

MOBA1: MOBILE APPLICATIONS 1

DEVICES AND PLATFORMS

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OVERVIEW

- Introduction to MOBA1
- Mobile Devices
- Mobile Platforms
- Mobile Applications

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TOPICS MOBA1

1. Introduction, Mobile Platform
2. Design & Development of Mobile Apps (1)
3. Design & Development of Mobile Apps (2)
4. Kotlin
5. Android (1)
6. Android (2)
7. Android (3)
8. Android (4)
9. Beacons

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TOPICS MOBA1

- 10. Mobile Web: Overview, Basics
- 11. Mobile Web: Style & Layout
- 12. Mobile Web: Device APIs, Cordova/Capacitor
- 13. Presentations: Projects and Labs
- 14. Presentations: Projects and Labs

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LESSONS AND SELF-STUDY

- Lecture: two lessons per week
- Practical exercises: also two lessons
- Self-study

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OUTLOOK: MOBA2 (PLANNED)

- 1. Mobile Web: Component driven UIs
- 2. Mobile Web: React.js
- 3. Mobile Web: Ionic/React
- 4. React Native (1): Basics, Navigation
- 5. React Native (2): Components and APIs
- 6. iOS Introduction
- 7. Swift
- 8. SwiftUI (1)
- 9. SwiftUI (2)
- 10. SwiftUI (3)
- 11. Presentations: Projects and Labs
- 12. Presentations: Projects and Labs

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PREVIOUS KNOWLEDGE

- HTML, CSS, JavaScript (WBE)
- Programming in C and Java

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ASSESSMENT

Weight	Type
20%	Exercises and presentations during class time
80%	Final exam

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EXERCISES AND PRESENTATIONS

- Small mobile project
- Exercises on most topics
- Presentation: project results

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EXERCISES AND PRESENTATIONS

- Small mobile project / presentation (teams of 2)
up to 5 points (project: 3, presentation: 2)
- Solved exercises / presentation
up to 5 points

Points acquired during class time count for the semester finals
(weighted, 20%)

If the practical results are inferior to the semester finals, only the latter count for the course grade

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FINAL EXAM

- Mobile Project, 3h, on-site
- Open book, internet allowed except communication

Changes are possible depending on the Corona situation...

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DOCUMENTS

In electronic form in Moodle:

- Slides
- Exercises
- Additional material

MOODLE

<https://moodle.zhaw.ch/course/view.php?id=2155>

- Weekly schedule
- Documents
- Course details and conditions
- Forum (?)

PRACTICAL LESSONS AND LECTURES

PRACTICAL LESSONS

- Tasks explained
- You work with your notebooks
- Teamwork is appreciated

LECTURES

- Private conversations disturbing
- Interaction and participation appreciated
- Take notes

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SMARTPHONE AND TABLET MARKET



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FEATURE PHONE TO SMART PHONE



↓ more ↓

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Quelle:
<https://www.samsung.com>

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MOBILE DEVICES



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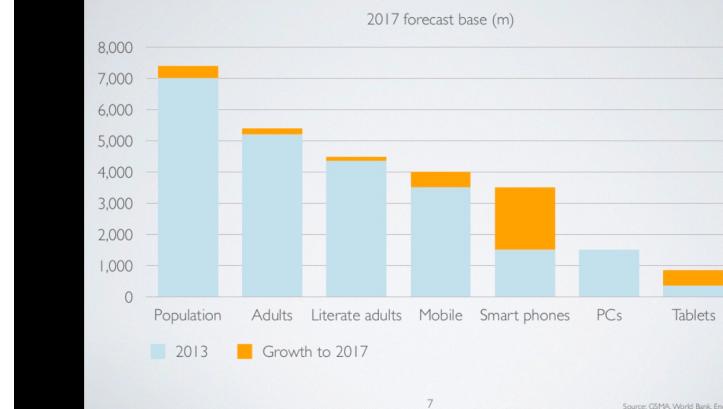
MOBILE DEVICES ??

- Notebooks
- Netbooks
- Feature Phones
- Personal Digital Assistants
- Smartphones
- Tablets
- Smartwatches
- SmartTags, AirTags
- Calculator watches
- Handheld game consoles
- Head-mounted displays
- Wearable computers
- Portable media players
- Digital still cameras (DSC)
- Digital video cameras (DVC) or digital camcorders
- Personal navigation devices (PND)

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The world in 2017



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MOBILE DEVICES IN MOBA 1/2

- In MOBA1/2 we focus on Smartphones
- With some comments on other devices
- Priority on devices with widespread mobile OSs

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FEATURES OF MOBILE DEVICES

- Smaller screens (here, smartphones and tablets differ)
- Different input concepts (touch, keyboard, stylus)
- Slow, unstable network connection
- Less powerful processors
- Batteries – minimize power consumption

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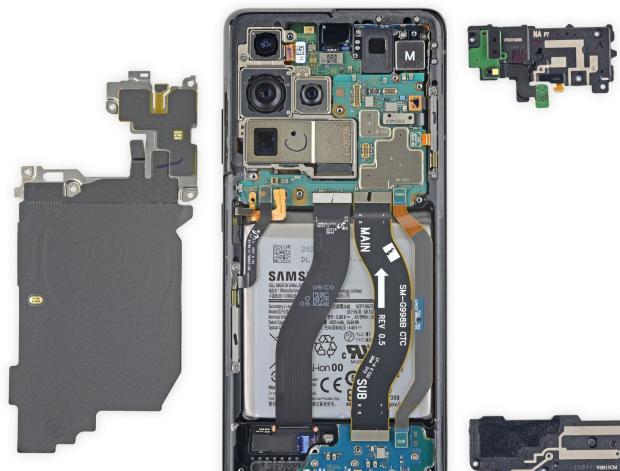
DEVICE SENSORS

- Camera
- Microphone
- Geolocation, GPS
- Accelerometer
- Gyroscope
- Magnetometer
- Battery state
- Proximity sensor

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INSIDE SAMSUNG GALAXY S21 ULTRA



Teardown

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INSIDE IPHONE 13 PRO VS 12 PRO

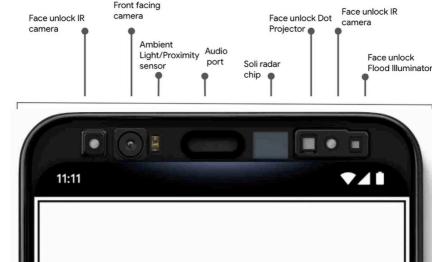
Teardown



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GOOGLE PIXEL 4 SOLI RADAR

- Google's Pixel 4 had built-in radar
- Pixel 5 and 6: radar sensor was ditched



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PROBLEM: FRONT CAMERA, SENSORS



- Google Pixel 6a
- Fingerprint unlock
- 8 MP front camera

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DYNAMIC ISLAND (APPLE)



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- **Mobile Platforms**
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Mobile platform wars over?

- Apple and Google's Android have won; unlikely that other platforms will be relevant
- Apple camped out at the high end, Android taking the rest
- But Google's control of Android is partial
- Facebook and Amazon trying to extract value
- Samsung's position uncertain

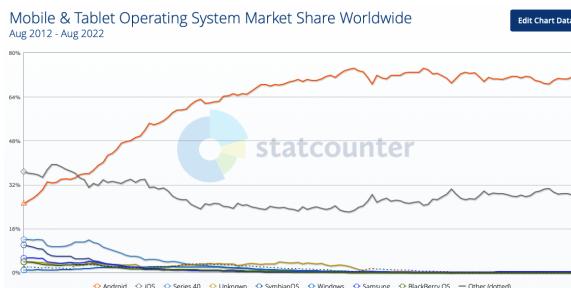
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ANDROID AND IOS

- Dominate the smartphone market
 - Also at the top in terms of developer mindshare
 - But: Mobile space changes continuously

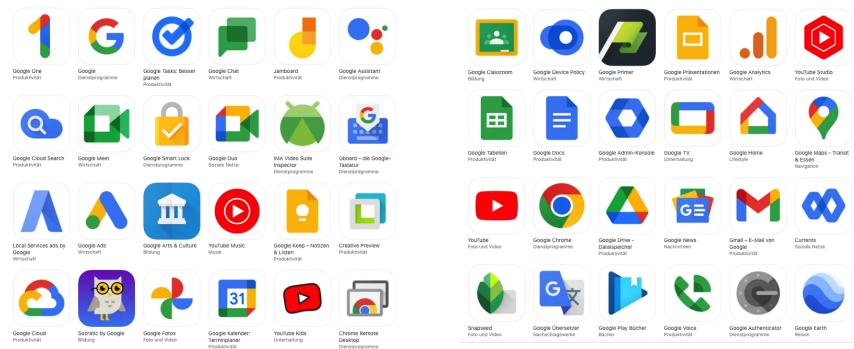


Source:
[statcounter](#)

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GOOGLE APPS FOR IOS



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Different focus for innovation

Apple

- Integrated hardware & software
 - Fingerprints, Bluetooth, Airdrop, 64 bit etc
 - Move innovation down the stack (hard for Google)
 - Directed discovery (iBeacon)

Google

- Systemic fragmentation, little hardware control
 - Google Now, Maps, Plus, semantic search etc
 - Move innovation up the stack (hard for Apple)
 - Predictive discovery (Now)

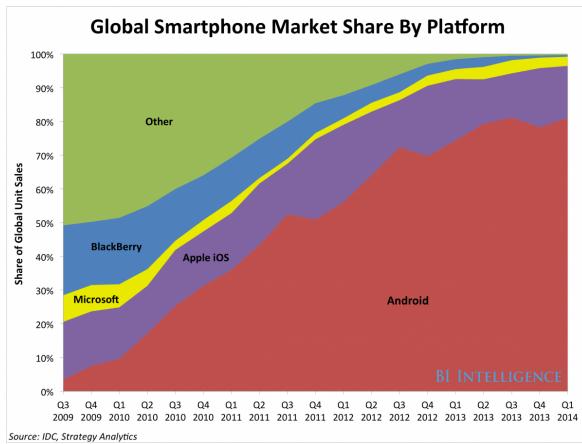
35 . 1

ANDROID'S PURPOSE

- Spreading the use of Google services across the mobile web
 - Makes economic sense to offer Android for free
 - In 2009 device vendors needed an answer to the iPhone
 - Android was available (and free...)
 - Most device vendors jumped on the Android bandwagon
 - Except for Apple, Nokia, and BlackBerry
 - Nokia and BlackBerry failed

↓ more ↓

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ANDROID DIFFERENTIATION

- Google allowed Android differentiation
- Purpose: Get device vendors to adopt it
- Vendors could create their own interface layer
- They could also change default apps, including the browser
- Samsung TouchWiz, HTC Sense, MotoBlur, ...
- **Differentiation is the positive slant on fragmentation**

IOS: HISTORY (1)

- iPhone unveiled by Steve Jobs January 9th 2007
- OS named iPhone OS
- November 2010: launch of the fourth generation of the OS
 - renamed to iOS
 - launch of the original iPad
- New version each year

[And Then Steve Said, ‘Let There Be an iPhone’](#)

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IOS: HISTORY (2)

- iOS 7 was touted as a major UI refresh
- iOS 8 with new frameworks and services, Apple Watch
- iOS 9 with split view on iPad, better Siri, faster graphics
- iOS 10 with haptic feedback, better Siri, better search
- iOS 11...16 with ?? ([various improvements](#))
 - iOS 14 with Widgets on Home Screen
 - iOS 16: lock screen customization

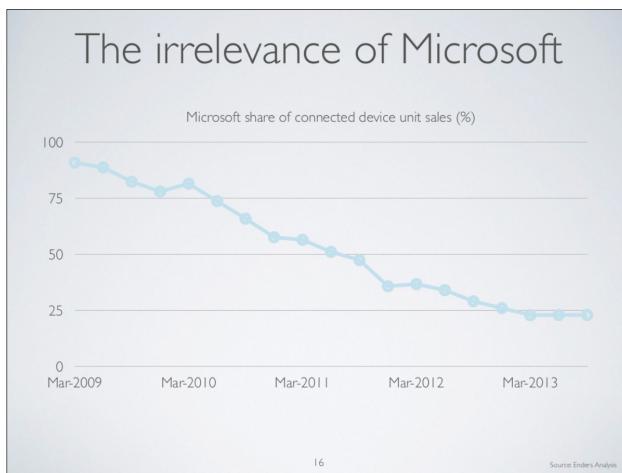
[→ Release notes for developers](#)

[High adoption rate of each iOS version soon after release](#)

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MARKET SHARE

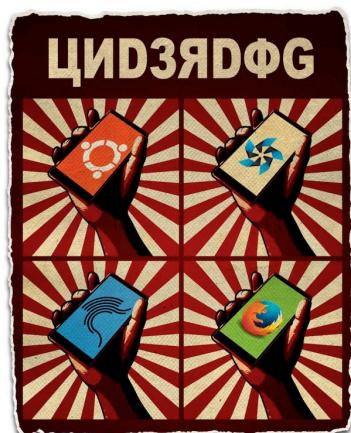
Period	Android	iOS	Windows	BlackBerry	Others
2018	85.1%	14.9%	0.0%	0.0%	0.0%
2017	85.0%	14.7%	0.1%	0.0%	0.1%
2016	83.4%	15.4%	0.8%	0.0%	0.4%
2015	78.0%	18.3%	2.7%	0.3%	0.7%
2014	81.2%	15.2%	2.5%	0.5%	0.7%
2013	75.5%	16.9%	3.2%	2.9%	1.5%
2012	59.2%	22.9%	2.0%	6.3%	9.5%

(Source: IDC)

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THE UNDERDOGS



Discontinued or irrelevant

- Firefox OS
- BlackBerry OS
- Ubuntu Phone
- Tizen
- Sailfish OS
- ...

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ECOSYSTEM SIZES



- Regional differences
- Sources
[StatCounter](#)
[kantarworldpanel](#)
[netmarketshare](#)

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ECOSYSTEM DIFFERENCES

Ecosystem is the key leverage point



For Apple, the ecosystem is what sells hardware

For Amazon, Google and Facebook, the experience on the phone is what drives engagement with all their services

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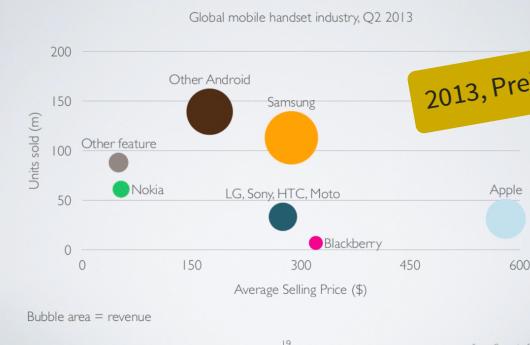
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PRODUCT CATEGORIES

Very different products



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MOBILE APPLICATIONS

- Traditionally we targeted phones
- Then tablets followed
- Today we have a complete range of device types
 - smartwatch, phone, tablet, TV and automotive
 - Each one poses its own usability challenges

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MOBILE APPLICATIONS

- Native
- Web-based
- Hybrid

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NATIVE MOBILE APPLICATIONS

- Platform specific language
- Platform specific APIs
- Platform specific central app store
- Advantages
 - Usually offer the best performance
 - Deepest integration
 - Best overall user experience
- Disadvantage
 - Most complex development option

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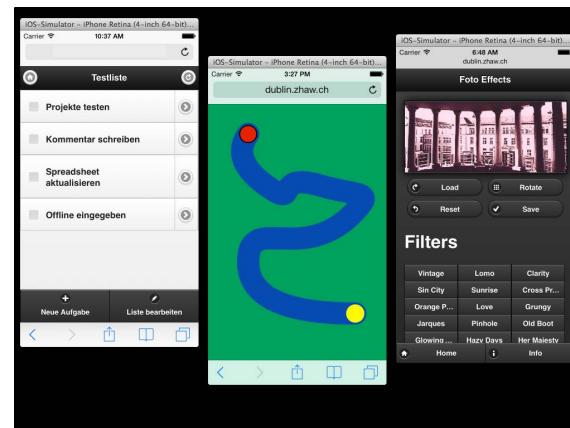
WEB-BASED MOBILE APPLICATIONS

- Based on HTML, JavaScript and CSS
- Do not rely on an app store
- Essentially locally stored mobile sites
- Try to emulate the look-and-feel of an app
- Can be added to the home screen

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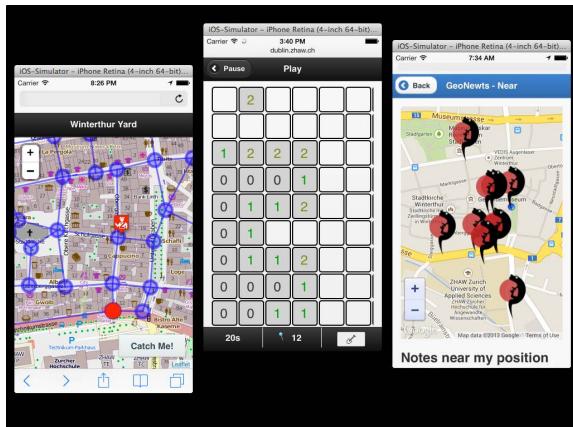
SAMPLE WBE PROJECTS



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SAMPLE WBE PROJECTS



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HYBRID MOBILE APPLICATIONS

- Frameworks can build a native wrapper around web apps (examples: Cordova, Capacitor)
- Use native code for enhanced performance and integration
- Use a webview with HTML-based content for other parts
- Allow to revise content and features without using the app stores

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SOURCES

- Slides and other material from courses WEB1, WBE
- Mobile Developer's Guide To The Galaxy, 18th Edition, Open XChange, <https://www.open-xchange.com/resources/mobile-developers-guide-to-the-galaxy/>
- Mobile is eating the world, Benedict Evans, 2013, <http://de.slideshare.net/bge20/2013-11-mobile-eating-the-world>

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