



iOS Application Development

Lecture 1: Introduction

Simon Völker & Philipp Wacker
Media Computing Group
RWTH Aachen University

hci.rwth-aachen.de/ios



RWTHAACHEN
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



Class Goals

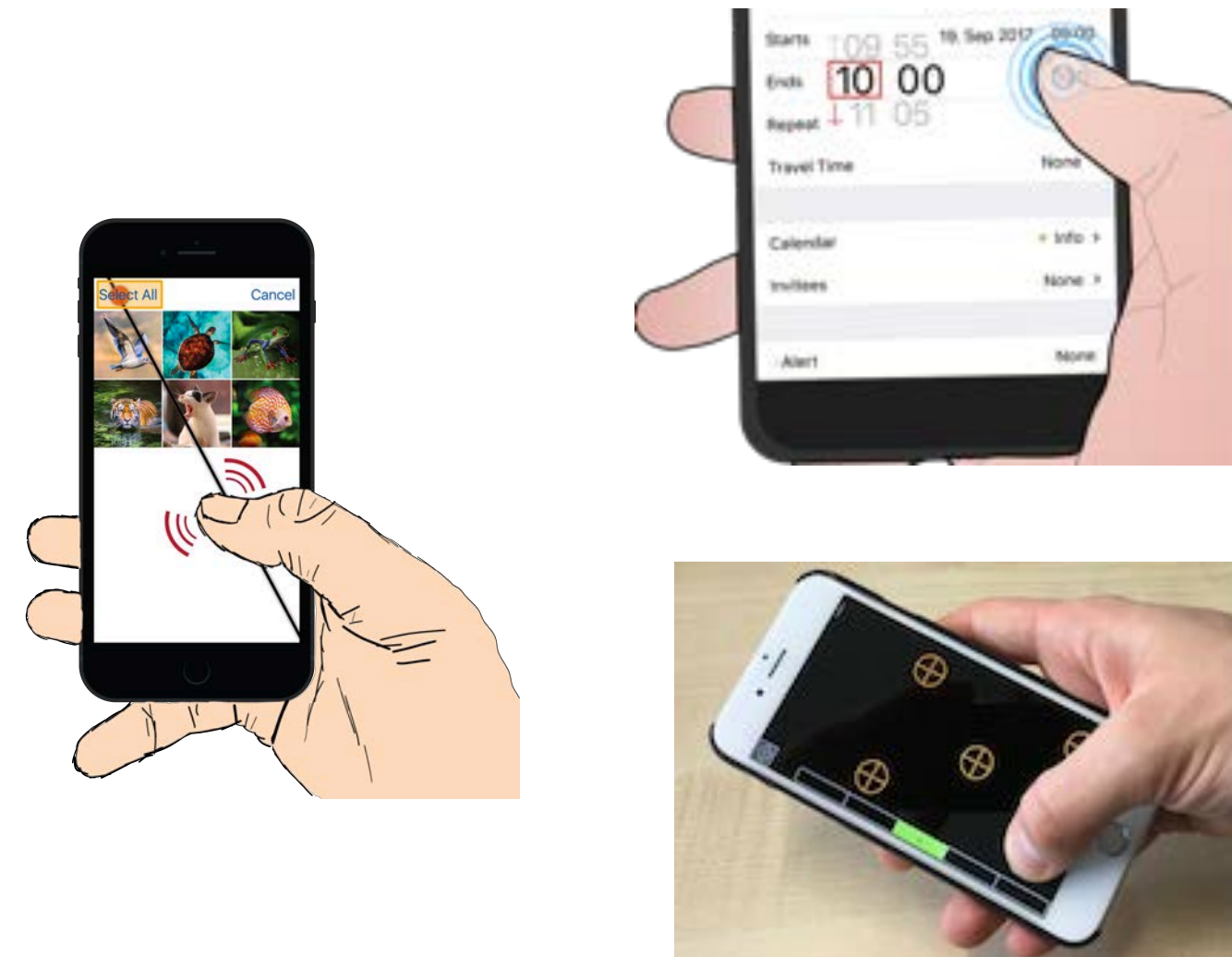
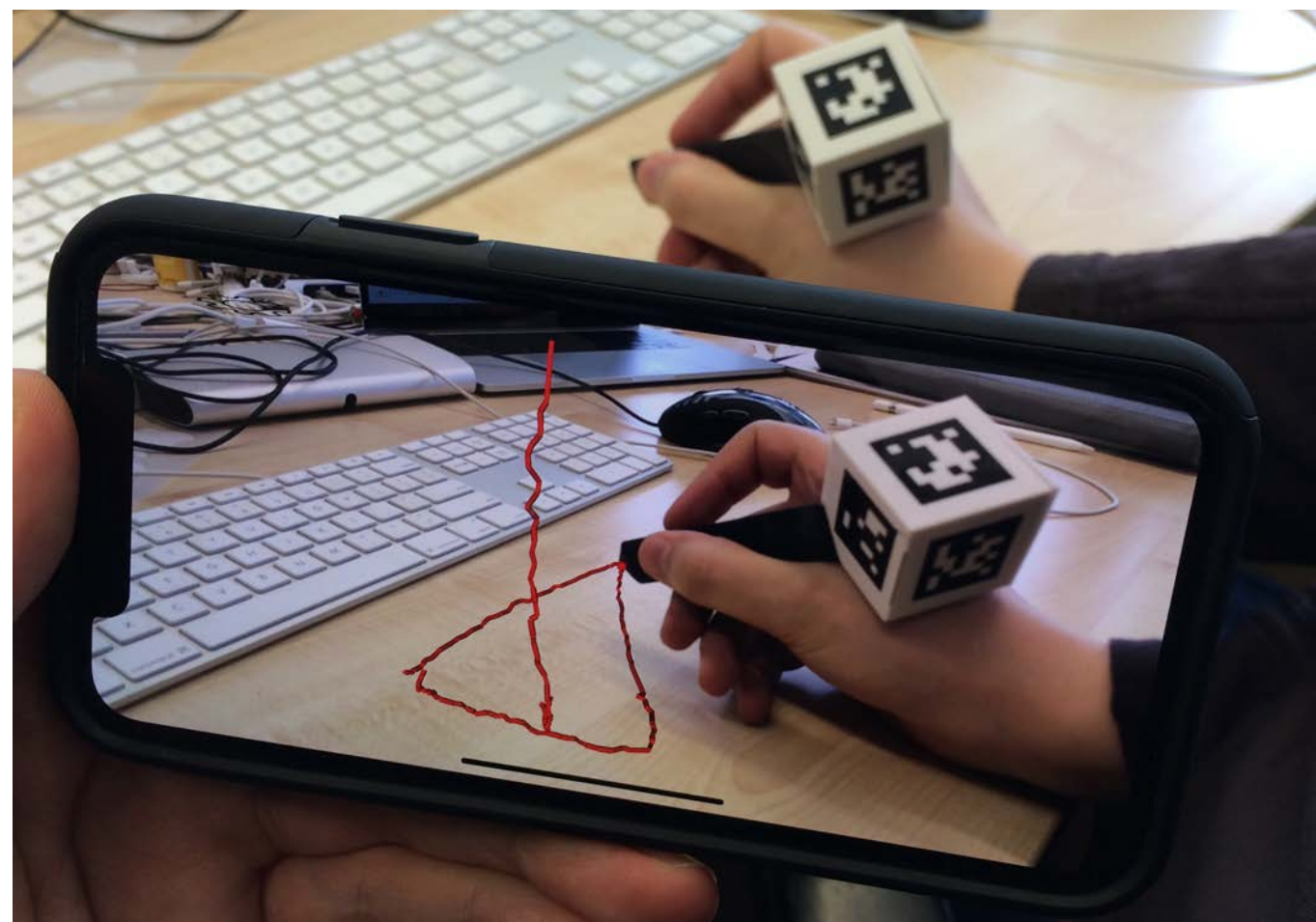
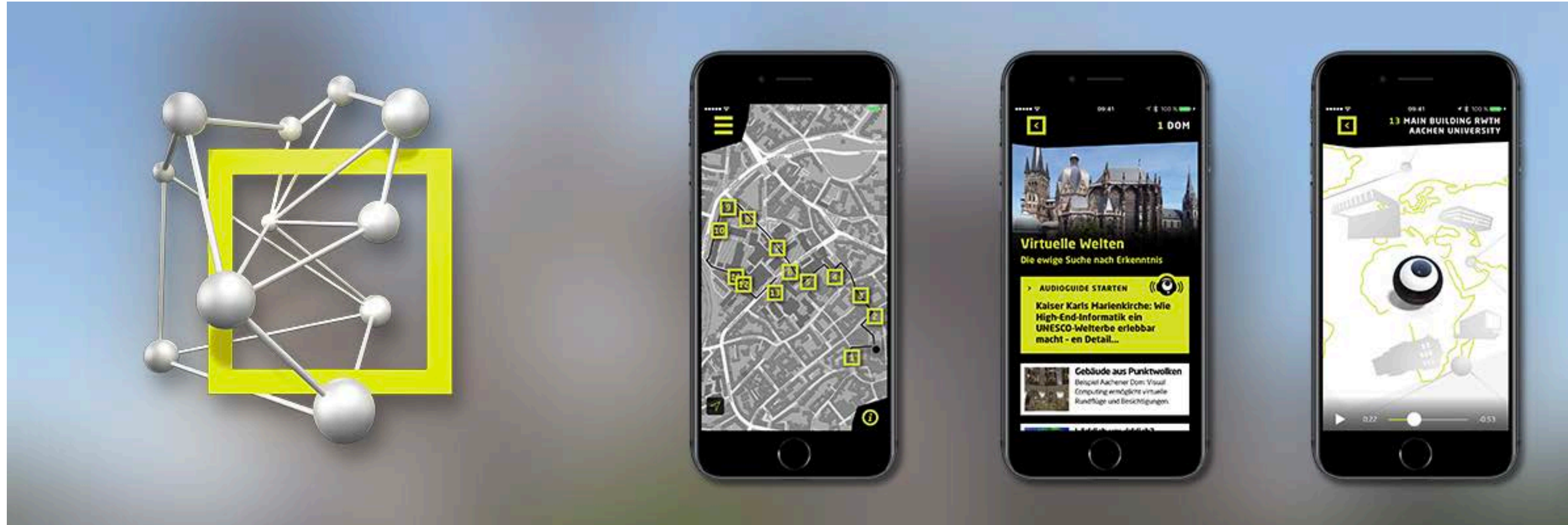
- Learn the basic of iOS App development
- Learn how to use advanced iOS Frameworks



- 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

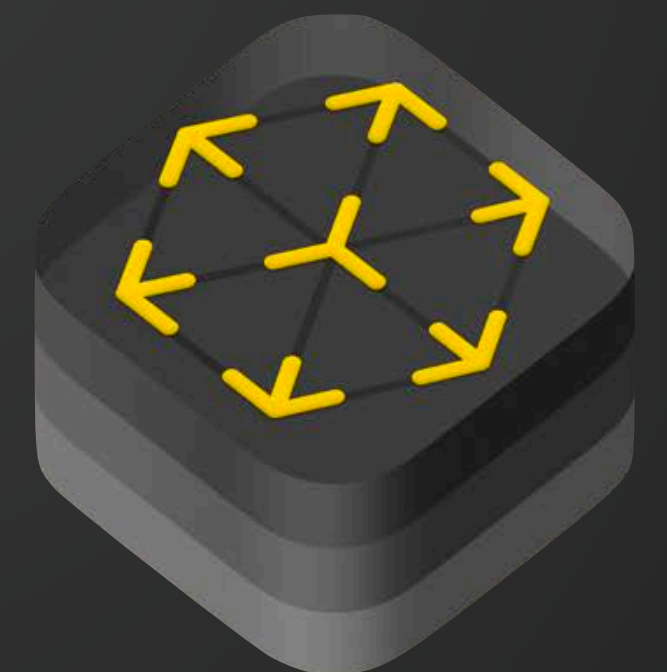
Administrivia

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

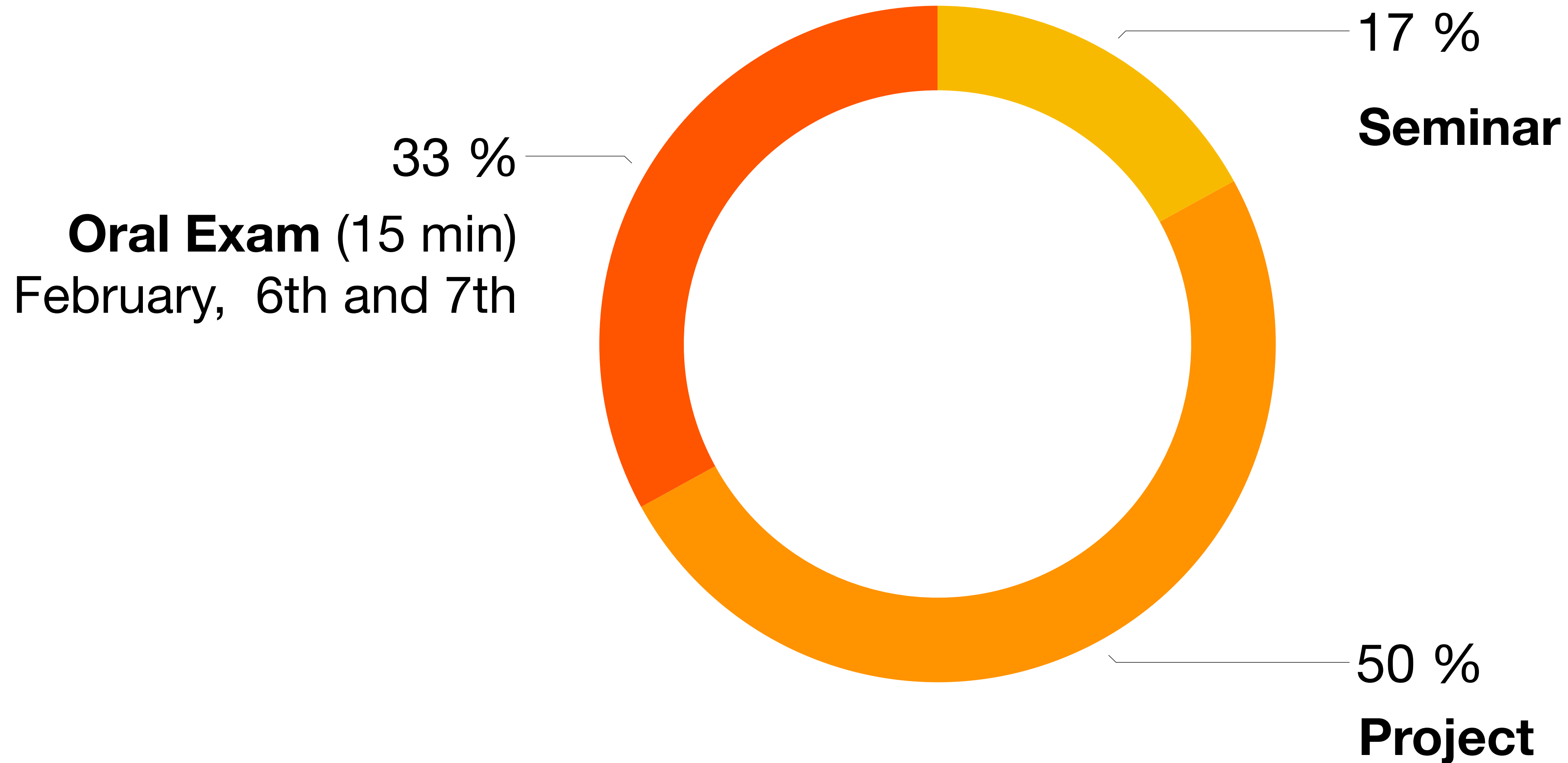


Class Syllabus

- Part 1
Lecture: Introduction into iOS and Swift
- Part 2
Seminars: iOS Frameworks
- Part 3
Project: App Development



Your Final Grade (6 ETCS)



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

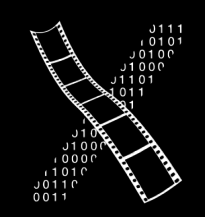




VS.

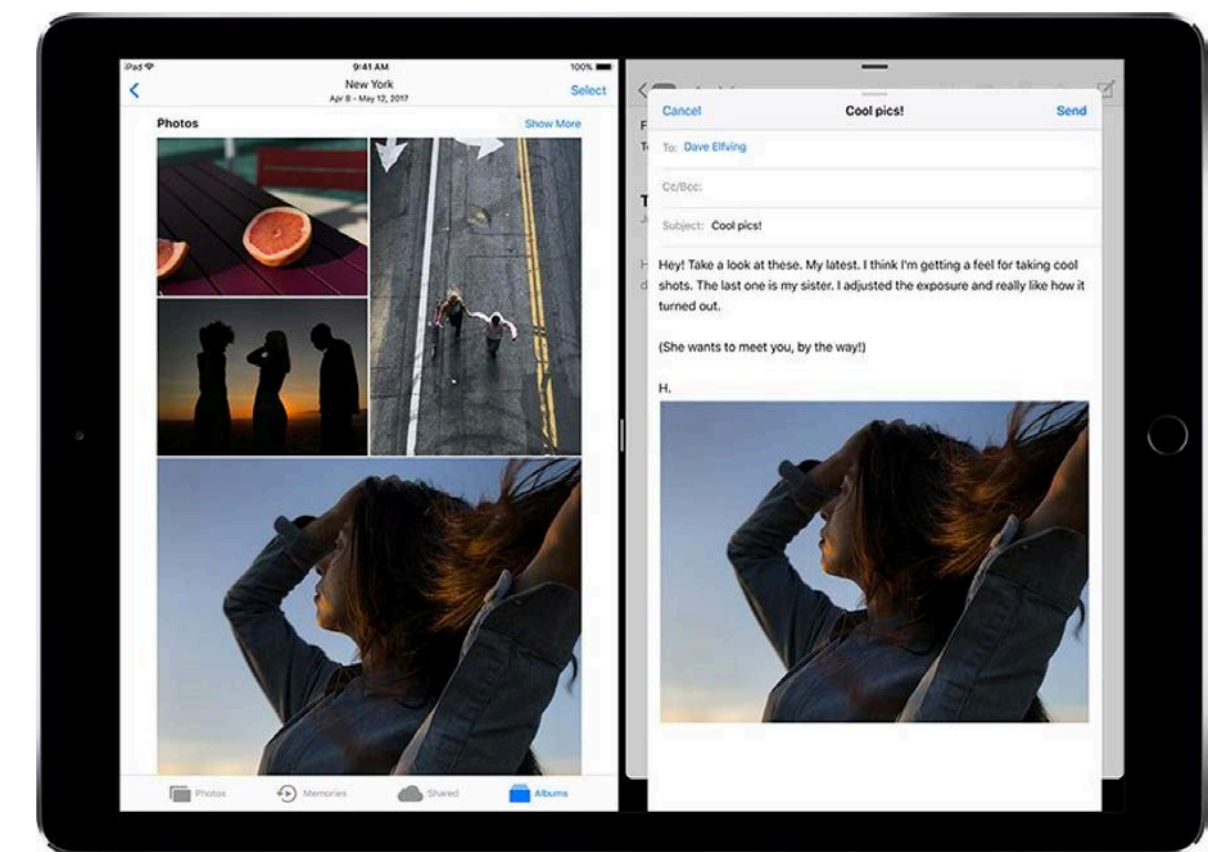






Mobile Device Characteristics

- 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

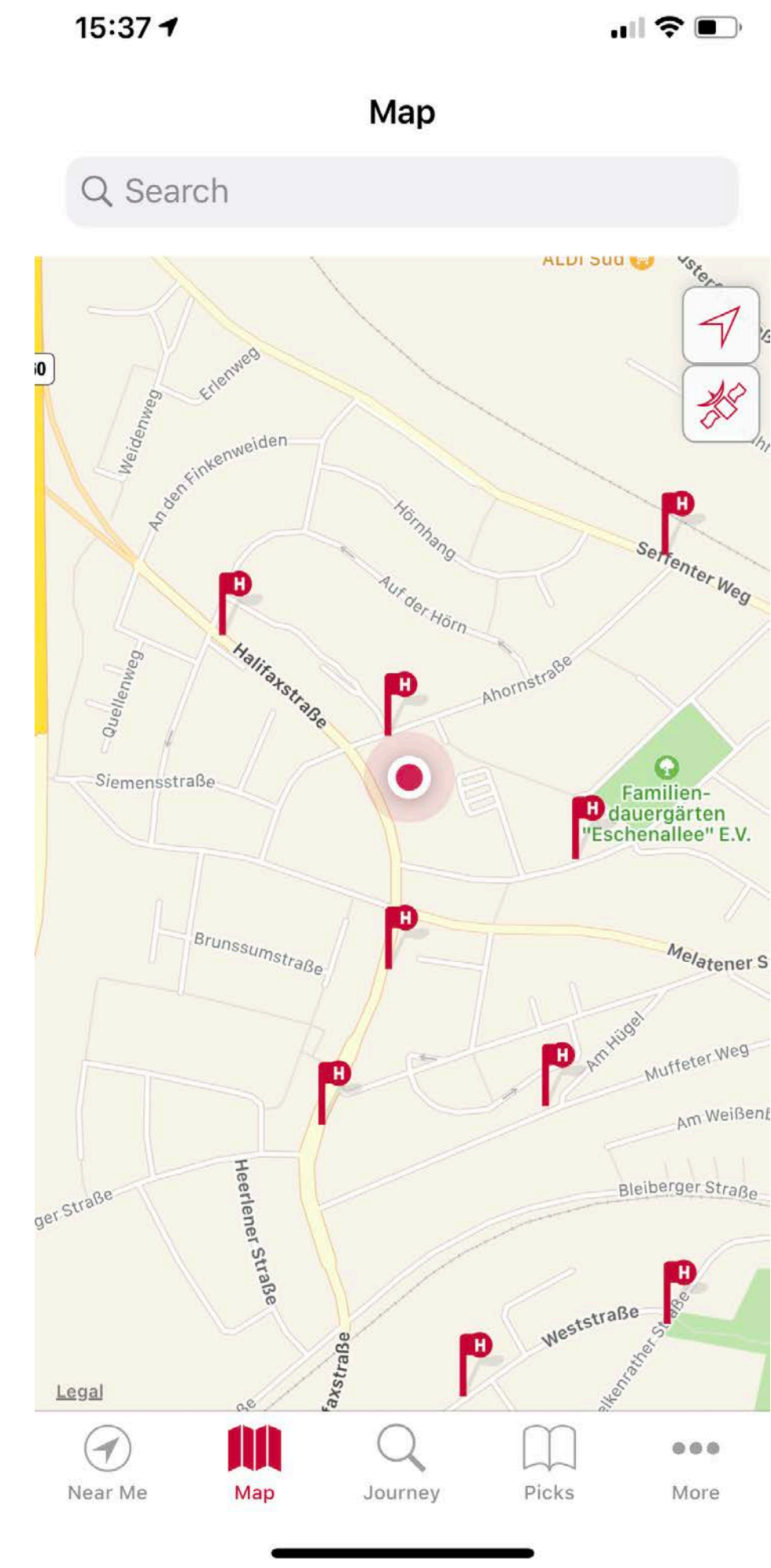
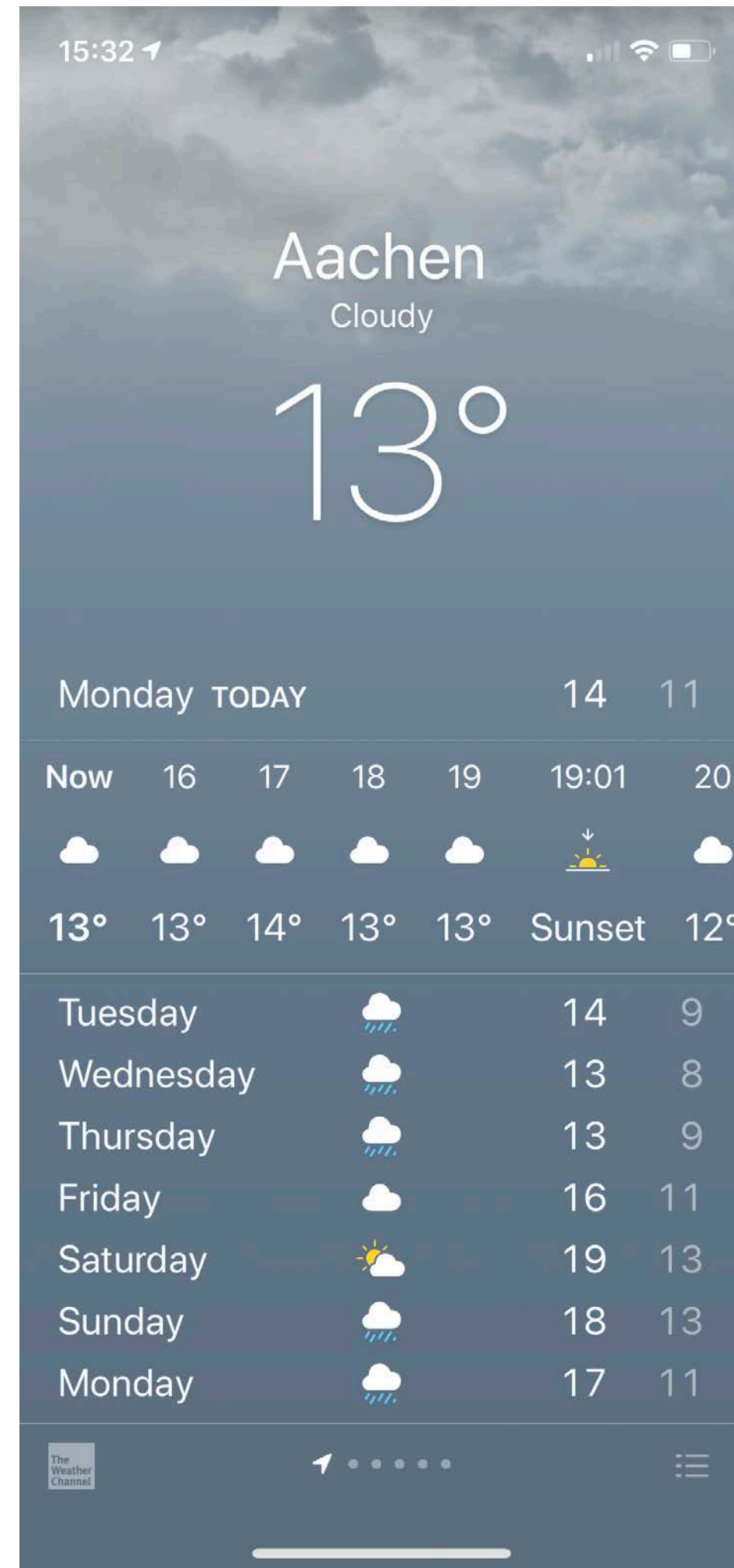
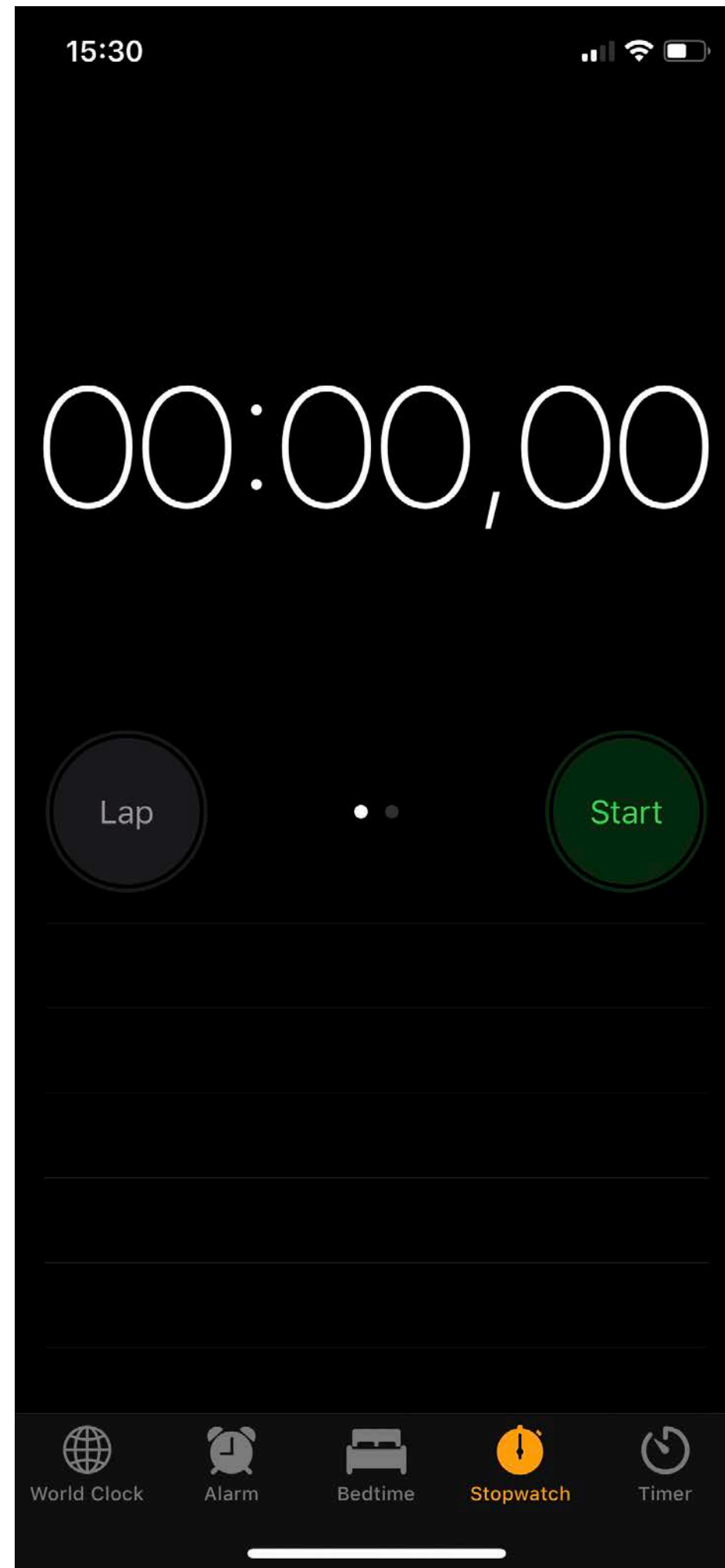


10 Golden Rules of Interface Design (see DIS 1)

- 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



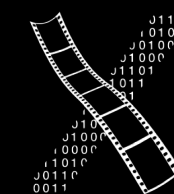
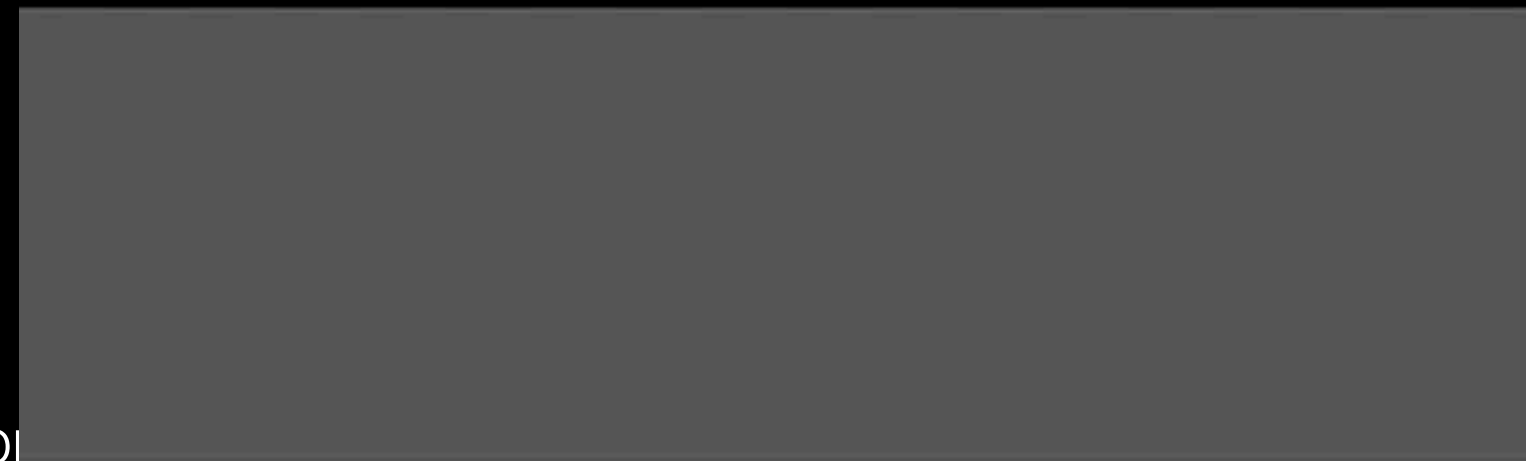
Designing the UI

- 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



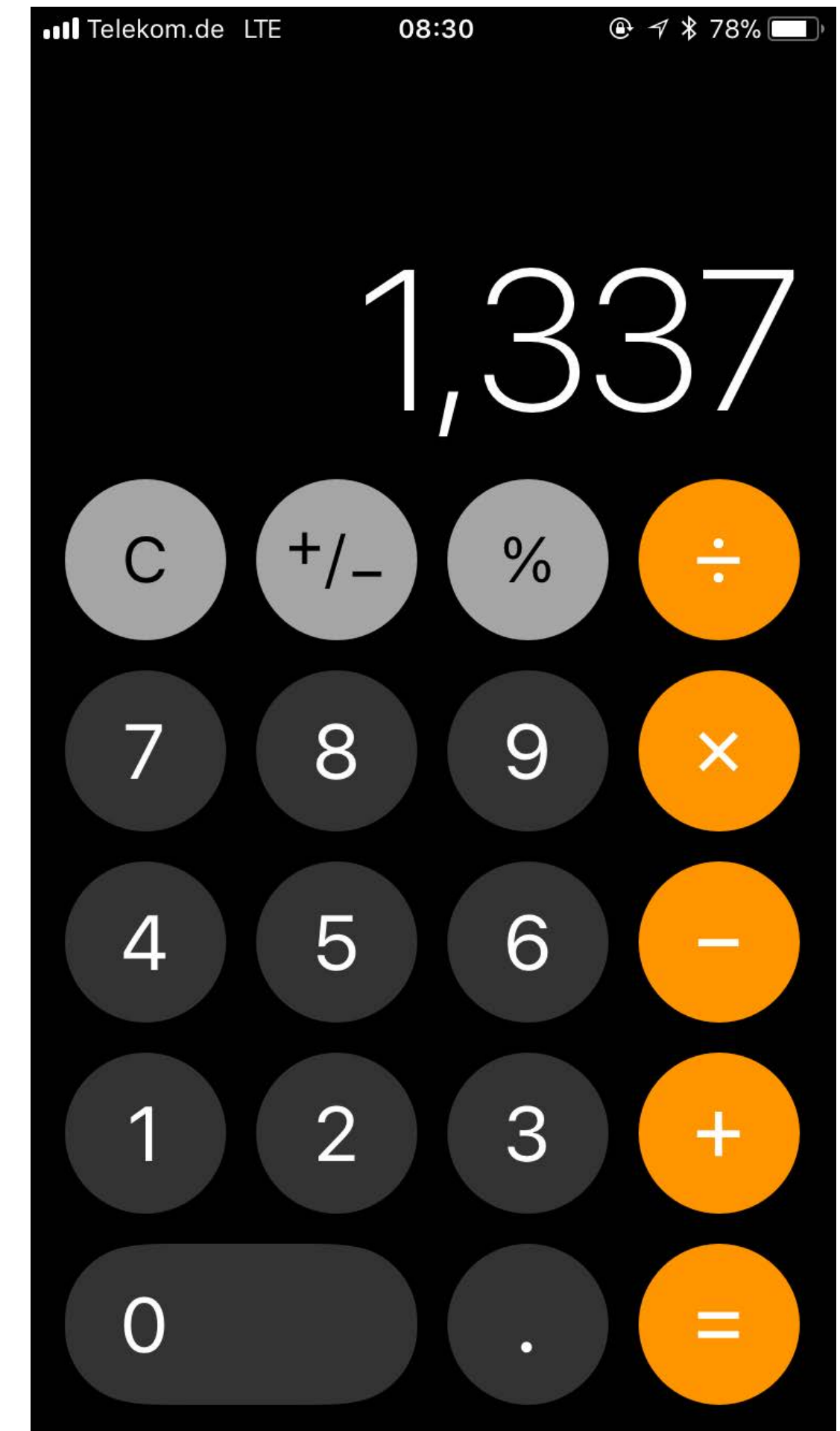


Notes



Designing the UI

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

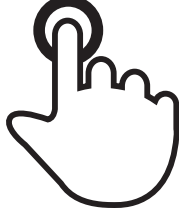
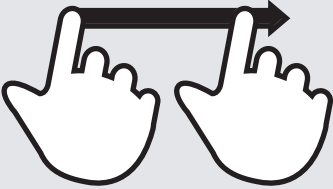




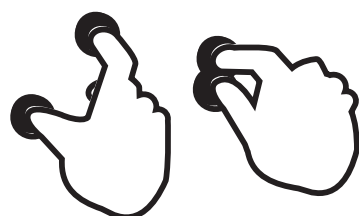
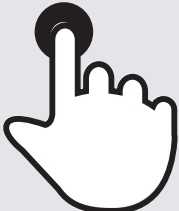


Interaction Design

- 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

Inbox

Search

Mailboxes: Inbox, VIPs, Drafts, Sent, Flagged

Sort by Date

Sender	Subject	Time
UX / HCI Researchers	Quantified Heuristics?	12:51
Lorente Ruiz, Luis	Iphone programming registration	10:40
RWTH - Gründerzentrum	AC² - der Gründungswettbewerb	09:56
Ehsan Poor Mohammady	PDUI Results	09:45
Willi Geffers	Re: Fragen zum Mac Lab	09:24
Nina Rußkamp	Anmeldung Proseminar	Yesterday
Alexander Theißen	iPhone Programming Lab	11/10/14
Chat Wacharamanotham	Re: Lab mac mini	11/10/14
tomaz & zrbenst	[appledoc] Fix EOF token crash (...)	11/10/14
Andrii Matviienko	Master's Thesis draft	10/10/14
Stauch, Alexander	Veranstaltung am 19.03.2015: "Drittmitt..."	10/10/14

RWTH - Gründerzentrum 13 Oct 2014 09:56 RG

To: rwth-mm@lists.rwth-aachen.de Cc: social@rwth-aachen.de

AC² - der Gründungswettbewerb

START UP!

Mit AC² - der Gründungswettbewerb zum eigenen Unternehmen.

Die GründerRegion Aachen unterstützt mit dem Geschäftsplanwettbewerb AC² - der Gründungswettbewerb Existenzgründer auf dem Weg zur eigenen Firma, mit besonderem Fokus auf das Thema „Innovation“.

Angehende Unternehmer erhalten mit einem kostenfreien Mentor, vier Gutachter-Feedbacks, sieben Fachinformationsveranstaltungen sowie attraktiven Geld- und Sachpreisen genau die Unterstützung, um ihre Gründungsidee ins richtige Licht zu setzen..

Kommen Sie zur Auftaktveranstaltung am

Dienstag, 11. November 2014,
in der Aachener Bank, Theaterstraße 5,
(Zugang über Wirichsbongardstraße)
Einlass: 18:30 Uhr, Beginn: 19:00 Uhr

und lernen Sie in ungezwungener Atmosphäre die Initiative, andere Existenzgründer, Unternehmer sowie die AC²-Experten aus Wirtschaft und Wissenschaft kennen.

Anmeldung zur Auftaktveranstaltung unter: <http://www.gruenderregion.de/gruenderkalender-alle-veranstaltungen.html>

Wie ist der Ablauf von AC² - der Gründungswettbewerb?

Der Geschäftsplanwettbewerb richtet sich an alle, die eine Geschäftsidee haben und eine Existenzgründung anstreben oder ein Unternehmen übernehmen möchten. Unterstützt durch einen Mentor aus dem AC² - Beraternetzwerk entwickeln Sie aus Ihrer Gründungsidee einen aussagekräftigen Geschäftsplan. Der Wettbewerb läuft in zwei Phasen ab. Grundsätzlich ist ein Einstieg in jeder der beiden Phasen möglich. In der ersten Wettbewerbsphase bis 5. Januar 2015 erarbeiten Sie mit Ihrem Mentor einen Grob-Geschäftsplan. In der zweiten Wettbewerbsphase bis 16. März 2015 entwickeln Sie diesen weiter zu einem Detail-Geschäftsplan. Am Ende jeder Phase steht die Begutachtung der eingereichten Pläne durch zwei unabhängige Gutachter. Die zehn besten Geschäftspläne der Phase 1 werden auf einer Zwischenprämierung am 10. Februar 2015 und die drei besten Geschäftspläne der Phase 2 im Rahmen der Verleihung des AC² - Innovationspreises der Region Aachen, Düren, Euskirchen, Heinsberg am 11. Juni 2015 mit Sachpreisen und Geldpreisen in einer Gesamthöhe von 32.500 Euro ausgezeichnet.

Fünf Gründerabende zu Themen wie Recht, Finanzen oder Marketing sowie zwei spezielle Veranstaltungen zum Thema Innovation runden das Programm ab. Im informellen Teil dieser Veranstaltungen besteht die Möglichkeit, mit anderen Gründern, den Mitgliedern aus dem AC² - Beraternetzwerk und Kapitalgebern in Kontakt zu treten.

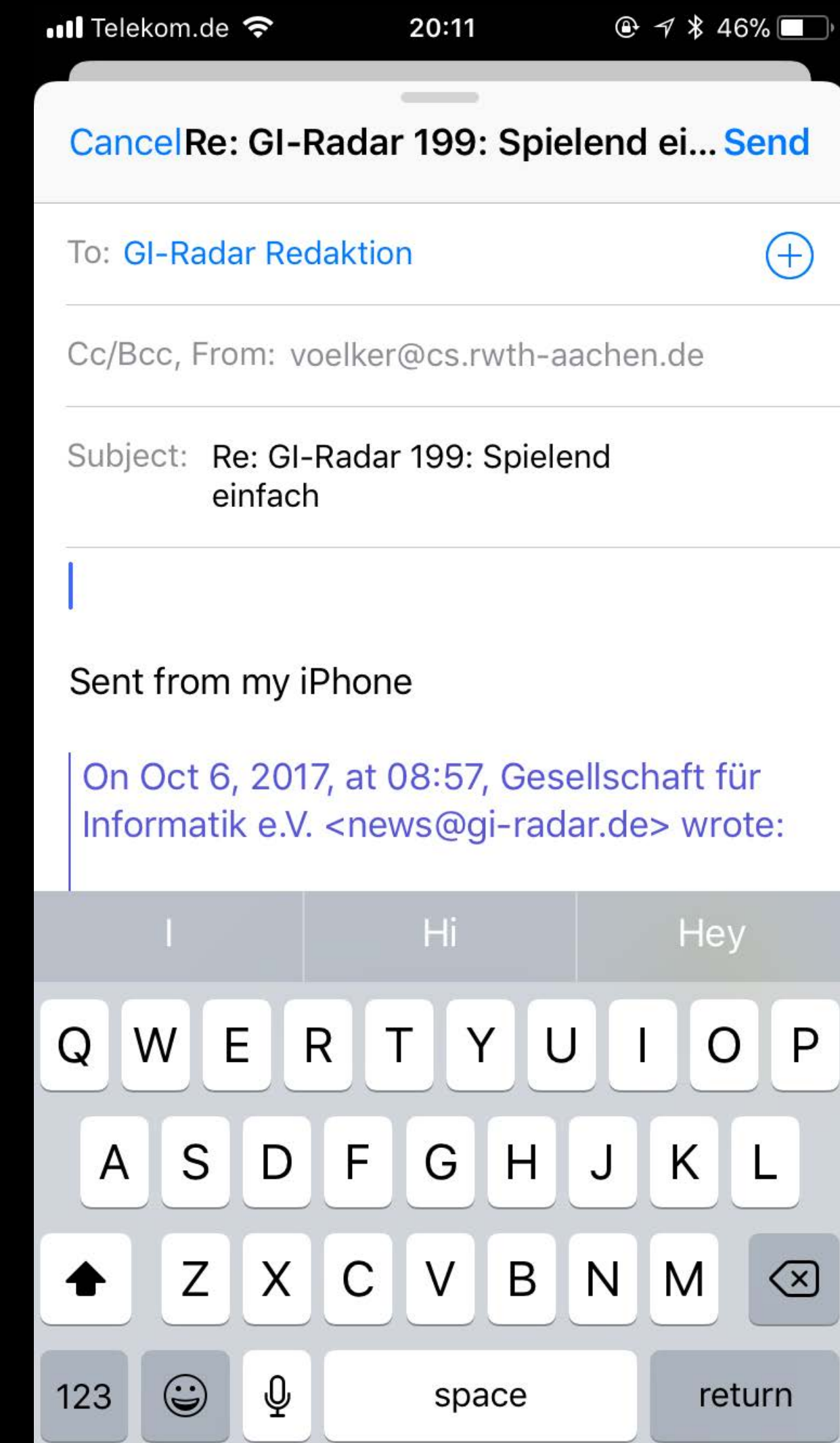
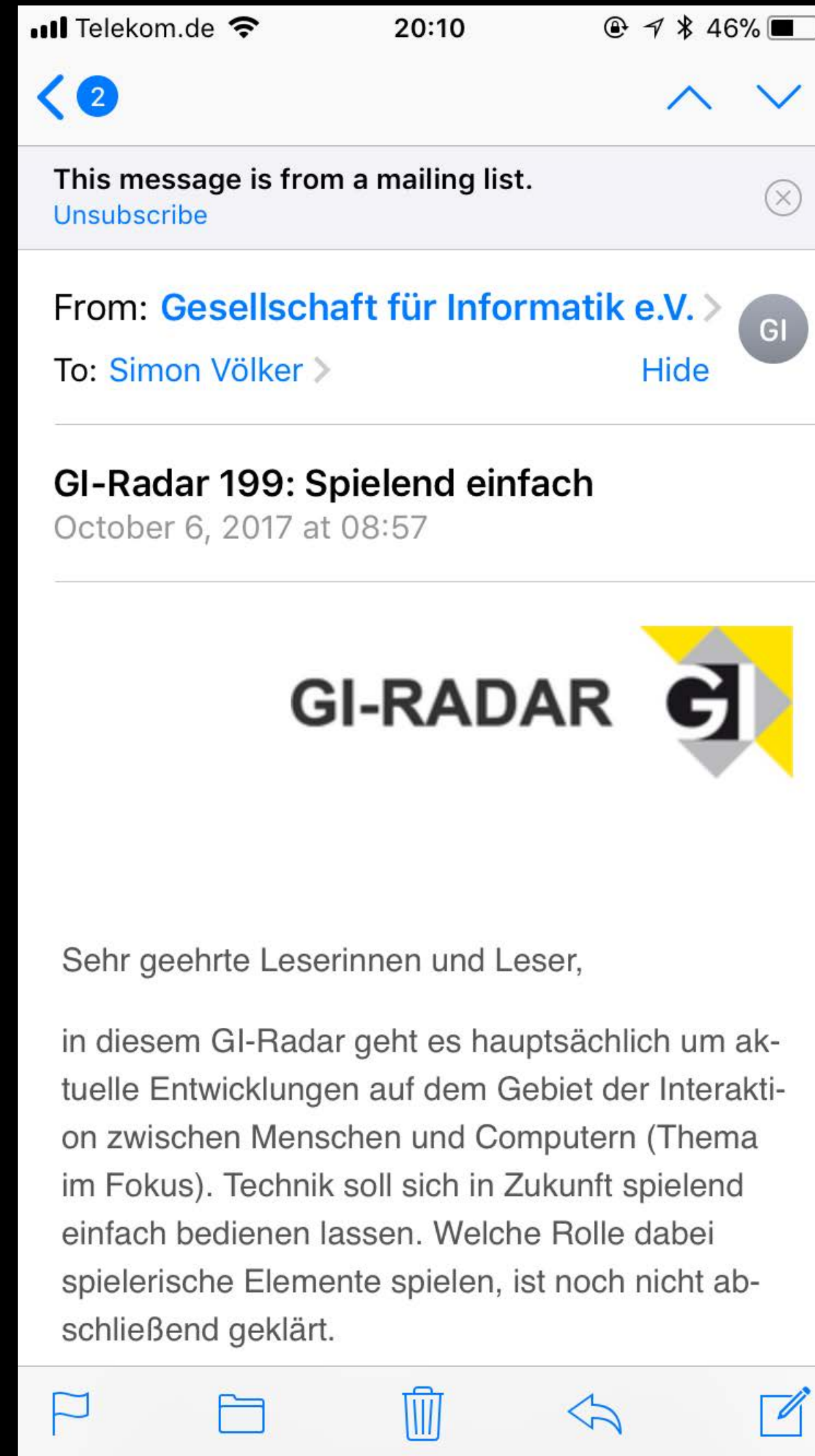
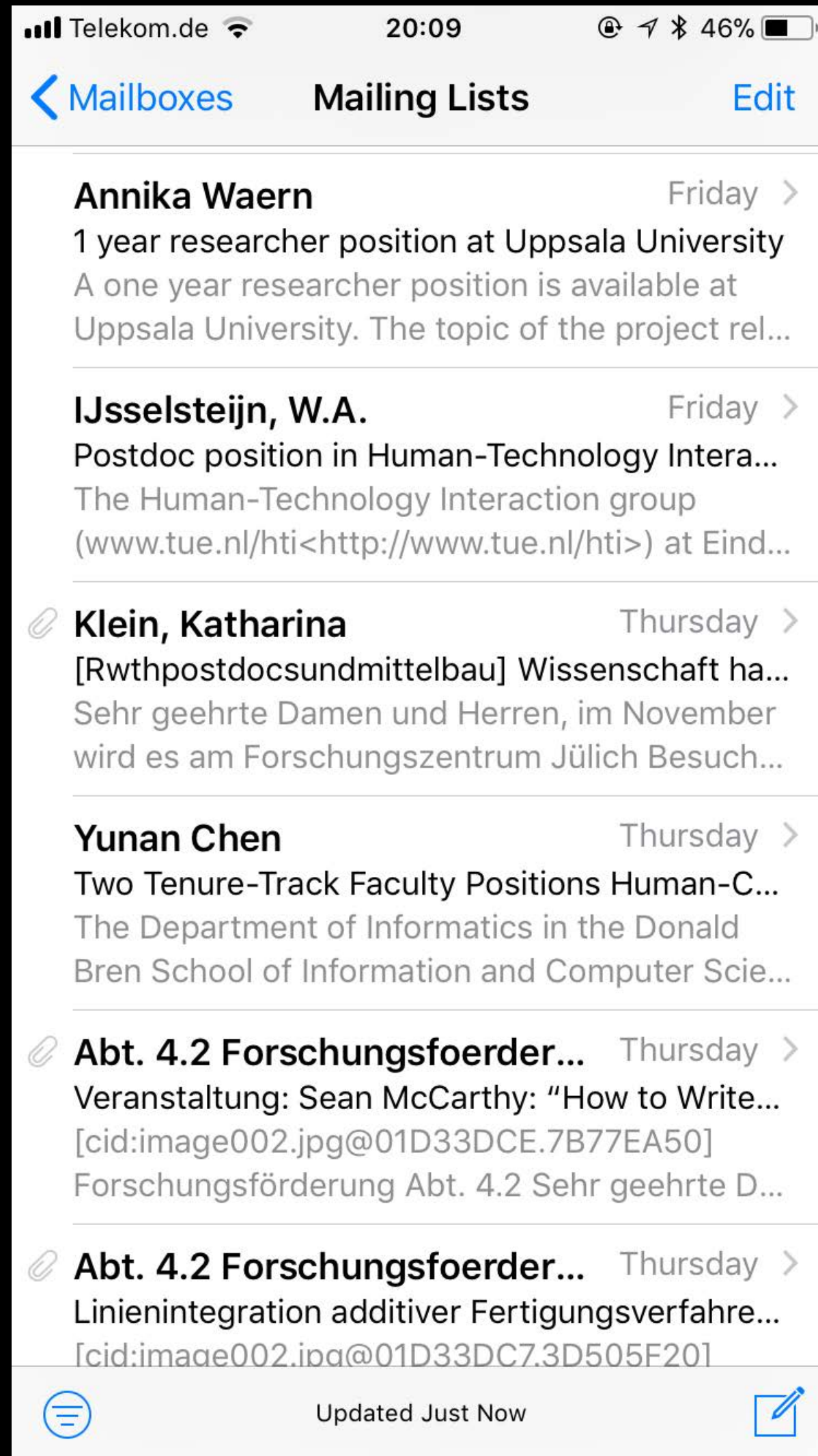
Informationen und Anmeldung unter:

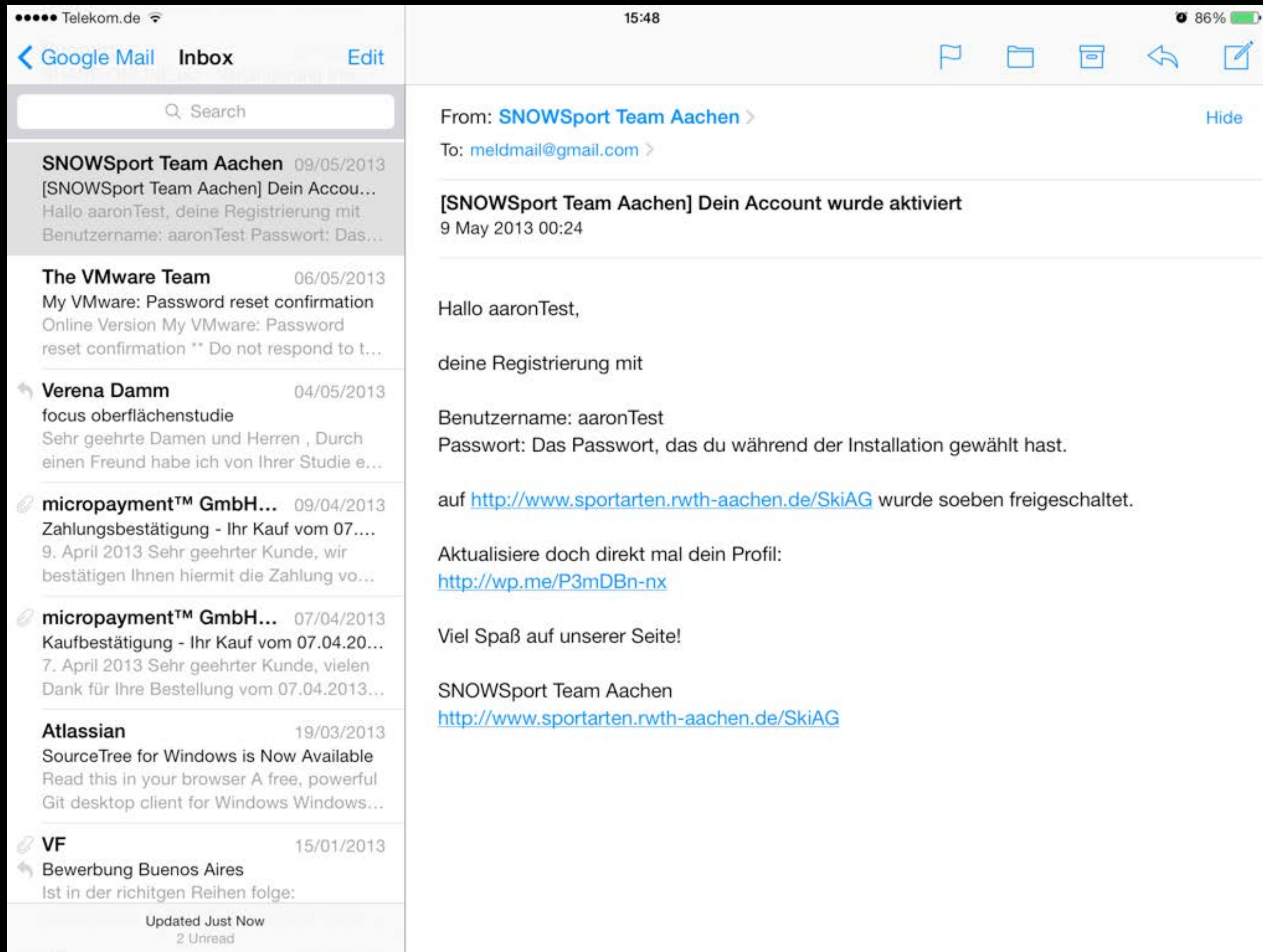
Internet: www.ac-quadrat.de

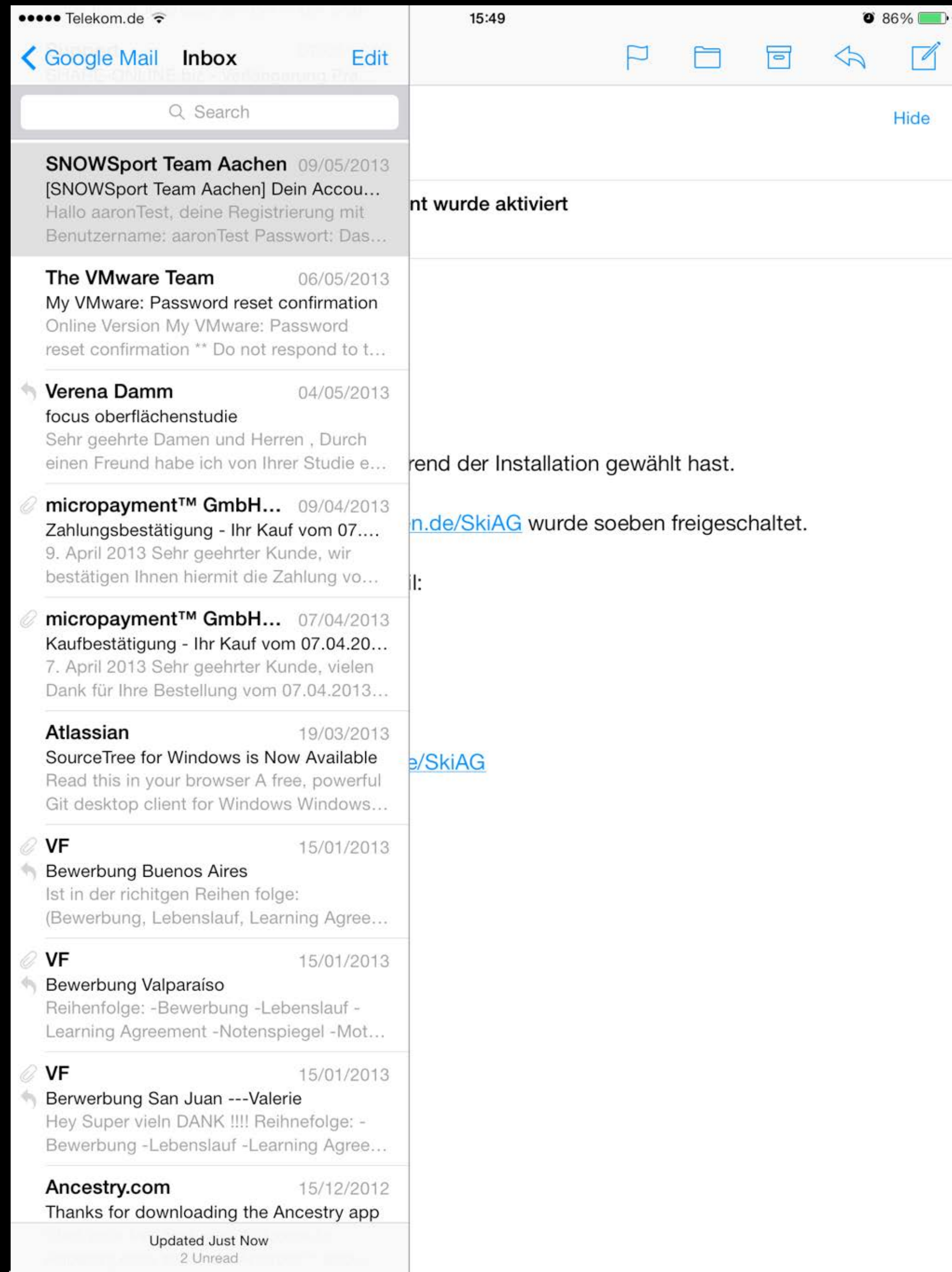
E-Mail: info@ac-quadrat.de

Telefon: 0241 4460-350



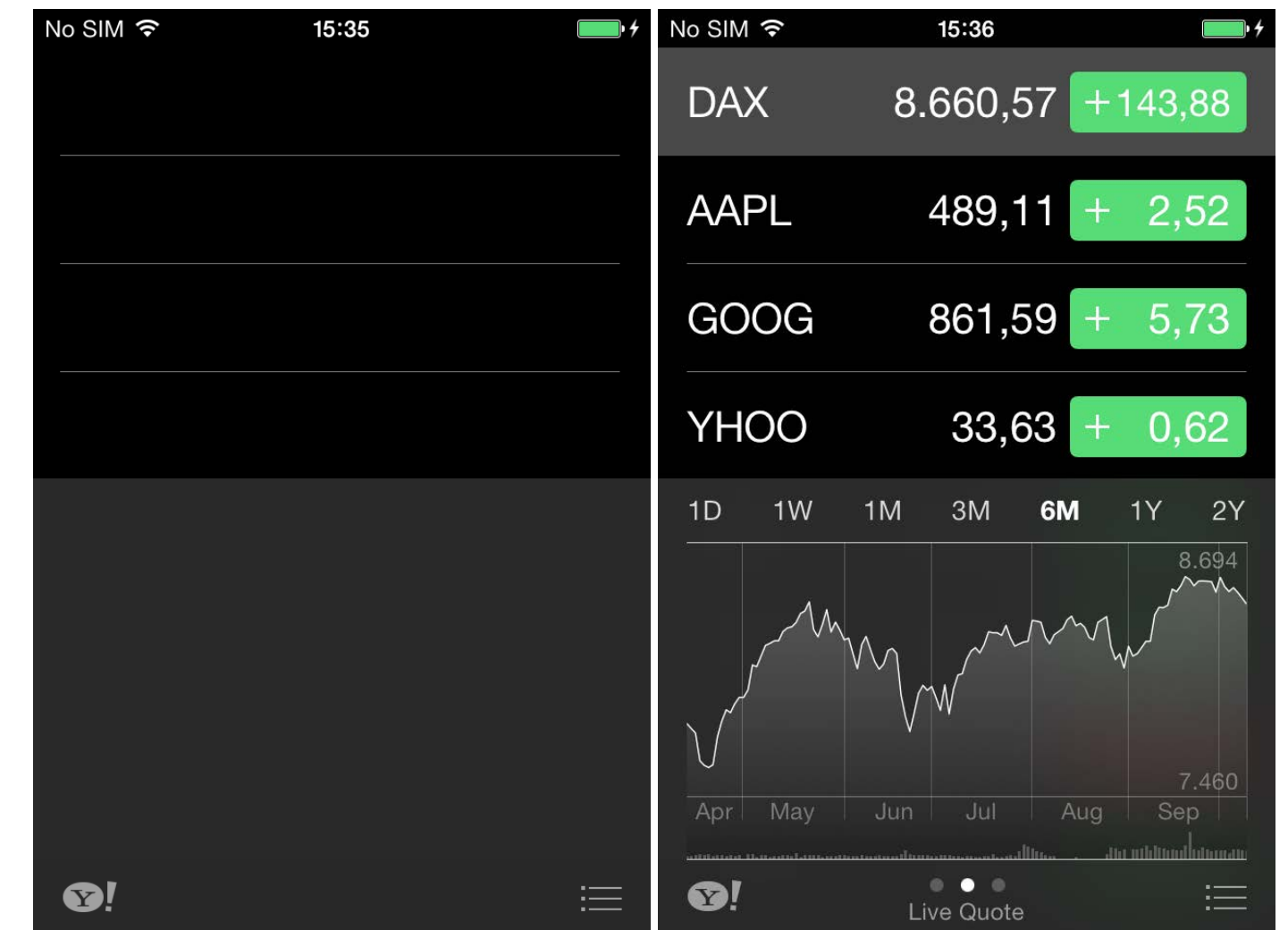






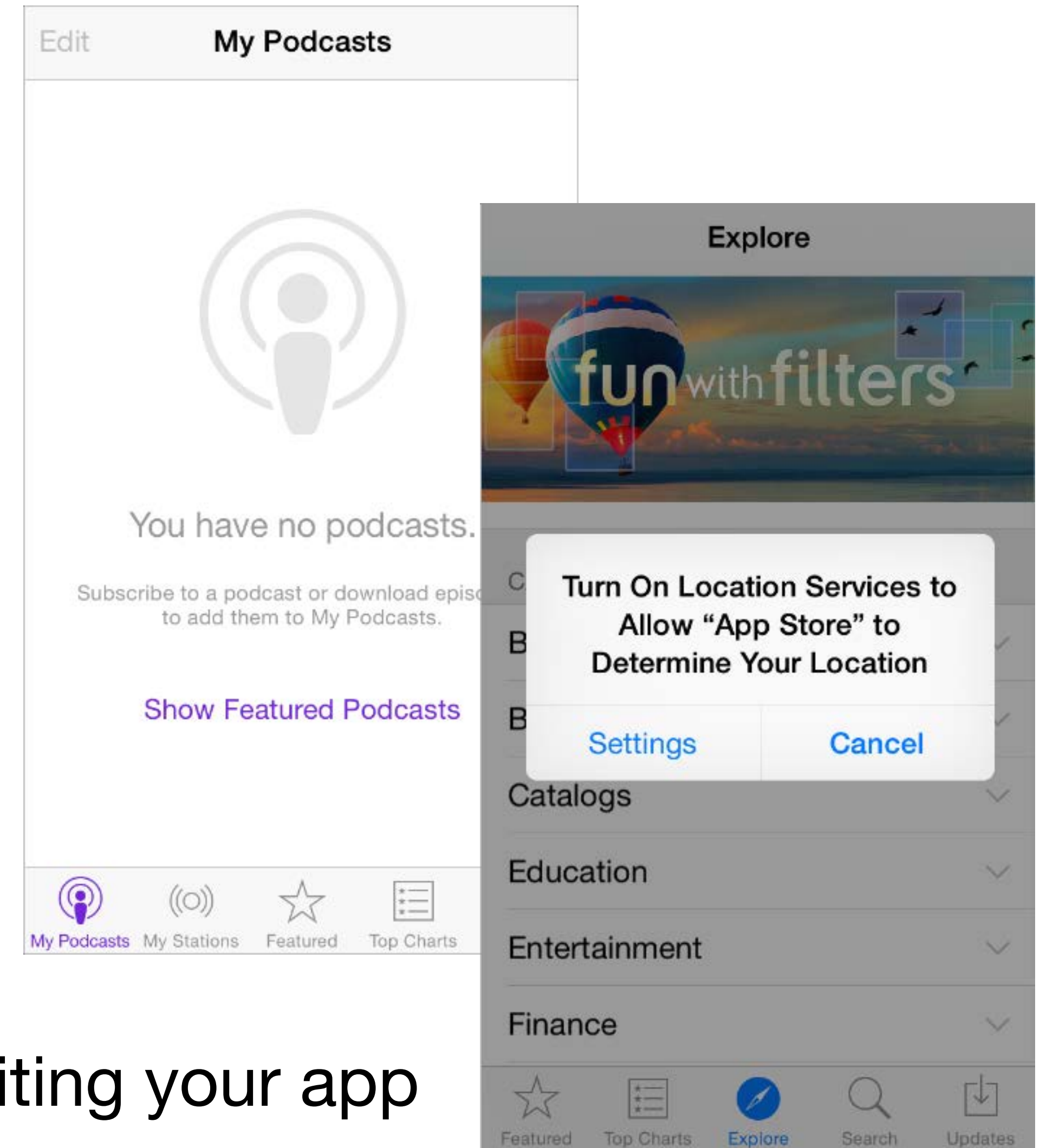
Starting

- 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



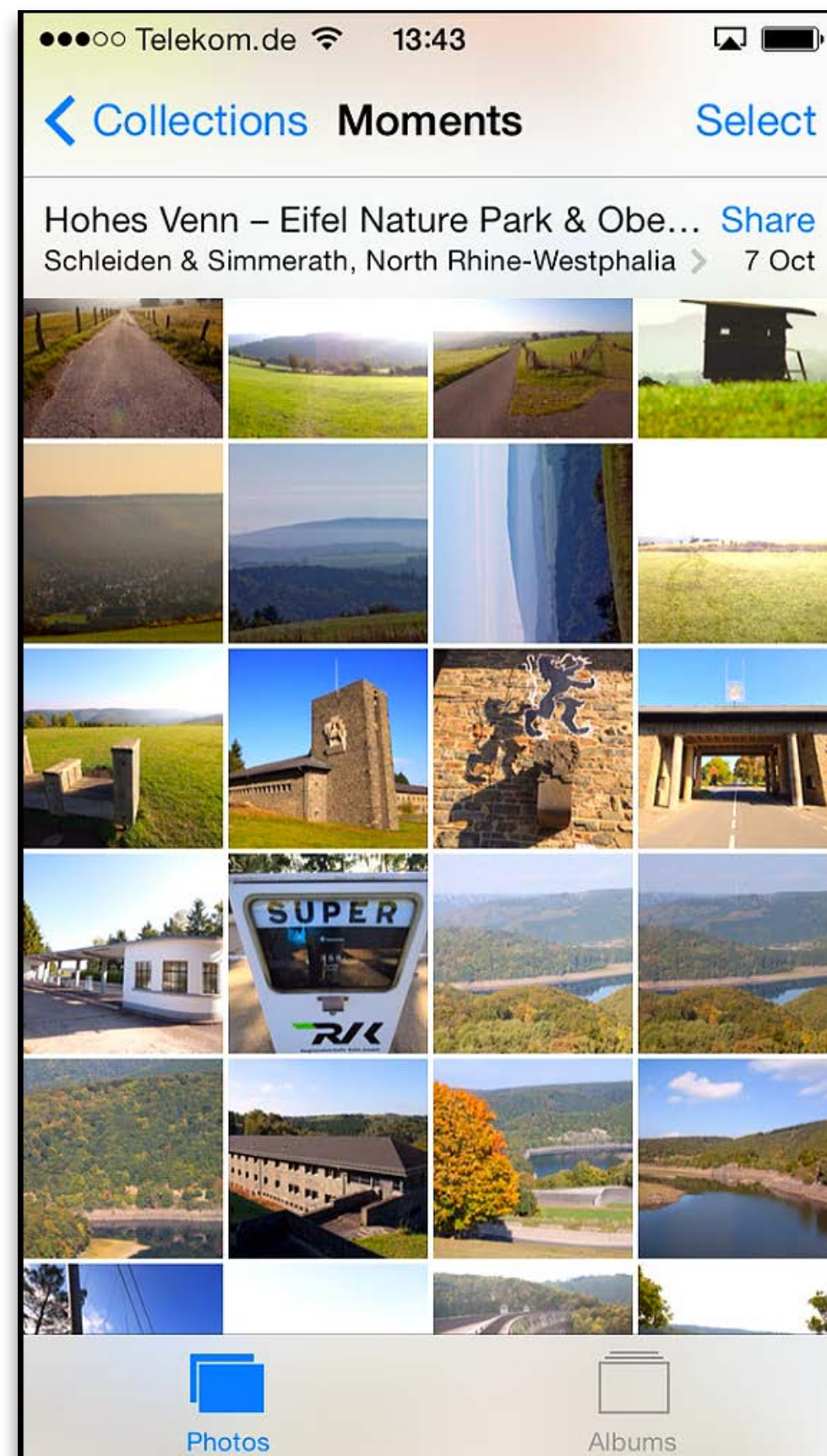
Stop

- 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



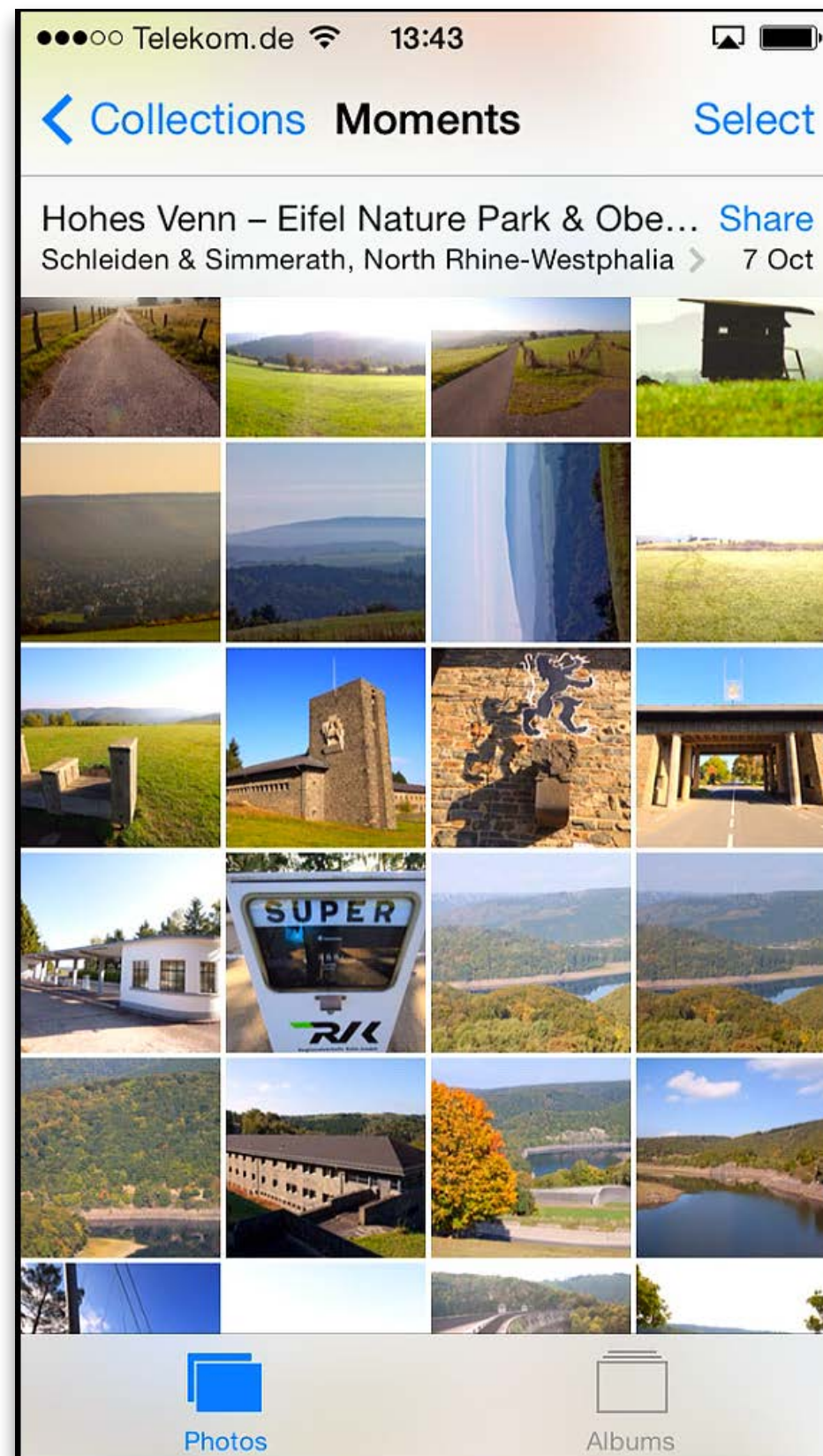
Seadragon

Productivity Applications

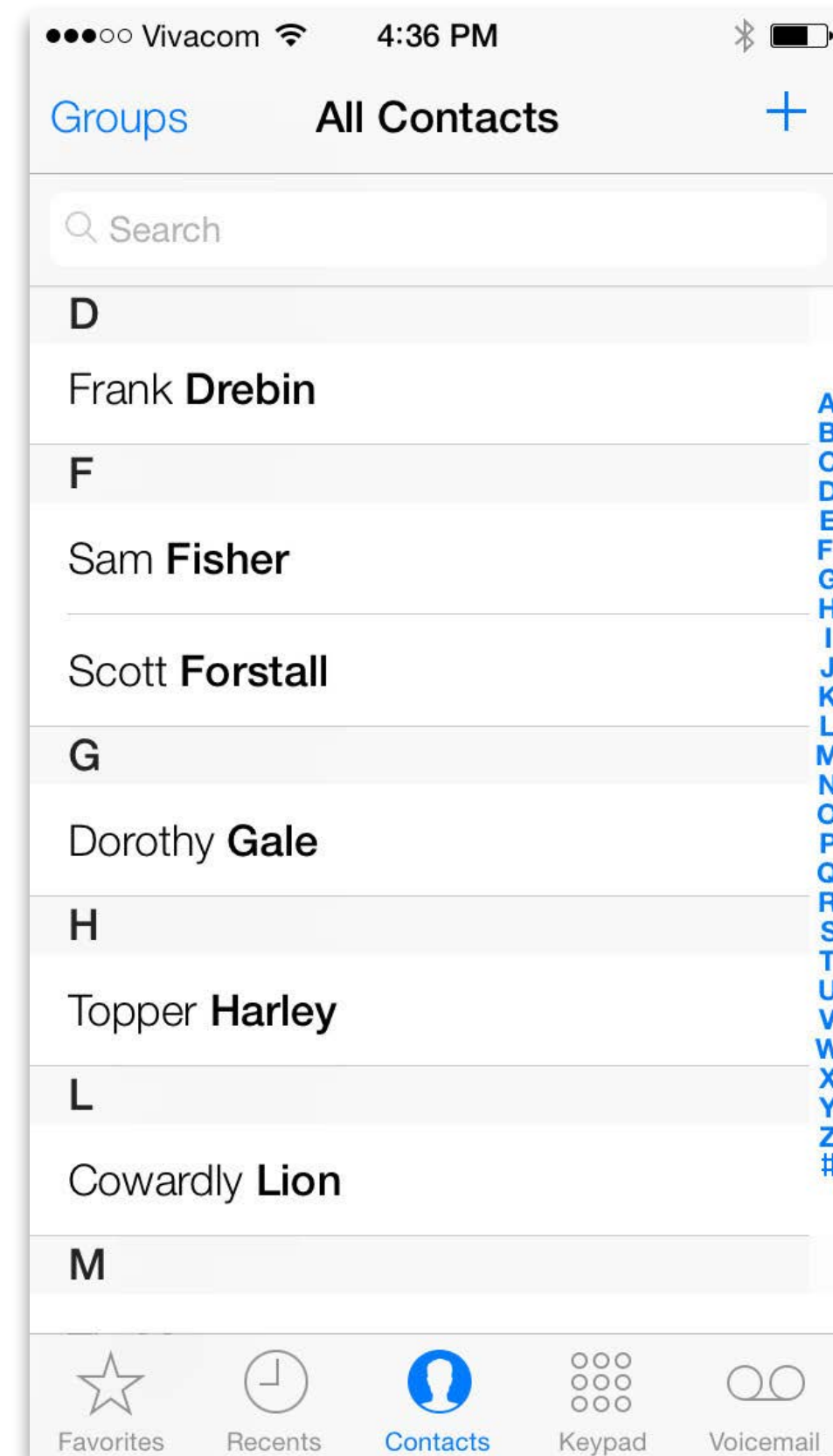
- Organizing and managing detailed information
- Often organize data hierarchically
- Organizing the list, add or remove items
- Examples: Contacts, Photos



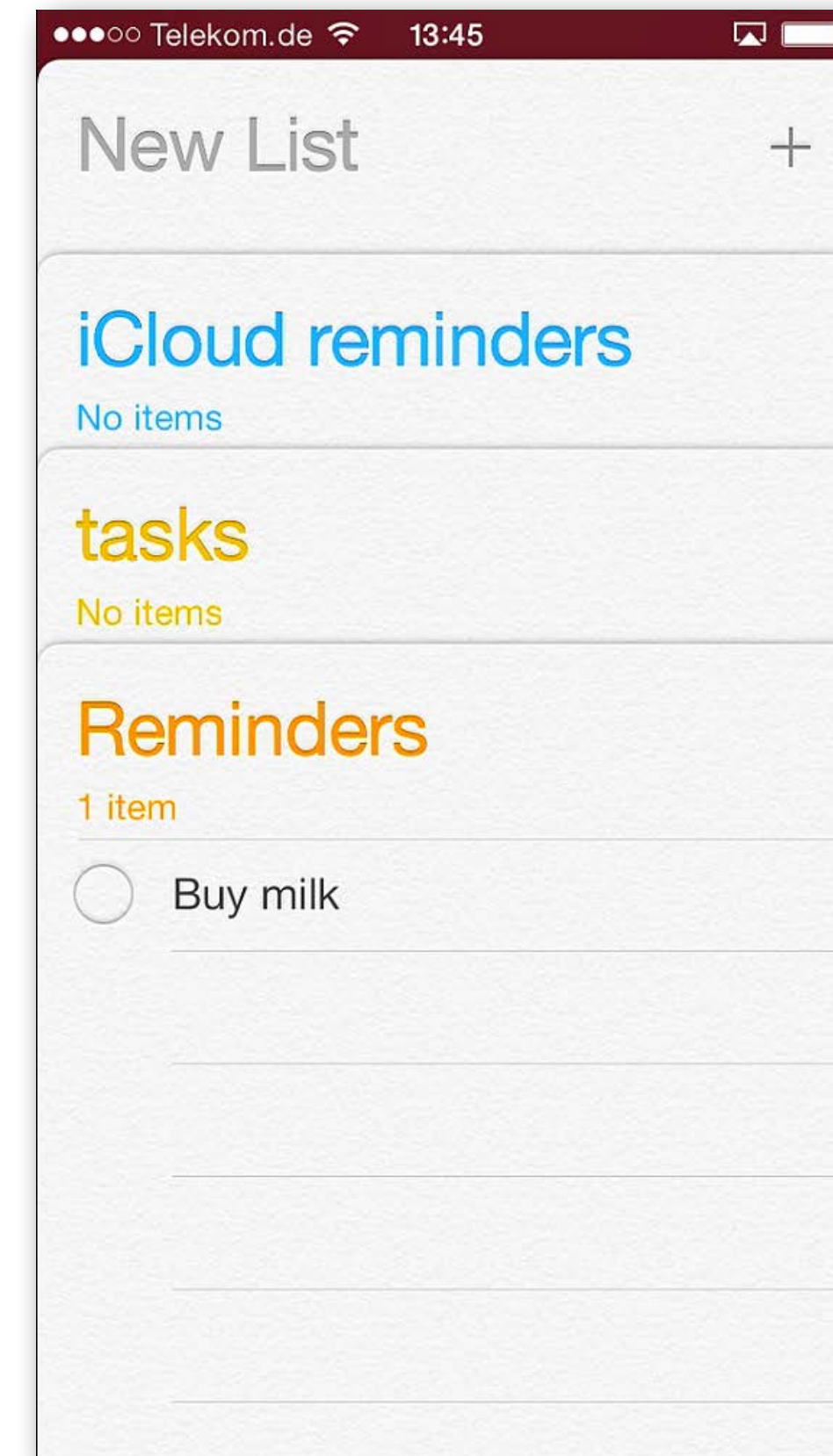
Productivity Applications



Photos



Contacts



Reminders



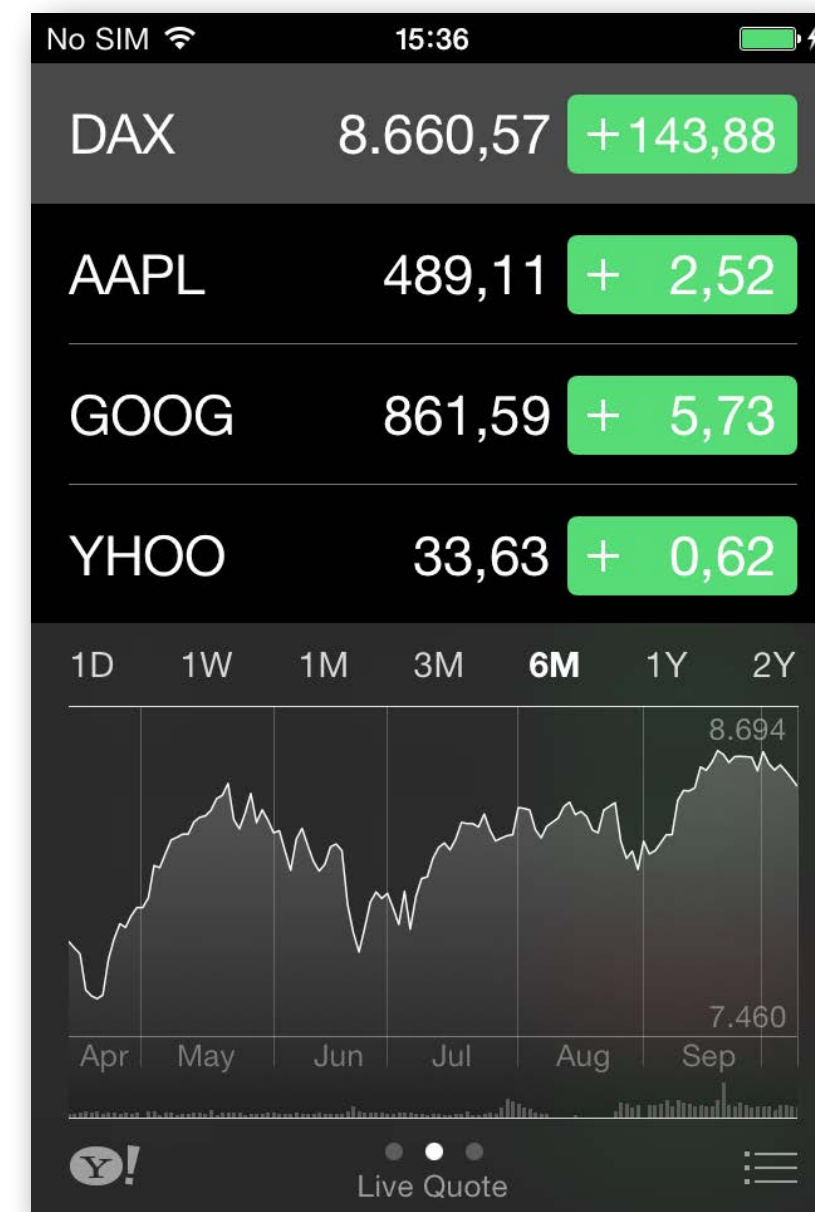
Utility Applications

- 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

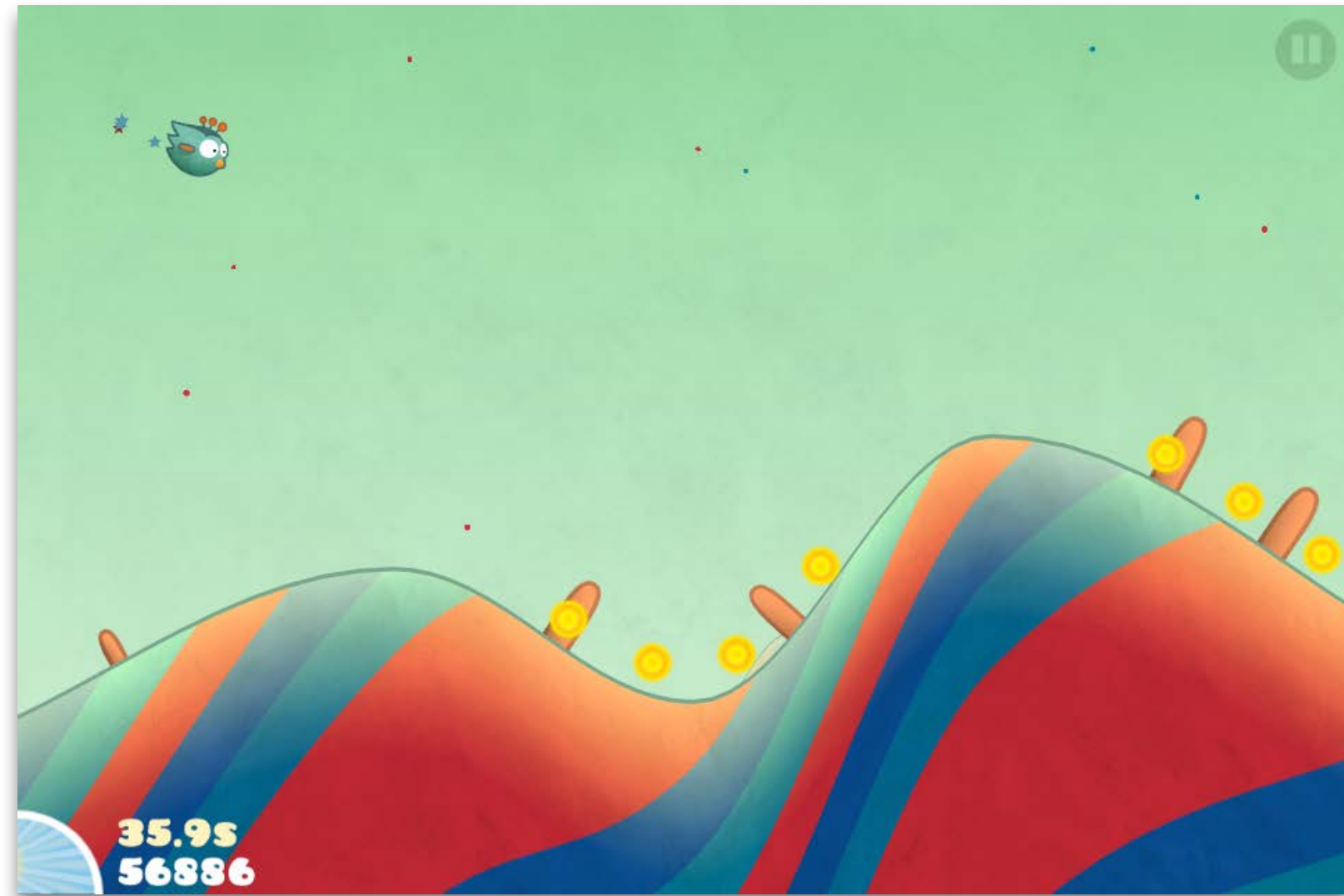


Living Earth

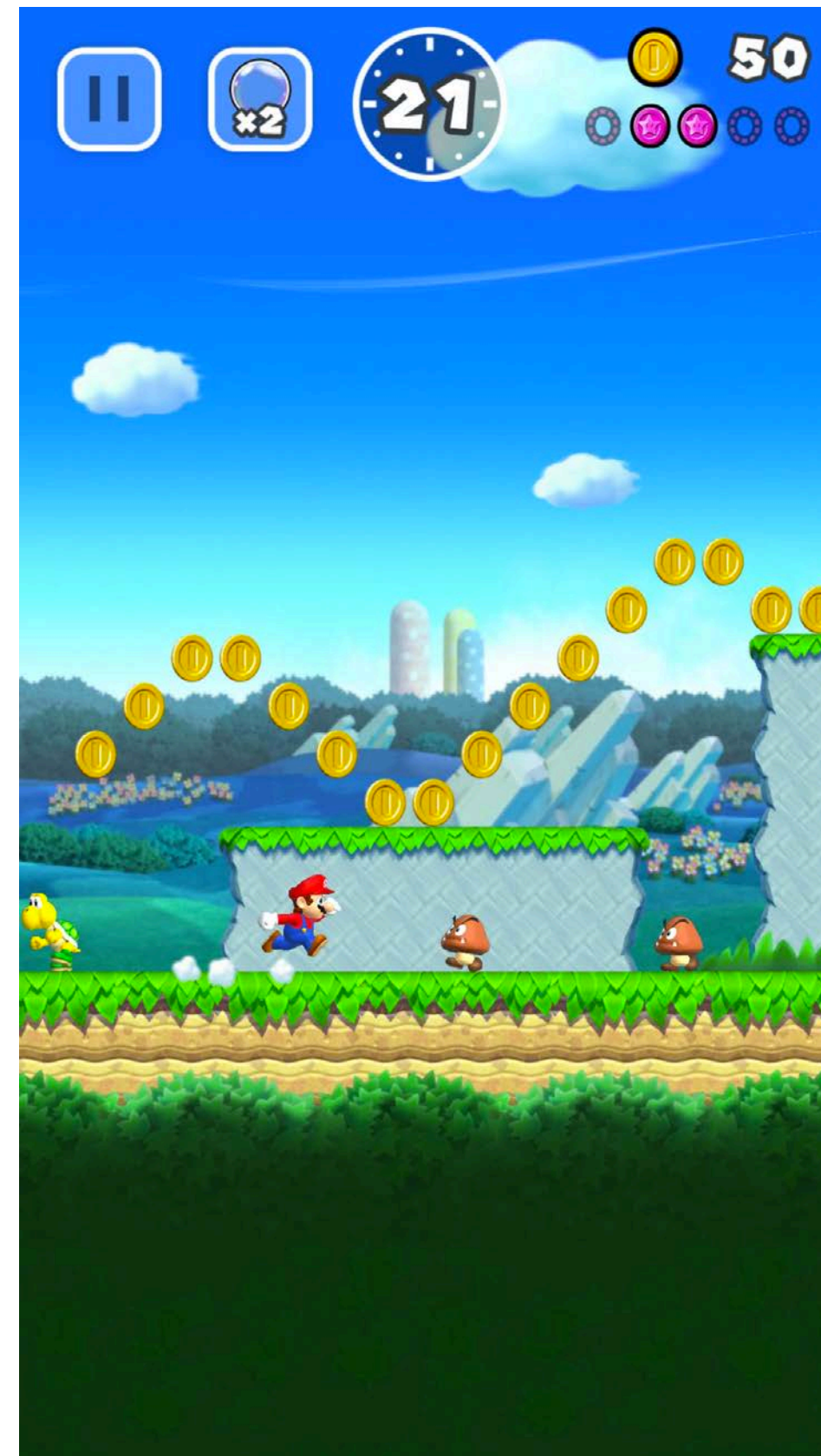


Carpenter

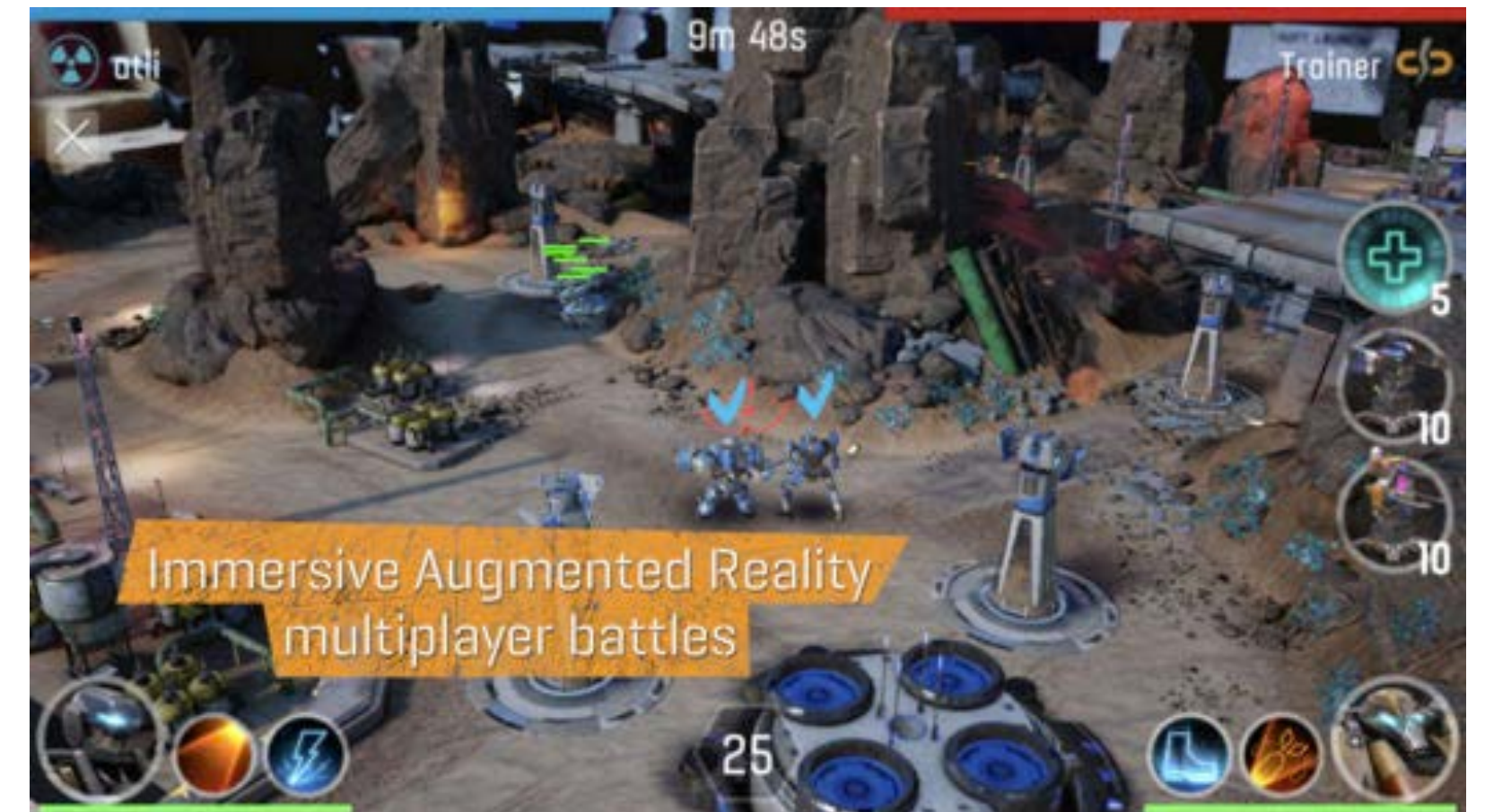
Games



Tiny Wings



Super Mario Run



The Machines

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/>

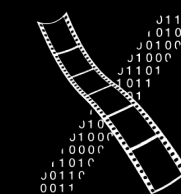
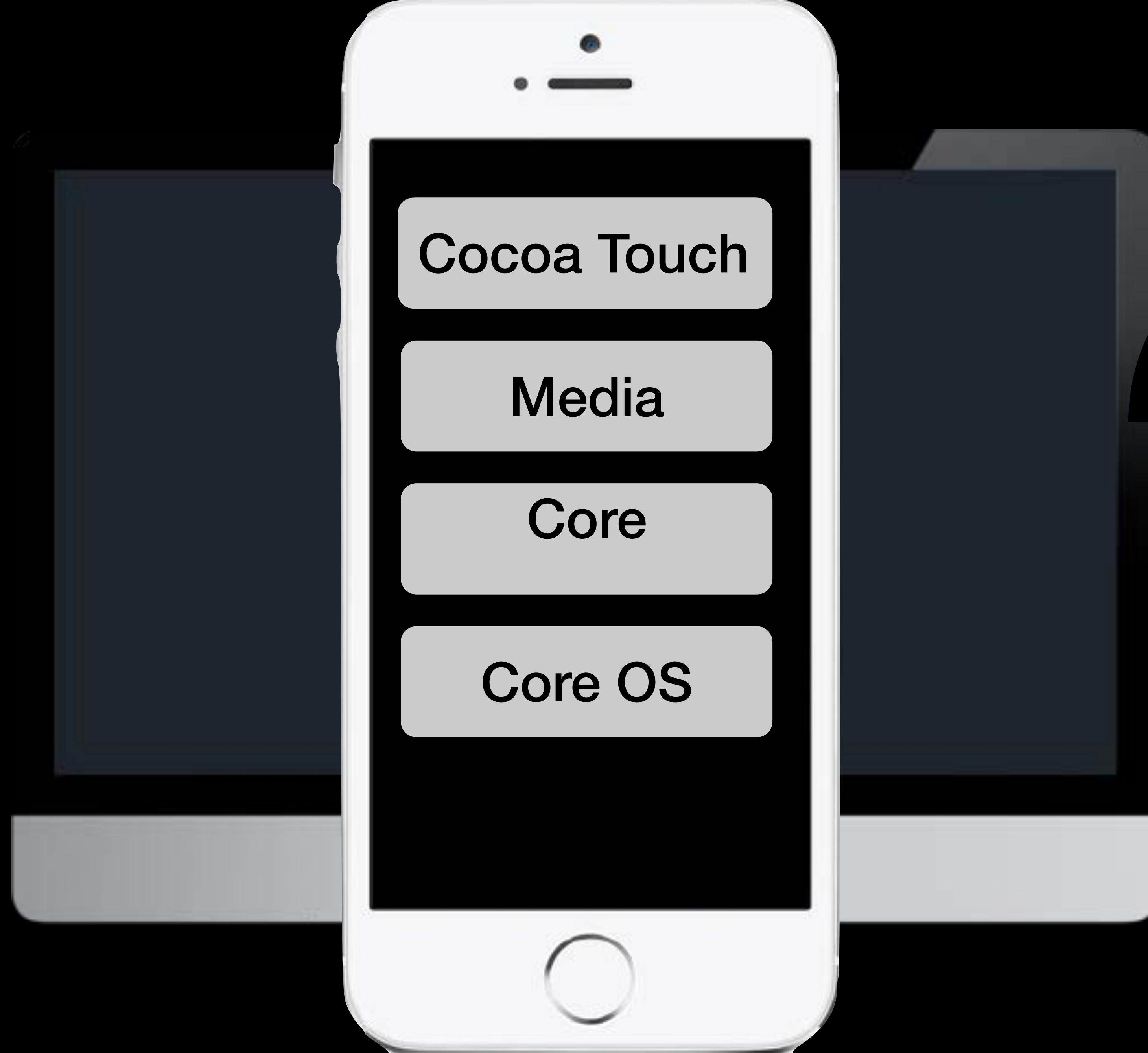


<https://www.apple.com/everyone-can-code/>

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

