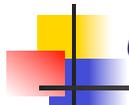




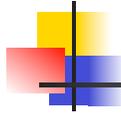
Human-Computer Interaction IS4300



P5 – Paper Prototyping *due*

- Recruit 3-5 users who are as close as possible to your target demographic.
- Be sure to record demographic information (age, gender, education, occupation, etc.) for your report.
- **Testing Users** When you run your prototype on a user, you should do the following things:
 - Obtain verbal consent for participation.
 - Brief the user.
 - Present one task.
 - Watch the user do the task. Take notes of your observations.
 - Repeat with the other tasks.
 - Interview users, take any measures you think are important.

2



P6 – Software Prototyping

- First computer-based implementation of your term project.
- Your computer prototype should be:
 - High fidelity in look.
 - Medium fidelity in feel. It's OK if your prototype does not support some advanced interactions, such as drag & drop. You can simulate these with animation, or a popup that describes in English what would happen.
 - Medium fidelity in breadth. Your prototype should be able to handle at least the 3 scenarios you described in your task analysis.
 - Low fidelity in depth. Don't implement any backend. Where system responses are needed, make them canned (i.e., always the same) or random. Write minimal code.



P6 – Software Prototyping

- DUE IN 2 WEEKS (11/14):
- IMPORTANT:
 - Your system must actually run and support your 3+ tasks to some level of fidelity.
 - Other students in the class must be able to download your software on any readily available computer and walk through the 3 tasks with little or nor help from you.
 - If you must develop for a unique device (e.g. iPhone) you must be prepared to loan 3-5 other students a device so they can do heuristic evaluation.

Group Project Deployment & Testing Plans?

Project	Members	Topic
1	Kenny, Eric, Sebastian	Stub hub
2	Alex G, Calvin, Pavel x 2	Textbook resale
3	Nick, David, Alex L, Bo-Ren	Multilingual JFK
4	Jenny, Jacques, Suhani	Music player
5	Noah, Jon, Bahar, Melina	MyCampus
6	Kevin A, Jacob T	OS Permissions
7	Daniel, Kevin Z	Gamified scheduler
8	Jacob VH, Cody	OCRemix

Ubicomp

- Ubiquitous Computing, aka
- Pervasive Computing
- “Computing off the desktop”
- Mark Weiser @ Xerox PARC
1990’s



Xerox PARC Projects

- PARCtab ('90s)
 - Location sensitive mobile computing
 - IR communication with each room



Ubicomp Topics

- Mobile computing
- Smart homes
- Passive sensing
- Context aware systems
- Ambient interfaces
- Automated capture & access
- Etc.

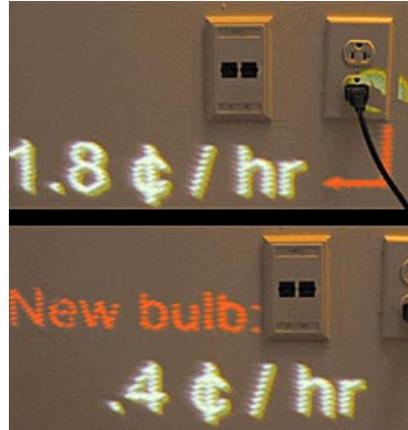
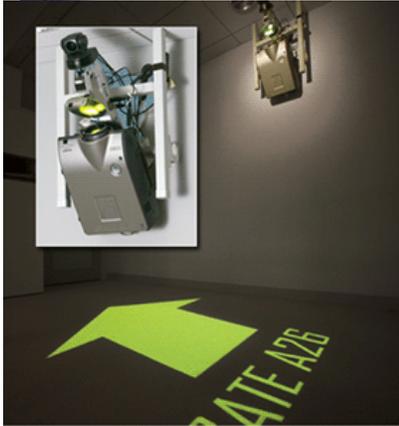
Professional Conferences

- ~CHI
- Ubicomp
- MobileHCI
- Pervasive Computing

Interactive wall-sized displays



IBM Anywhere Display



PlaceLab



Ambient Interfaces: Ambient Orb



Ambientdevices.com

Context-Aware Computing

- Apps that automatically respond to, or incorporate, context.
- Examples of context?
 - Location
 - Time
 - Activity
 - People
- Current examples of context sensing?
- Trying to guess 'user intent' is notoriously difficult...

Challenge in Context-aware Computing: Inferring User Intent



Exercise

- Design an algorithm for the Star Trek doors.
 - Assume any existing sensors.

Challenge in mobile/ubicomp/everyday:
how to monitor and interact proactively



Challenge in mobile/ubicomp/everyday:
how to monitor and interact proactively





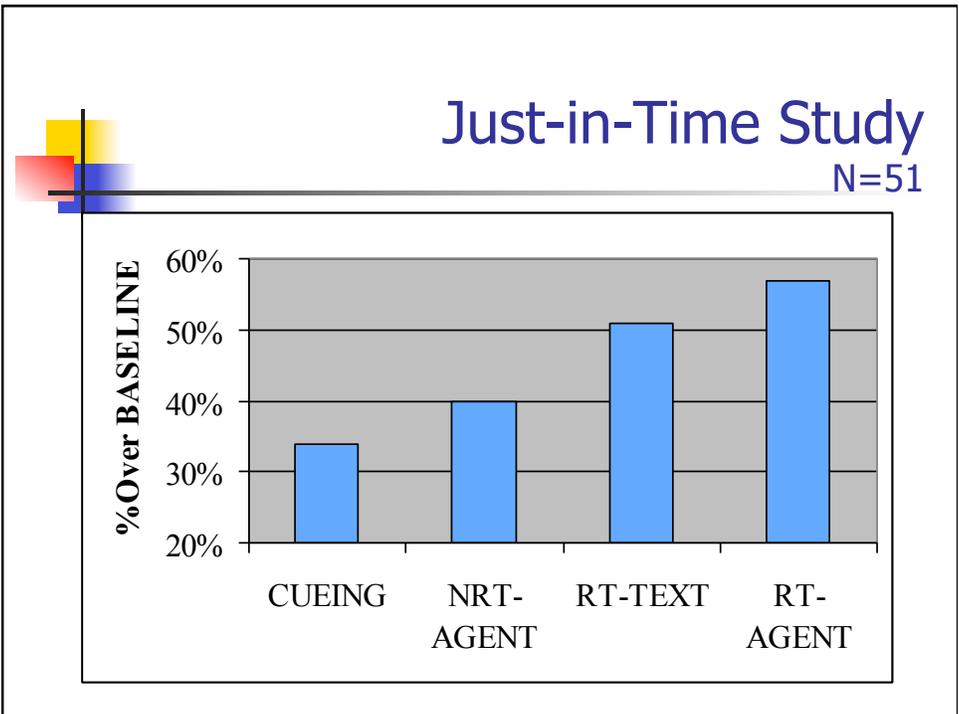
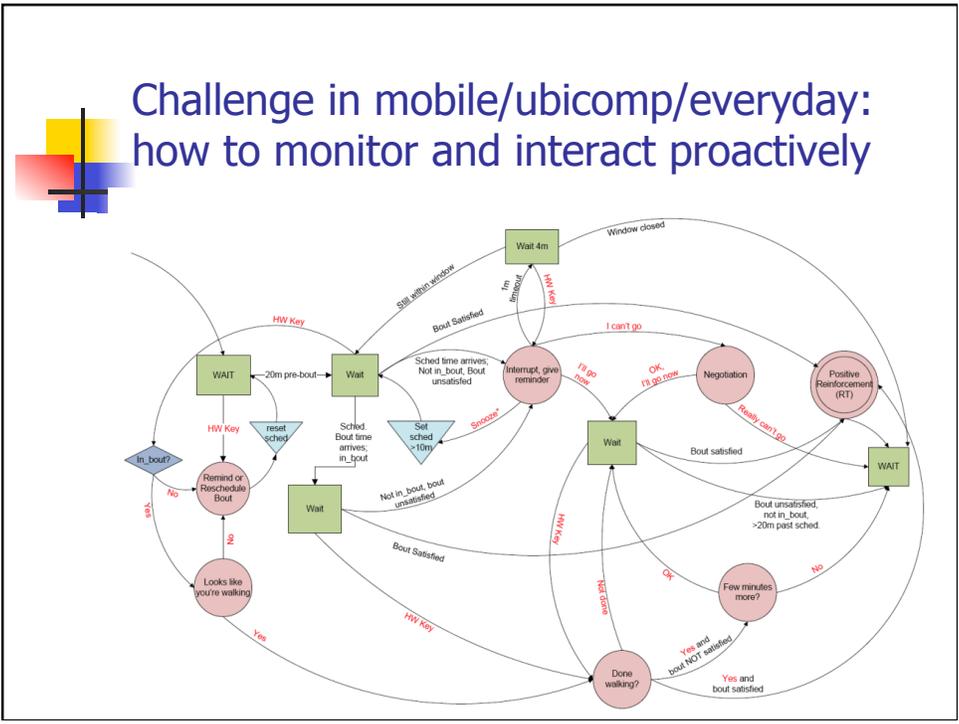
Wearable Agent Field Study

- Primary hypothesis: real-time intervention more effective than retrospective.
- 5-week, 5-treatment within-subjects design
- 100 free-living, sedentary adults



Problem

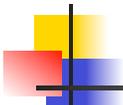
- User has scheduled a time they have committed to go for 10 minute walk
- Accelerometer tells you
 - Whether they are walking or not (in bout)
 - Whether they satisfied their commitment
- Remind them when time
 - Allow them to "snooze" for 10 mins
 - Allow them to "opt out" (with "negotiation")
- Determine whether they did their walk
 - Can be +/- 20min window of specified time
 - Positive reinforcement if yes





How do our models of interaction need to change for ubicomp?

- Model Human Processor / Norman's Interaction Model, Assumes:
 - single user
 - uninterrupted task
 - state either on screen or in working memory
- Alternate theoretical frameworks
 - Activity theory, Distributed cognition, Ethnography



Benyon Ch 19 Mobile computing

- How to do requirements analysis ("understanding")?
 - Observation (problems?)
 - Interviews & Mockups
 - Surveys
 - Diary studies
 - Street activity sampling (short interviews)
 - Expert interviews
 - Ethical issues?

Benyon Ch 19

Mobile computing

- How to do evaluation?
 - Expert methods
 - User testing

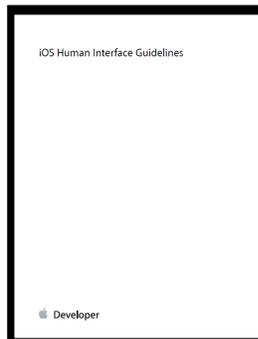
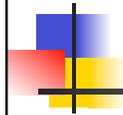


Kaikkonen, et al, 2005

How do mobile UIs (apps) impact design principles?

- Visibility?
- Feedback?
- Modes (memory)?
- Learnability?
- External consistency?
- Affordances?

Mobile UIs



Mobile UIs

- What's different in designing for mobile vs. desktop apps?

Define "mobile UI"

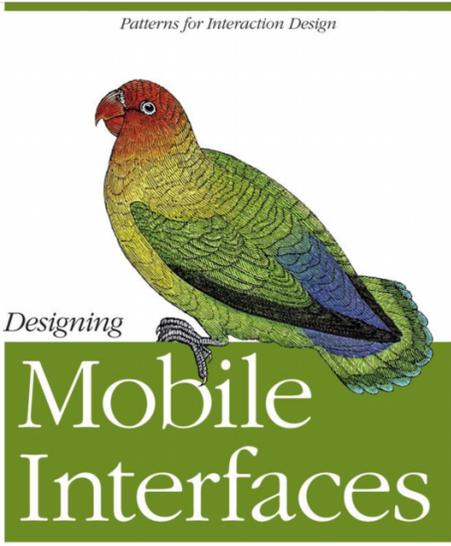


Mobile UIs

- Hooper & Berkman
 - Small
 - Portable
 - Connected
 - Interactive
 - Contextually Aware

Differences from Desktop

- Challenges
 - Limited screen space, or no screen at all.
 - battery life
 - limitations on storage, memory, processor and communication ability
 - screens on non-smartphone mobiles may not be 'bit-mapped' (alphanumeric)
 - All sorts of people will be using the device - used in all manner of physical and social contexts.
- Advantages
 - novel forms of interaction
 - sensors



Patterns for Interaction Design

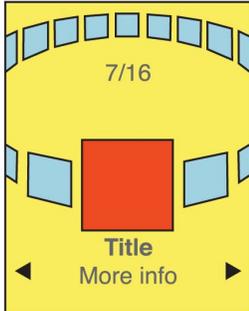
Designing

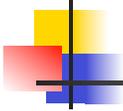
Mobile Interfaces

O'REILLY®

*Steven Hooper
& Eric Berkman*

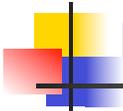
- 584 pages
- 11/11
- Design patterns





Some Issues in Designing for Mobile Devices?

- Small UI
- Limited input ability
- Wide variety of
 - Screen size / resolution
 - Hardware inputs
 - Sensor inputs
 - Connectivity options
 - OS / API versions
- Rapidly changing device & OS (some)



Principles of Mobile Design

Hooker & Berkman

- Respect User-Entered Data
 - Input is hard
- Mobiles are Personal
 - Assume one user, with personal data active
- Lives Take Precedence
 - Don't interrupt unless necessary
- Must Work in all Contexts
 - E.g., screen brightness
- Use Sensors & Smarts
 - Do things for the user when possible
- User Tasks Take Precedence
 - User-directed interaction
- Consistency (external & internal)

Page Layout Guidelines

- Mobile screen real estate is valuable.
 - Skip unnecessary banners, images, graphics (“administrative clutter” – Tufte)
- Consistent & simple navigation elements
- Keep everything as simple as possible
- For Serious tools (vs. games)
 - Minimal number of colors
 - Keep UI data-centered



Design Methodology

Hooker & Berkman

- Storyboard UIs (as before)
- Additional considerations
 - Gestural interface & finger size
 - Use contexts
 - Asynchronous events
 - Use of sensors, devices
 - Different display sizes, orientations (e.g., auto-switch landscape / portrait)

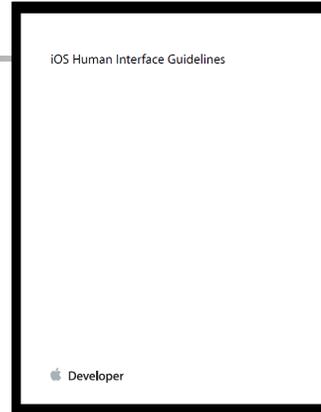
iPhone Human Interface Guidelines

<https://developer.apple.com/ios/human-interface-guidelines/>



Themes in iOS10:

- Clarity.
- Defer to content
- Depth.



Defer to Content



Defer to content – content is central, not UI

Minimal “administrative clutter” (Tufte)

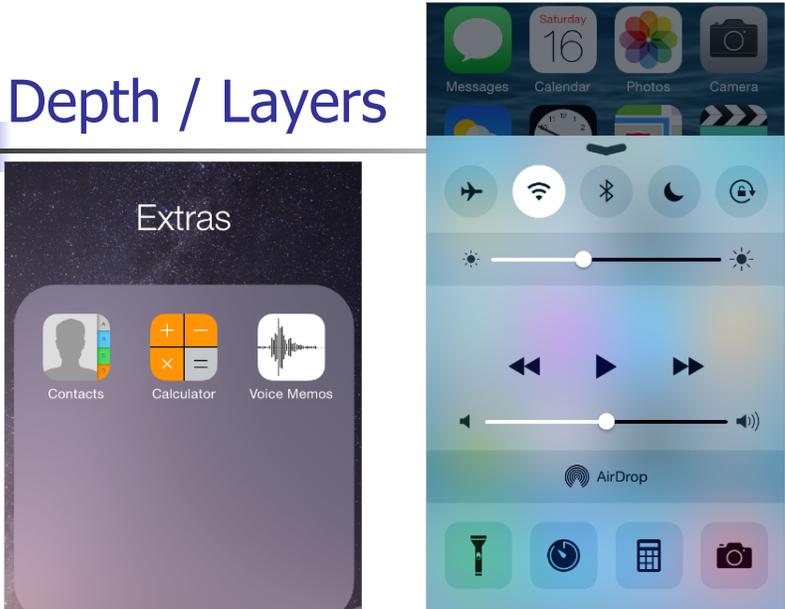


Clarity

- Text legible at every size and font
- Negative space / whitespace
- System fonts
- Color to signal diff functions
- Borderless buttons



Depth / Layers



Visual layers and realistic motion impart vitality and heighten delight and understanding.

iOS Widgets

Navigation Bar (top)

To traverse hierarchical information



Tool Bar (bottom)

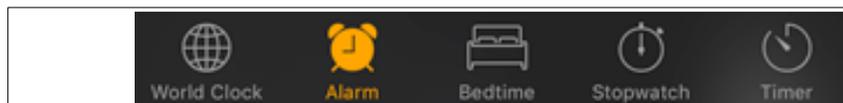
Controls that perform actions related to objects in the screen or view.



iOS Widgets

Tab Bar (bottom)

ability to switch between different subtasks, views, or modes.

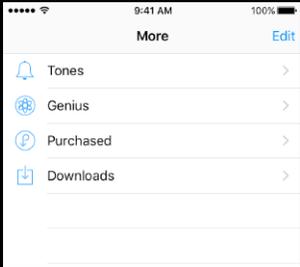


iOS Widgets

Table View

Display objects in single column

Simple



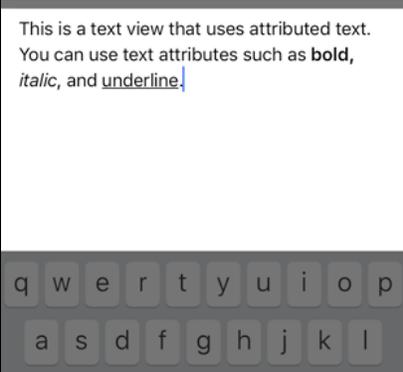
Grouped



iOS Widgets

Text View

accepts & displays lines of text



Web View

displays HTML





iOS Widgets

Action Sheet

Alerts

Turn On Location Services to Allow Maps to Determine Your Location

Settings Cancel

Flag

Mark as Unread

Move to Junk

Cancel



iOS Widgets

Slider



Switch

On Off



Date/Time Picker

Mon Sep 2	6	57
Tue Sep 3	7	58
Wed Sep 4	8	59
Today	9	00 AM
Fri Sep 6	10	01 PM
Sat Sep 7	11	02
Sun Sep 8	12	03

Picker

- Čeština
- Dansk
- Deutsch
- ✓ English
- Español
- Suomi
- Français

Button

Button

Search bar

Q Search

iOS Human Interface Guidelines

- The Display Is Paramount
 - The display of an iOS-based device is at the heart of the user's experience.
 - The display encourages people to forget about the device and to focus on their content or task.
- Device Orientation Can Change

Apps Respond to Gestures, Not Clicks

- Tap
 - To press or select a control or item
- Drag
 - To scroll or pan; To drag an element.
- Flick
 - To scroll or pan quickly.
- Swipe
 - To reveal hidden content / widgets.
- Double tap
 - Zoom in and center; Zoom out.
- Pinch
 - Zoom in ; Zoom out
- Pressure (3D touch)
 - Spring-back mode (e.g., preview)





iOS Human Interface Guidelines

- People Interact with One App at a Time
- Preferences Are Available in Settings
 - Single, common settings app.
- Onscreen User Help Is Minimal
- Most iOS Apps Have a Single Window



iOS Design Methodology

1. Create an App Definition Statement (aka requirements analysis)
 1. List All the Features (tasks) You Think Users Might Like
 2. Determine Who Your Users Are
 3. Filter the Feature List Through the Audience Definition

iOS Design Methodology

2. Design the App for the Device

- Follow iOS UI Paradigms
 - Controls should look tappable
 - App structure should be clean and easy to navigate
 - User feedback should be subtle, but clear
- Reconsider Web-Based Designs
 - Focus your app – narrow set of tasks
 - Make sure your app lets people do something – interactive
 - Design for touch
 - Let people scroll

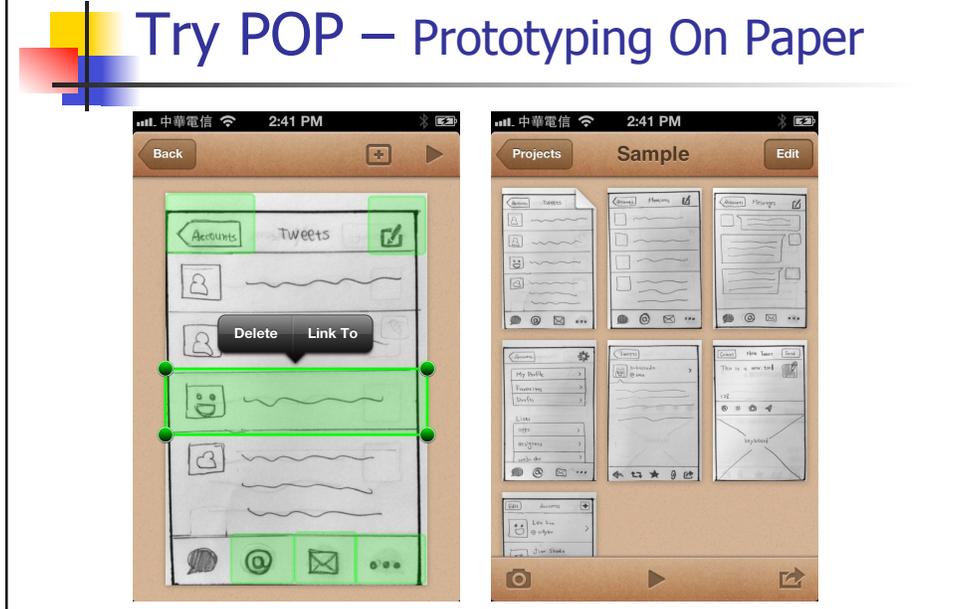
Remember SILK?

Try POP – Prototyping On Paper



Remember SYLK?

Try POP – Prototyping On Paper



Usability Testing for Mobile



How to do usability studies of *in situ* mobile users?

Oulasvirta & Nyssönen, "Flexible Hardware Configurations for Studying Mobile Usability"

Mobile Usability Lab...



Example Apps

30 Superb Examples of iPhone
Interface Design
topDesign mag

Simplicity

support few tasks – but do them well



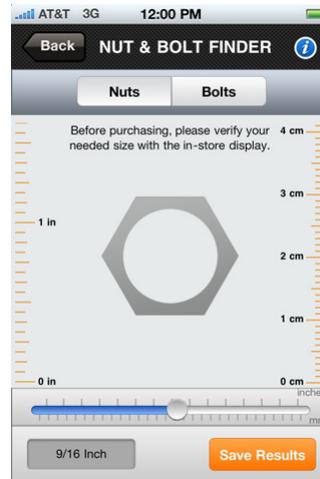
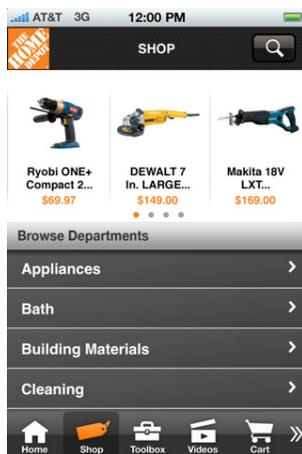
Golfscape

Augmented Reality Rangefinder



Home Depot

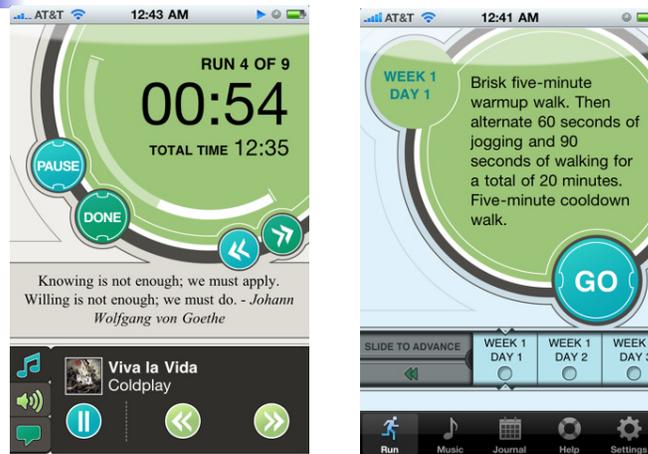
research and purchase over 100,000 products



Nike+ GPS



Couch to 5K



Your favorite (well-designed) apps?

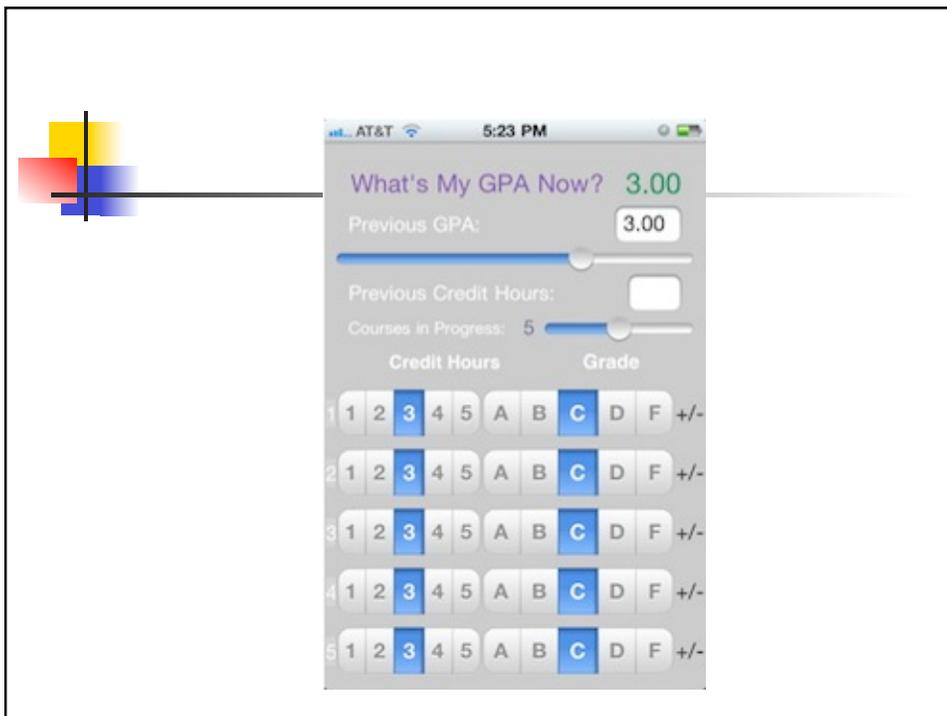
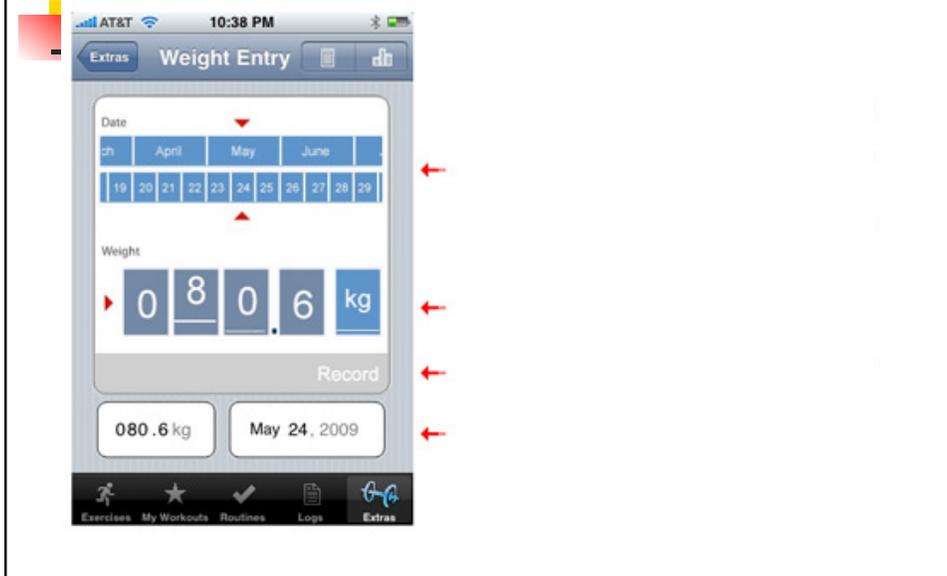
Bad Examples..

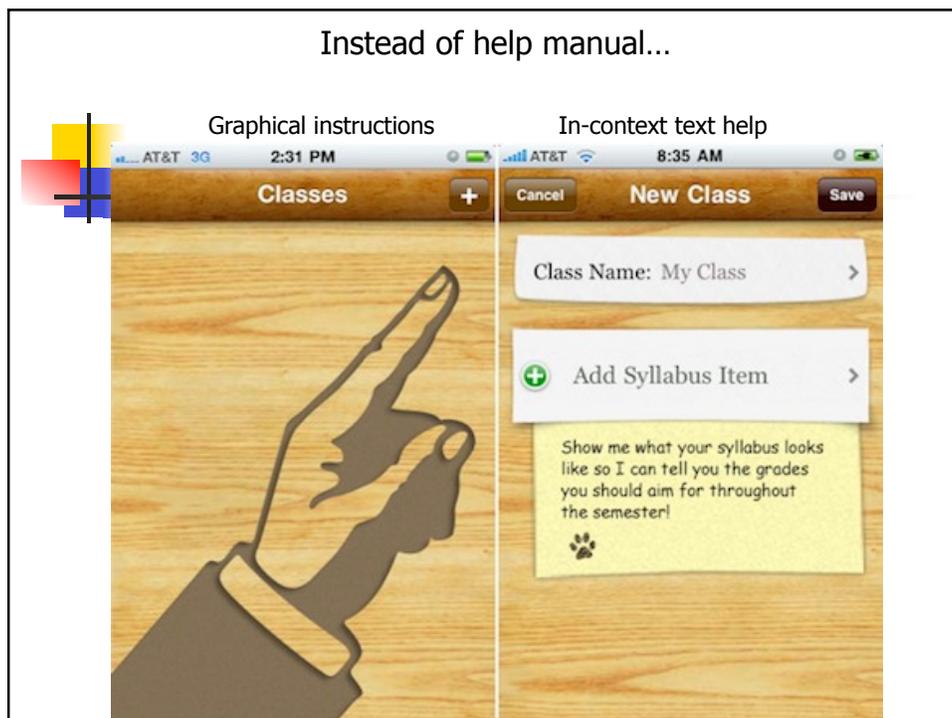
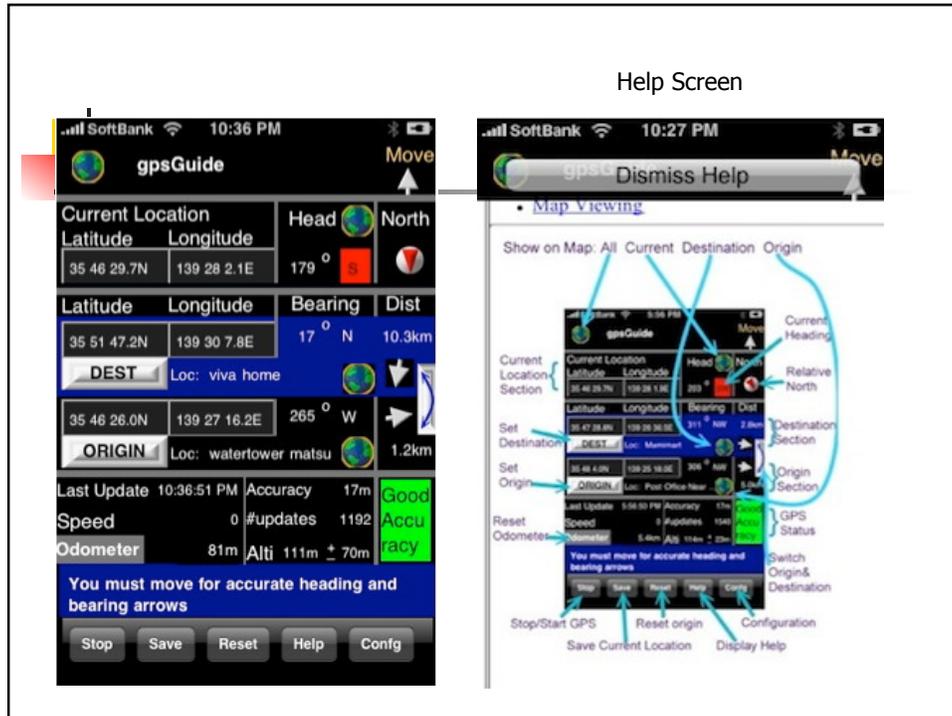
Komarov, "iPhone Apps Design Mistakes", *smashing magazine*

Olsen, "10 Surefire Ways to Screw Up Your iPhone App", *UX magazine*



iFitness – weight entry







Basics of Graphic Design

Contrast: poor contrast between the background and the content.

Repetition: Last two rows in the left example break the font size pattern, and the right example doesn't have much repetition at all

Alignment: Left alignment generally looks more professional than centered alignment (left) or no alignment (right).

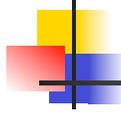
Proximity: Very weak spatial groupings



Exercise

- Break into teams
- Design a new myNEU portal* for an iPhone
 - How would you do requirements analysis?
 - Determine most important subset of tasks
 - Sketch a design
 - Sketch main app page
 - How is your design different from a desktop app?

* *or other NU-related app*



To do

- Read
 - Designing for the Web (Benyon Ch 14).
- Start P6
- Consider starting on final report