iPhone Application Programming
Lecture 1: Introduction

Prof. Jan Borchers
Media Computing Group
RWTH Aachen University

Winter Semester 2013/2014

http://hci.rwth-aachen.de/iphone

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iPhone Programming Team

- Prof. Jan Borchers
- Chat Wacharamanotham, M.Sc.
  - chat@cs.rwth-aachen.de
- Student Assistant: Aaron Krämer
- Specialized topic presenters

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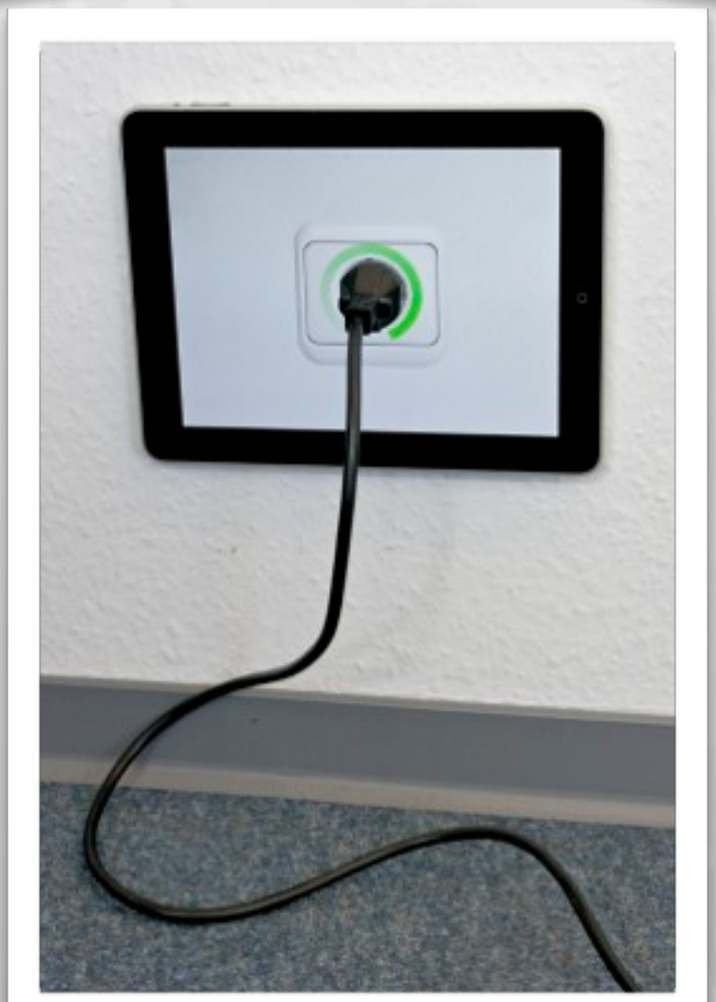
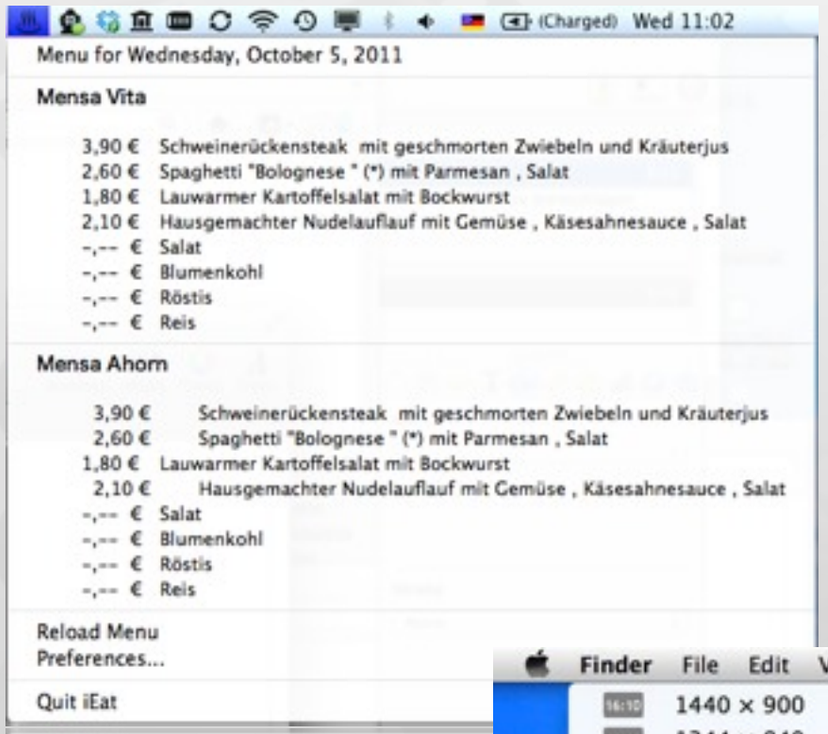
Research projects summer 2011
Available at: http://hci.rwth-aachen.de/videos/iphone1314/S01/i10Project2013.m4v



Pocket DRAGON

We Are in the App Store

iEat for OS X



Display Menu

iEat for iOS

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Class Goals

- Understand the differences between desktop and mobile development
- Look at a software framework designed from scratch
- Illustrate how established software engineering patterns are applied in the real world

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Class Topics

- Mobile application design principles
- iOS development basics
- View controllers & dialogs
- Input techniques
- Performance tweaking
- Data Persistence
- Networking
- iPad programming
- Location & maps
- Audio

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Format

- Lecture
  - Tue 9:15–11:45, room 2222
  - Reading assignments
- Lab (20 spots)
  - Mon 16:15–17:45, room 4U15
  - 6 programming assignments
  - Final project with presentation (TBA)

	3 ECTS Lecture only	6 ECTS Lecture + Lab
Assignments		10%
Project		20%
Final Exam	100%	70%

- Final exam: 10.03.14, 9:00–11:00 at room 2222

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Requirements

- OOP experience
- No Mac required
  - We will supply Macs & iPods for the lab
- You must register for this course in CAMPUS
- Lab: apply before Friday Oct. 18th at: http://hci.rwth-aachen.de/iphone

iPhone Developer University Program

- RWTH is member of the iPhone Developer University Program
- Free on-device development for all students throughout the semester
  - Invites will be sent to your RWTH email address
- You need to accept Apple's student agreement (online)

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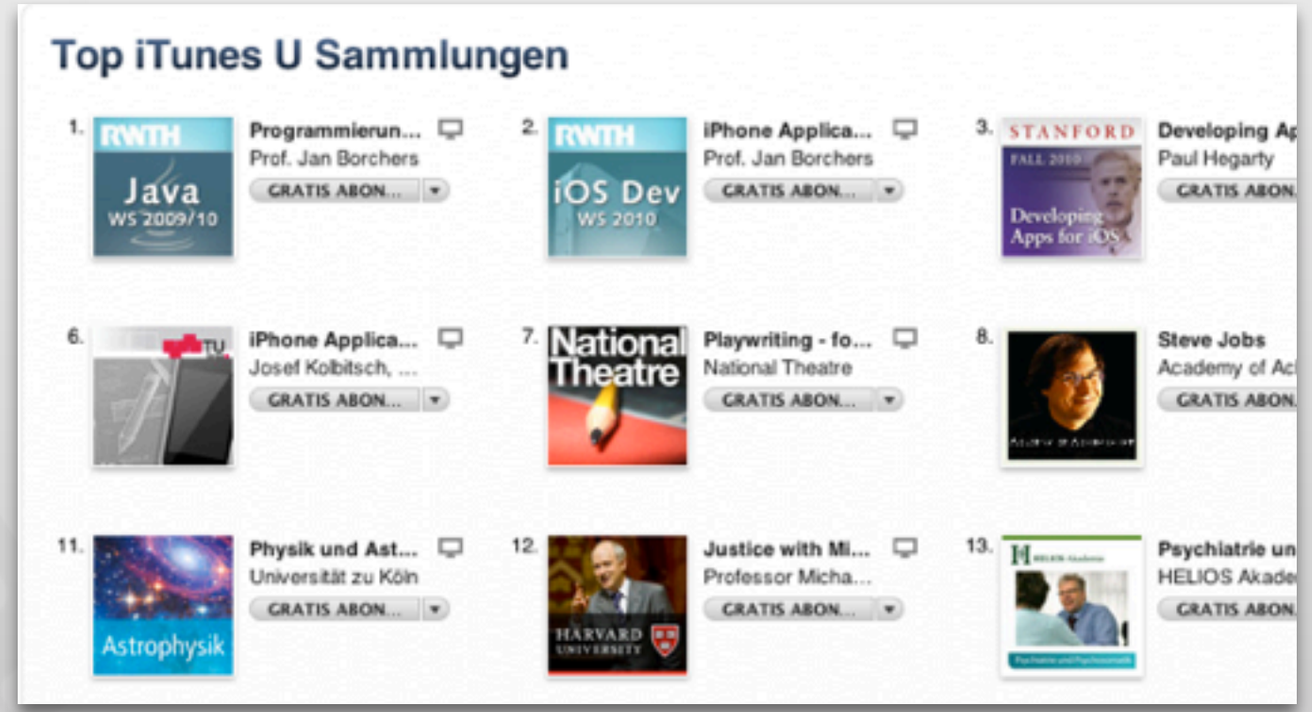
All slides and lecture videos will be available on iTunesU

http://hci.rwth-aachen.de/iphone

Why Take this Class?

- We know HCI, OS X, and iOS
  - Projects, publications, AATCe
- High iTunes U ranking
- Updated to latest iOS 7



Developing for Mobile Platforms

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The iOS Family

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Mobile Device Characteristics

- Screen size is compact
- Memory is limited
- Users interact with one screen at a time
- Users interact with one application at a time
- Onscreen help is minimal
- Context is key (task focus, peripheral use)

User falls while texting

Available at: http://hci.rwth-aachen.de/videos/iphone1314/S01/user_falls_while_texting.mov

Context is Key

9 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

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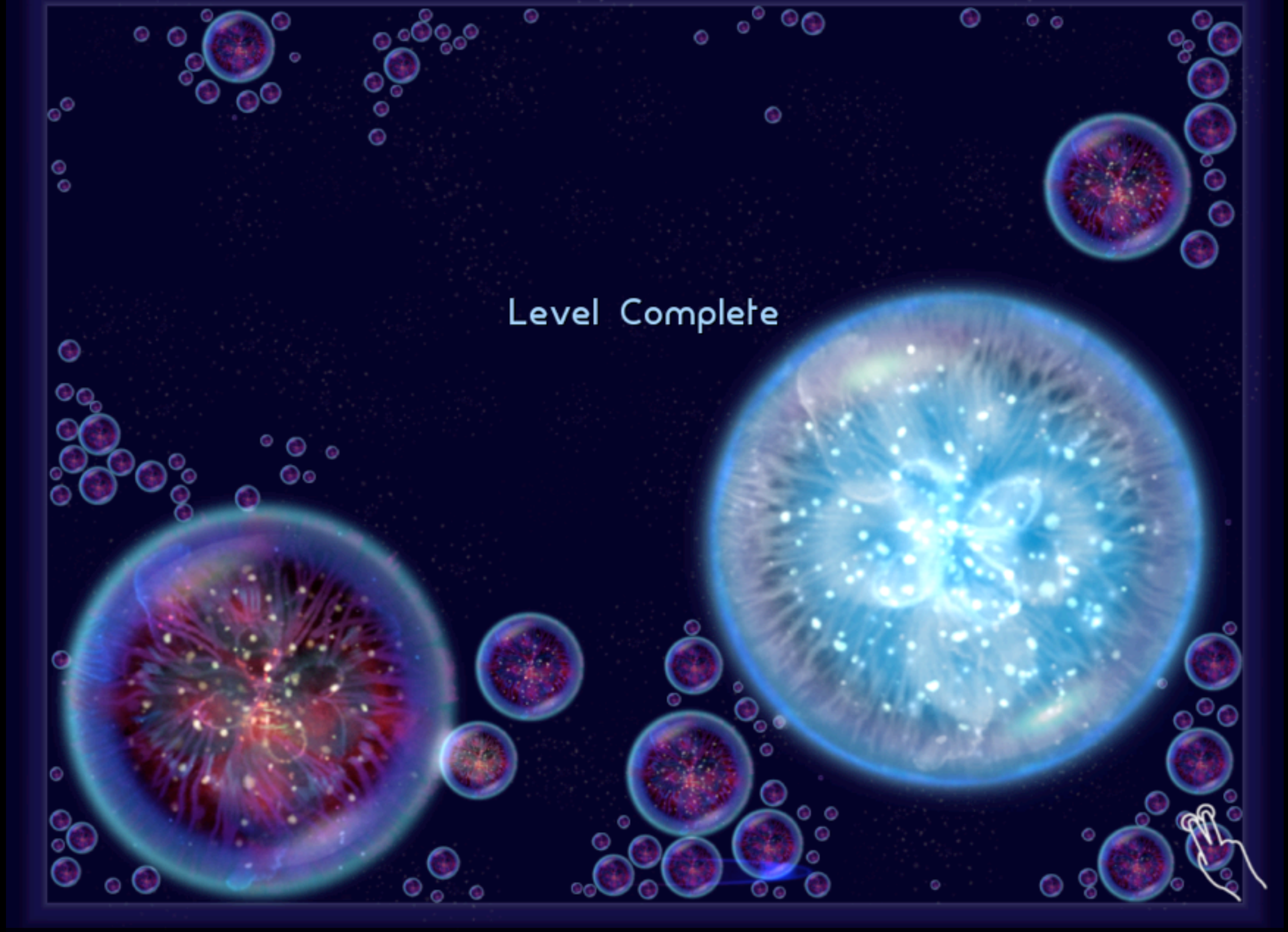

Onscreen help in Osmos HD

Drill down structure
example: Notes

Available at: http://
hci.rwth-aachen.de/
videos/iphone1314/S01/
Notes iOS7.mov

Life as an App

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

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Designing the UI

- Make it obvious how to use your application
- Sort information from top to bottom
- Minimize text input
- Express information succinctly
- Provide fingertip-size targets

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Interaction Design

- Multitouch interaction is still new
- Interaction patterns not established yet
- Follow Apple's examples if possible
- If you use complex gestures, help the user

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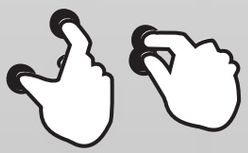
Standard Gestures

	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.

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Designing the UI

- Five resolutions, three aspect ratios:

	Resolution	
	Classic	Retina
iPhone	320 x 480	640 x 960
iPhone 5(S, C)		640 x 1136
iPad	1024 x 768	2048 x 1536
iPad Mini	1024 x 768	

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

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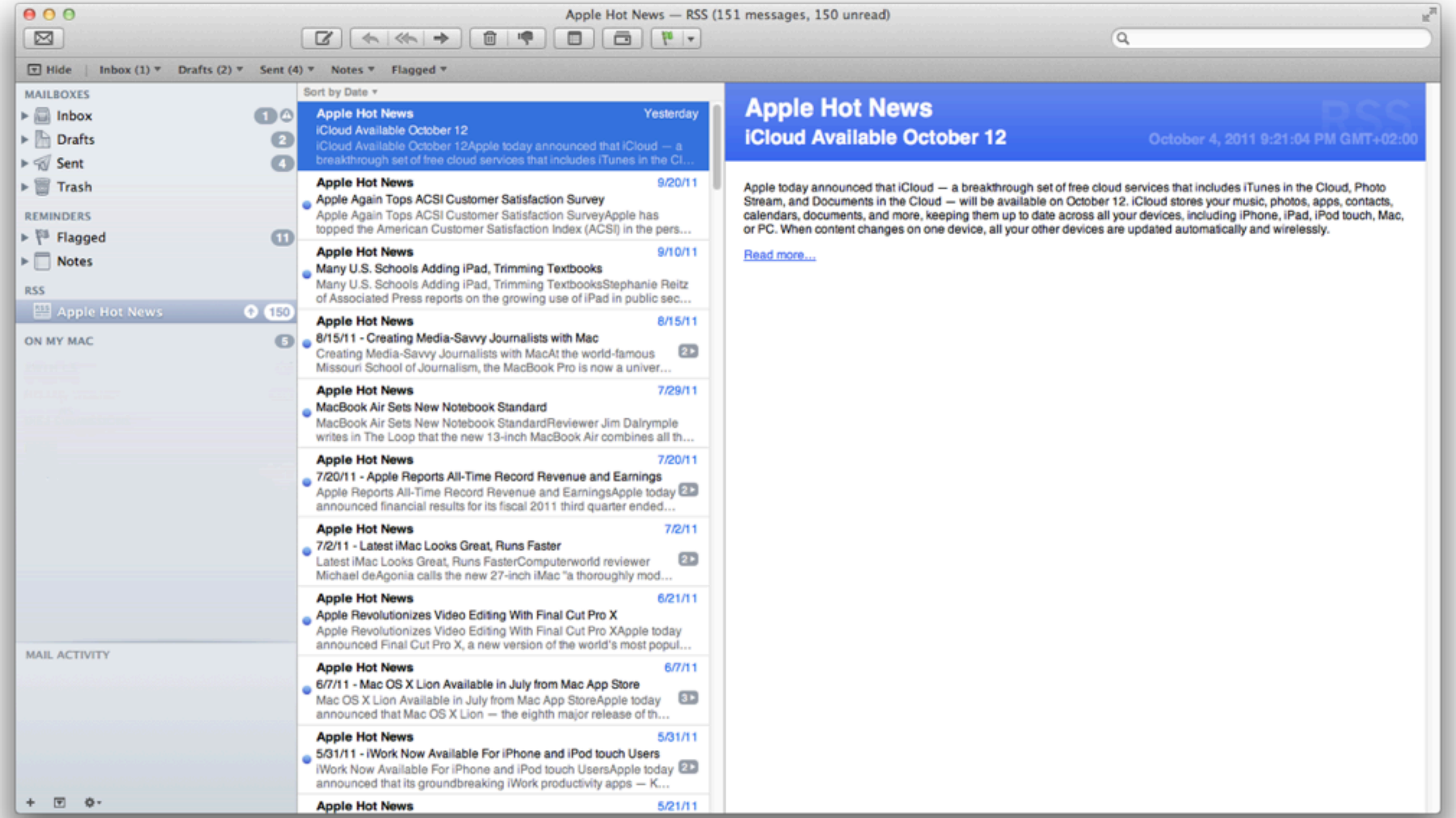

Converting desktop application to mobile: Mail

No SIM 16:07

Mailboxes **Inbox** Edit

WordPress 08/12/12
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Benutzername: aaronTest Passwort: blubbyblub http://www.sportarten.rwt…

micropayment™ Gmb… 27/11/12
Zahlungsbestätigung - Ihr Kauf vom 2…
27. November 2012 Sehr geehrter Kunde, wir bestätigen Ihnen hiermit di…

Team von Microsoft-K… 14/11/12
Bestätigen Sie Ihre E-Mail-Adresse
Microsoft-Konto Bestätigen Sie Ihre E-Mail-Adresse Um die Einrichtung dies…

Gmail Team 18/09/12
Your Gmail address, secondmeldmail…
Congratulations on creating your brand new Gmail address, secondmeldmail

Updated Just Now
2 Unread

No SIM 16:07

Inbox (2)

Gmail Team
To: Trash Mail more…

Your Gmail address, secondmeldmail@gmail.com, has been created
18 Sep 2012 13:00

Congratulations on creating your brand new Gmail address, secondmeldmail@gmail.com. Please keep this email for your records, as it contains an important verification code that you may need should you ever encounter problems or forget your

No SIM 16:08

Cancel **Re: Your Gmail addres…** Send

To: Gmail Team

Cc/Bcc:

Subject: Re: Your Gmail address, secon…

Sent from my iPhone

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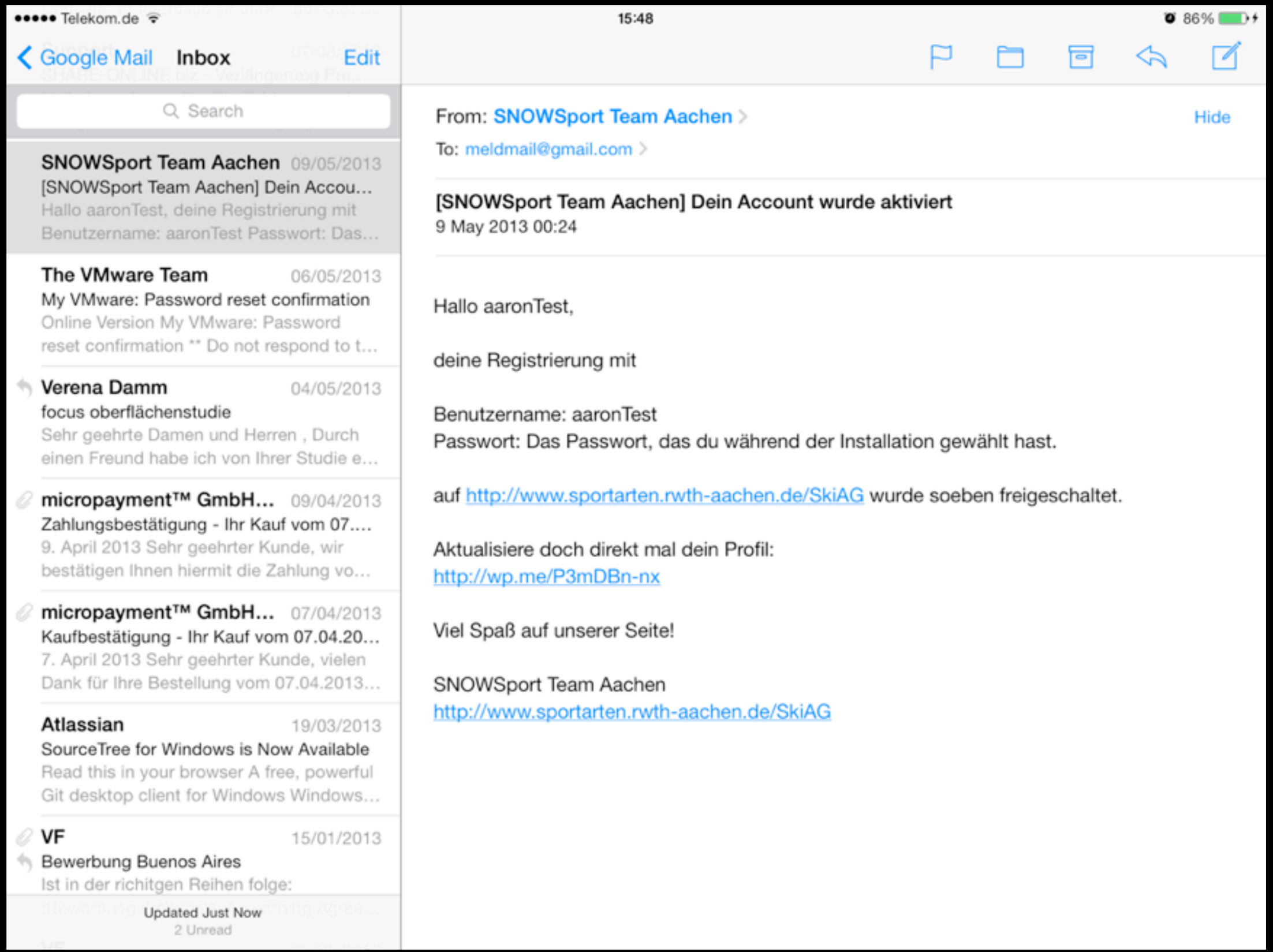
Z X C V B N M
123 space return



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[SNOWSport Team Aachen] Dein Accou...
Hallo aaronTest, deine Registrierung mit Benutzername: aaronTest Passwort: Das...
The VMware Team 06/05/2013
My VMware: Password reset confirmation
Online Version My VMware: Password reset confirmation ** Do not respond to t...
Verena Damm 04/05/2013
focus oberflächenstudie
Sehr geehrte Damen und Herren , Durch einen Freund habe ich von Ihrer Studie e...
micropayment™ GmbH... 09/04/2013
Zahlungsbestätigung - Ihr Kauf vom 07....
9. April 2013 Sehr geehrter Kunde, wir bestätigen Ihnen hiermit die Zahlung vo...
micropayment™ GmbH... 07/04/2013
Kaufbestätigung - Ihr Kauf vom 07.04.20...
7. April 2013 Sehr geehrter Kunde, vielen Dank für Ihre Bestellung vom 07.04.2013...
Atlassian 19/03/2013
SourceTree for Windows is Now Available
Read this in your browser A free, powerful Git desktop client for Windows Windows...
VF 15/01/2013
Bewerbung Buenos Aires
Ist in der richitgen Reihen folge:
Updated Just Now
2 Unread
From: SNOWSport Team Aachen
Hide
To: meldmail@gmail.com
[SNOWSport Team Aachen] Dein Account wurde aktiviert
9 May 2013 00:24
Hallo aaronTest,
deine Registrierung mit
Benutzername: aaronTest
Passwort: Das Passwort, das du während der Installation gewählt hast.
auf http://www.sportarten.rwth-aachen.de/SkiAG wurde soeben freigeschaltet.
Aktualisiere doch direkt mal dein Profil:
http://wp.me/P3mDBn-nx
Viel Spaß auf unserer Seite!
SNOWSport Team Aachen
http://www.sportarten.rwth-aachen.de/SkiAG

●●●●● Telekom.de

15:49

86%

Google Mail Inbox Edit

Search

SNOWSport Team Aachen 09/05/2013
[SNOWSport Team Aachen] Dein Accou...
Hallo aaronTest, deine Registrierung mit Benutzername: aaronTest Passwort: Das...

The VMware Team 06/05/2013
My VMware: Password reset confirmation
Online Version My VMware: Password reset confirmation ** Do not respond to t...

Verena Damm 04/05/2013
focus oberflächenstudie
Sehr geehrte Damen und Herren , Durch einen Freund habe ich von Ihrer Studie e...

micropayment™ GmbH... 09/04/2013
Zahlungsbestätigung - Ihr Kauf vom 07....
9. April 2013 Sehr geehrter Kunde, wir bestätigen Ihnen hiermit die Zahlung vo...

micropayment™ GmbH... 07/04/2013
Kaufbestätigung - Ihr Kauf vom 07.04.20...
7. April 2013 Sehr geehrter Kunde, vielen Dank für Ihre Bestellung vom 07.04.2013...

Atlassian 19/03/2013
SourceTree for Windows is Now Available
Read this in your browser A free, powerful Git desktop client for Windows Windows...

VF 15/01/2013
Bewerbung Buenos Aires
Ist in der richitgen Reihen folge: (Bewerbung, Lebenslauf, Learning Agree...

VF 15/01/2013
Bewerbung Valparaíso
Reihenfolge: -Bewerbung -Lebenslauf - Learning Agreement -Notenspiegel -Mot...

VF 15/01/2013
Berwerbung San Juan ---Valerie
Hey Super vielen DANK !!!! Reihnefolge: - Bewerbung -Lebenslauf -Learning Agree...

Ancestry.com 15/12/2012
Thanks for downloading the Ancestry app

Updated Just Now
2 Unread

Hide

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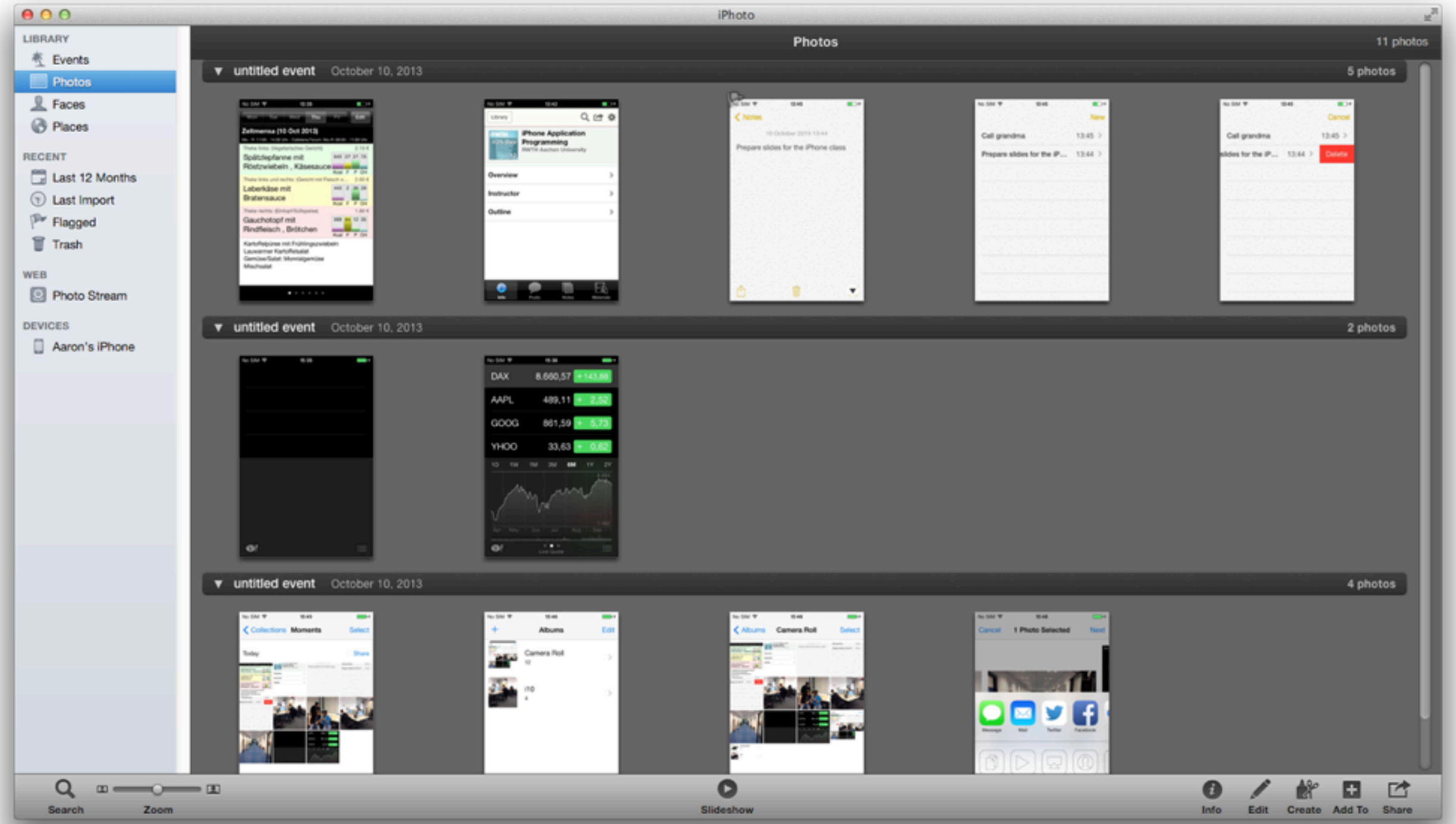
rend der Installation gewählt hast.

n.de/SkiAG wurde soeben freigeschaltet.

l:

e/SkiAG



Converting desktop application to mobile: iPhoto

Photos app in iOS 7

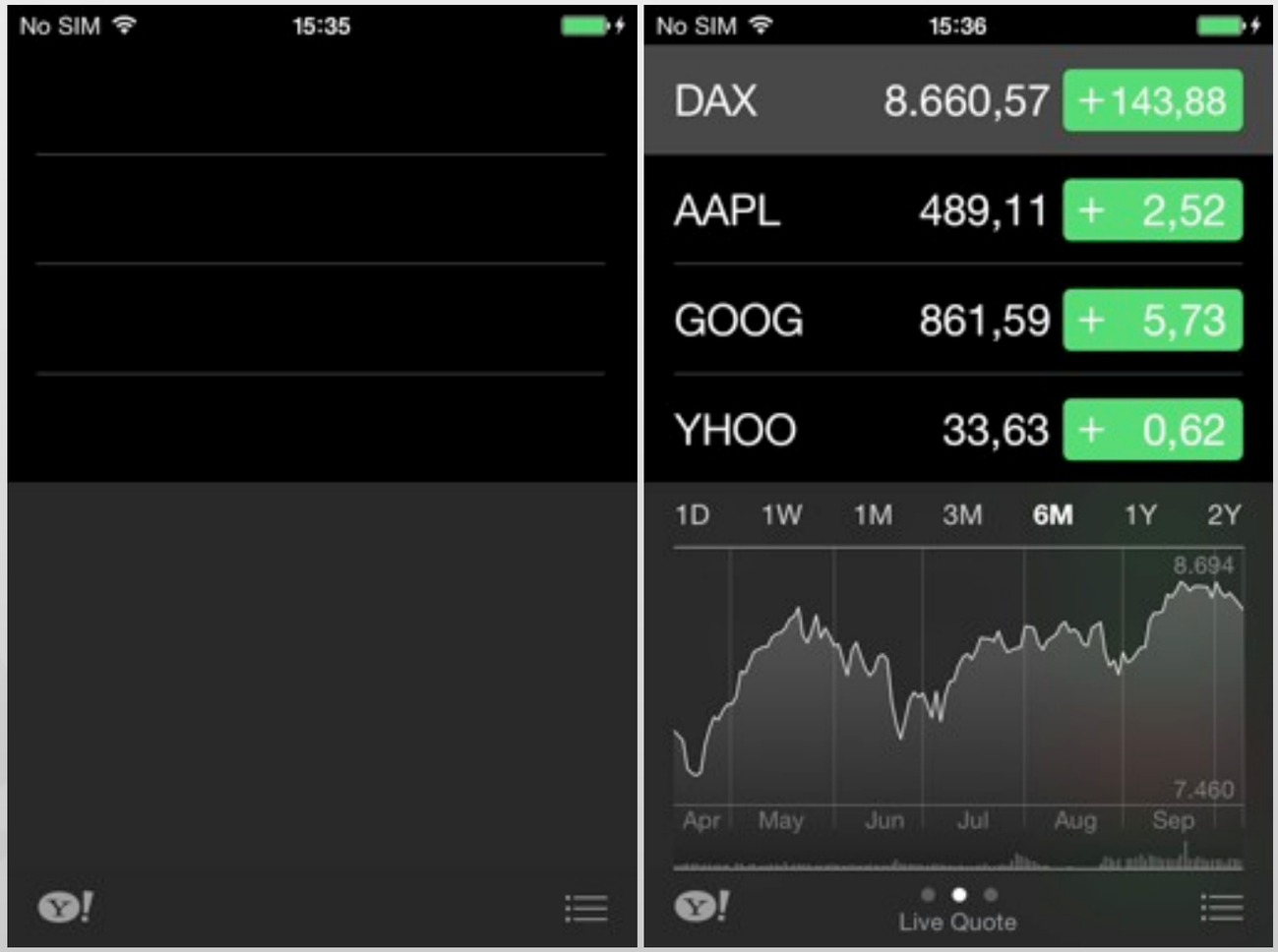
Available at: http://
hci.rwth-
aachen.de/videos/
iphone1314/S01/
Photos iOS7

Starting

- Apps should start quickly to provide a fluid user experience
- Show a launch image that

  closely resembles the first

  screen of your app
- Restore the state of last run
- By default, launch in portrait orientation.



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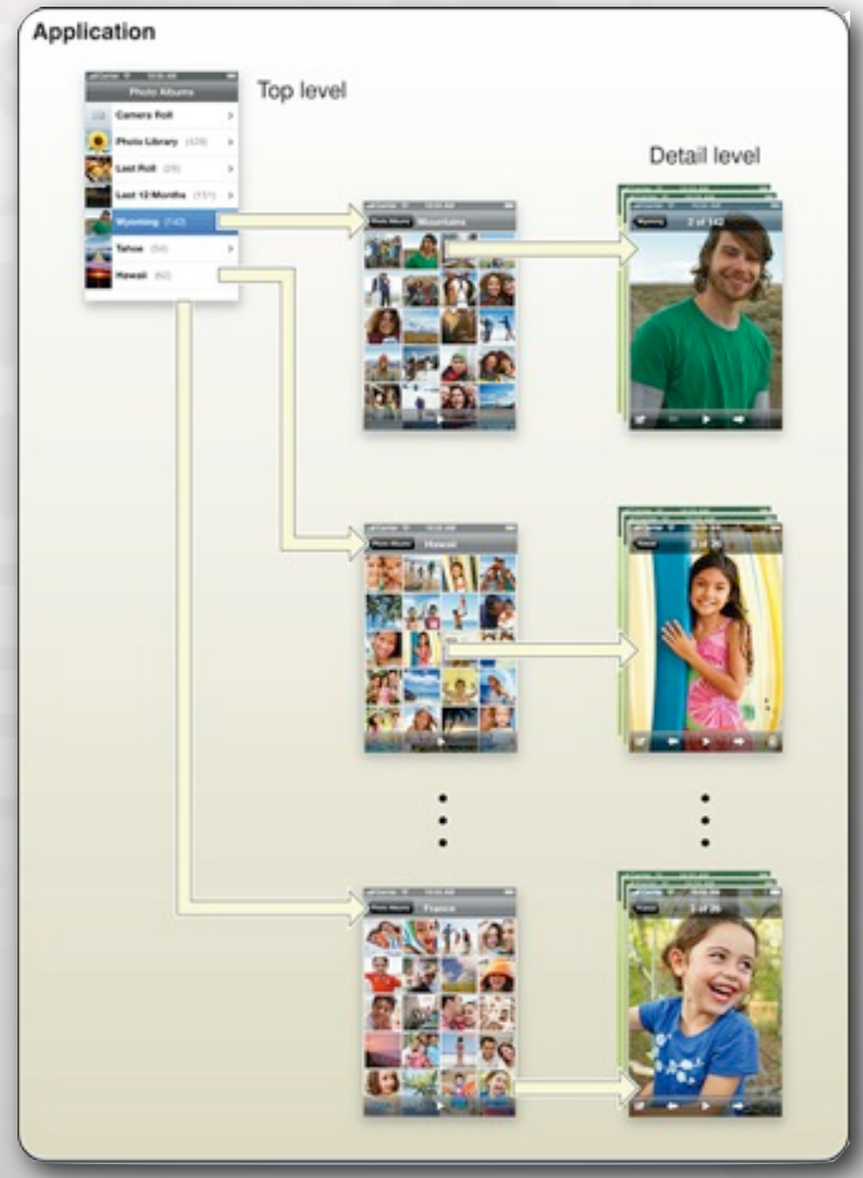
Stop

- 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

Application Styles

Productivity



Photos

Utility

Weather

Immersive

Seadragon

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Productivity Applications

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

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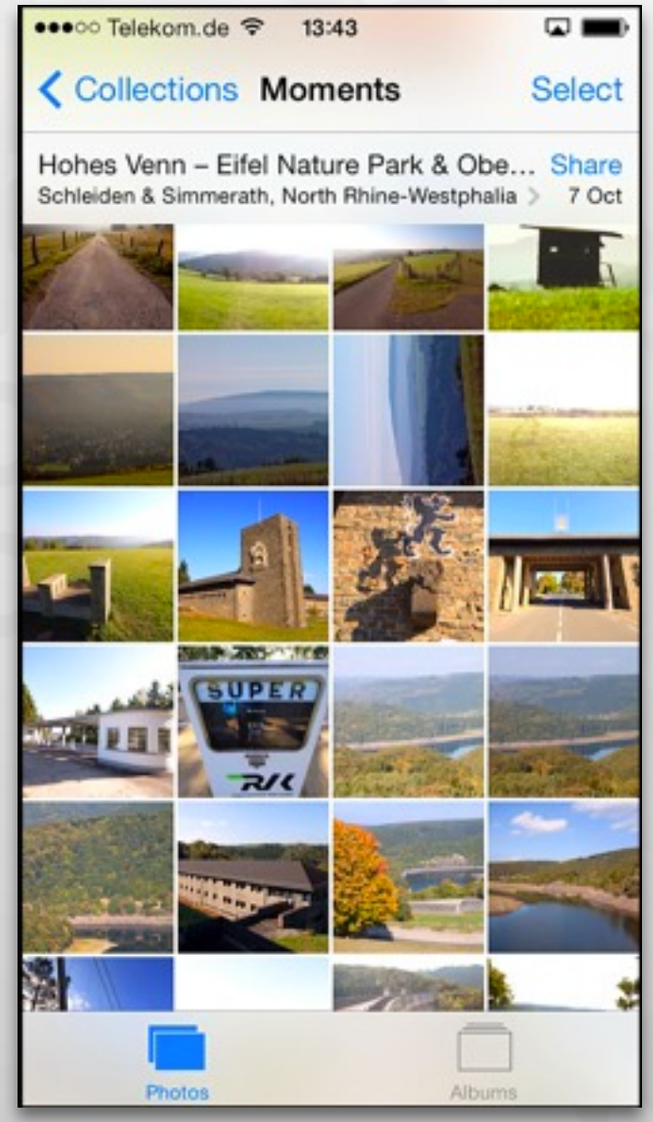
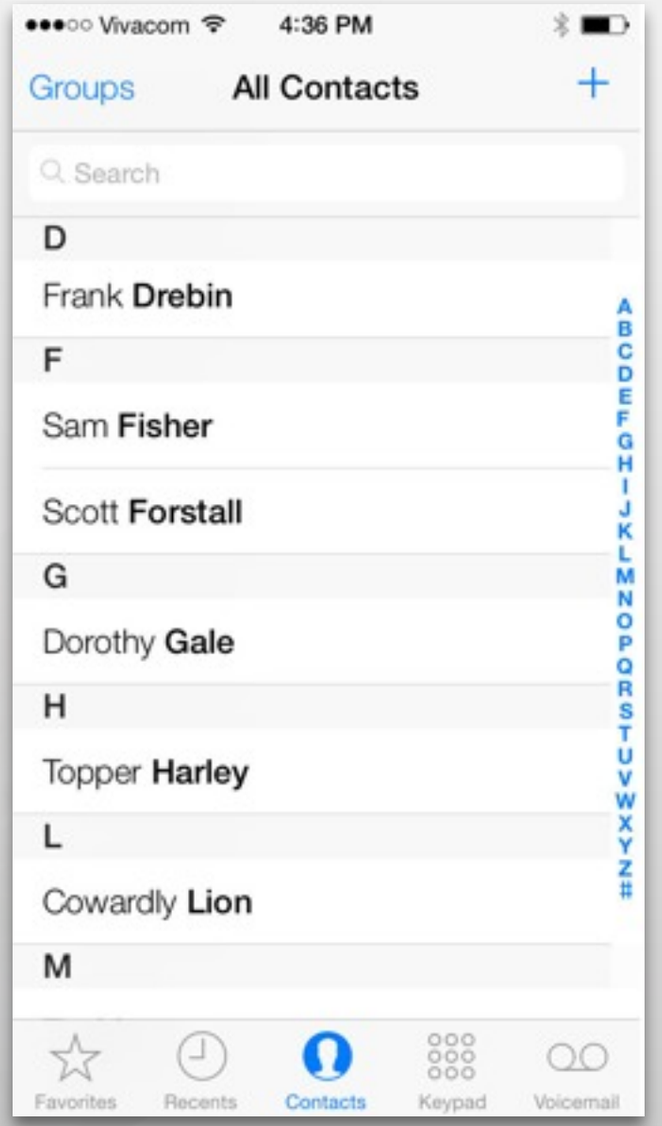
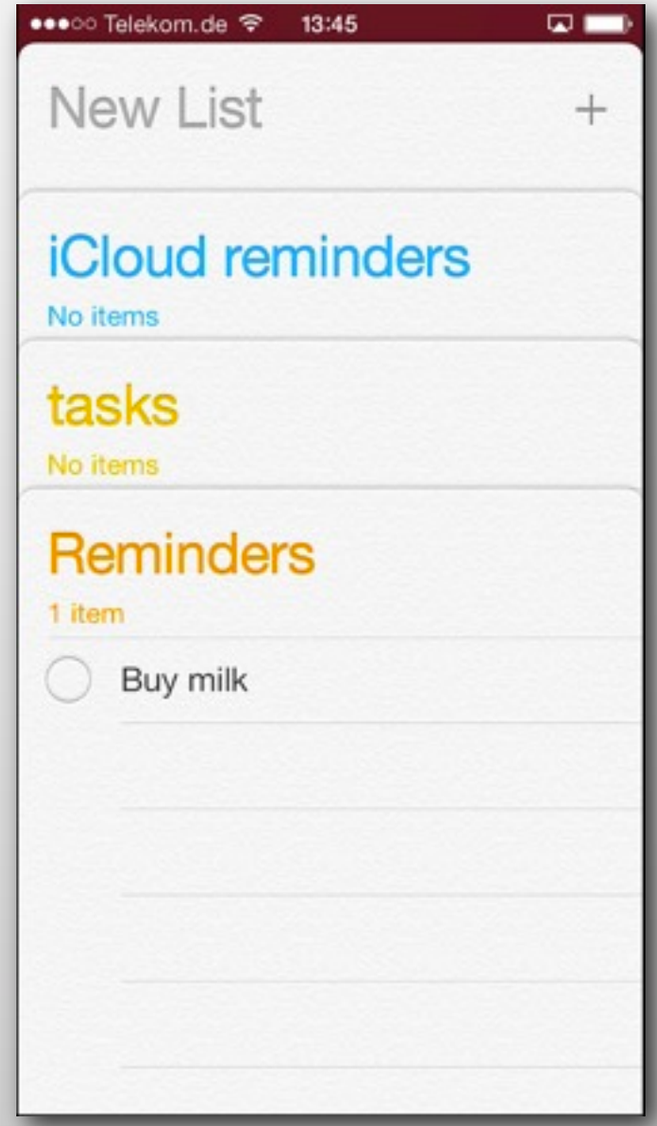
Productivity Applications



Photos



Contacts



Reminders

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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

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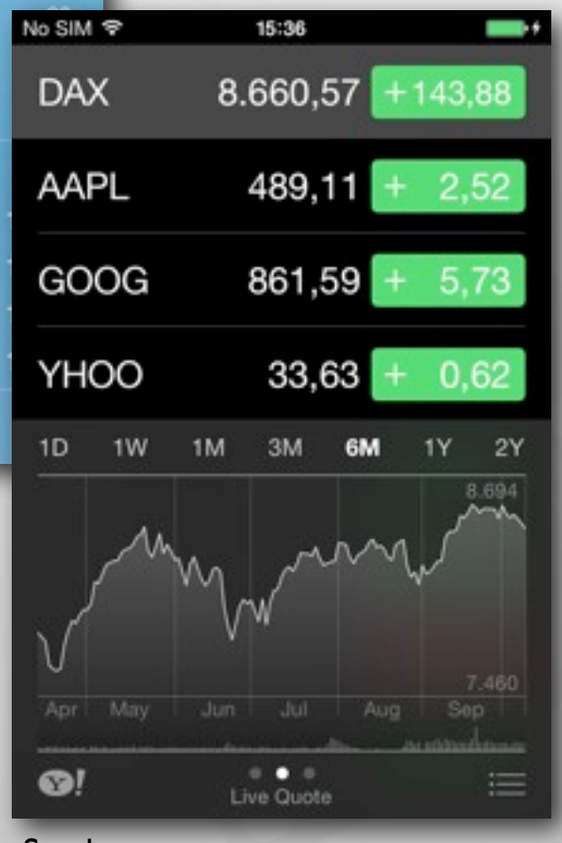
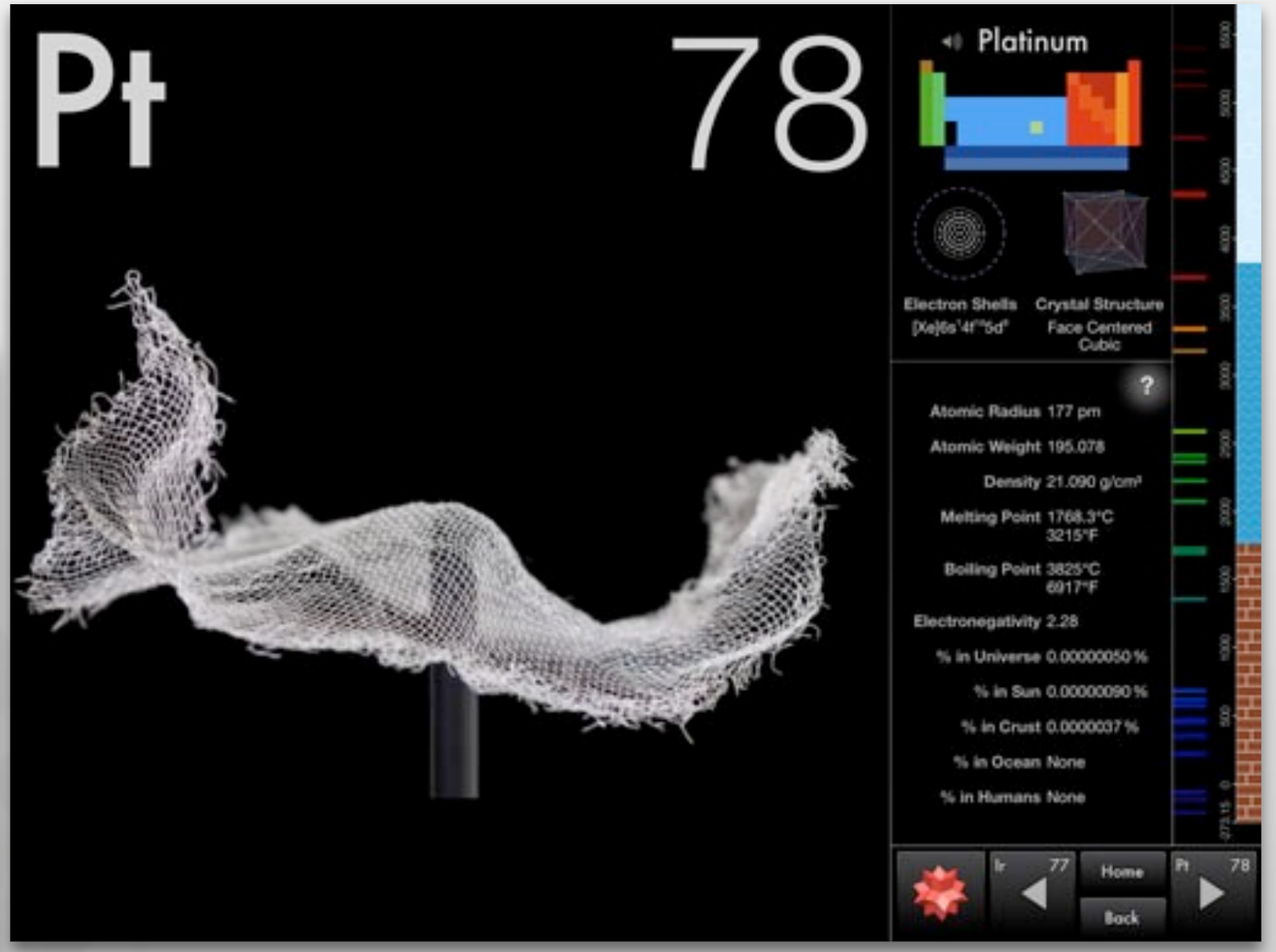
Utility Applications

Weather



Stocks



Elements

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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

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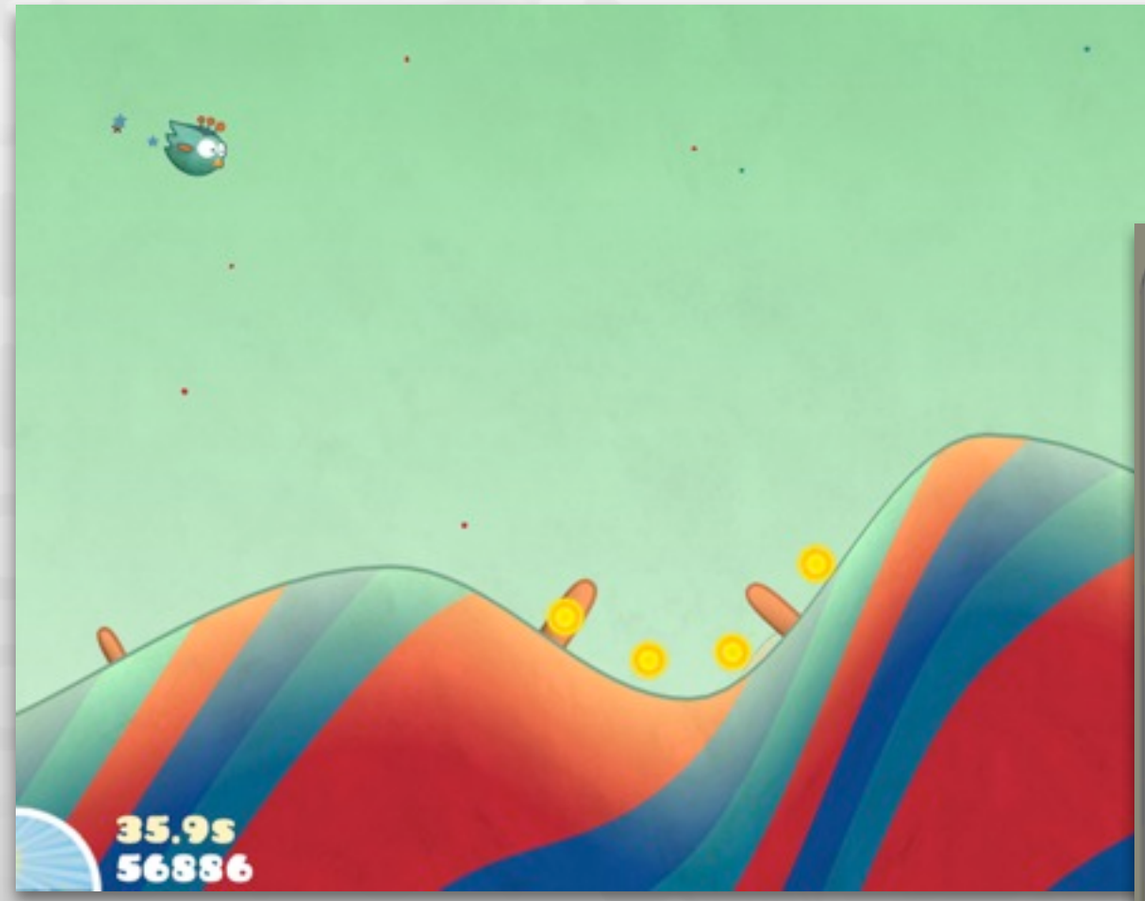
Games



Tiny Wings

FlightControl

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iOS 7 Design Themes

- Deference: The UI helps users understand and interact with the content, but never competes with it.
- Clarity: Text is legible at every size, icons are precise and lucid, adornments are subtle and appropriate, and a sharpened focus on functionality motivates the design.
- Depth: Visual layers and realistic motion impart vitality and heighten users' delight and understanding

Searching… 3:28 PM

Aachen
hourly

9°

Friday	8°	2°
Saturday	11°	3°
Sunday	12°	6°
Monday	13°	8°
Tuesday	12°	4°
Wednesday	14°	8°

Y! **Updated** 10/11/13 **3:27 PM**

Telekom.de 15:31

Aachen

Showers

9°

Friday Today 8 2

Now	16	17	18	18:51	19
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9	7	7	7	Sunset	7

Saturday	11	3
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Monday	13	8
Tuesday	12	4
Wednesday	14	8

Y!

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Telekom.de
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No Service
4:08 PM
Messages
Friday
11
Calendar
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Videos
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Maps
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Reminders
Clock
Game Center
Newsstand
iTunes
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Settings
Phone
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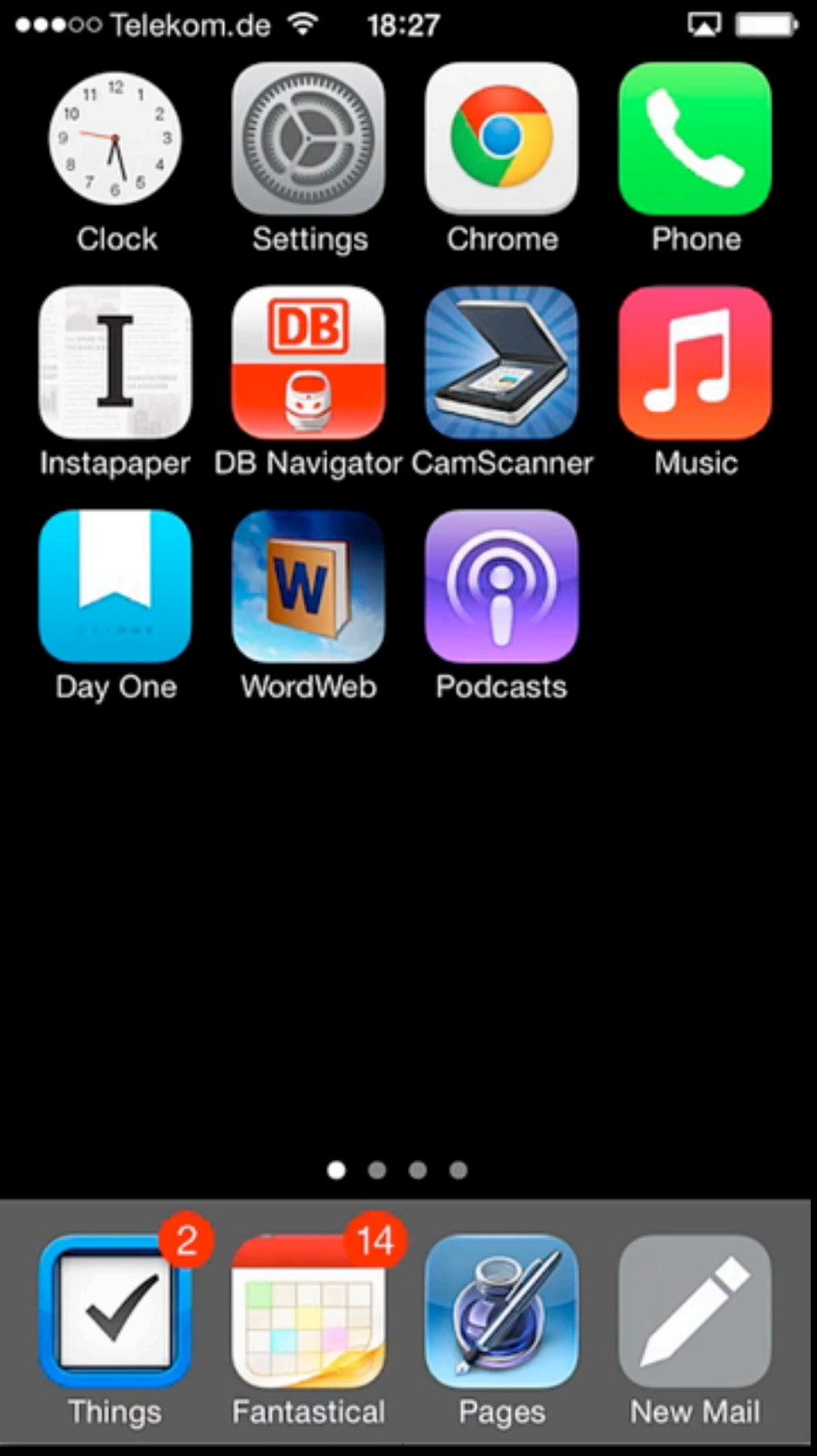
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CamScanner
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work +40 855 512 12
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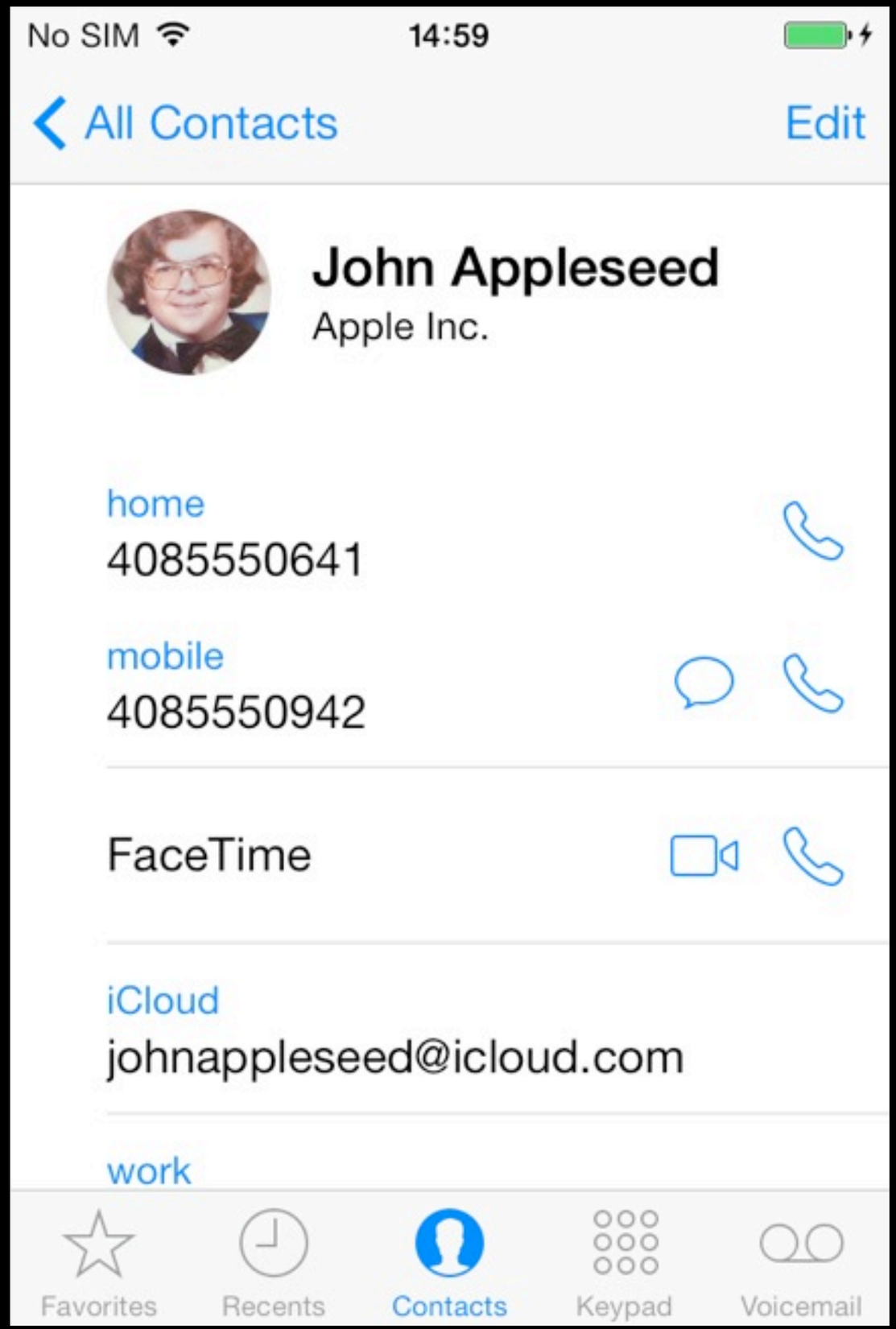
Keypad
Voicemail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work +40 855 512 12
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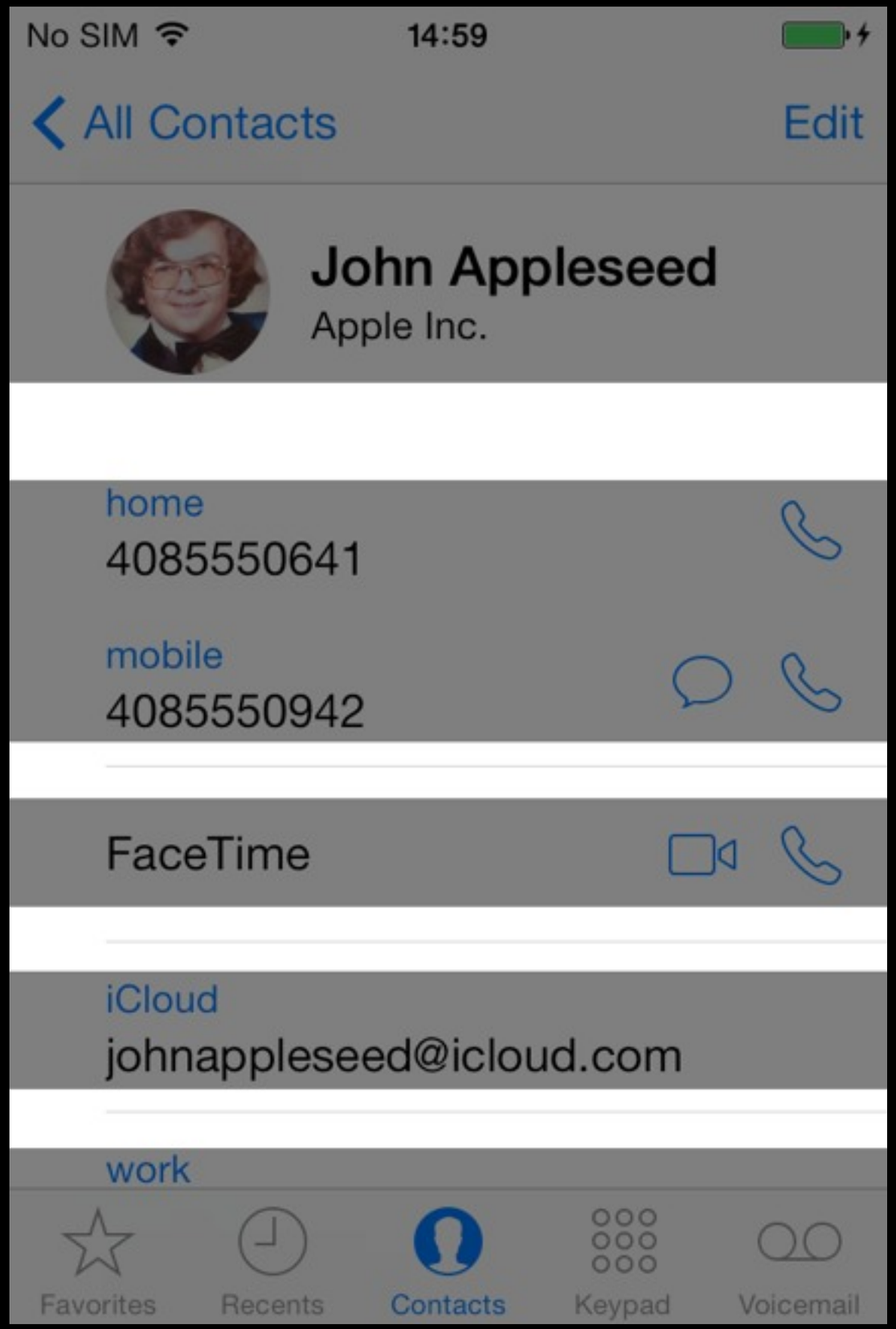
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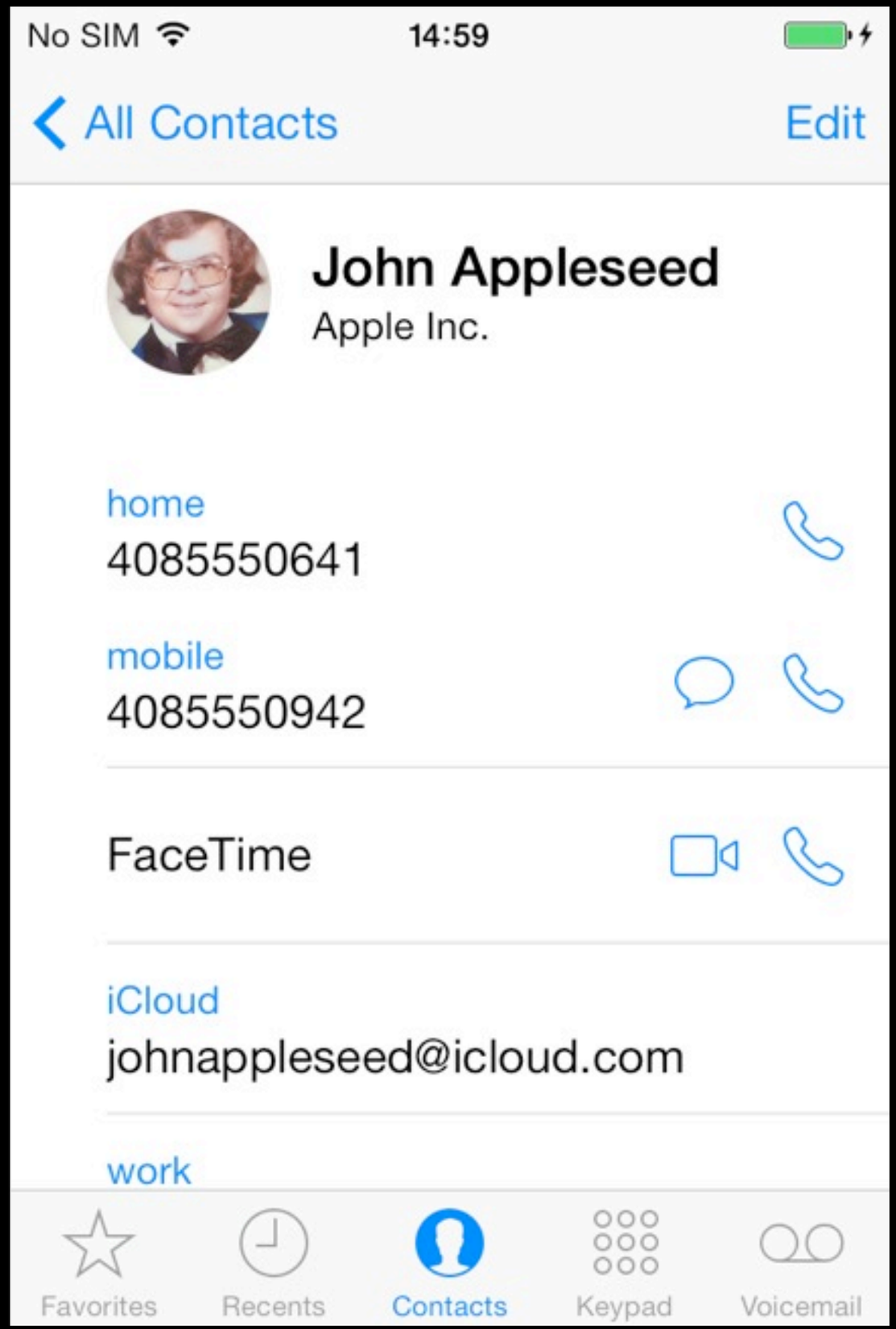
No SIM
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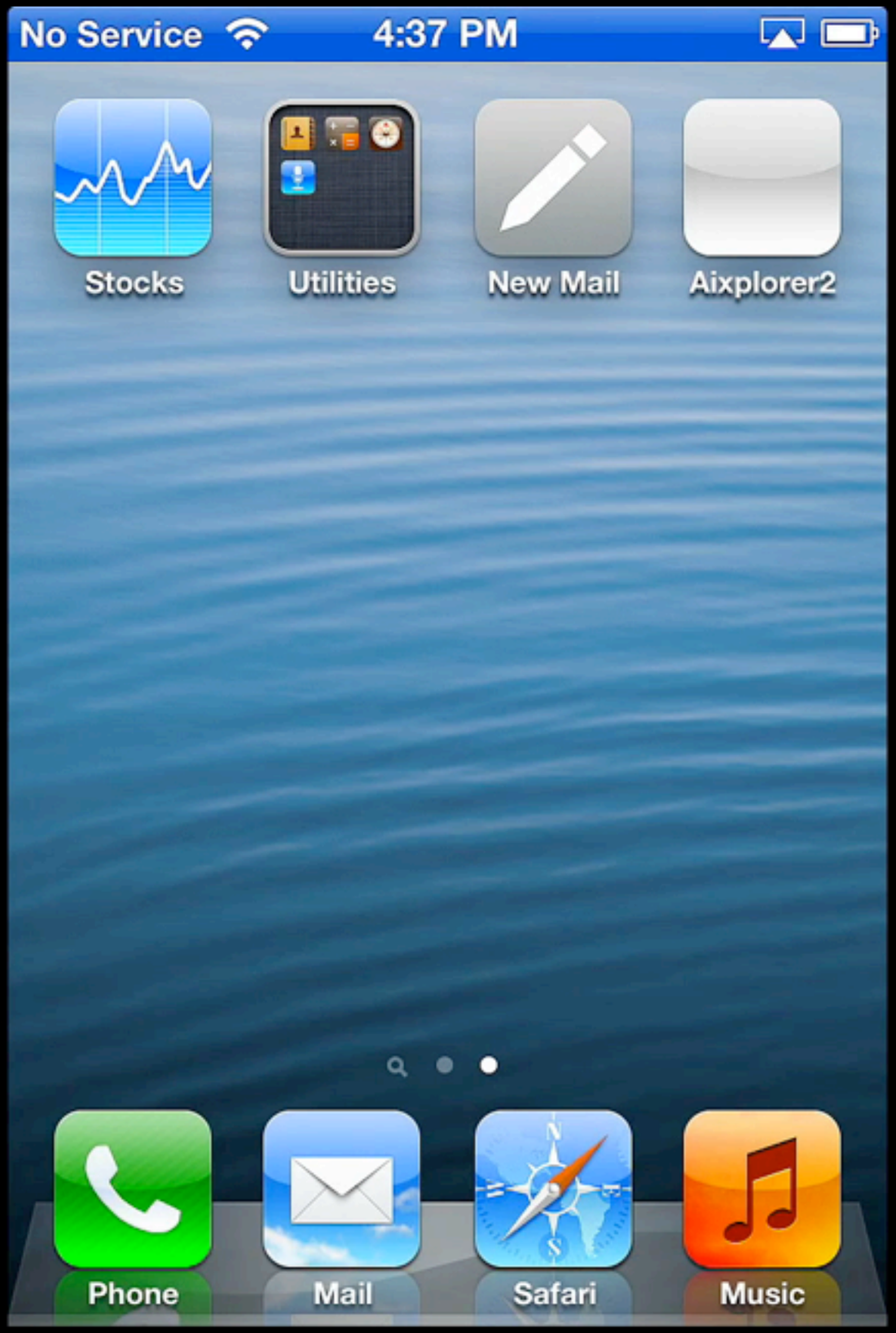
No Service
4:37 PM
Stocks
Utilities
New Mail
Aixplorer2
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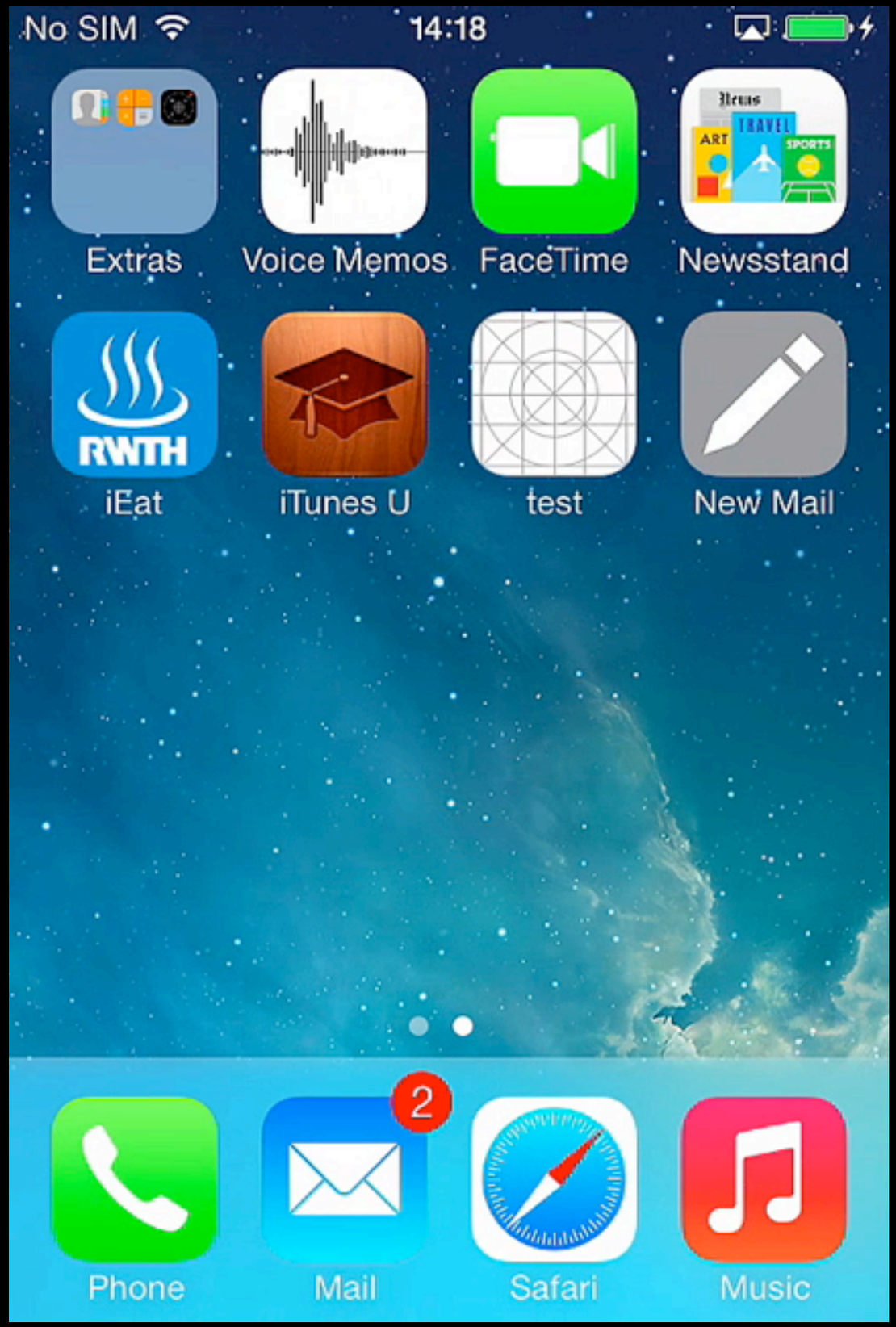
No SIM
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Extras
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FaceTime
Newsstand
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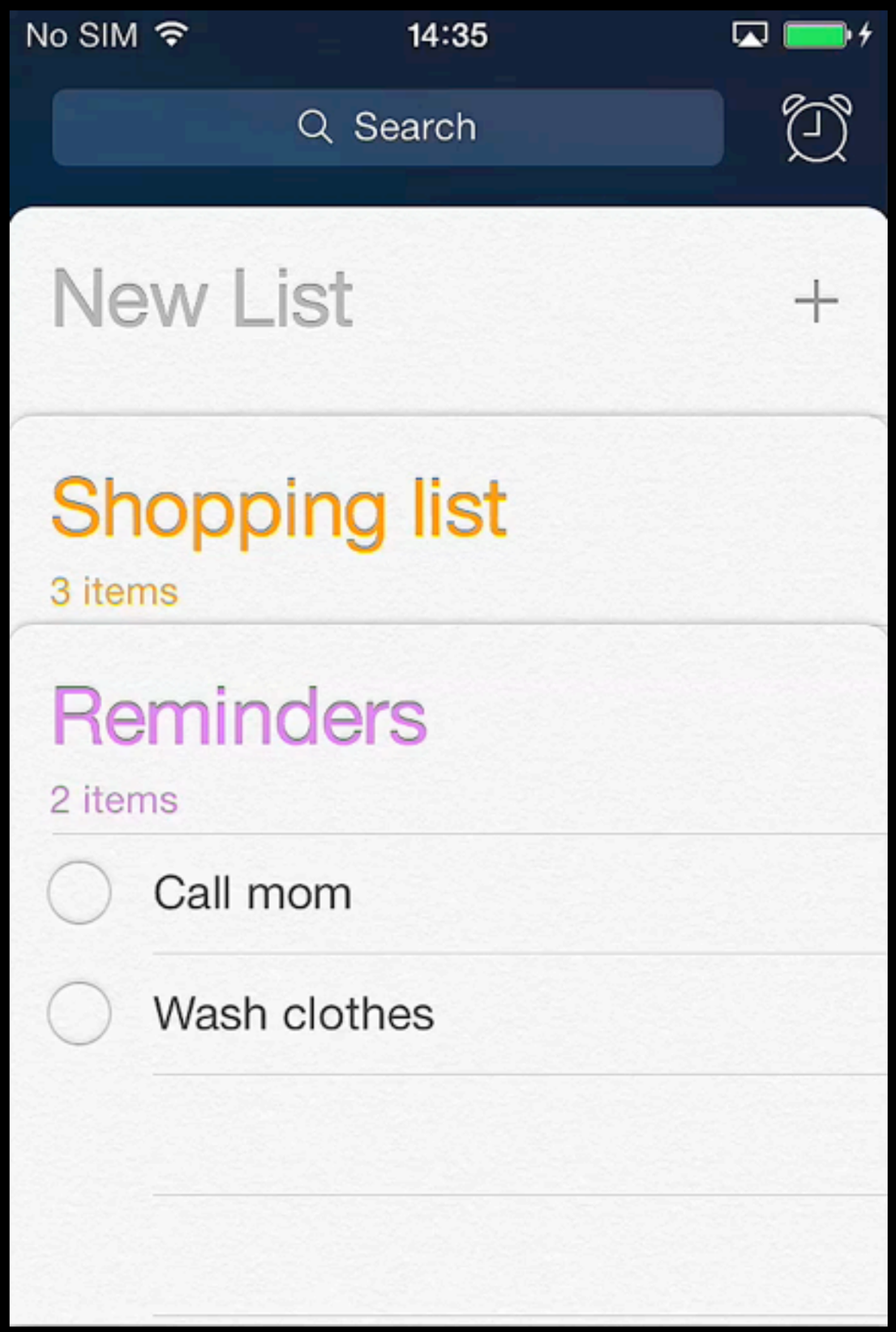
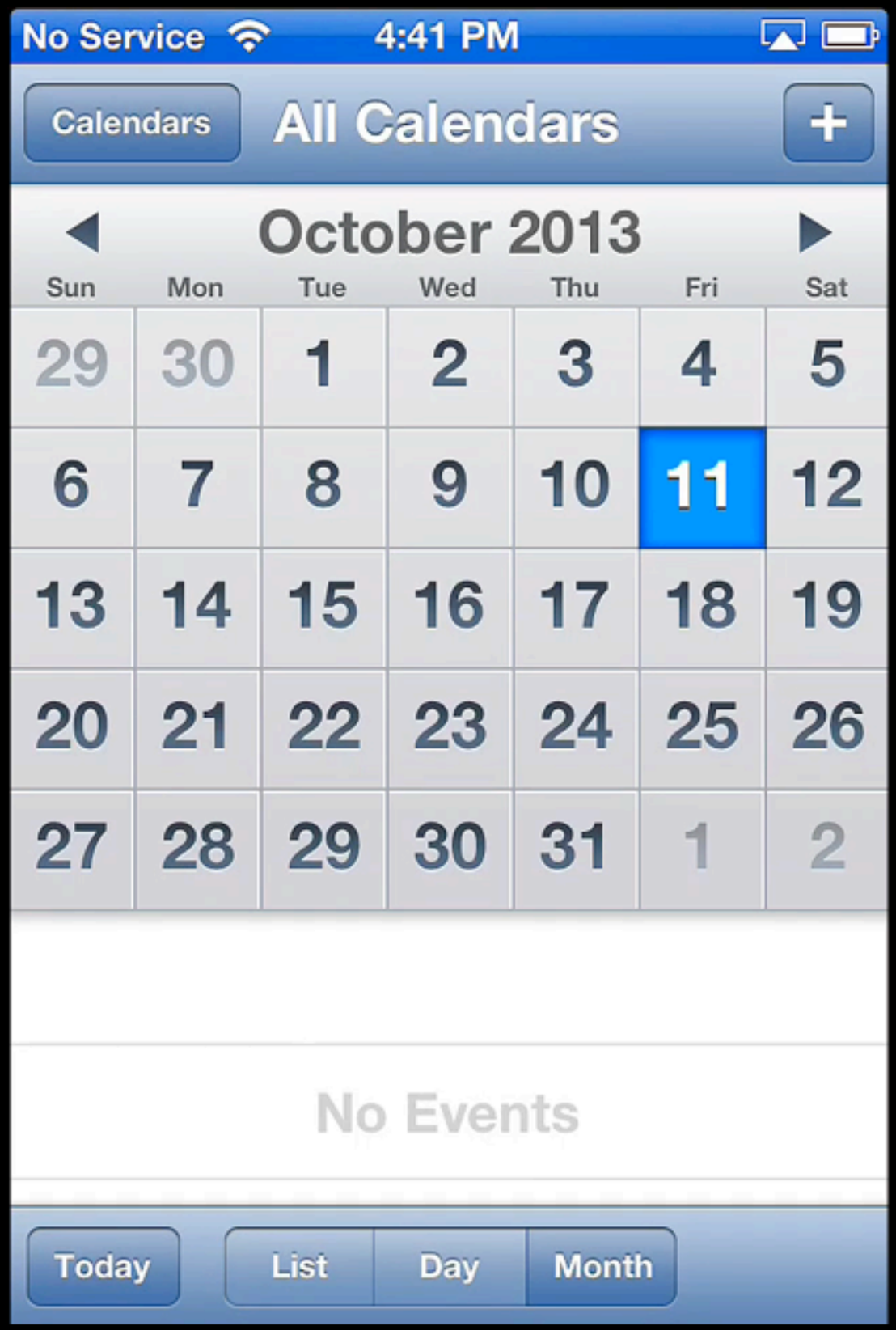
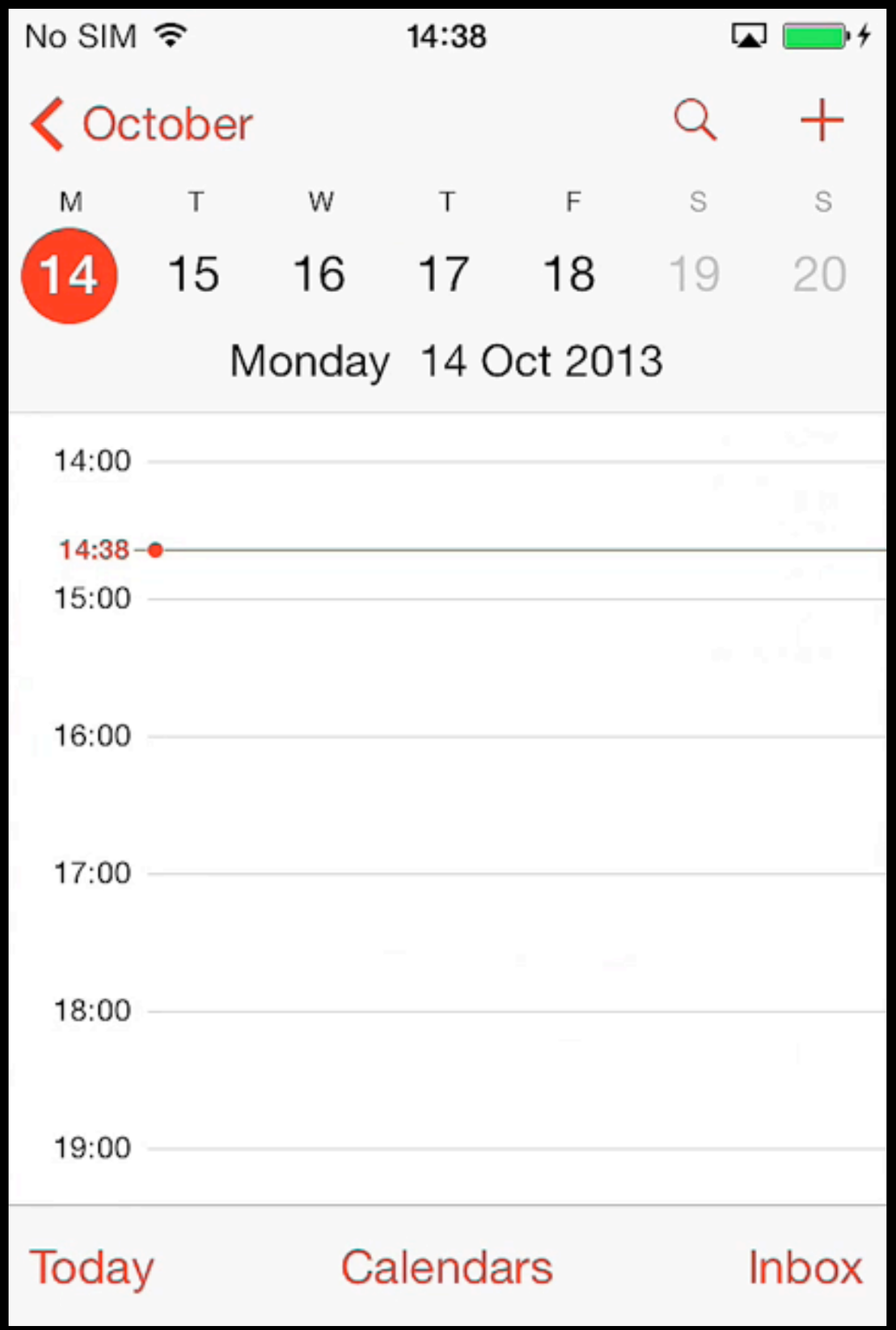
Safari
Music

No Service
4:36 PM
Reminders
Reminders


No SIM
14:35
Search
New List
Shopping list
3 items
Reminders
2 items
Call mom
Wash clothes


No Service
4:41 PM
Calendars
All Calendars
October 2013
Sun
Mon
Tue
Wed
Thu
Fri
Sat
29 30 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31 1 2
No Events
Today
List
Day
Month


No SIM
14:38
October
M T W T F S S
14 15 16 17 18 19 20
Monday 14 Oct 2013
14:00
14:38
15:00
16:00
17:00
18:00
19:00
Today
Calendars
Inbox

Fundamentals of iPhone, iPad, and iPod touch Development

4th Edition

Early Release

RAW & UNEDITED

Programming iOS 7

O'REILLY®

Matt Neuburg

iOS Architecture: Overview

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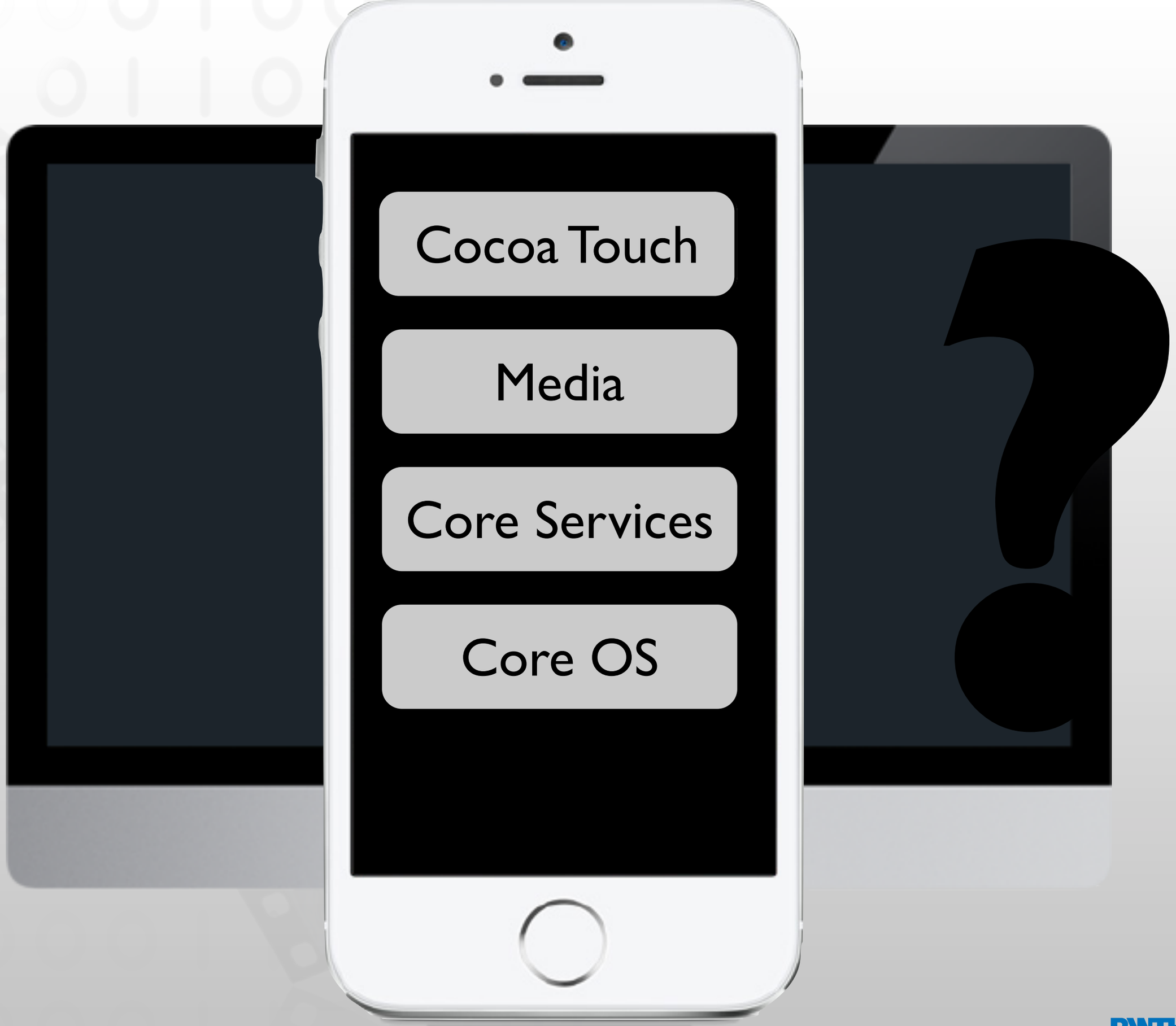

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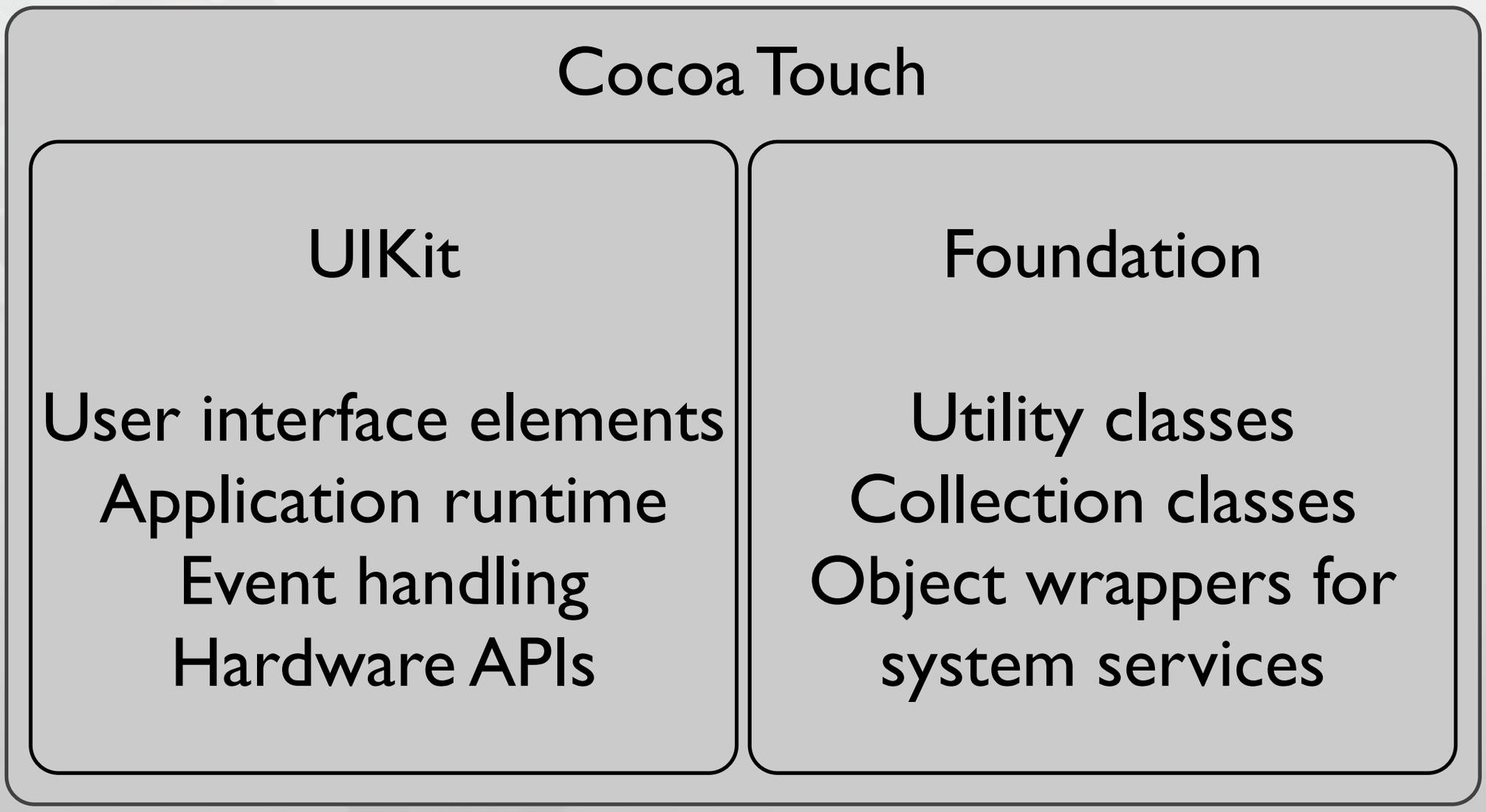
Cocoa Touch Architecture



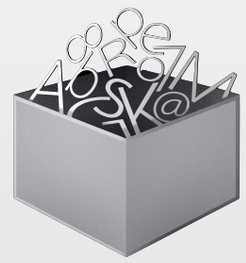
iPhone OS Frameworks

Core Data

WebKit

Bonjour

Store Kit



Text Kit

Core Location

Core Bluetooth

Core Motion

Event Kit

Javascript Core

Security

Core Audio

GL Kit

Sprite Kit

Game Kit

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Summary

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

- Reading assignment:

Selected iOS Human Interface Guidelines and WWDC videos
See hci.rwth-aachen.de/iphone for the list
(required reading for exam and final project)

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