log.i(...)	INFO
Log.e(...)	ERROR
Log.w(...)	WARN
Log.v(...)	VERBOSE
Log.wtf(...)	„What a Terrible Failure: Report a condition that should never happen.“ :D

Tip: A good convention is to declare a TAG constant in your class

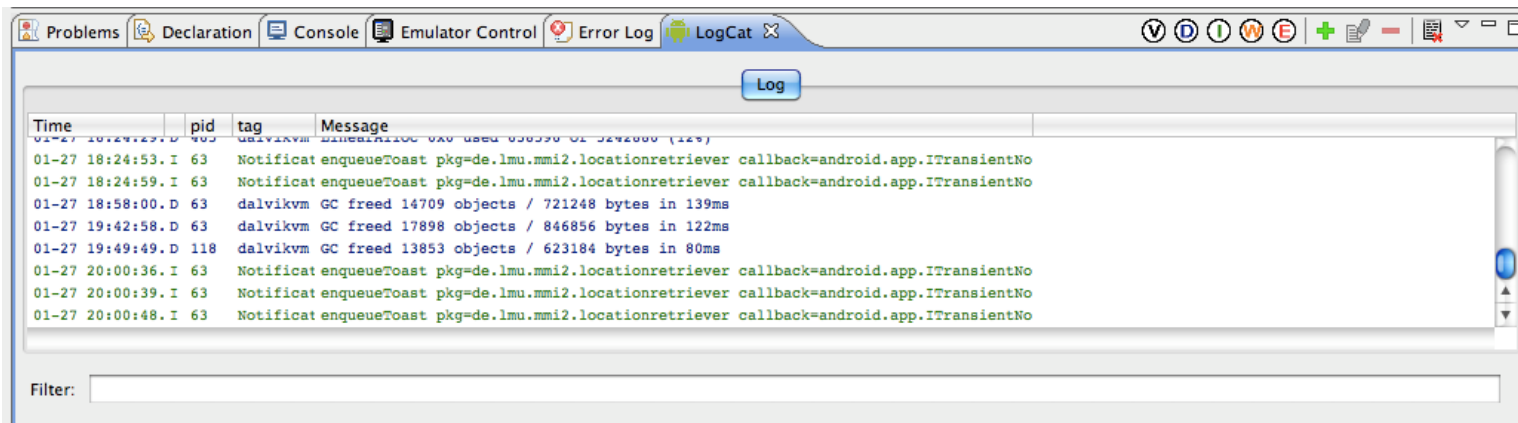
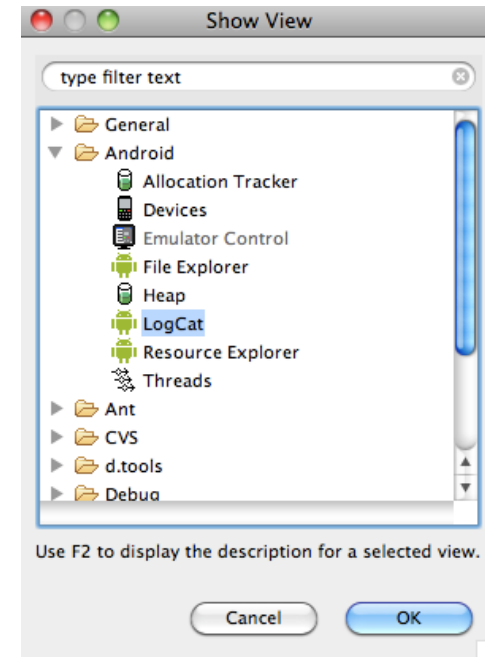
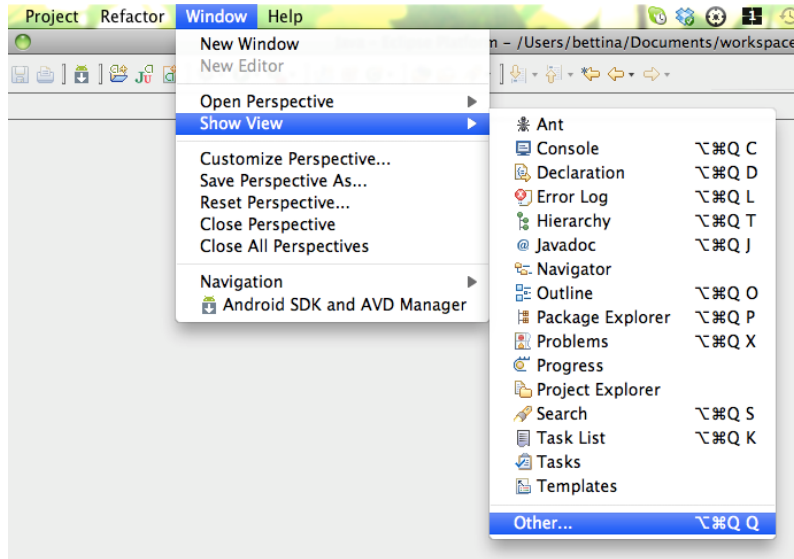
```
private static final String TAG = "MyActivity";
```

```
...
```

```
Log.d(TAG, someVariable.toString());
```

# Logging View in Eclipse

Activate View:



# Developing on a Device

Declare application as “debuggable”

```
<application ... android:debuggable="true">
```

Turn on “USB Debugging” on your device

Home screen, MENU, Settings, Applications, Development

Connect via USB, check whether detected

```
C:\>adb devices
```

```
List of devices attached
```

```
emulator-5554    device
```

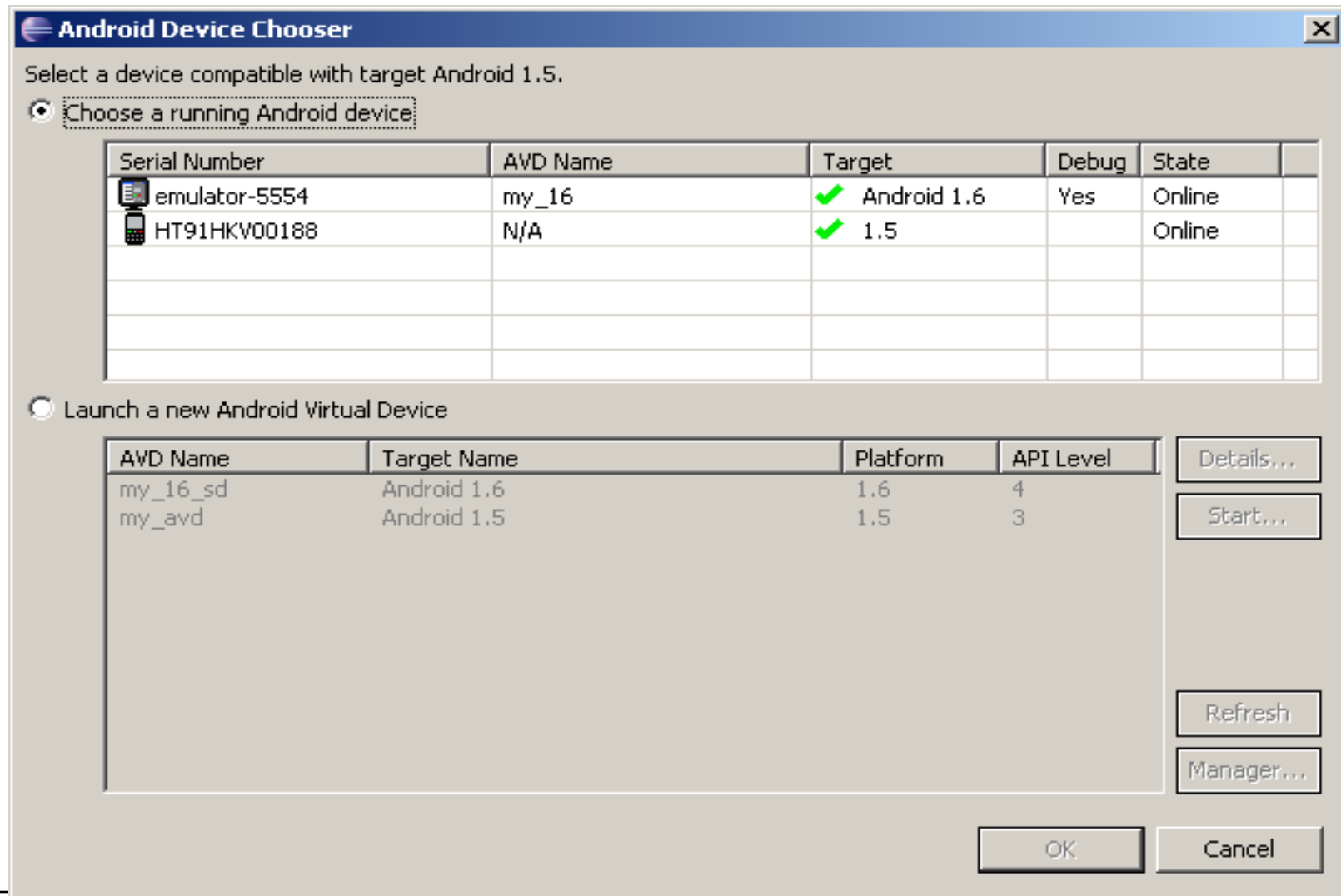
```
HT91HKV00188    device
```

If not listed, setup system to detect device

<http://developer.android.com/guide/developing/device.html>

Start in Eclipse, device chooser appears

# Developing on a Device: Device Chooser



# Location-Based Services



# Location-Based Services

Mapping APIs: Display and navigate maps

`com.google.android.maps`

`MapView`

`MapActivity`

Location APIs: Access location data (GPS, WiFi, GSM)

`android.location`

`LocationManager`

`Geocoder`

# Permissions (in AndroidManifest.xml)

Permissions for location-based services

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

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

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

Child of <application>

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

Example

<http://developer.android.com/intl/fr/guide/tutorials/views/hello-mapview.html>

# Map API

Locate keystore

Open command line

Get MD5 hash of debug certificate

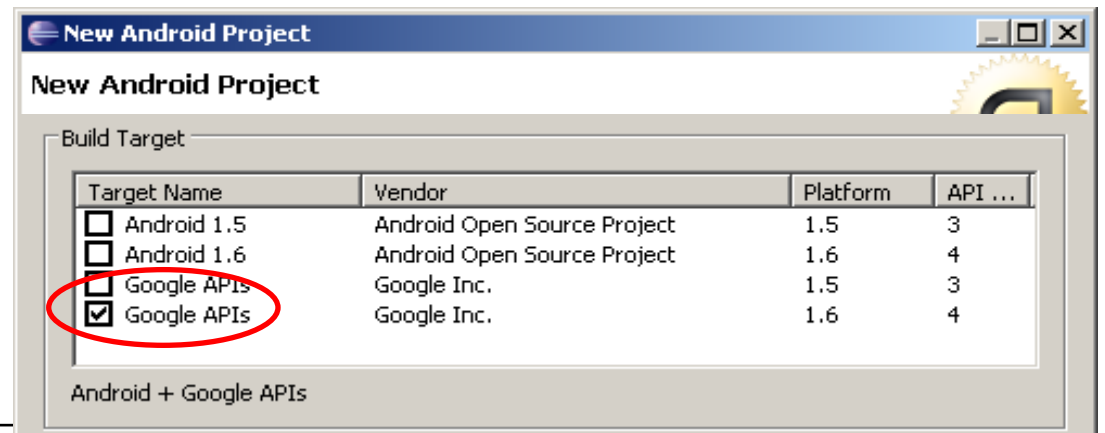
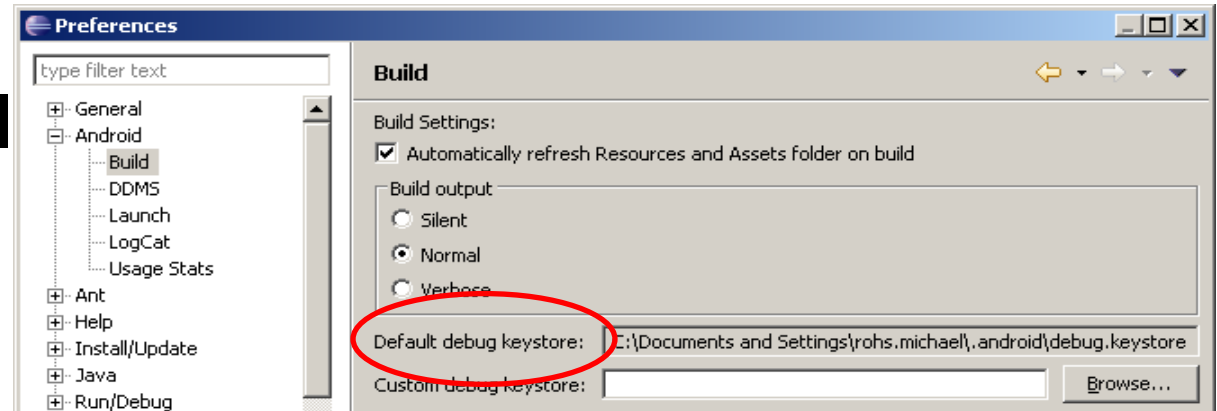
```
keytool -list -alias androiddebugkey  
-keystore "C:\Documents and Settings\<<user>\.android\debug.keystore"  
-storepass android -keypass android
```

Get the key from Google

<http://code.google.com/android/maps-api-signup.html>

Projects using maps  
need build target  
"GoogleAPIs"

Potentially needs  
a new AVD



# Example Map View

## XML

```
<LinearLayout xmlns:android="http://schemas..."  
    android:orientation="vertical" android:layout_... >  
    <com.google.android.maps.MapView android:layout_...  
        android:apiKey="02LvHoUW1Z_HVYZWU..." />  
</LinearLayout>
```

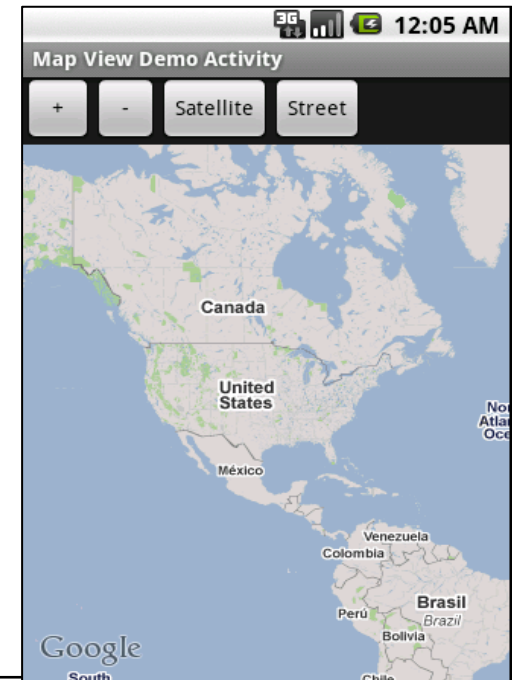
## Java

```
public class MapViewDemoActivity extends MapActivity {  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.mapview);  
    }  
    protected boolean isRouteDisplayed() { return false; }  
}
```



# Example Map View with Controls

```
<LinearLayout xmlns:android="http://schemas..."  
    android:orientation="vertical" ...>  
    <LinearLayout android:orientation="horizontal" android:layout_...>  
        <Button android:id="@+id/zoomin" android:text=" + " ... />  
        <Button android:id="@+id/zoomout" android:text=" - " ... />  
        ...  
    </LinearLayout>  
    <com.google.android.maps.MapView  
        android:id="@+id/mapview"  
        android:apiKey="02Lv..." ... />  
</LinearLayout>
```



# Example Map View with Controls

```
public class MapViewDemoActivity extends MapActivity {
    private MapView mapView;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.mapview);
        mapView = (MapView) findViewById(R.id.mapview);
        Button zoominBtn = (Button) findViewById(R.id.zoomin);
        zoominBtn.setOnClickListener(new OnClickListener() {
            public void onClick(View view) {
                mapView.getController().zoomIn();
            }
        });
        ...
    }
    protected boolean isRouteDisplayed() { return false; }
}
```

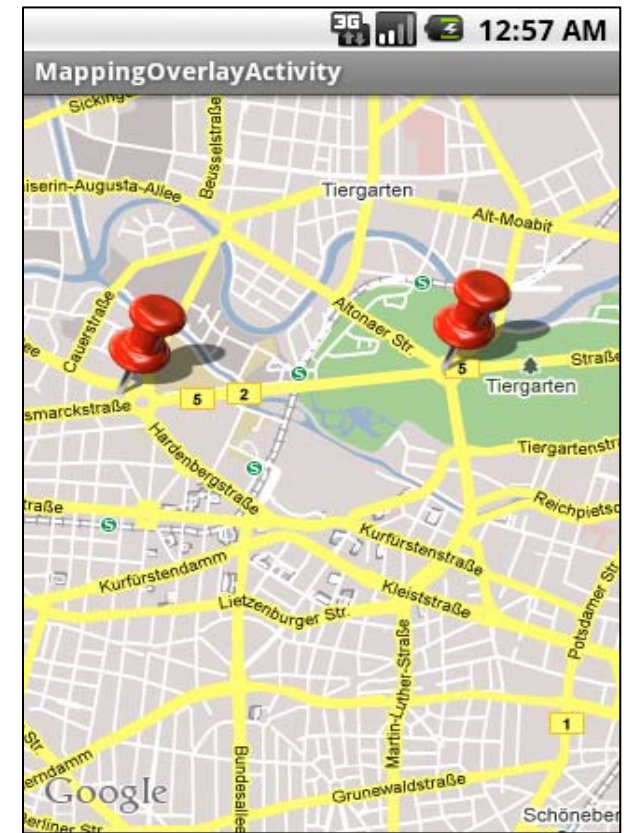
# Using Overlays

/res/layout/mapviewoverlay.xml

```
<LinearLayout xmlns:android="http://schemas..."  
    android:orientation="vertical" ...>
```

```
<com.google.android.maps.MapView  
    android:id="@+id/mapviewoverlay"  
    android:apiKey="02Lv..." ... />
```

```
</LinearLayout>
```



# Using Overlays

```
public class MappingOverlayActivity extends MapActivity {  
    private MapView mapView;  
    private GeoPoint tlabs = new GeoPoint((int)(  
        52.513036 * 1000000), (int)(13.320281 * 1000000));  
    private GeoPoint saeule = new GeoPoint((int)(  
        52.514495 * 1000000), (int)(13.350130 * 1000000));  
  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.mapviewoverlay);  
        mapView = (MapView) findViewById(R.id.mapviewoverlay);  
        mapView.setBuiltInZoomControls(true);  
        mapView.setClickable(true);  
        mapView.getController().setCenter(tlabs);  
        mapView.getController().setZoom(14);  
        Drawable marker = getResources().getDrawable(R.drawable.pushpin);  
        mapView.getOverlays().add(new InterestingLocations(marker));  
    }  
}
```



# Using Overlays

```
class InterestingLocations extends ItemizedOverlay<OverlayItem> {  
    private List<OverlayItem> locations = new ArrayList<OverlayItem>();  
    private Drawable marker;  
    public InterestingLocations(Drawable marker) {  
        super(marker);  
        this.marker = marker;  
        locations.add(new OverlayItem(tlabs, "T-Labs", "T-Labs"));  
        locations.add(new OverlayItem(saeule, "Siegessäule", "Siegessäule"));  
        populate();  
    }  
    public void draw(Canvas canvas, MapView mapView, boolean shadow) {  
        super.draw(canvas, mapView, shadow);  
        boundCenterBottom(marker);  
    }  
    protected OverlayItem createItem(int i) {  
        return locations.get(i);  
    }  
    public int size() {  
        return locations.size();  
    }  
}
```



Marker hotspot: bottom center

# Location-Based Services

Geocoding: address → latitude / longitude

Reverse geocoding: latitude / longitude → address(es)

Package android.location

List<Address> getFromLocation(double lat, double lon, int max)

List<Address> getFromLocationName(String locationName, int max)

# Geocoding with Threads

/res/layout/geocode.xml

```
<RelativeLayout xmlns:android="http://schemas..." ...>
```

```
<LinearLayout android:layout_alignParentBottom="true"  
    android:orientation="vertical" ... >
```

```
<EditText android:id="@+id/location" ... />
```

```
<Button android:id="@+id/geocodeBtn"  
    android:text="Find Location" ... />
```

```
</LinearLayout>
```

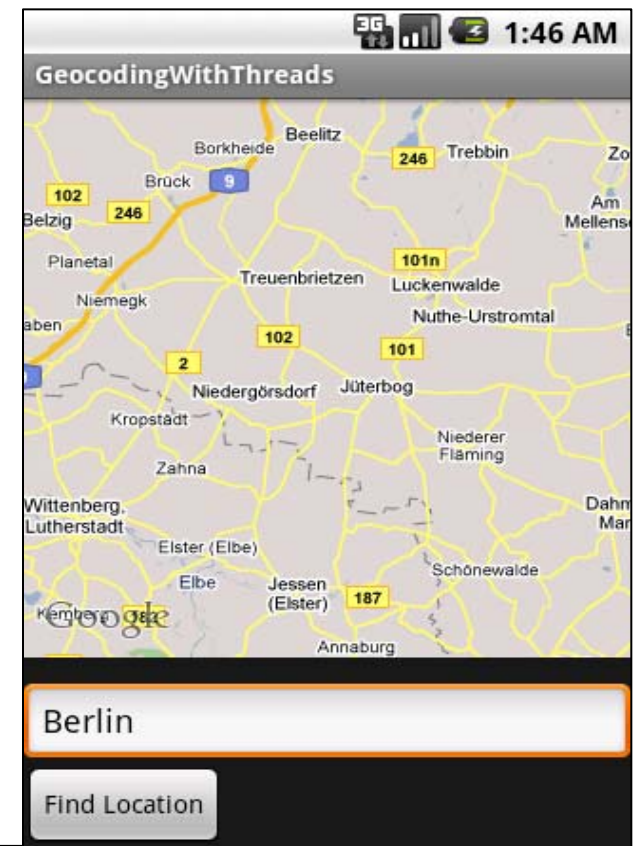
```
<com.google.android.maps.MapView
```

```
    android:id="@+id/geoMap"
```

```
    android:clickable="true"
```

```
    android:apiKey="02Lv..." ... />
```

```
</RelativeLayout>
```



# Geocoding with Threads

```
public class GeocodingWithThreads extends MapActivity {  
    Geocoder geocoder = null;  
    MapView mapView = null;  
    ProgressDialog progDialog = null;  
    List<Address> addressList = null;  
  
    protected void onCreate(Bundle b) {  
        super.onCreate(b);  
        setContentView(R.layout.geocode);  
        mapView = (MapView) findViewById(R.id.geoMap);  
        int lat = (int) (52.513036 * 1000000);  
        int lng = (int) (13.320281 * 1000000);  
        GeoPoint pt = new GeoPoint(lat, lng);  
        mapView.getController().setZoom(10);  
        mapView.getController().setCenter(pt);  
    }  
}
```

# Geocoding with Threads

```
geocoder = new Geocoder(this);
Button geoBtn = (Button) findViewById(R.id.geocodeBtn);
geoBtn.setOnClickListener(new OnClickListener() {
    public void onClick(View view) {
        EditText loc = (EditText) findViewById(R.id.location);
        String locationName = loc.getText().toString();
        progressDialog = ProgressDialog.show(
            GeocodingWithThreads.this, "Processing...",
            "Finding Location...", true, false);
        findLocation(locationName);
    }
});
}
```

# Geocoding with Threads

```
private void findLocation(final String locationName) {  
    Thread thread = new Thread() {  
        public void run() {  
            try {  
                // do background work  
                addressList = geocoder.getLocation(locationName, 5);  
                // send message to handler to process results  
                uiCallback.sendMessage(0);  
            } catch (IOException e) {  
                e.printStackTrace();  
            }  
        }  
    };  
    thread.start();  
}
```

# Geocoding with Threads

```
private Handler uiCallback = new Handler() {
    public void handleMessage(Message msg) {
        progDialog.dismiss();
        if (addressList != null && addressList.size() > 0) {
            int lat = (int) addressList.get(0).getLatitude() * 1000000;
            int lng = (int) addressList.get(0).getLongitude() * 1000000;
            GeoPoint pt = new GeoPoint(lat, lng);
            mapView.getController().setCenter(pt);
        } else {
            Dialog foundNothingDlg = new AlertDialog.Builder(
                GeocodingWithThreads.this)
                .setIcon(0).setTitle("Failed to Find Location")
                .setPositiveButton("OK", null)
                .setMessage("Location Not Found...")
                .create();
            foundNothingDlg.show();
        }
    }
};
```

# Location Manager Service

Obtain device's geographical location

Get notification upon entering a specified location



# Example: Last Location

```
public class LocationManagerDemoActivity extends Activity {
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        LocationManager locMgr = (LocationManager)
            getSystemService(Context.LOCATION_SERVICE);
        Location loc = locMgr
            .getLastKnownLocation(LocationManager.GPS_PROVIDER);
        Toast.makeText(this, loc.toString(), 10000).show();
        Log.d("last location", loc.toString());
        List<String> providerList = locMgr.getAllProviders();
        Iterator<String> iter = providerList.iterator();
        while (iter.hasNext()) {
            Log.d("provider", iter.next().toString());
        }
    }
}
```

# Example: Location Updates

```
public class LocationUpdateDemoActivity extends Activity {
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        LocationManager locMgr = (LocationManager)
            getSystemService(Context.LOCATION_SERVICE);
        LocationListener locListener = new LocationListener() {
            public void onLocationChanged(Location location) {
                if (location != null) {
                    Toast.makeText(getBaseContext(),
                        "New location (" + location.getLatitude() + ", " +
                        location.getLongitude() + ")", Toast.LENGTH_LONG).show();
                }
            }
        };
        public void onProviderDisabled(String provider) {}
        public void onProviderEnabled(String provider) {}
        public void onStatusChanged(String provider, int status, Bundle extras) {}
    };
    locMgr.requestLocationUpdates(LocationManager.GPS_PROVIDER,
        0, 0, locListener);
}
```

}}

# Simulated Location for the Emulator

Dalvik Debug Monitor Service

Play back GPS traces

GPX: GPS Exchange Format

KML: Keyhole Markup Language

Telnet to a running emulator

```
telnet localhost <emulator port>
```

```
geo fix <lon> <lat>
```

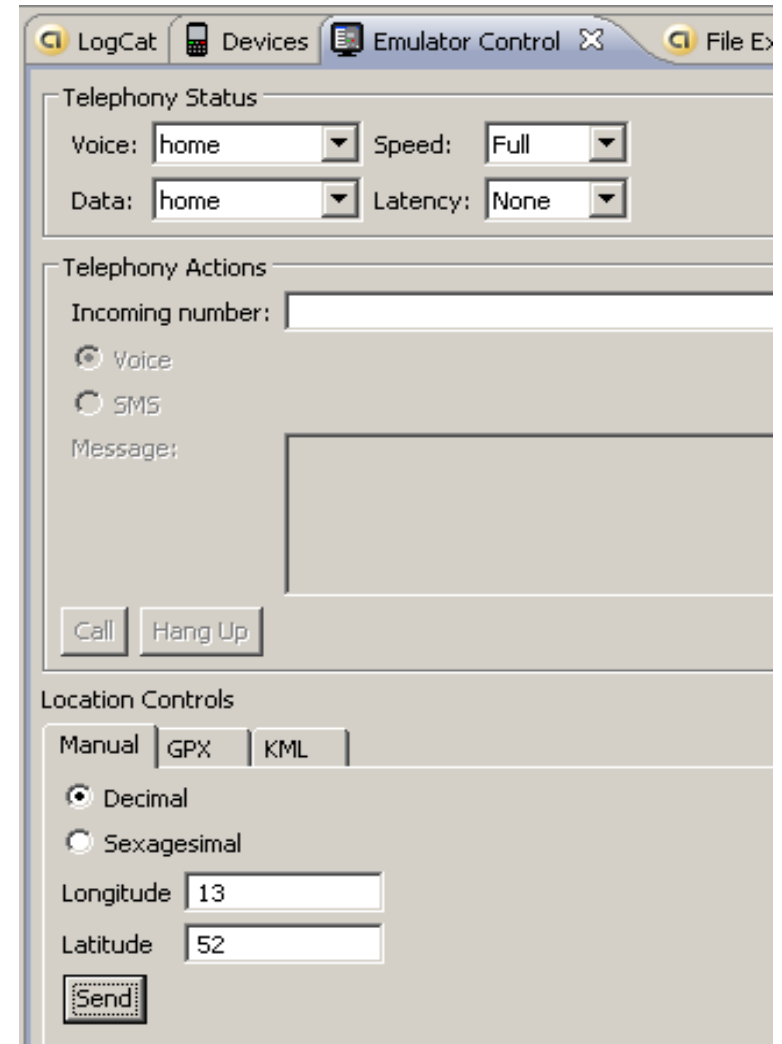
```
geo nmea <nmea sentence>
```

Example

```
telnet localhost 5554
```

```
geo fix 13 52
```

<http://developer.android.com/intl/fr/guide/developing/tools/emulator.html>



# Media Framework

# Media APIs

## Package android.media

MediaPlayer: Playing audio and video content

MediaRecorder: Record audio and video content

## Content sources

Internet

.apk file (as a resource or as an “asset”)

Secure digital (SD) card

# Audio Player Example

/res/layout/main.xml

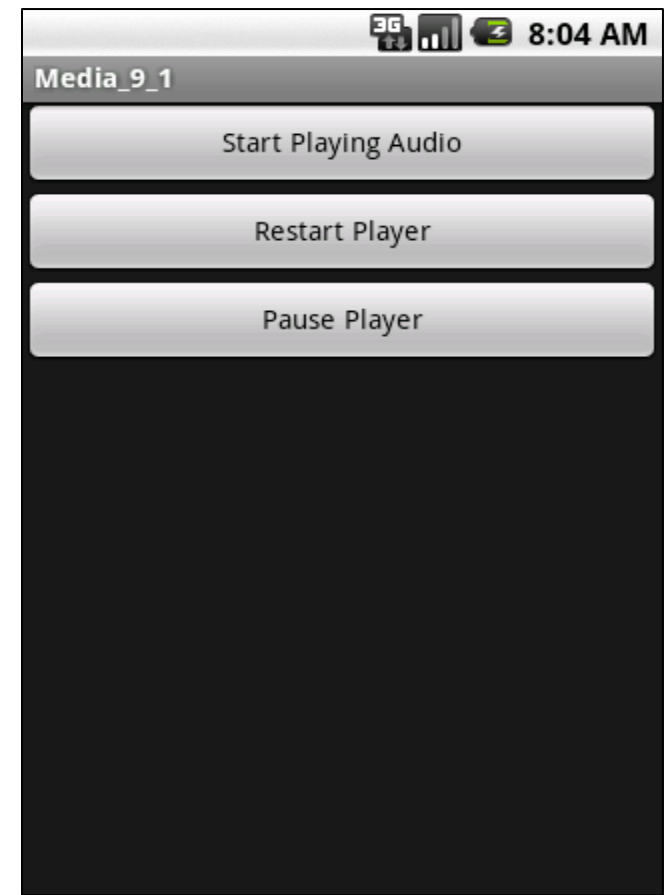
```
<LinearLayout xmlns:android="http://schemas..."  
    android:orientation="vertical" ...>
```

```
<Button android:id="@+id/startPlayerBtn"  
    android:text="Start Playing Audio" ... />
```

```
<Button android:id="@+id/restartPlayerBtn"  
    android:text="Restart Player" ... />
```

```
<Button android:id="@+id/pausePlayerBtn"  
    android:text="Pause Player" ... />
```

```
</LinearLayout>
```



# Audio Player Example

```
public class MainActivity extends Activity {  
    private static final String AUDIO_URL = "http://music.com/song.mp3";  
    private MediaPlayer mediaPlayer = null;  
    private int playbackPosition = 0;  
  
    public void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.main);  
        Button startPlayerBtn = (Button) findViewById(R.id.startPlayerBtn);  
        Button pausePlayerBtn = (Button) findViewById(R.id.pausePlayerBtn);  
        Button restartPlayerBtn = (Button) findViewById(R.id.restartPlayerBtn);  
        startPlayerBtn.setOnClickListener(new OnClickListener() {  
            public void onClick(View view) {  
                try { playAudio(AUDIO_URL); }  
                catch (Exception e) { e.printStackTrace(); }  
            }  
        });  
    }  
}
```

# Audio Player Example

```
pausePlayerBtn.setOnClickListener(new OnClickListener() {  
    public void onClick(View view) {  
        if (mediaPlayer != null) {  
            playbackPosition = mediaPlayer.getCurrentPosition();  
            mediaPlayer.pause();  
        }  
    });  
restartPlayerBtn.setOnClickListener(new OnClickListener() {  
    public void onClick(View view) {  
        if (mediaPlayer != null && !mediaPlayer.isPlaying()) {  
            mediaPlayer.start();  
            mediaPlayer.seekTo(playbackPosition);  
        }  
    });  
}
```



# Audio Player Example

```
private void playAudio(String url) throws Exception {
    killMediaPlayer();
    mediaPlayer = new MediaPlayer();
    mediaPlayer.setDataSource(url);
    mediaPlayer.prepare();
    mediaPlayer.start();
}

protected void onDestroy() {
    super.onDestroy();
    killMediaPlayer();
}

private void killMediaPlayer() {
    if (mediaPlayer != null) {
        try { mediaPlayer.release(); }
        catch (Exception e) { e.printStackTrace(); }
    }
}
```

# Playing Local Media Files

In /res/raw/song.mp3

```
mediaPlayer = MediaPlayer.create(this, R.raw.song);  
mediaPlayer.start();
```

Via file descriptor

```
AssetFileDescriptor fileDesc =  
    getResources().openRawResourceFd(R.raw.song);  
mediaPlayer = new MediaPlayer();  
mediaPlayer.setDataSource(fileDesc.getFileDescriptor(),  
    fileDesc.getStartOffset(), fileDesc.getLength());  
fileDesc.close();  
mediaPlayer.prepare();  
mediaPlayer.start();
```