Distributed Systems – Exercises

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VS Exercises

- Programming exercises
  - Three assignments
  - One open project
  - Can be carried forward from last year

- Theoretical exercises
  - Exam preparation for Part 1 (Mattern)
  - Assignments for Part 2 (Wattenhofer)
Final Grade

- Written exam counts 180 points
- Assignment 1-3 count 10 points each
- Open project counts 15 points
- → Total achievable points are 180 + 45 = 225 points

- Final grade is derived from the ratio

\[
\text{achieved points} \quad \frac{\text{225 points}}{} 
\]
Mobile Platform for Distributed Systems
Android Smartphone Market Share Worldwide

Source: http://stats.areppim.com/stats/stats_mobiosxtime.htm
Platform Internals

Android Application A
Dalvik Virtual Machine

Android Application B
Dalvik Virtual Machine

Android Application C
Dalvik Virtual Machine

Linux Kernel

Security
- Process Management
- Memory Management
- Network Stack
- I/O
- Display
- Keypad
- Touchscreen
- Power Management
- Other Drivers
  - WiFi, Bluetooth, Camera, Audio, Telephony, Flash, Sensors

Hardware
Android Key Terms

- **Activity**
  - Logical unit of a user activity
    (like window in a computer program)
  - Usually full-screen (cf. Fragments)

- **View**
  - Hierarchical UI element
  - Combined in layouts and extended to Widgets with more functionality

- **Service**
  - Background activity without UI, e.g., music player or FTP server
Android Key Terms

«Intent»
- Starts or switches between «Activities»
- Passive data structure
- Describes the action
  - An explicit class to activate
  - Or implicit components that match an «Intent filter»

«BroadcastReceiver»
- Listens for global events (Intents)
  e.g., «headphones were plugged» sent by system
- Can delegate to preferred Activity
- Can inform the user
Activity Lifecycle

- Multi-Tasking
  - OS keeps apps alive as long as possible
  - On memory shortage, processes are killed according to their priority

- States of an Activity
  - Running (Resumed)
  - Paused
  - Stopped
  - Finished/killed
Online Help

- You’ll find a lot of resources in the Internet

- For general introductions, you can start here:

- For specific problems → Google!
Programming Exercises
Team

Leyna Sadamori  Marian George  Hông-Ân Cao  Mihai Bace
Organization

- Teams of three
  - Develop with the emulator
  - Test on the actual phone

- Smart phones
  - Use your own Android – no rooting required
  - Nexus 5 with Android 4.4.3 available by us

- Grading
  - Per group
  - Can be carried forward from/to last year
Schedule

- **A1: GUI and hardware**
  - 29 Sep 2014 – 08 Oct 2014 (1.5 weeks)

- **A2: Client/server, Web services**
  - 06 Oct 2014 – 20 Oct 2014 (2 weeks)

- **A3: Group communication and logical time**
  - 20 Oct 2014 – 03 Nov 2014 (2 weeks)

- **A4: Open project (with presentation)**
  - 31 Oct 2014 – 19 Dec 2014 (7 weeks)
Homework
Create Groups

- Log in to submission system
  - https://www.vs.inf.ethz.ch/edu/vs/submissions/

- First „exercise“ is to register a group
- Leader starts a group
- Add partners
- Specify which phone you will be using
  - Own Android
  - Lecture phone (Nexus 5)
Get a phone if necessary

- A number of Nexus 5 are available
  - Android 4.4.2 pre-installed
  - For the BLE task, you have to update to 4.4.3!
  - Pick-up today, after 1 p.m. in CNB H 108

- Activate debugging
  - «Settings > About phone > Build number» – Tab several times
  - «Settings > Developer options > Android debugging»
Install the Toolchain

- **Java SE JDK**

- **Android SDK: ADT Bundle including Eclipse**

- **Use Android SDK Manager to get at least**
  - Android 4.3 (API Level 18)
  - Android 4.4.2 (API Level 19)

- **Device driver**
  - Android Composite ADB Interface
  - Google for your OS / device combination
    - E.g. for Google phones (windows only)
Test Your Toolchain

- Create an AVD in the «Android Virtual Device Manager»
  - Device: Nexus 5
  - Target: Android 4.4.2 - API Level 19
  - CPU: ARM
  - Emulator Options: Host GPU

- Create an «Android Sample Project» in Eclipse
  - New > Other > Android Sample Project
  - Sample: ApiDemos

- Run the project as Android application
  - On the AVD
  - On your phone
Android Tutorial

- Monday, 29 September 2014
  - Introduction to Android programming
  - «Live-Hacking» together with you
    - Be prepared!

- Monday, 29 September 2014
  - Assignment 1