

Mobila applikationer och trådlösa nät

HI1033

Lecture 8

Today's topics

- Location Based Services
- Google Maps API
- MultiMedia



Location Based Services

- LocationManager provides access to location based services
- Location providers, providing different technologies for location finding
 - Global Positioning System, GPS
 - Cell ID
 - WiFi nets – “crowd sourced data”
- - Power use – GPS expensive
 - Speed
 - Accuracy
 - Bearing
 - Cost (why?)

GPS

- Global Positioning System
- 25-30 operational satellites

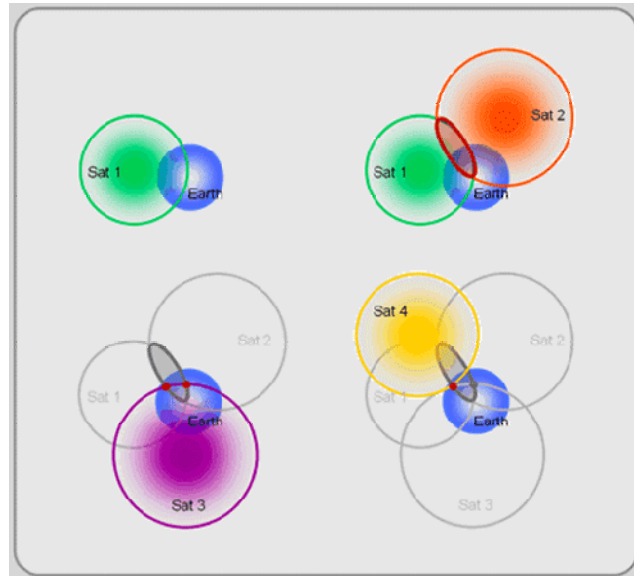


Image source: <http://www.techjini.com/blog/>

“Crowd sourced data”



Location Based Services, components

- LocationManager
 - provides access to Android system location services
- `manager = (LocationManager) ctx.getSystemService(Context.LOCATION_SERVICE);`
- LocationListener
 - interface for receiving notifications from the location manager on location changed
- Location
 - representation of a geographic location, plus a time stamp

Location Based Services, settings

- In AndroidManifest.xml


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

 (or `ACCESS_COARSE_LOCATION`)
- Define accuracy and power requirements to decide which provider to use


```
Criteria criteria = new Criteria();
criteria.setAccuracy(Criteria.ACCURACY_FINE);
criteria.setPowerRequirement(Criteria.POWER_MEDIUM);
criteria.setAltitudeRequired(false);
criteria.setCostAllowed(false);
```
- `provider = locationManager.getBestProvider(criteria, true);`

Listening for location updates

- Implement a LocationListener

```
class LocationListenerExample implements LocationListener {

    @Override
    public void onLocationChanged(Location location) {
        ... // calculate, update ui
    }

    @Override
    public void onStatusChanged(String provider, int status, Bundle
    extras) { ... }

    @Override
    public void onProviderEnabled(String provider) { ... }

    @Override
    public void onProviderDisabled(String provider) { ... }
}
```

Listening for location updates

- Start, *and stop*, receiving location information -
manager.requestLocationUpdates(...)
- manager.removeLocationUpdates(...)
- Example (in Activity)

```
protected void onResume() {
    super.onResume();
    locationManager.requestLocationUpdates(
        bestProvider, 5000, 10,
        locationListener);
}

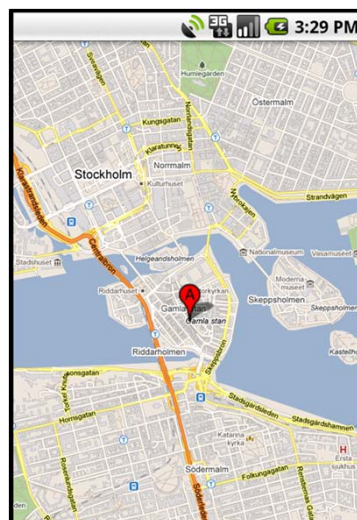
protected void onPause() {
    super.onPause();
    locationManager.removeUpdates(locationListener);
}
```

Geo-coding

- android.location.Geocoder translates between longitude/latitude and “addresses”
- Lookups are done at a (Google-) server, hence requires android.permission.INTERNET
- *Should be performed in the background*
- Forward: address to coordinates
- Reverse: coordinates to address
- ```
addresses = geocoder.getFromLocation(
 location.getLatitude(),
 location.getLongitude(), 5);
```

## Google Maps Android API v2

- Google APIs
  - Interface to Google specific services like maps, admob, fusion...
- Google Maps API
  - Embed maps into an activity as a fragment
  - Customize maps; map types, markers et c.
  - Control the users view
- Version 1 deprecated since 2012



## Google Maps, Layout

- A MapFragment object act as a container for, and provide access to, the GoogleMap object
- <RelativeLayout ...>
 

```

...
<fragment
 android:id="@+id/map"
 android:name=
 com.google.android.gms.maps.MapFragment"
 ... />
...
</RelativeLayout>

```

## Google Maps, the Activity

```

public class MainActivity extends Activity {

 @Override
 protected void onCreate(Bundle savedInstanceState) {
 super.onCreate(savedInstanceState);
 setContentView(R.layout.activity_main);

 gMap = ((MapFragment)
 getFragmentManager().
 findFragmentById(R.id.map)).getMap();

 latlngStockholm = new LatLng(
 59.324082, 18.071136);
 }

 private GoogleMap gMap;
 private LatLng latlngStockholm;
}

```

## Google Maps, the Activity

- In onStart or onResume
- ```
private void setUpMap() {  
    // Do we have to instantiate the map?  
    if (gMaps == null) {  
        gMaps = ((MapFragment)  
            getFragmentManager().findFragmentById(  
                R.id.map)).getMap();  
    }  
}
```

Google Maps, control the users view

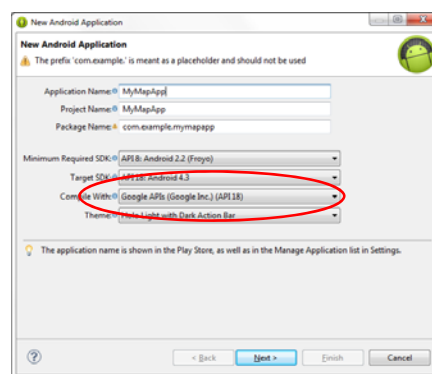
```
gMaps.moveCamera(  
    CameraUpdateFactory.newLatLngZoom(  
        LatLngStockholm, 10));  
  
gMaps.animateCamera(  
    CameraUpdateFactory.zoomTo(15), 2000, null);  
  
MarkerOptions mops = new MarkerOptions();  
mops.title("The capital of Scandinavia")  
    .icon(image)  
    .position(latlngStockholm);  
gMaps.addMarker(mops);
```

Google Maps, uses permissions

- `android.permission.INTERNET`
- `android.permission.ACCESS_NETWORK_STATE`
- `android.permission.WRITE_EXTERNAL_STORAGE`
- `com.google.android.providers.gsf.permission.READ_GSERVICES`
- `android.permission.ACCESS_COARSE_LOCATION`
- `android.permission.ACCESS_FINE_LOCATION`

Developing using Google Maps

- Not a standard Android API – requires Google APIs
- To debug (and release) apps using Google Maps
 - Download Google APIs: Eclipse, Window/Android SDK Manager
 - Set up an account at Google Play Services: <http://developer.android.com/google/play-services/setup.html>
 - Generate API-key for Google Maps Android: https://developers.google.com/maps/documentation/android/start#getting_the_google_maps_android_api_v2



Developing using Google Maps

- Manifest

```

<meta-data
    android:name="com.google.android.maps.v2.API_KEY"
    android:value="AIzaS.....9vABbo" />

<meta-data
    android:name="com.google.android.gms.version"
    android:value="@integer/google_play_services_version" />

<uses-feature
    android:glEsVersion="0x00020000" android:required="true"
/>

```



Simulating location in the emulator

1. In Eclipse, open the Dalvik Debug Monitor Service, DDMS, perspective
2. In the Emulator Control pane, scroll to Location Control
3. Enter *longitude and latitude* and send
 - ...or use a predifened file (GPX or KML)
 - ...or, use the console:
telnet localhost 5554
> geo fix <longitude> <latitiude> [<altitude>]

Readings on Google Maps Android API

- Meier does *not* cover version 2
- <https://developers.google.com/maps/documentation/android/>
- <http://developer.android.com/google/play-services/maps.html>

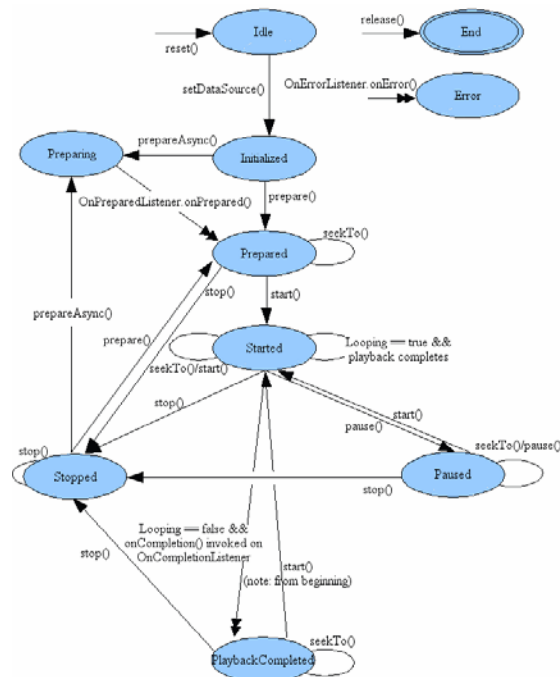
Playing Audio and Video

- Supported audio formats:
MP3, MIDI, Ogg Vorbis, PCM/WAVE, ...
- Supported video formats:
MPEG-4, H.263, H.264 AVC
- Playback - MediaPlayer class
Recording – MediaRecording class
- Play from
 - application resources (res/raw)
 - local files
 - Content Providers, such as the media store
 - network URL

Playing Audio and Video

Playback control of audio/video files and streams is managed as a state machine

[single arrow head represent synchronous method calls, double arrow head represent asynchronous method calls]



Playing Audio

- From resources:
 - `Context appctx = getApplicationContext();`
`player = MP.create(appCtx, R.raw.my_audio);`
 - Player is already prepared
- From a URI, e.g. via a ContentProvider:
 - `Uri myUri =; // initialize Uri here`
`MediaPlayer mediaPlayer = new MediaPlayer();`
`mediaPlayer.setAudioStreamType(`
`AudioManager.STREAM_MUSIC);`
`mediaPlayer.setDataSource(appctx, myUri);`
`mediaPlayer.prepare();`
`mediaPlayer.start();`

Playing Audio

- From a URL:
 - `String url = "http://....."; // your URL here`
`MediaPlayer mediaPlayer = new MediaPlayer();`
`mediaPlayer.setAudioStreamType(`
`AudioManager.STREAM_MUSIC);`
`mediaPlayer.setDataSource(url);`
`mediaPlayer.prepare(); // might take long`
`mediaPlayer.start();`
- When no longer needed:
 - `player.release();`
`player = null;`

Playing video using VideoView

- Encapsulates a MediaPlayer
- ```
VideoView videoView = (VideoView)
 findViewById(R.id.video_view);

videoView.setKeepScreenOn(true);
videoView.setVideoPath("/sdcard/test2.3gp");

if (videoView.canSeekForward()) {
 videoView.seekTo(videoView.getDuration()/2);
}
videoView.start();
// [...]
videoView.stopPlayback();
```

## Other media topics

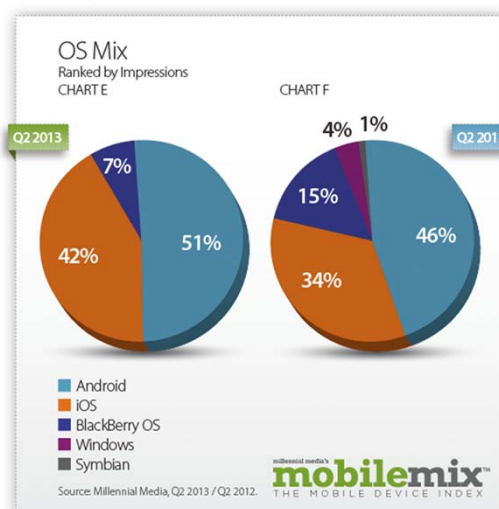
- MediaPlayer –  
<http://developer.android.com/guide/topics/media/mediaplayer.html>
- Recording audio and video -MediaRecorder
- Camera, taking pictures, preview, ...
- Adding media to the media store
- Raw audio manipulation
- Speech recognition

## So you want to write a mobile app?

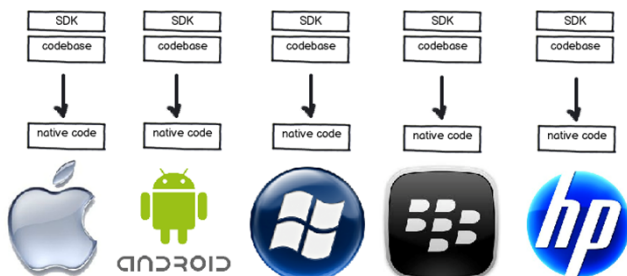
- Native
  - Write a completely new app using the native APIs for each platform
  - best-looking, most functional, ...
  - Cost...
- Hybrid
  - Some parts native, some parts portable across platforms
  - Frequently consists of an HTML and JavaScript core, wrapped in a native layer.
- Cross-compilation (variant of hybrid)
  - Uses non-native languages, which are then compiled to the native platform
- HTML5
  - The most portable solution
  - Non-native look
  - Apps lack access to many of a devices' capabilities.
- Further reading
  - <http://www.drdoobs.com/mobile/so-you-want-to-write-a-mobile-app-place/240155587>

## Native: platform fragmentation...

Develop native applications for which platforms?



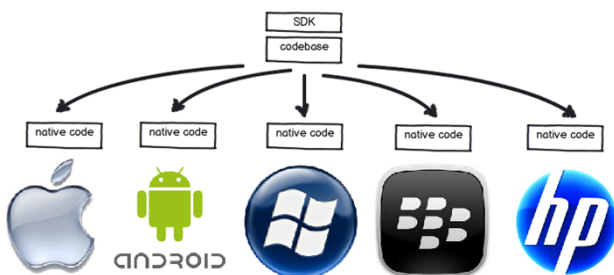
## Building a mobile app - Native



| Platform   | Language    | IDE           |
|------------|-------------|---------------|
| iOS        | Objective C | XCode         |
| Android    | Java        | Eclipse       |
| Windows    | .NET        | Visual Studio |
| Blackberry | Java        | BB JDE        |

Pamela Fox – www.pamelafox.org - JFokus 2012

## Cross compiled code



|                                |            | iOS | Android | WP7 | BB | WebOS |
|--------------------------------|------------|-----|---------|-----|----|-------|
| <a href="#">ParticleCode</a>   | Java, AS3  |     |         |     |    |       |
| <a href="#">XMLVM</a>          | Java, .NET |     |         |     |    |       |
| <a href="#">Xamarin.Mobile</a> | C#, .NET   |     |         |     |    |       |

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## Hybrid app, bridge SDK

```
<!DOCTYPE html>
<html>
 <head>
 <script type="text/javascript" charset="utf-8" src="phonegap.js"></script>
 <script type="text/javascript" charset="utf-8">
 function capturePhoto() {
 navigator.camera.getPicture(onPhotoDataSuccess);
 }

 function onPhotoDataSuccess(imageData) {
 var smallImage = document.getElementById('smallImage');
 smallImage.src = "data:image/jpeg;base64," + imageData;
 }
 </script>
 </head>
 <body>
 <button onclick="capturePhoto();">Capture Photo</button>

 </body>
</html>
```

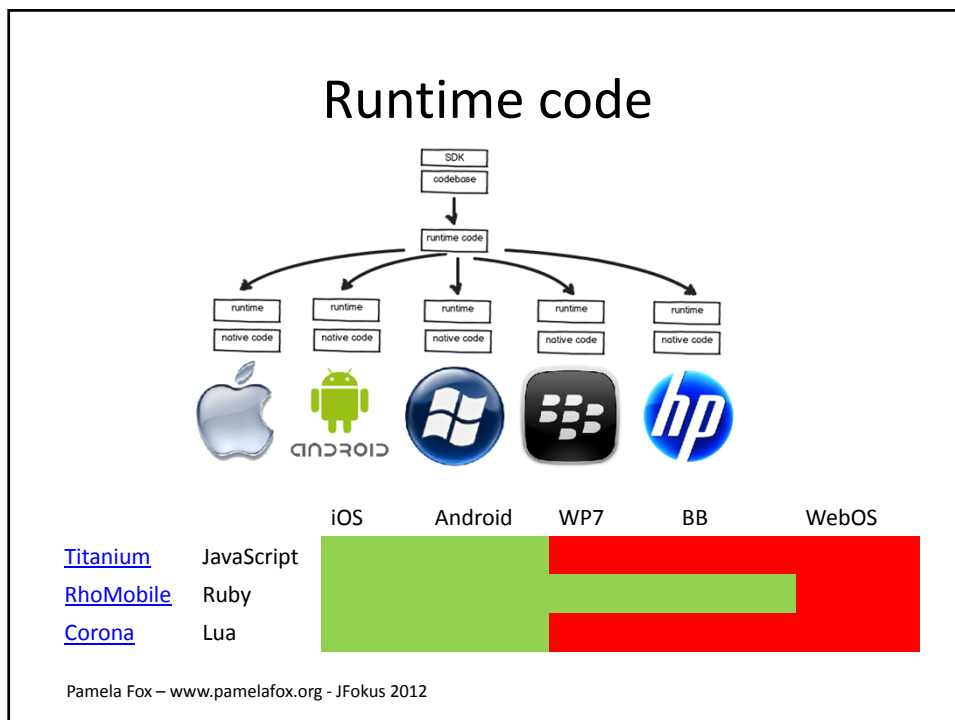
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## JavaScript

**Any application that can be written in  
JavaScript, will eventually be written in  
JavaScript.**

Atwood's Law

(whether or not JavaScript is suitable for this particular application)



## HTML5

- Google's CEO Eric Schmidt on HTML5:
- "It's taken 20 years because the underlying standards had to evolve from the proprietary Mac and Windows platforms. But they have both adopted HTML5 as a future direction. So that means in future a lot of apps will be running in HTML5 in both mobile and non-mobile form."



## HTML5

- Currently under development
- New syntactical features. These include the <video>, <audio>, and <canvas> elements
- Integration of Scalable Vector Graphics, SVG, content
- Drag-and-drop
- Full-scale application development for the browser possible
- Apps might be platform agnostic?
- Android comes with a HTML5 Webkit-based browser