



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)



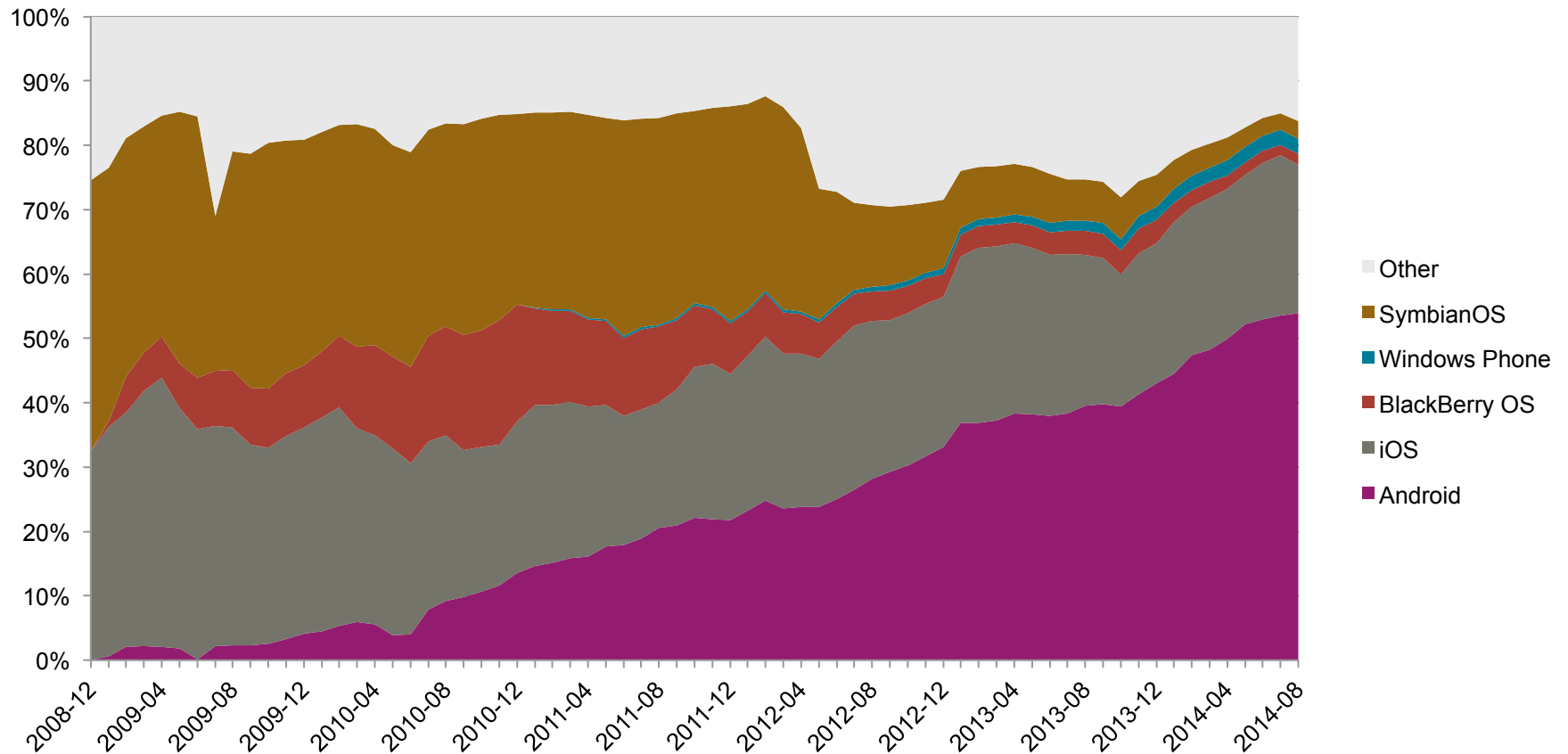
Final Grade

- 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 $\frac{\text{achieved points}}{225 \text{ points}}$



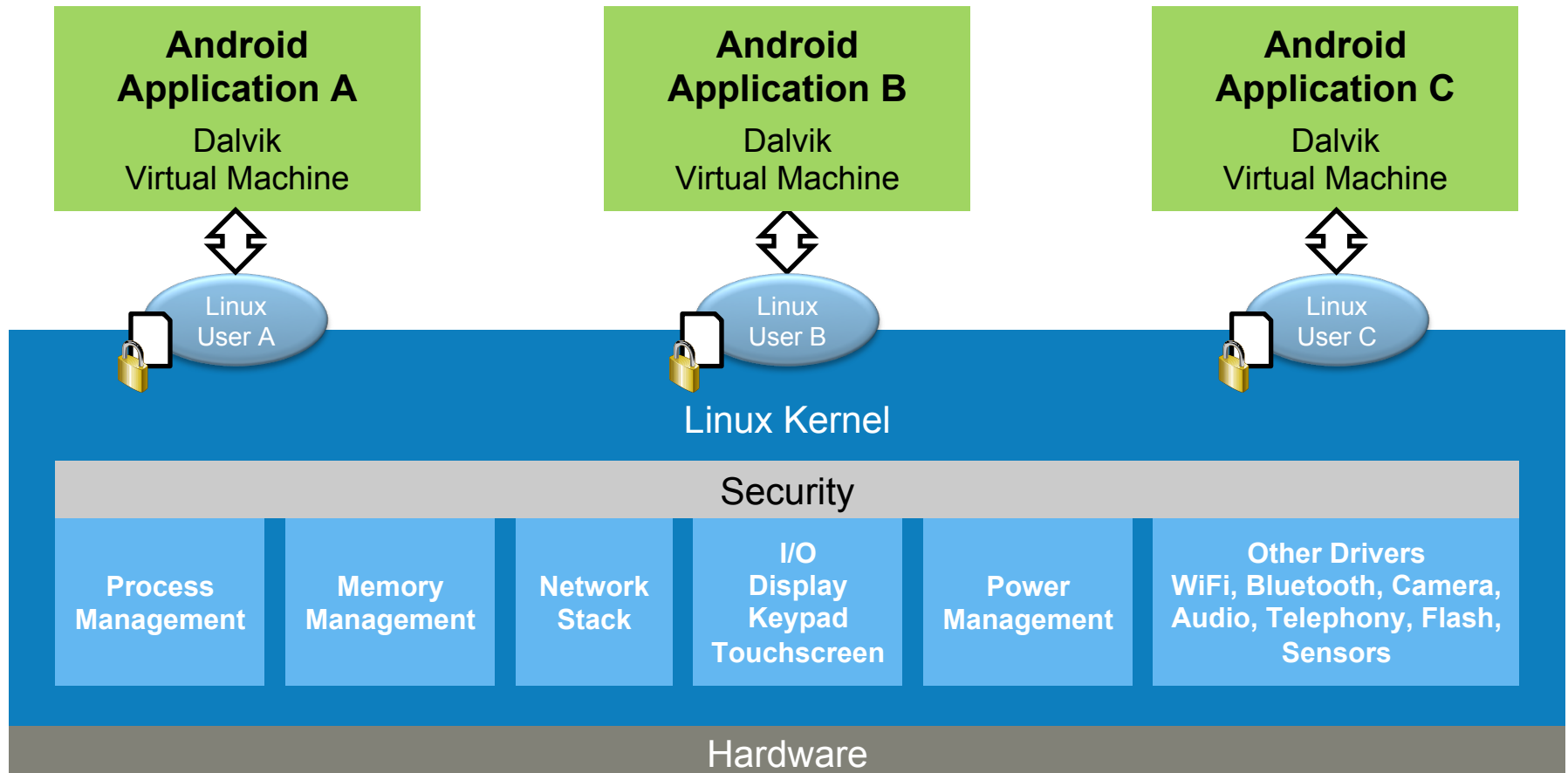
Mobile Platform for Distributed Systems

Android Smartphone Market Share Worldwide



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

Platform Internals



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



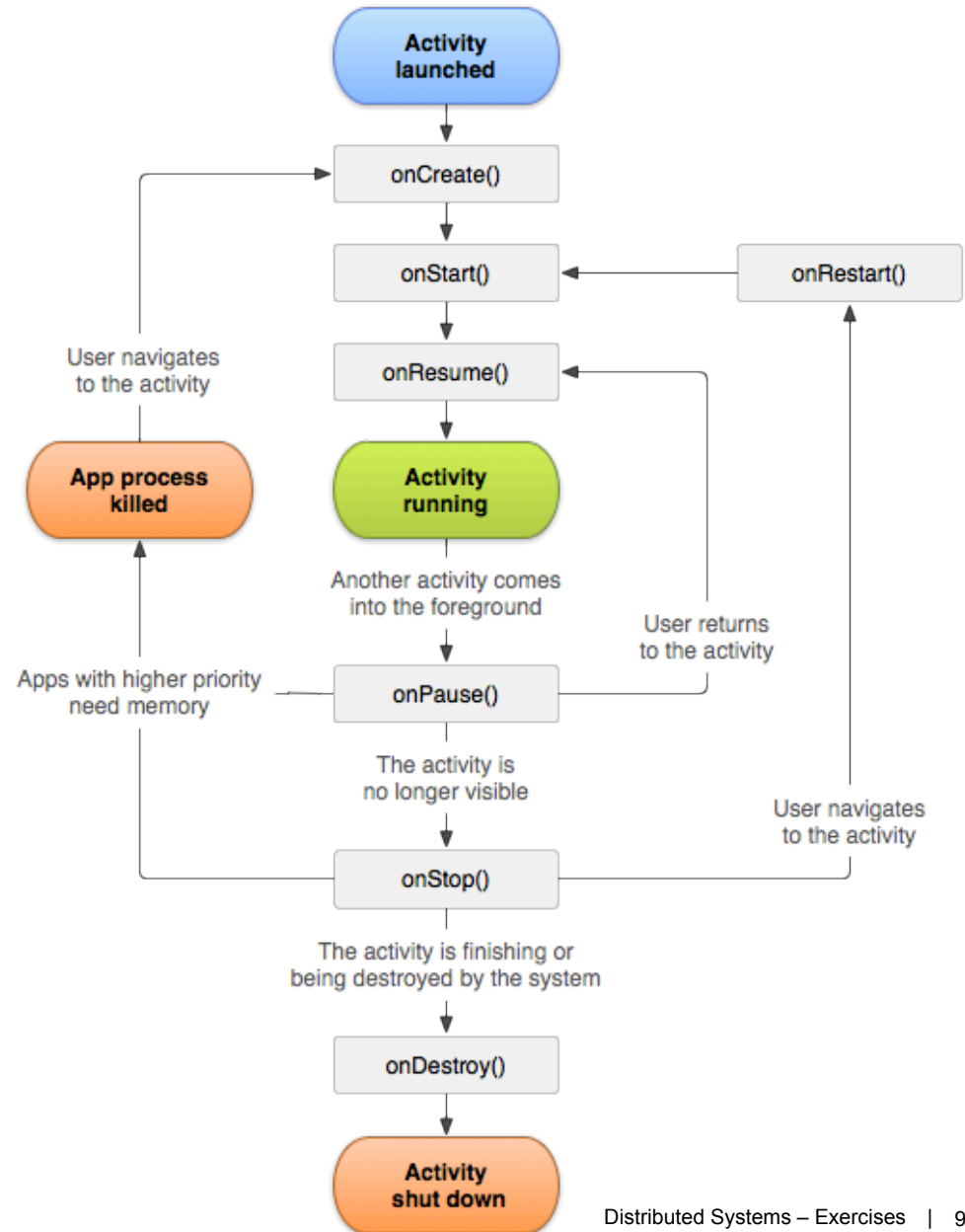
Android Key Terms

- «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:
 - <http://developer.android.com/guide/index.html>
- For specific problems → Google!



Programming Exercises

Team



Leyna Sadamori



Marian George



Hồng-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)



ANDROID DEVELOPER TOOLS

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
 - <http://www.oracle.com/technetwork/java/javase/downloads/index.html>
- Android SDK: ADT Bundle including Eclipse
 - <http://developer.android.com/sdk/index.html>
- 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)
 - <http://developer.android.com/sdk/win-usb.html>

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

