

Distributed Systems 2011 – Assignment 1

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The Exercise

- Objectives
 - Get familiar with Android programming
 - Emulator, debugging, deployment
 - Learn to use UI elements and to design an Activity
 - Learn how to connect Activities and Services using Intents
 - Learn how to use the Sensor API
 - Tackling problems with developing a real app
- Dates:
 - Exercise begins: **Now**
 - Exercise is due: **9:00am, October 10, 2011**



The Exercise is divided up into 3 tasks

- **First Task: Sensors and Actuators**
 - Produce an application to access all available Sensors
 - Use selected actuators
- **Second Task: AntiTheft Alarm**
 - Produce an application to “*secure*” the device against theft
- **Third Task: Enhancements of Task 2**
 - Come up with creative solutions to deal with the shortcomings of the simple alarm

Task 1: Sensors and Actuators

■ Objectives:

- Learn how to create an Android project
- Familiarize yourself with UI Elements
- Understand the concept of Activities and Intents
- Learn to use the sensor API

■ Todo:

- Write an app that displays all available sensors in a ListView
- Show sensor readings in a second activity
- Trigger actuator events in a third activity

Hints

- Project names: VS_G**_A1_1 (change ** to your group number)
- Don't forget to add all components (Activities, Services) to the application in the manifest file
- Don't forget the permissions in the manifest file
- Listing all the sensors:

```
private SensorManager sensorMgr = null;  
private List <Sensor> sensors;
```

```
sensorMgr = (SensorManager) getSystemService(SENSOR_SERVICE);  
sensors = sensorMgr.getSensorList(Sensor.TYPE_ALL);
```

- When starting `SensorsDetail`, the Intent should carry the information which sensor to display in detail
- `SensorsDetail` should implement the `SensorEventListener` interface and continuously present the sensor's value(s). Check the `ArrayList<String>` and `ArrayAdapter<String>` classes. They are useful to hold the sensor values as Strings for the `ListView`

Task 2: AntiTheft Alarm



■ Objectives:

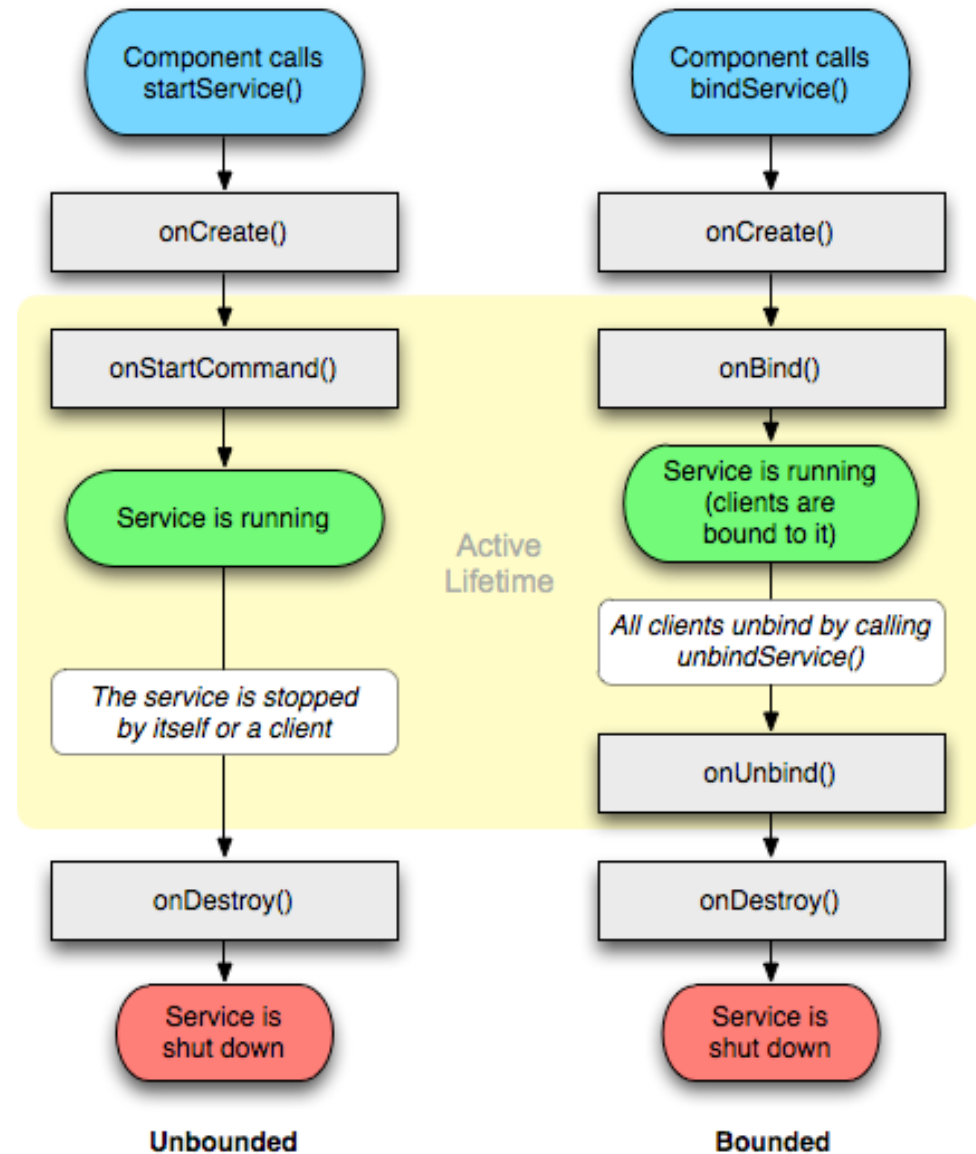
- Transfer the knowledge of Task 1 into a real app
 - Understand problems stemming from a framework under development
- Think about how to make use of the sensors
- Learn how to use background Services

■ Todo:

- Write an app to “secure” the device against theft
 - Sound an alarm when the device is moved (without authorization)

Hints

- Service lifecycle
- A simple Started Service (unbounded service) is good for us



Hints

- We know this service always runs in the same process as its clients, we don't need to deal with inter process communication (IPC)
- See the **LocalService.java** and the **ServiceStartArguments.java** examples
- Don't forget to declare the Service in the manifest file!

Task 3: Enhancements

- Problems with Task 2 include:
 - Headphones can suppress alarm
 - HTC Desire with 2.2 (currently) unable to process sensor events when in Standby
 - Unable to lock and thus protect the alarm
- Possible solutions:
 - GPS
 - Silent alarm
 - BroadcastReceiver
- **Todo:**
 - Come up with a creative solution to one of the problems

Hints – Settings Activity (1)

MySettingsActivity.java

```
package ch.inf.ethz.vs.android.g**.a*;  
import android.os.Bundle;  
import android.preference.PreferenceActivity;  
  
public class MySettingsActivity extends PreferenceActivity {  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        // Load the preferences from an XML resource  
        addPreferencesFromResource(R.xml.preferences);  
    }  
}
```

Do not forget to add this Activity to your application in the manifest file!

Hints – Settings Activity (2)

```
\res\xml\preferences.xml
```

```
<?xml version="1.0" encoding="utf-8"?>
<PreferenceScreen xmlns:android="http://schemas.android.com/apk/res/android">
  <PreferenceCategory android:title="Server IP settings">
    <CheckBoxPreference
      android:key="network_mode_enable"
      android:title = "Stream to server"
      android:summary = "Enable to stream the sensor values to the server"
      android:defaultValue = "true" />
    <EditTextPreference
      android:key = "server_ip"
      android:dependency = "network_mode_enable"
      android:title = "IP address"
      android:summary = "IP address of the fancy server"
      android:layout = "?android:attr/preferenceLayoutChild"
      android:dialogTitle = "IP address of the Tracker"
      android:defaultValue = "192.168.1.1" />
    <EditTextPreference
      android:key = „server_port"
      android:dependency = "network_mode_enable"
      . . . />
  </PreferenceCategory>
</PreferenceScreen>
```

Hints – Settings Activity (3)

MyMainActivity.java

```
import android.preference.PreferenceManager;

SharedPreferences sharedPrefs =
    PreferenceManager.getDefaultSharedPreferences( getApplicationContext() );

boolean network_mode_enable =
    sharedPrefs.getBoolean( "network_mode_enable", false );

InetAddress saddr =
    InetAddress.getByName( sharedPrefs.getString( "server_ip", "192.168.1.1" ) );

int sport =
    Integer.parseInt( sharedPrefs.getString( "server_port", "8080" ) );
```

The Report

- You are required to produce a **report**
 - Maximum 2 pages!
 - About your experience with **tasks 2 and 3**
 - Motivate and explain your enhancement (Task 3)
- **Other Ideas:** Problems, design choices, code snippets, UML class diagrams, documentation, comparison to Symbian/iOS (if previous experience in those), ...

Deliverables

- <https://www.vs.inf.ethz.ch/edu/vs/submissions/>
- use your *nethz* logins
- file names: **report.pdf** and **code.zip**
- new uploads will overwrite the old ones
- check uploaded files

LEADER:

- create group
- add members
- upload files

MEMBERS:

- sign the submission

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Exercise:	Assignment No 1 - Anti-Theft Alarm
Individual or Group:	Groups of up to 3
Due:	10.10.11-09:00:00
Spec:	spec_ds_hs2010_1.pdf

Groups

You aren't part of a registered group, yet. To *join a group*, you need to ask the group leader to add you. If you want to *start a group* and become a group leader yourself, click the button below. It is the group leader's responsibility to upload the solution.

ETH Zurich : Computer Science : Pervasive Computing : Distributed Systems : Education : DS HS2011

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Exercise: Assignment No 1 - Anti-Theft Alarm

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Due: 10.10.11-09:00:00

Spec: [spec_ds_hs2010_1.pdf](#)

Groups

You are the leader of this group. You have to upload the solution. Every time you change the submissions, the others will have to re-sign confirming they agree with the submission. However, it is sufficient if they only do so *once for the final version*. Please bear this in mind when you make last minute changes!

NETHZ ID	Role	Last change	Remove	Signature
XXXXXXXXXX	LEADER	26.09.11-16:48:22	Close group	Not required
XXXXXXXXXX <input type="button" value="Add"/>				

Submission

Upload your submission files to the server. Please note the supported *filename(s)* and *format(s)*. You may change your submission until the deadline of this assignment. However, be aware that only your most recent submission is kept and can be marked.

It is your responsibility to check that the files below have been uploaded correctly! Please use the links to check your submission!

Filename	Last Change	Size	Maximum Size	Supported Formats	Upload	Status
report	nA	nA	2 MB	pdf	<input type="text"/> <input type="button" value="Browse..."/>	Missing submission
code	nA	nA	12 MB	zip	<input type="text"/> <input type="button" value="Browse..."/>	Missing submission

By clicking on *Submit Changes*, you declare the above documents to be **your own work, only**. Any contributions made by other people must be acknowledged and sources must be properly referenced!

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NETHZ ID	Role	Last change	Remove	Signature
XXXXXXXXXX	LEADER	26.09.11-16:19:30	Close group	Not required
XXXXXXXXXX	MEMBER	26.09.11-16:19:36	Remove	Not signed yet BAD
XXXXXXXXXX	MEMBER	26.09.11-16:20:21	Remove	Not signed yet BAD

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report	26.09.11-16:23:12	120.95 KB	2 MB	pdf	<input type="text"/> <input type="button" value="Browse..."/>	Submission available
code	26.09.11-16:23:12	120.95 KB	12 MB	zip	<input type="text"/> <input type="button" value="Browse..."/>	Submission available

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Groups

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NETHZ ID	Role	Last change	Remove	Signature
XXXXXXXXXX	LEADER	26.09.11-16:19:30	Not available	Not required
XXXXXXXXXX	MEMBER	26.09.11-16:19:36	Remove me	Missing signature BAD [Sign]
XXXXXXXXXX	MEMBER	26.09.11-16:20:21	Not available	Not signed yet BAD

Submission

You are not the leader for this group exercise. You may view but not change the submission.

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You are logged in as [redacted] View your **grades**.

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[redacted]	MEMBER	26.09.11-16:19:36	Remove me	26.09.11-16:24:15 OK
[redacted]	MEMBER	26.09.11-16:20:21	Not available	Not signed yet BAD

Submission

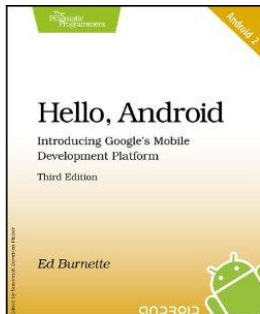
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Remarks

- minus points if project does not compile
- Task 2 and Report are necessary to meet the minimum requirements.
- Elements of Task 1 can be reused in Assignment 2.

Books



- Ed Burnette – Hello, Android (Pragmatic Bookshelf 2010)



- Reto Meier – Professional Android Application Development (Wrox 2008)



- Arno Becker – Android Grundlagen und Programmierung
http://www.dpunkt.de/ebooks_files/free/3436.pdf

Have fun!

Questions?