

SMART SENSORS FOR DOMOTICS AND HEALTH CARE

- Android, Google, Googlefit

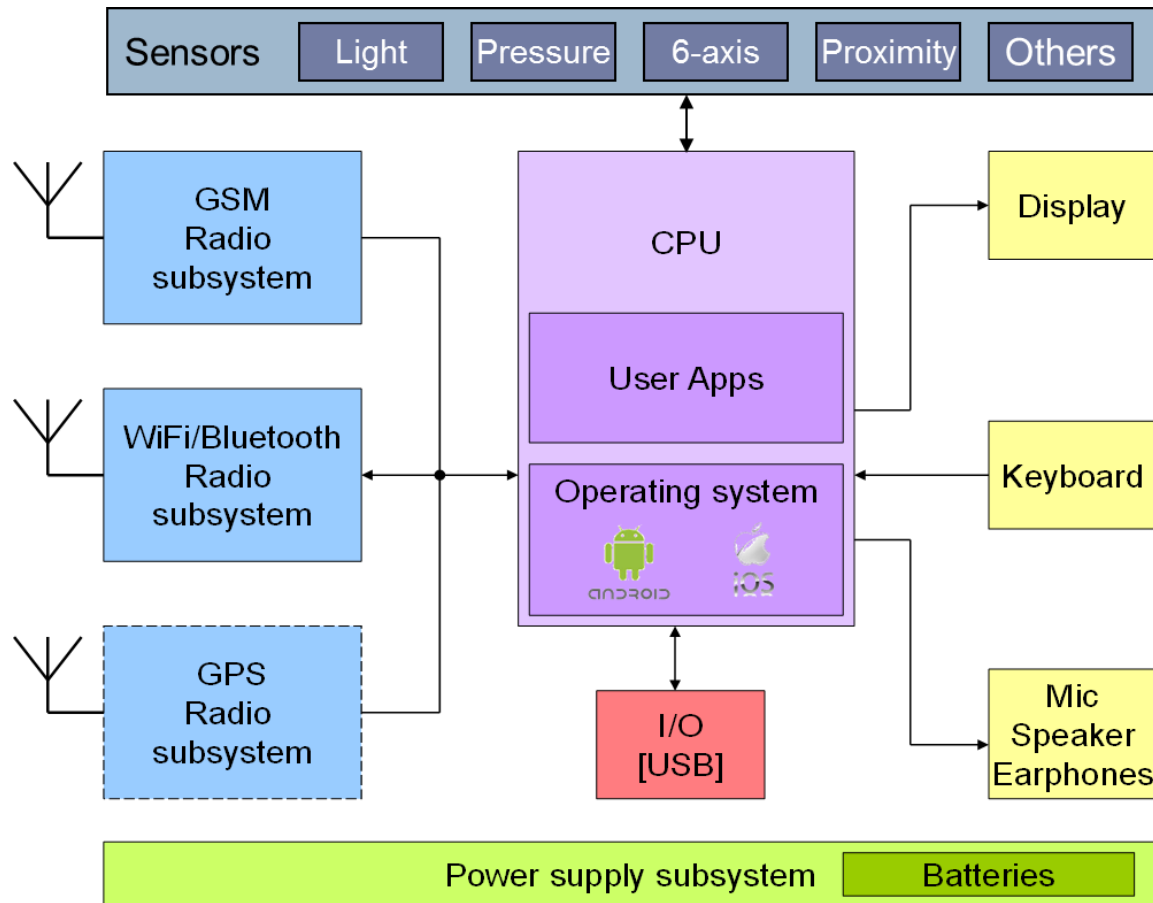
A.A. 2015 / 2016

Alessandra Flammini

OPERATIVE SYSTEMS (OS)

Why a Smartphone needs an OS?

- To execute several programs and applications
- To manage memory and communication interfaces
- To manage its Hw and its SW

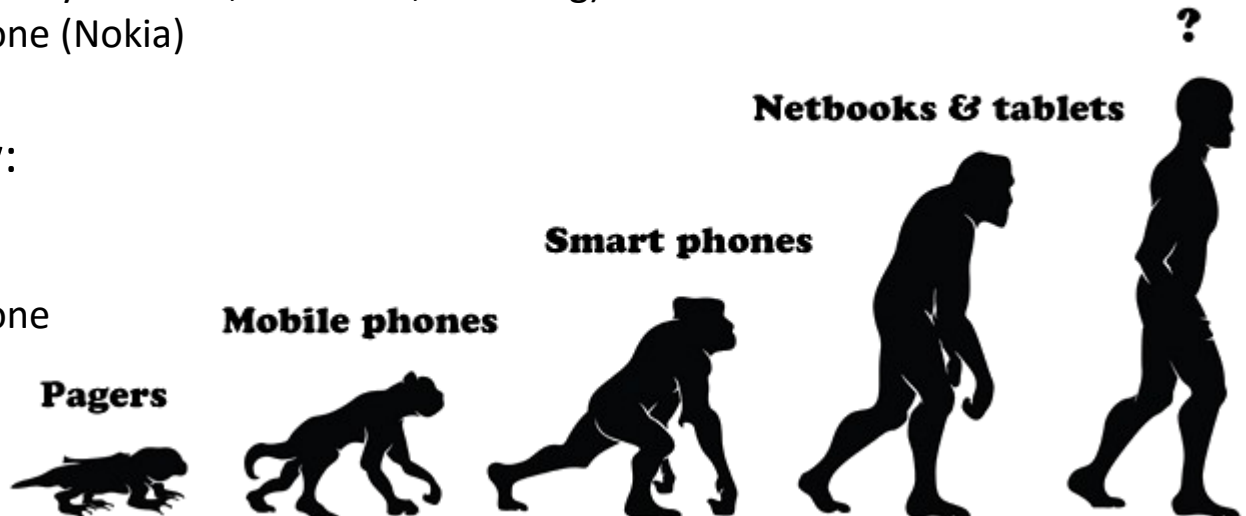


ANDROID, Overview of OS for mobile

Android, open source, based on Linux, Samsung, LG, other
IOS, license, brand, guaranteed, powerful, Apple, iPhone, iPad



- First mobile phone 1983, camera phones late '90, OS late '90
- Proprietary formats emerged to better take advantage of hardware capabilities:
 - Palm OS (became Garnet OS)
 - RIM Blackberry OS
 - Java Micro Edition
 - Symbian OS (Sony Ericsson, Motorola, Samsung)
 - Windows Phone (Nokia)
 - iPhone iOS
- Major players now:
 - iOS
 - Android
 - Windows Phone



ANDROID: main differences with IOS

- Different device size (more HW manufacturers)
- Expandable memory
- USB connection
- External HW easier to product



ANDROID: History

- ▶ 2003: The project starts (OS for mobiles)
- ▶ 2005: Google purchased the initial developer of the OS, Android Inc.
 - ▶ Start Dalvik VM development



- ▶ 2007: Open Handset Alliance (OHA) consortium announced (34 founding members)
 - ▶ Mobile handset makers (i.e. HTC), software developers (Google), some mobile carriers (i.e. Telecom) and chip makers (i.e. Qualcomm)
 - ▶ SDK development

ANDROID: History

- 2008: T-Mobile G1 announced
 - SDK 1.0 released
 - Google sponsors first Android Developer Challenge
 - Android Open Source Project (Apache license)
 - Android Dev Phone 1 released



android
open source project

- 2009: New SDK release
 - Cupcake (SDK 1.5)
 - Softkeyboard with autocomplete feature
 - Auto-rotation option
 - Donut (SDK 1.6)
 - New camera features
 - Search features improved (Quick/Voice)
 - Éclair (SDK 2.0/2.0.1/2.1)
 - New camera features
 - Multiple accounts



ANDROID: History

- 2010: Nexus One released to the public
 - Froyo (SDK 2.2)
 - Expandable memory
 - USB tethering
 - Gingerbread (SDK 2.3)
 - UI update
 - NFC
- 2011: New SDK release
 - Honeycomb (SDK 3.0/3.1/3.2) for tablets only
 - New UI tablet oriented
 - Multi-core processor supporting
 - Ice Cream Sandwich (SDK 4.0/4.0.1/4.0.2/4.0.3)
 - WIFI direct
 - Changes to the UI
 - Face unlock
- 2012:
 - Ice Cream Sandwich (SDK 4.0.4)
 - Stability improvement
 - Jelly Bean (SDK 4.1)
 - Google Now



ANDROID: History

▶ 2013:

▶ Kit Kat (SDK 4.4)

- ▶ NFC capabilities through Host Card Emulation
- ▶ Wireless printing support
- ▶ Storage access framework
- ▶ New framework for UI transition



▶ 2014:

▶ Lollipop (SDK 5)

- ▶ Android RunTime (ART) with ahead-on-time (AOT) compilation
- ▶ 64-bit CPU



▶ 2015:

▶ Marshmallow (SDK 6)

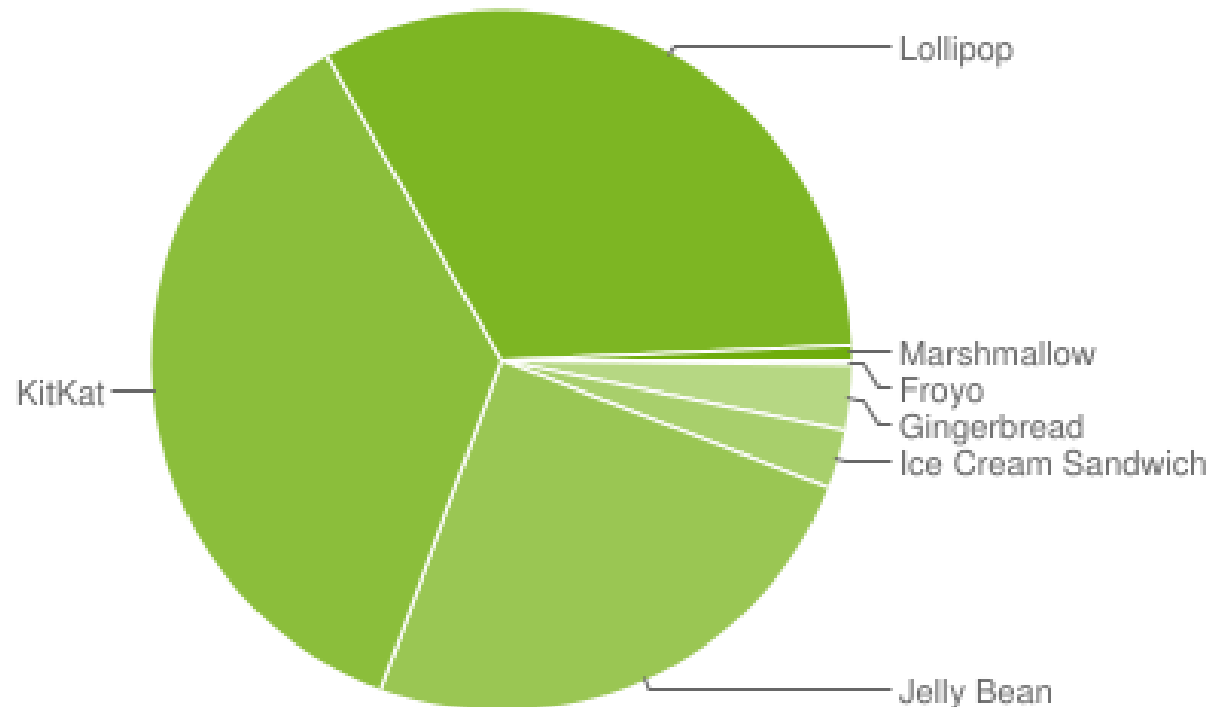
- ▶ Fingerprint recognition, new functionalities for Power management



ANDROID: History

Current Releases Distribution

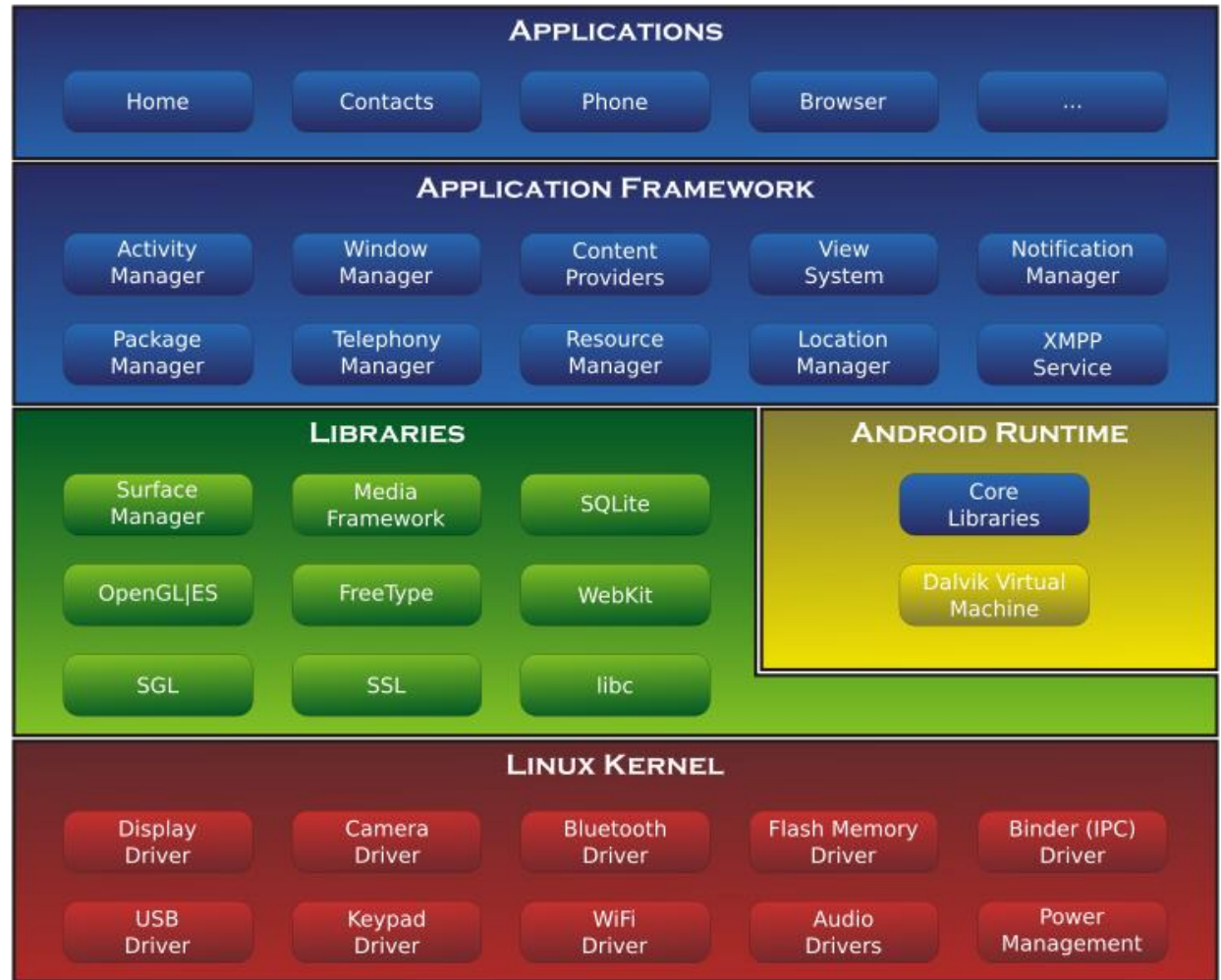
- Froyo: 0.2%
- Gingerbread: 3%
- IceCreamS: 2.7%
- JellyBean: 24.7%
- **KitKat: 36.1%**
- Lollipop: 32.6%
- Marshmallow: 0.7%



ANDROID: ARCHITECTURE

Android is:

- an OS (Linux kernel) for HW interface
- A Library set to be used in APPs
- A Java Virtual Machine for APPs porting and executing (all Apps are written in **Java language**)
- A framework for APPs development
- An Applications containers
 - general Apps (Phone)
 - specific Apps (FB)



ANDROID: Linux Kernel

- ▶ Android Linux Kernel has differentiated from Linux Kernel
 - ▶ From 2.6 ver to 3.8
- ▶ Basic SO services
 - ▶ Abstraction between hardware and software
 - ▶ Security
 - ▶ Memory management
 - ▶ Process management



ANDROID: SDK

- ▶ Software Development Kit (SDK) enables developers to create applications for the Android platform
- ▶ Sample projects source code
- ▶ Custom virtual machine
- ▶ Development tools:
 - ▶ Dalvik Debug Monitor Service (DDMS)
 - ▶ Android Debug Bridge (ADB)
 - ▶ Android Emulator
- ▶ SDK emulator: allows to develop and test apps on PC without a physical device (simulate the mobile)
- ▶ SDK download link:
<http://developer.android.com/sdk/index.html>

PLATFORMS AND APPLICATIONS

- A Platform is a set of Application Programming Interfaces
 - is developed for an OS
 - allow APPs to share data in a standard way (e.g. the user can share data or allow access from a community or a part of it, can track data,...)
- Google fit (June 2014) is health-tracking platform developed by Google for the Android OS (>4.0)
 - supported by most of smart watches
 - partnership with activity tracker, scales, cardio belt, Apps providers...(Nike, HTC, LG, Withings, Motorola, Runtastic, Polar,...)
 - Healthkit is a similar platform developed for IOS (Spring 2014)
- MyFitnessPAL
 - free smartphone app that tracks diet and exercise to determine optimal nutrients and caloric intake for the users' goals
 - large database of over 5 million foods
- Runtastic (makes sport fantastic)
 - Runtastic is a company providing devices and Apps for sports
 - Runtastic is a free App to manage training plans and provide activity tracking



ANDROID, GOOGLE, GOOGLE FIT, APPs: tests

Tests

1) Android is based on [b]:

- a. Windows b. Linux c. IOS d. DOS

2) Android relise of 2015 is [d]

- a. Jelly bean b. Kit Kat c. Lollipop d. Marshmallow

3) Android with respect to IOS supports: [c]

- a. A Healty Platform b. Accelerometers
c. Memory expansion d. Applications for fitness

4) Apps for Android are written in language... [a]

- a. Java b. C c. Visual Basic d. Phyton

5) Internal memory management is a function of.... [d]

- a. Activities b. SDK
c. Library set d. Kernel Linux

6) Google Fit is... [a]

- a. A platform b. An Operative Systems c. An APP d. A Library