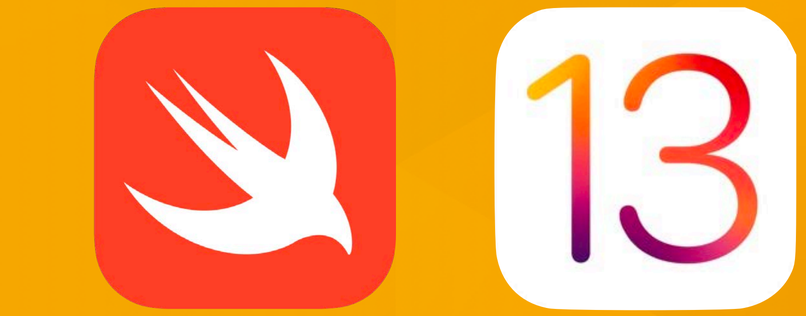
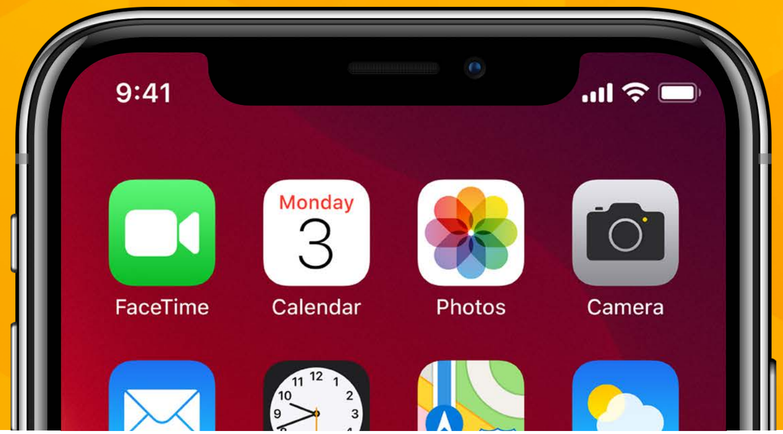




iOS Application Development

Lecture 1: Introduction

Simon Völker & Philipp Wacker
Media Computing Group
RWTH Aachen University

hci.rwth-aachen.de/ios

RWTH AACHEN UNIVERSITY

Team

Simon Völker

voelker@cs.rwth-aachen.de
E-Mail Subject: [iOS]

Philipp Wacker

wacker@cs.rwth-aachen.de
E-Mail Subject: [iOS]

Certified Trainer
App Development with Swift 4

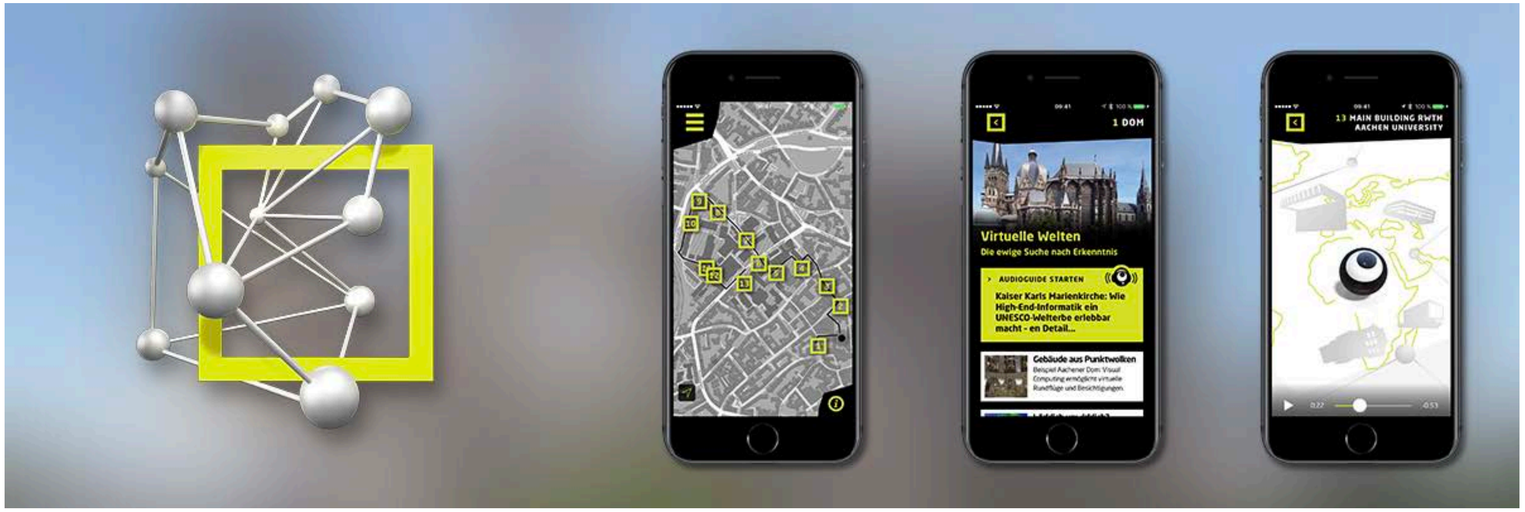
RWTH AACHEN UNIVERSITY

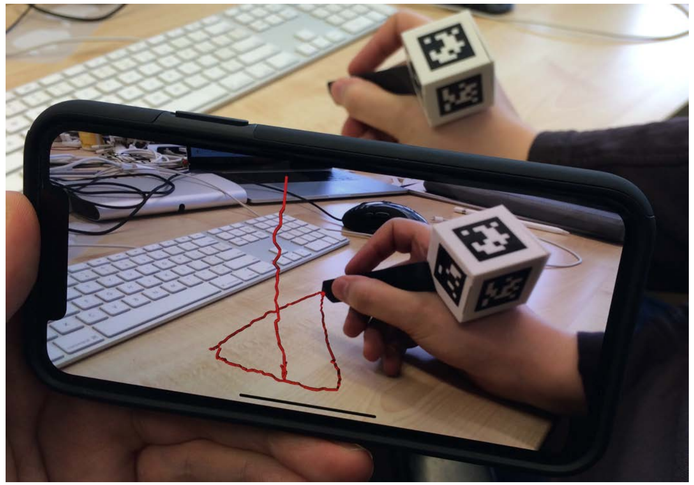
Class Goals

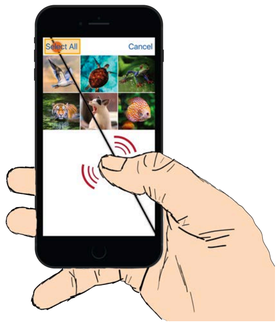
- Learn the basic of iOS App development
- Learn how to use advanced iOS Frameworks

- Understand the differences between desktop and mobile development
- During the project: Focus on UX and Usability
- Coding, coding, and coding…

Our Projects with iOS







CENTRE **CHARLEMAGNE**
Neues Stadtmuseum Aachen

RWTH AACHEN UNIVERSITY

Administrivia

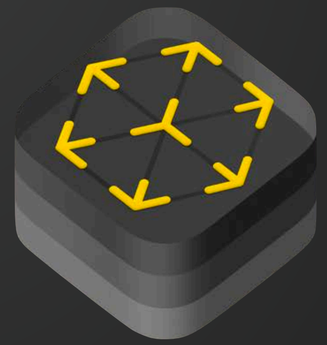
- 6 Credit points
- Class times
  - Mondays (12:30 — 14:00), Room 2222
  - Tuesday (10:30 — 12:00), Room 2222
- Only 42 Seats

Class Syllabus

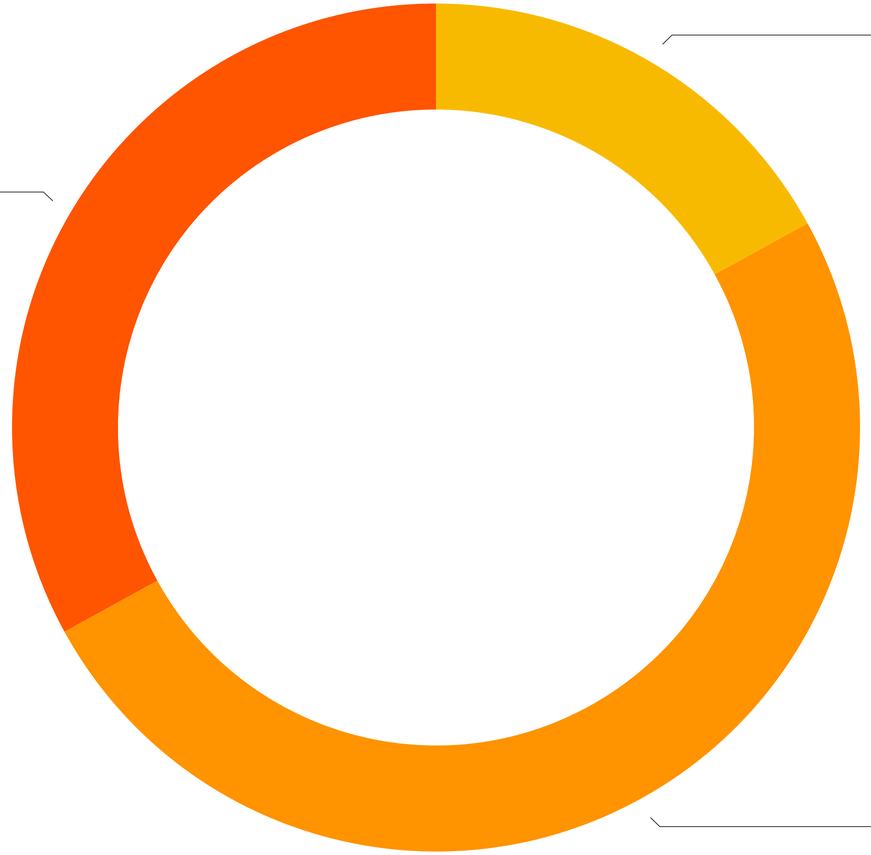
- Part 1
  Lecture: Introduction into iOS and Swift

- Part 2
  Seminars: iOS Frameworks

- Part 3
  Project: App Development



Your Final Grade (6 ETCS)



17 %

Seminar

33 %

Oral Exam (15 min)
February, 6th and 7th

50 %

Project

Lectures

- Introduction to Swift
- XCode
- Introduction to UIKit
- Navigation and workflows
- Tables and persistence
- Working with the web
- and more…

App Development with Swift

https://www.apple.com/everyone-can-code/

Seminar

Possible Topics:

- Swift UI
- Core Data
- RealityKit & Reality Composer
- Core ML + Create ML
- WatchOS
- Extensions
  & Inter-App Communication
- Debugging and Instruments
- MapKit, CoreLocation
- SiriKit
- CloudKit & iCloud Drive
- GameplayKit
- Metal
- AVKit
- Bringing People into AR
- Networking in iOS
- ClassKit
- Scene Kit

- Groups of 3 (14 Groups)
- 20 minute presentations
- 18.11.2019 - 9.12.2019
- Overview of the framework
- Example applications
- Can be recorded
- Attending is mandatory
- 17% of the final grade

Project

Possible Topics:

- Games
- AR Apps

- Depending on the available devices

- Groups of 3 (14 Groups)
- Submittable app
- 18.11.2019 - 9.12.2019
- Final presentation with live demo
- Code documentation!!!
- 50% of the final grade

Oral Exam

- Questions about:
  - Lecture content
  - All Seminars
  - Your Project

- February 6th and 7th
- 15 minutes
- 33% of your final grade

Course Requirements

- OOP experience
- Apple Developer ID
- Mac and iOS Device would be helpful
- You must register for this course in RWTHOnline
- This course is only for students from:
  - B.Sc. and M.Sc. Computer Science
  - SSE / MI / DS / TK

Limited Seating

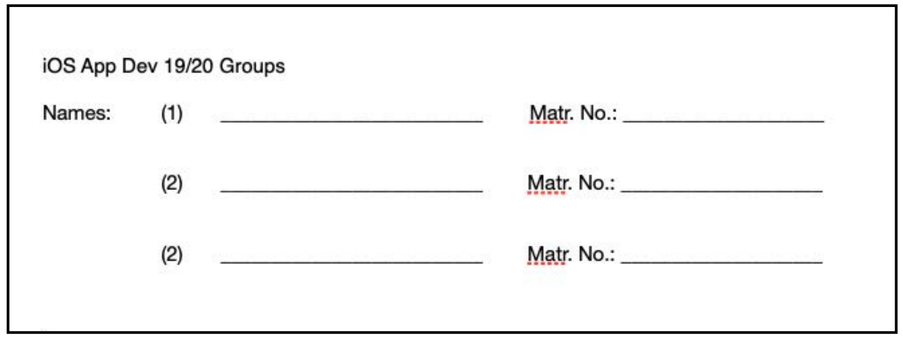
- We only have 42 seats are available
- Attending the seminar is mandatory (18.11 - 9.12.)
- Attending the project meetings is also mandatory (10.12 - 31.01.)
- Only take this class if you are sure you can attend all classes!!

How to get a Seat?

- Register in RWTHOnline today (08.10.19)
- Sign and hand in the **Declaration of Compliance** until 10.10.19.
- Form a group of 3 students and send us the group details until 10.10.19
- We will randomly select 14 groups on the 11.10.19

Find a Group

- Fill out the group sheet today after the lecture **OR**


iOS App Dev 19/20 Groups

Names: (1) _____ Matr. No.: _____

(2) _____ Matr. No.: _____

(2) _____ Matr. No.: _____

- Send an eMail to voelker@cs.rwth-aachen.de until this Thursday (10.10.19)
  - Subject: iOS19/20 Groups
  - Content: Name and MatNr. of your group members

- We'll also invite everyone who is registered for the course in RWTHOnline temporarily to the Moodle-Room to use the forum for finding group partners.

Lecture Slides and Videos

- All slides and lecture videos will be available online:
  - http://hci.rwth-aachen.de/ios
  - https://www.youtube.com/user/i10rwthaachen

CHAPTER 0

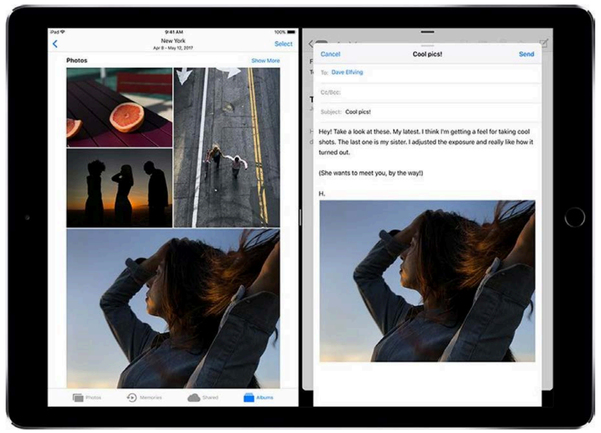
Developing for Mobile Platforms

VS.


9:41
FaceTime
Monday
3
Calendar
Photos
Camera
Mail
Clock
Maps
Weather
Reminders
Notes
Stocks
News
Books
App Store
Podcasts
TV
Health
Home
Wallet
Settings

Mobile Device Characteristics

- Context is key: task, attention split, peripheral use, movement, interaction time
- Screen size is compact
- Users interact with one screen at a time
- Mostly users interact with one application at a time (iPadOS allows split screen)
- Onscreen help is minimal
- Direct touch or pen input

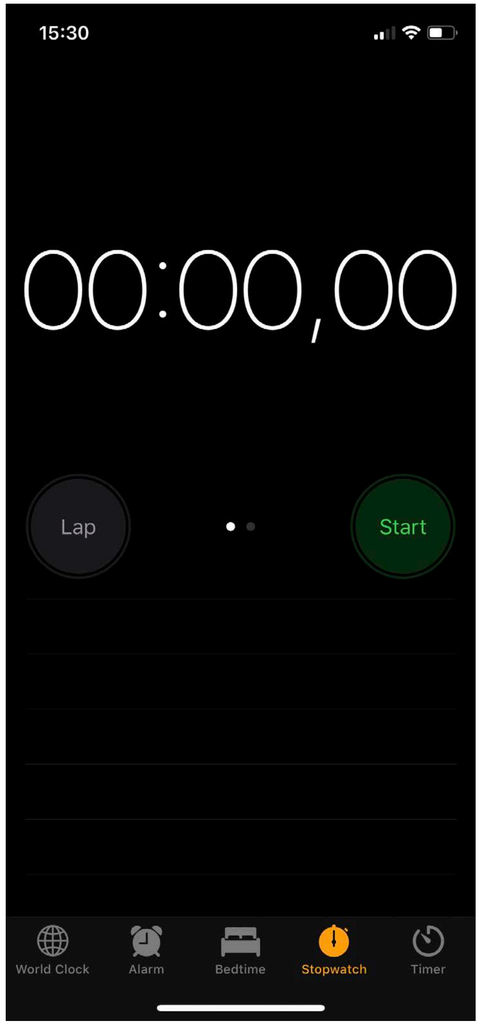


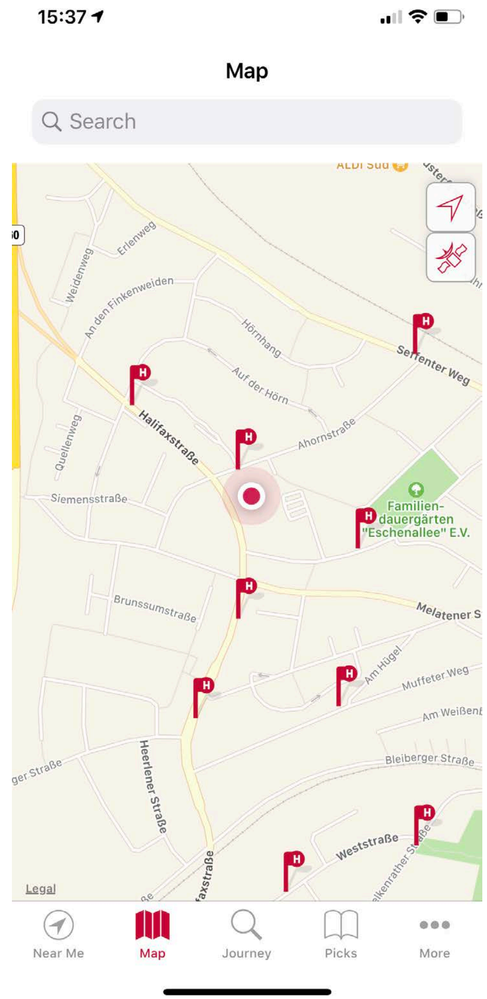
10 Golden Rules of Interface Design (see DIS 1)

- Keep the interface simple
- Speak the user's language
- Be consistent and predictable
- Provide feedback
- Minimize memory load

- Avoid errors, help to recover, offer undo
- Design clear exits and closed dialogs
- Include help and documentation
- Offer shortcuts for experts
- Hire a graphics designer

Three Examples





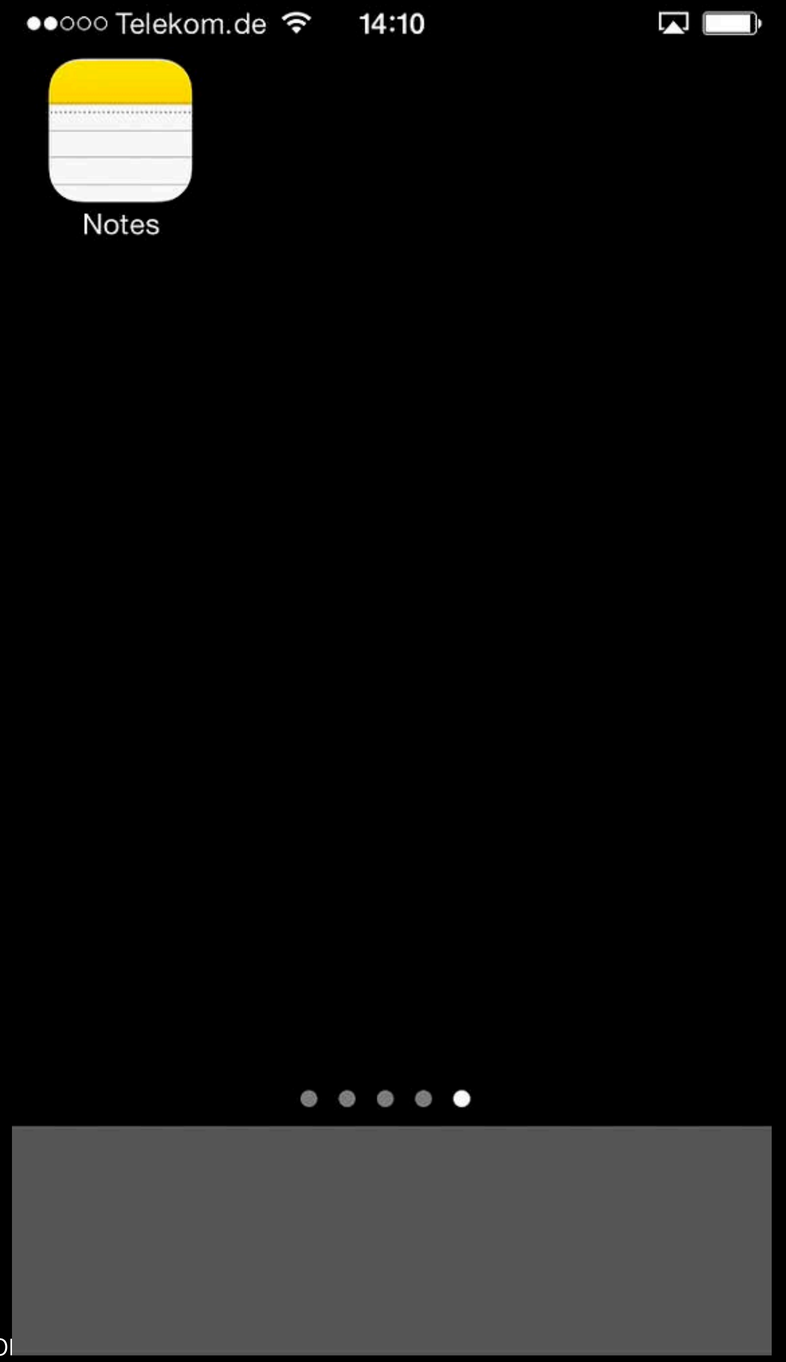
The iOS Family

Life as an App

- iOS is an app-centric environment
- One app per task!
  - Define the task that users want to accomplish with your app
  - Do *one* thing, but do it well
- Data is stored per app
- Data exchange between some apps is difficult

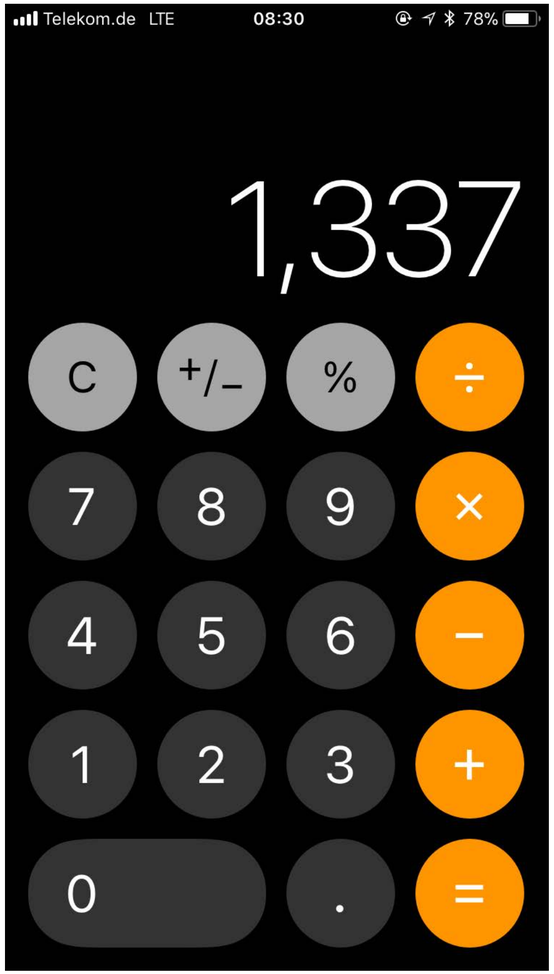
Designing the UI

- Make it obvious how to use your application
- Sort information from top to bottom
- Use visual weight for relative importance
- Use alignment for groupings or hierarchy
- Use multiple views for different parts of the app



Designing the UI

- Text should always be legible
- Avoid inconsistent appearances
- Provide fingertip-size targets (.8 x .8 mm)
- Minimize text input



Interaction Design

- Smartphones are mostly used with only one hand

- Not everyone is used to Multitouch interaction
  - Only use Multi-touch if you need it

- Follow Apple’s examples if possible

- If you use complex gestures, help the user

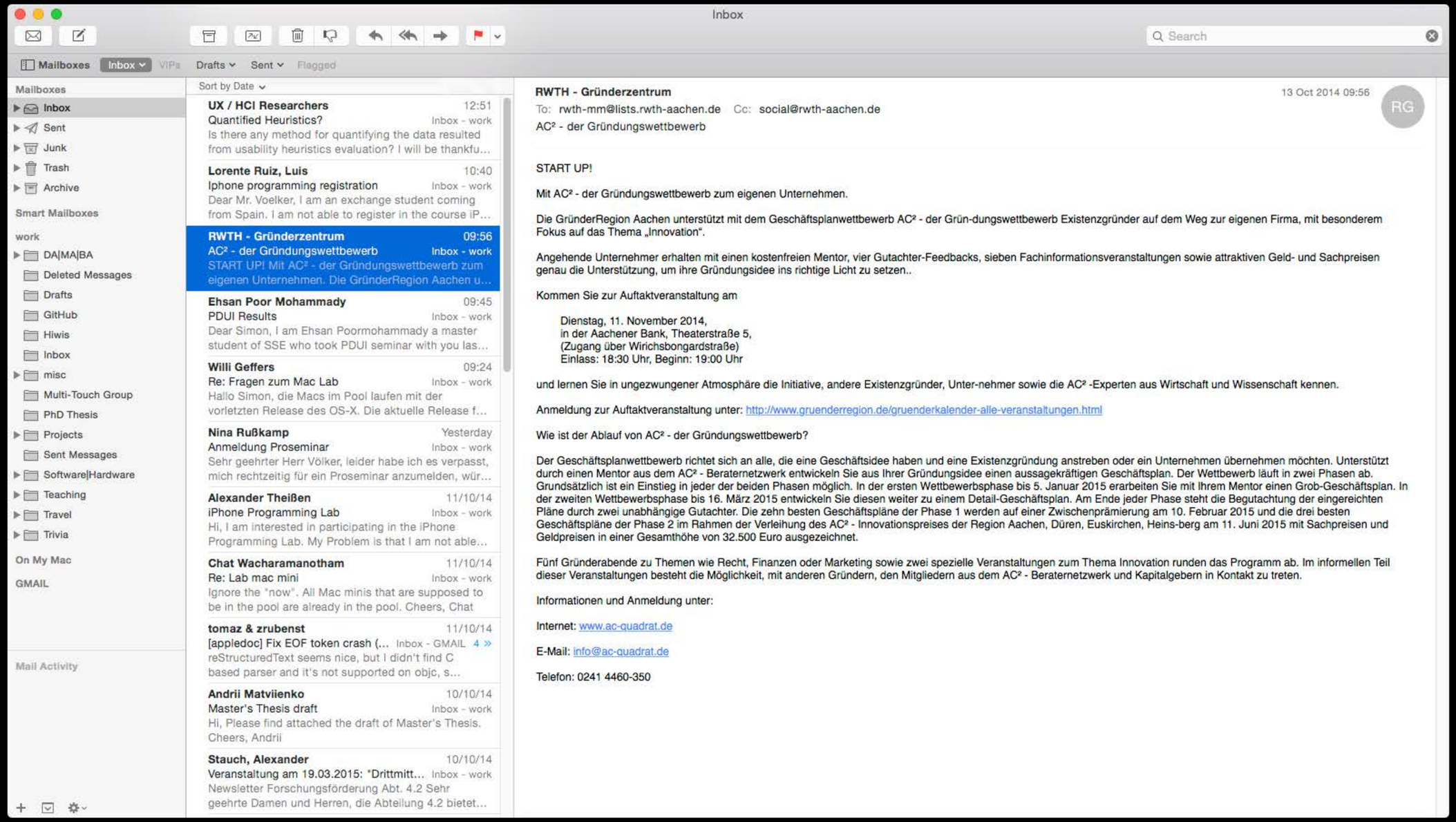
Standard Gestures

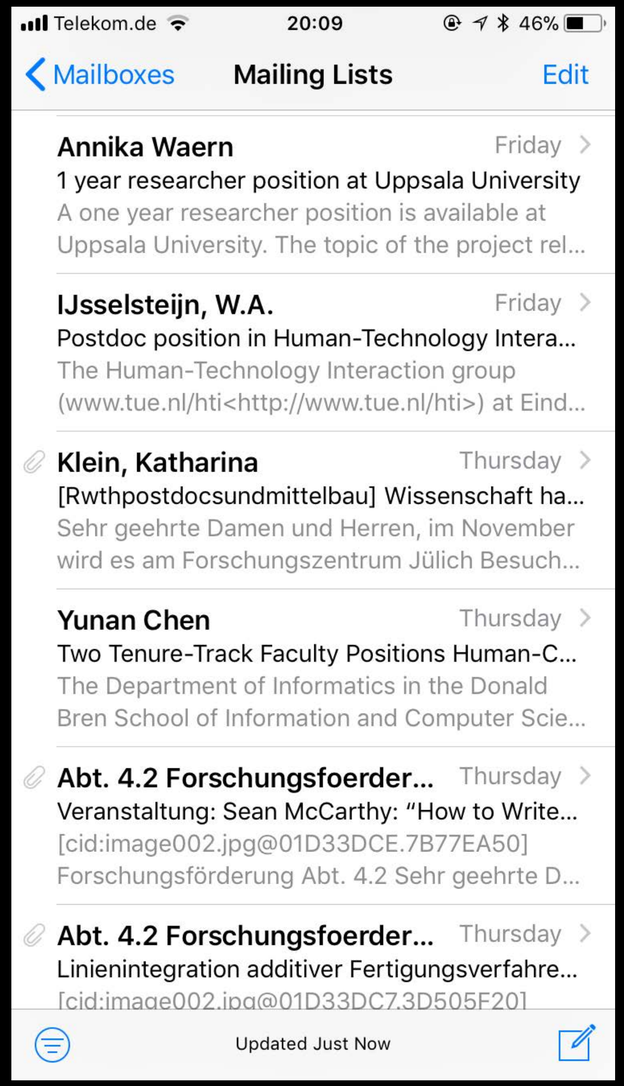
	Tap	To press or select a control or item (analogous to a single mouse click).
	Drag	To scroll or pan.
	Flick	To scroll or pan quickly.
	Swipe	In a table-view row, to reveal the Delete button.
	Double tap	To zoom in and center a block of content or an image. To zoom out (if already zoomed in).
	Pinch open	To zoom in.
	Pinch close	To zoom out.
	Touch and hold	In editable text, to display a magnified view for cursor positioning.

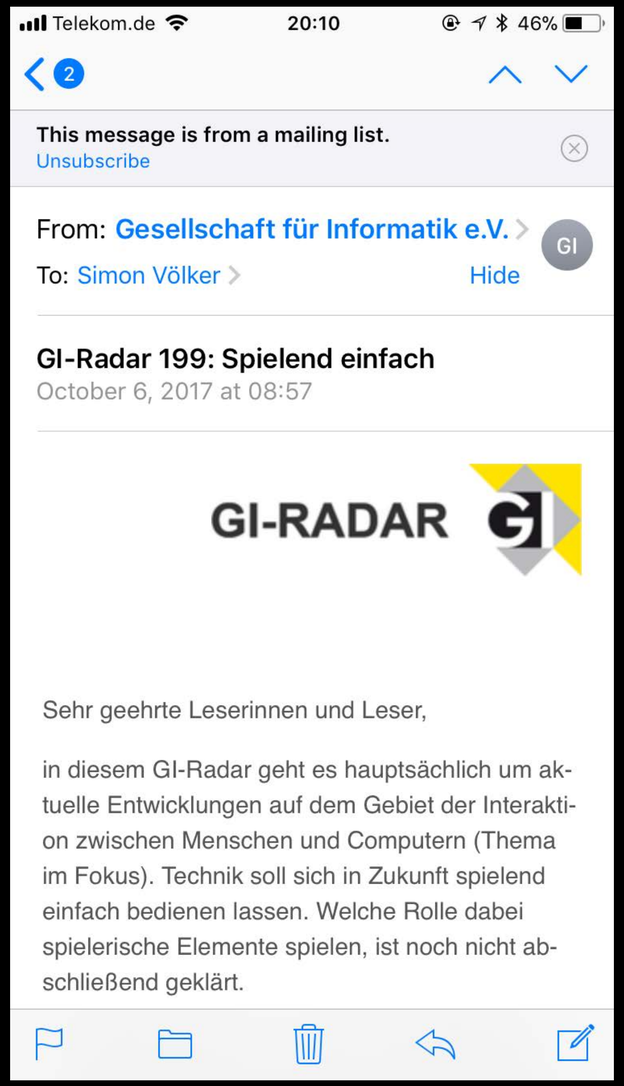
Designing the UI

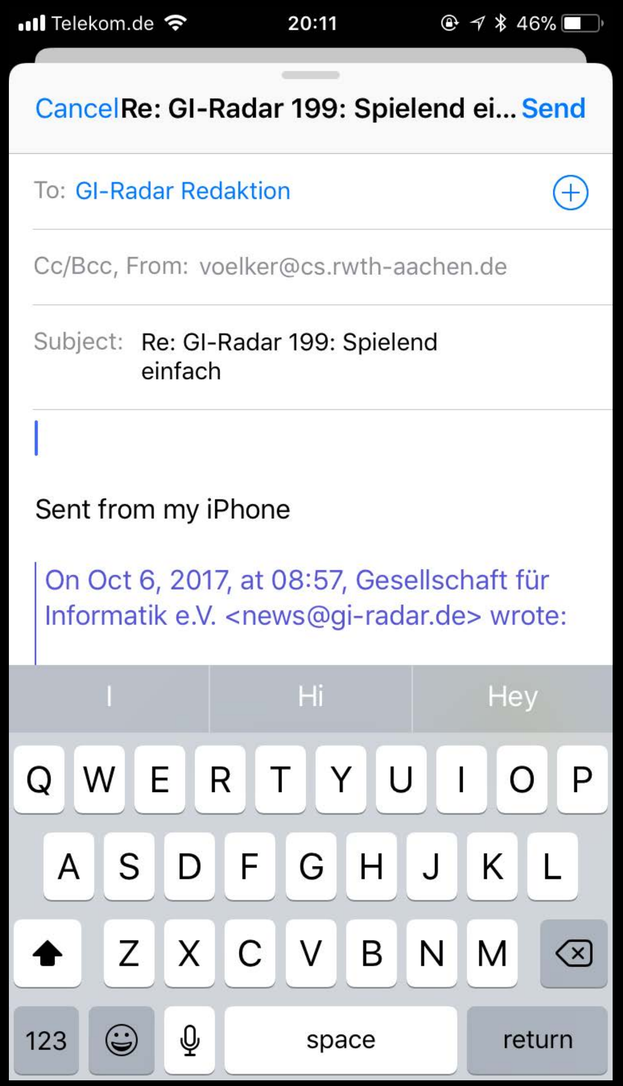
- Several resolutions, about four aspect ratios:

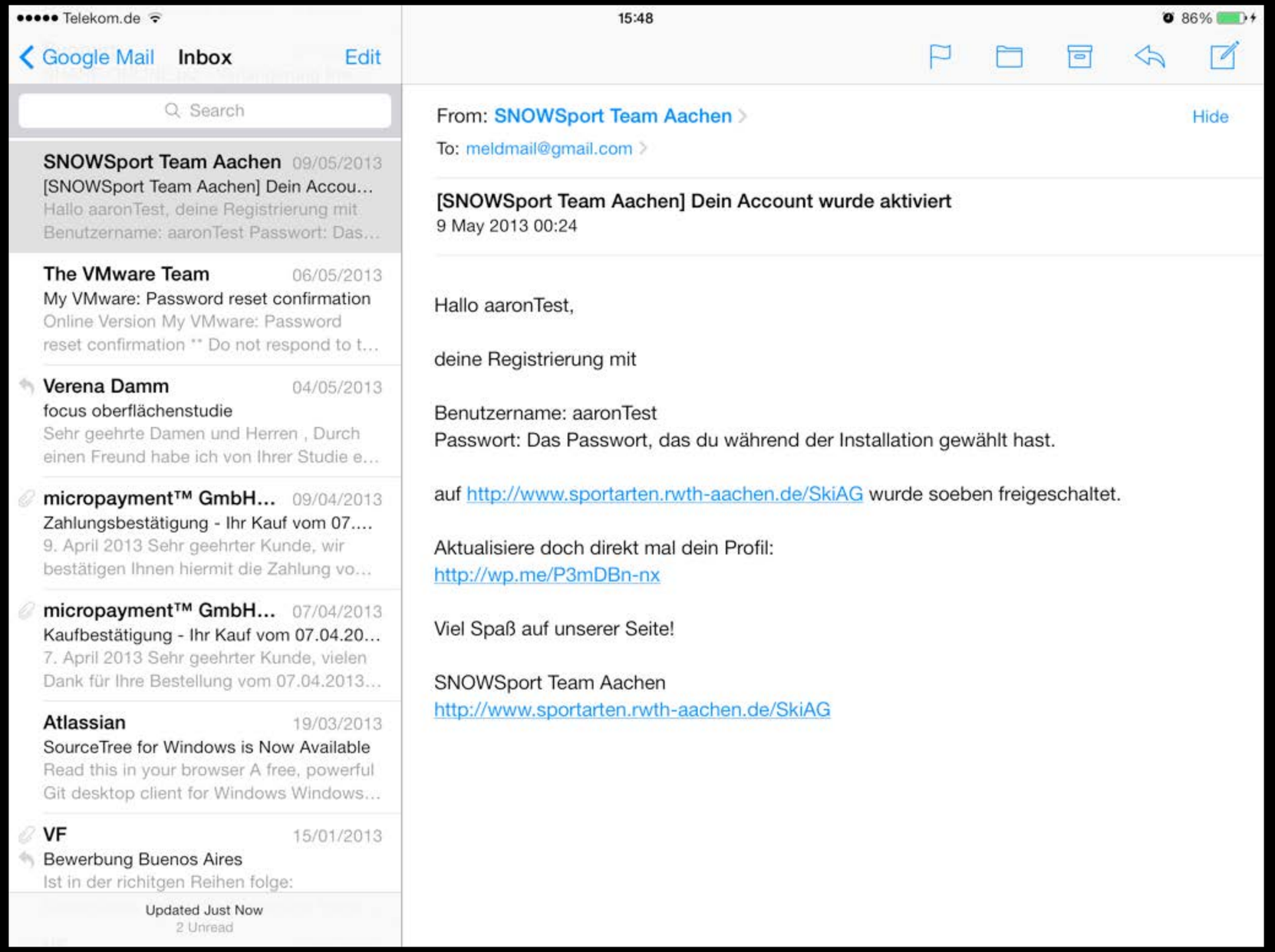
- Device orientation: portrait or landscape
- Designing for the iPad requires more than increasing the resolution

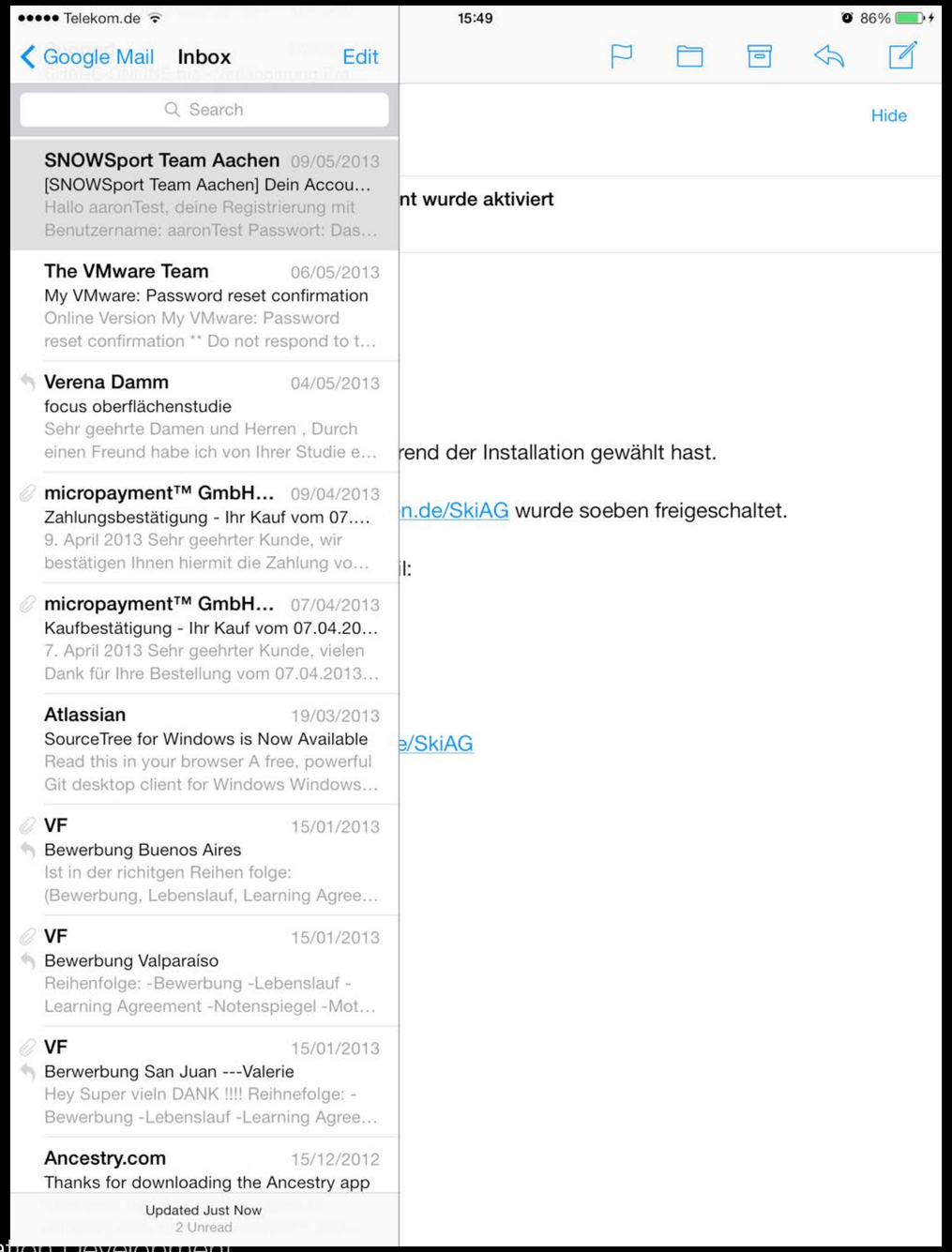










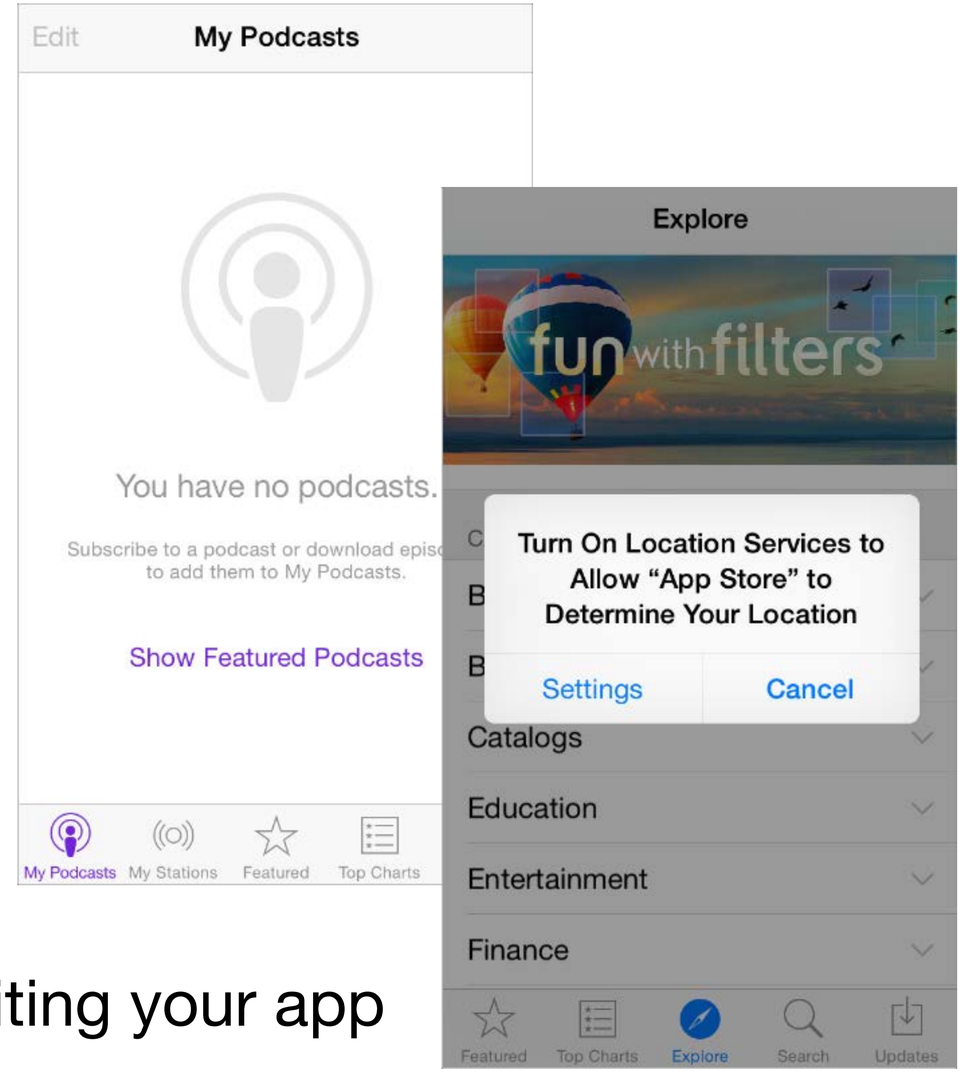


Starting

- Apps should start quickly to provide a fluid user experience
- Show a launch image that closely resembles the first screen of your app (launch file)
- Restore the state of last run (minimize user input)
- Delay a login requirement for as long as possible
- By default, launch in device's current orientation
- Think carefully before providing an onboarding experience

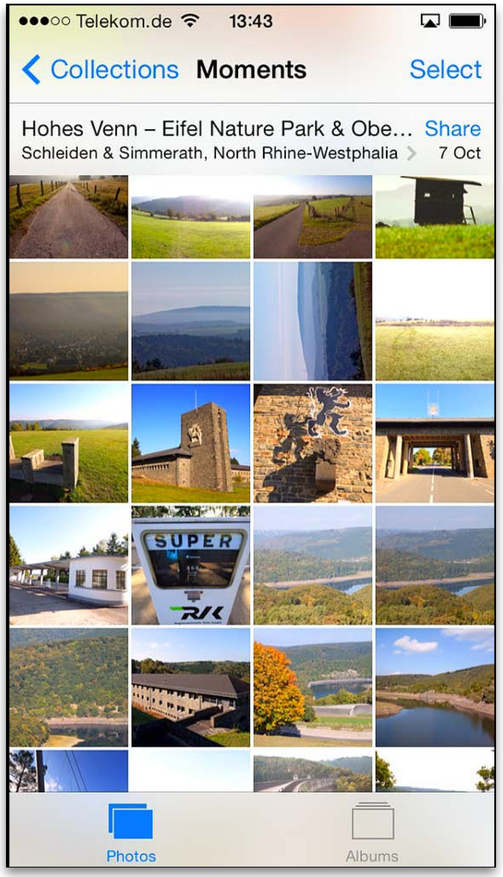
Stop

- No Quit button or menu item
- Be prepared to quit at any time
- Program flow interrupted by external events
  - Incoming phone call
- Store state when stopping
- Application moved to background
- Notify users what feature are unavailable and limiting your app



Application Styles

Productivity



Photos

Utility

Weather

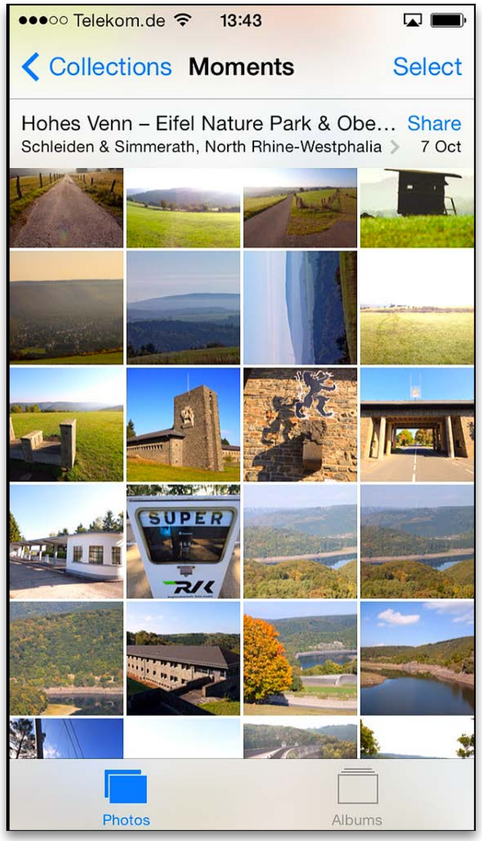
Immersive

Seadragon

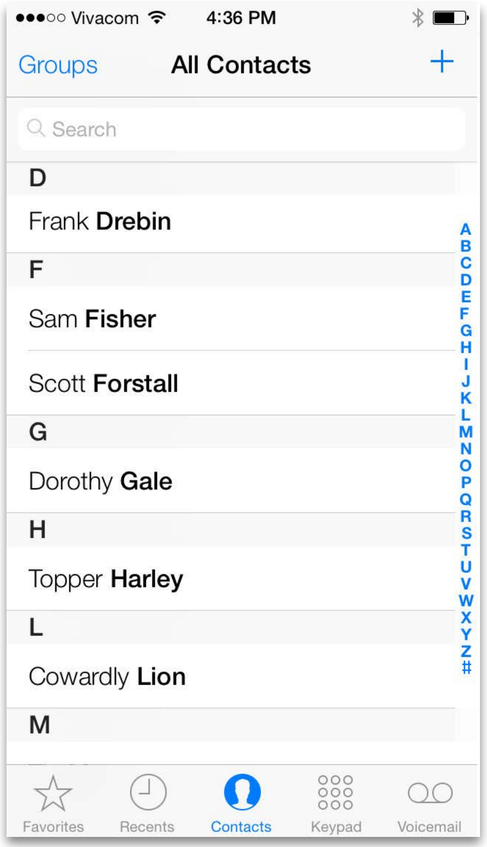
Productivity Applications

- Organizing and managing detailed information
- Often organize data hierarchically
- Organizing the list, add or remove items
- Examples: Contacts, Photos

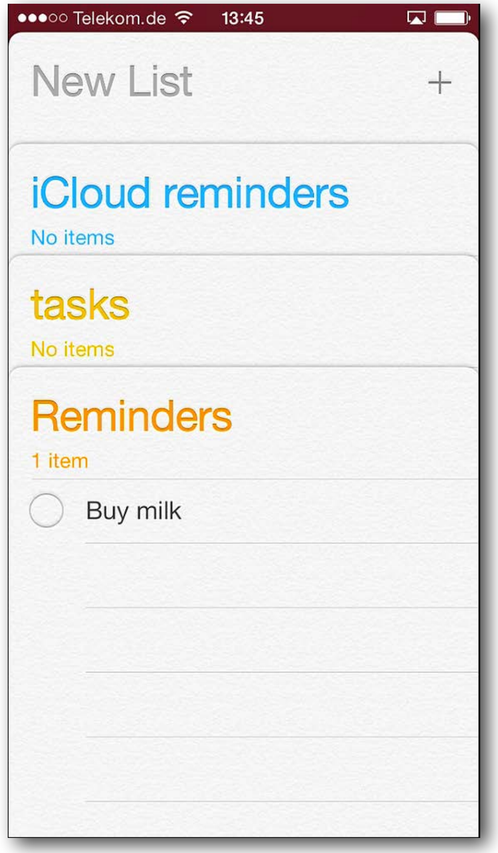
Productivity Applications



Photos



Contacts



Reminders

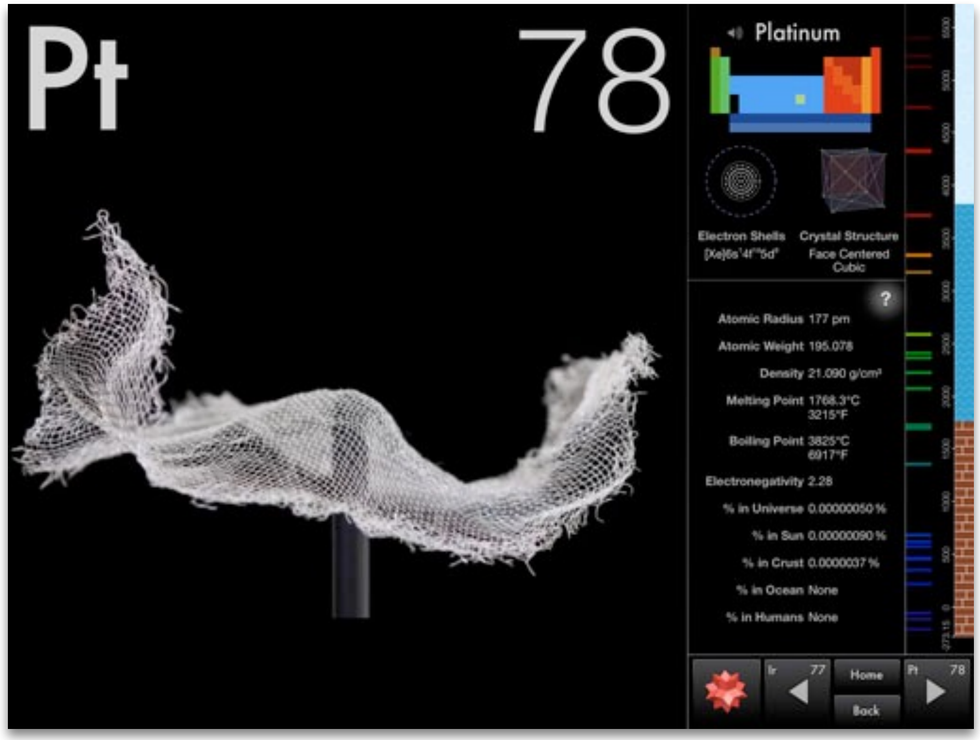
Utility Applications

- Simple task, minimum user input
- Customized, visually attractive UI that enhances the displayed information
- Data is organized in flattened list of items
- Examples: Weather, Stocks

Utility Applications

Weather

Stocks



Elements

Immersive Applications

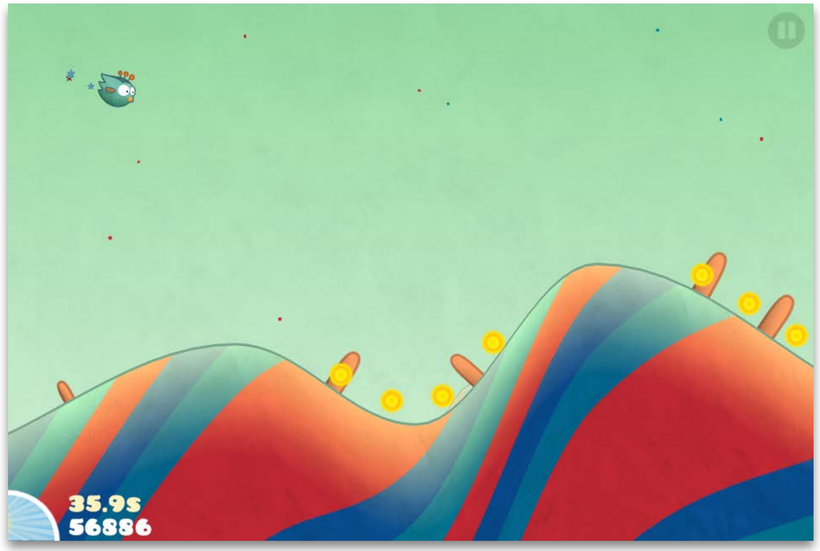
- Full-screen, visually rich UI
- Focussed on content and user experience
- Tends to hide much of the device’s user interface
- Custom navigational methods
- Examples: Living Earth, Carpenter

Immersive Applications

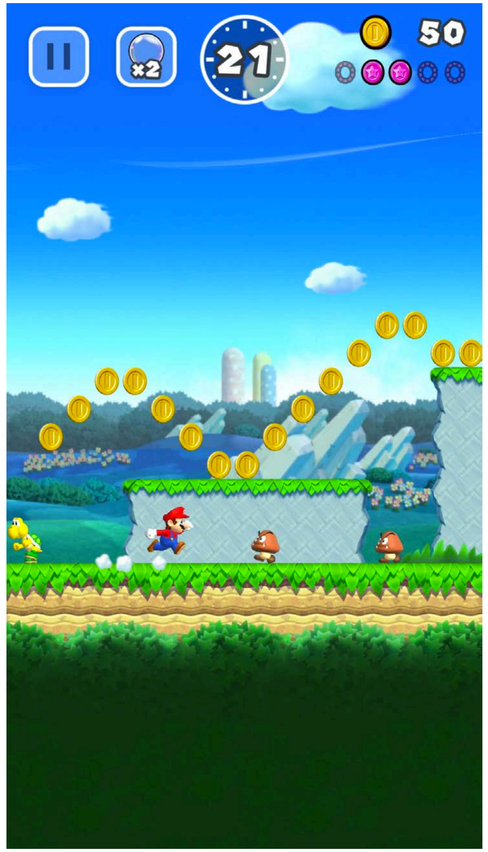
Living Earth

Carpenter

Games



Tiny Wings



Super Mario Run

The Maschines

Summary

- Mobile vs. desktop apps: user, task, context
- Keep hardware restrictions in mind
- Application styles: productivity, utility, immersive
- Further reading material:

- iOS Human Interface Guidelines: https://developer.apple.com/ios/human-interface-guidelines/overview/themes/
- https://www.apple.com/everyone-can-code/

What's Next?

- Register in RWTHOnline today (10.10.19)
- Find a group and notify us via the sheet or eMail
- Notification on 11.10.19
- Next Lecture: 14.10.19 | 12:30 - 14:00
  - Distribution of seminar topics and introduction into Swift

Cocoa Touch Architecture