Due Today:

Drop off printout of your contextual inquiry now.
WINEM
THE RFID WINE RACK
A TECHNOLOGY SKETCH FROM
THINGM
thingm.com
Assignment: Low Fidelity Prototype

Due Mar 7

Identify project mission statement

Create a low-fidelity software prototype that supports 3 tasks
- 1 easy, 1 moderate, 1 difficult task

You will use myBalsamiq software – logins will be mailed out this week.

Create a video showing your prototype:
- How it supports the 3 tasks
- Context in which it will be used (back story)

Your video must include narration!
Individual Programming Assignment 3

Due March 11, 5pm
Write a Twitter client for Android

Basic Functionality:
View home timeline
View “mention” timeline
View author info
Post tweets
Open URLs in tweets

40 points – twice as much as IPA1 and 2

Submit video

Examples:
http://www.youtube.com/results?
search_query=twitter+android+app&aq=1
Topics

Prototyping Theory

Prototyping Practice:
  Paper Prototyping + Testing
  Software Prototyping
  Video Prototyping
Prototyping Theory
Prototype: ?
Prototypes: the means by which designers organically and evolutionarily learn, discover, generate, and refine designs. (Lim & Stolterman)
Prototype:

*a representation of a design, made before the final solution exists.*

 *(Moggridge, Designing Interactions)*
Prototyping:
producing early working versions of the future application system and experimenting with them.

(Lichter)
Industrial Design Process, ca. 1940 (Dreyfuss)

1. We start by studying the competition. We analyze models and illustrations of other companies' merchandise, both here and from abroad.

2. We familiarize ourselves with the client's manufacturing facilities. We like to know the limitations as well as the potentials of his plants.

3. We learn how the product will be used. In developing Model 600, our designers took a Singer sewing course, Singer zig-zag stitching and all.

4. After consultations with top management, sales executives and engineers, we develop a variety of idea sketches.

5. Now we're ready to study the design in three dimensions. We start this phase of the work with a rough clay model.

6. Using the anthropometric techniques we originated, we turn to human engineering. We see how a mother and daughter will use the machine.

7. Through each step there is close collaboration with our client's engineers. Working drawings are made and checked against their pilot model.

8. A prototype model—identical to the production-line product in every detail—completes the project. Exit designer. Enter sales team.
design process
Dreyfuss, Designing for People, 1955;
Lawson, How Designers Think, 1997;
Cross, Designerly Ways of Knowing, 2005
The Value of Prototyping
Benefits of Prototyping

1. We know more than we can tell
2. Actions in the world outperform mental operations
3. The value of surprise
Tacit Knowledge
The Purpose of Prototyping

What questions do prototypes answer?
When and how should they be constructed?
PURPOSE

Understand Existing Experience

“Inquiring Actions”

Explore

Experiment

Validate

Communicate

Anchor Discussion

Persuade
PURPOSE

Understand Existing Experience

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Figure 2: Experiencing a train journey.
PURPOSE

Understand Existing Experience

“Inquiring Actions”

Explore  Experiment  Validate

 Communicate

 Anchor Discussion  Persuade
Three Stages of Prototyping (IDEO)

# of ideas vs project time

INSPIRE

EVOLVE

VALIDATE

Prototype-driven specifications

Specification-driven prototypes
Prototypes for the Microsoft mouse
From Moggridge, *Designing Interactions*, Ch2
Houde and Hill – What do Prototypes Prototype?

Figure 1. A model of what prototypes prototype.
Example 1. Role prototype for 3D space-planning application [E1 Houde 1990].
Example 2. Look-and-feel prototype for 3D space-planning application [E2 Houde 1990].
Example 3. Implementation prototype for 3D space-planning application [E3 Chen 1990].
FUNCTIONALITY

Scope
- Partial
  - Horizontal slice (Breadth)
  - Vertical slice (Depth)
- Full

Method of Realization
- Low-Fidelity Mockup
- Working Implementation
  - Created With Production Tools
- Simulation / Wizard of Oz
  - Created With Different Tools
Paper Prototyping
Materials

Large, heavy, white paper (11 x 17)  
5x8 in. index cards  
Post-it notes  
Tape, stick glue, correction tape  
Pens & markers (colors & sizes)  
Transparencies (including colored)  
Colorforms (toy stores)  
Scissors, X-acto knives, etc.
Interface Elements

2. Select the Actions for your rule:
   - Copy it to the specified folder
   - Delete it
   - Forward it to people
   - Highlight it with color

3. Rule Description (click underlined value to edit):
   Apply this rule after the message arrives
   where the from line contains Craig Duncan
   
   Find what: 
   Find next
   Find after
   Find after

   Search: All
   Match case
   Find whole words only
   Use wildcards
   Sound like
   Find as word forms
Nielsen/Norman Video

01:57-08:15
Constructing the Prototype

Set a deadline
Don’t think too long - build it!

Draw a window frame on large paper
Draw at a large size, but use correct aspect ratio

Put different screen regions on cards
Anything that moves, changes, appears/disappears
Use greeking to indicate text if necessary

Ready response for any user action
e.g., Have those pull-down menus already made

Use photocopier to make many versions
Wizard of Oz Testing

SIMS 213 Project: Telebears redesign
A bit slow for a computer - but it works!
Nielsen/Norman Video

28:18-29:30
Conducting a Test

Three or Four testers (preferable)

**Greeter** - Puts users at ease & gets data

**Facilitator** - only team member who speaks
  - Gives instructions & encourages thoughts, opinions

**Computer** - knows application logic & controls it
  - Always simulates the response, w/o explanation

**Observer(s)** - Take notes & recommendations

Typical session should be approximately 1 hour

Preparation, the test, debriefing
Conducting a Test (cont.)

**Greet**
Get forms filled, assure confidentiality, etc.

**Test**

Facilitator explains how test will work
Perform a simple task

Facilitator hands written tasks to the user
Must be clear & detailed

**Facilitator keeps getting “output” from participant**
“What are you thinking right now?”, “Think aloud”

**Observers record what happens**
Avoid strong reactions: frowning, laughing, impatience – biases the test

**Designers should not lead participants**
Let users figure things out themselves as much as possible
Only answer questions if user remains stuck for a long time
Conducting a Test (cont.)

**Debrief**

Fill out post-evaluation questionnaire
Ask questions about parts you saw problems on
Gather impressions
Give thanks
Preparing for a Test

Select your participants
Understand background of intended users
Use a questionnaire to get the people you need
Don’t use friends or family

Prepare scenarios that are
Typical of the product during actual use
Make prototype support these (small, yet broad)

Practice running the computer to avoid “bugs”
You need every menu and dialog for the tasks
All widgets the user might press
Remember “help” and “cancel” buttons

WOZ is different from pre-built/canned functionality
Wizard of Oz Tips

**Rehearse your actions**

Make a flowchart which is hidden from the user
Make list of legal words for a speech interface

**Stay “in role”**

You are a computer, and have no common sense, or ability to understand spoken English.

Facilitator can remind user of the rules/think-aloud approach if the user gets stuck
Record Critical Incidents

Critical incidents are any unusual/interesting events

Most of them are usability problems.

They may also be moments when the user
  Got stuck
  Suddenly understood something
  Said “that’s cool” etc.
Using the Results

Update task analysis and rethink design
Rate severity & ease of fixing problems
Fix both severe problems & make the easy fixes

Will thinking aloud give the right answers?
Not always
If you ask a question, people will always give an answer, even if it has nothing to do with the facts
Try to avoid leading questions
Prototyping in Software
Fidelity in Prototyping

Fidelity refers to the level of detail.

High fidelity:
Prototypes look like the final product.

Low fidelity:
Artists renditions with many details missing.
Paper Prototypes are low-fidelity.
What about software?
Hi-Fi Disadvantages

Distort perceptions of the tester
Formal representation indicates “finished” nature
People comment on color, fonts, and alignment

Discourages major changes
Testers don’t want to change a “finished” design
Sunk-cost reasoning: Designers don’t want to lose effort put into creating hi-fi design
Low-fidelity prototyping in software

“Informal” design tools:
Goal is to be as rapid and flexible as physical tools
Add benefits of digital media: Undo, copy+paste, resizing, etc.
May be a good idea to design in software, then print out elements and screens for paper testing.

Examples:
DENIM (UC Berkeley)
Balsamiq Mockups
Section Tomorrow

You will use Balsamiq Mockups to create a prototype for your individual Twitter application. Bring your laptop!
High-fidelity visual mockups

Interface looks like the final application
May or may not be interactive
Often, interactivity is limited to static changes

Example Tools:
Keynote + Powerpoint
Adobe Flash Catalyst
“Slideware” Prototypes

Uses standard presentation software to create screen designs
Libraries of widgets for many platforms (e.g., iPhone, Android, Web, Facebook apps) exist
Each slide shows one key screen
To **tell** others about your design (in a presentation), visually indicate the action a user is taking.

For touch screens: include hands!

Linear: you (designer) are in control of the narrative.
Telling vs. Testing for Touch Screens

To **test** your design, link different screens together and let users explore.

Non-linear: user is in control of the narrative.
High-fidelity, fully-interactive prototypes

Look and behave like the final application. Take a lot of effort to build – too little payoff?

Example tools:

- HTML+CSS+Javascript
- Apple DashCode
- jqTouch library
What tools do designers in industry use to prototype?
Professional Use of Prototyping Tools Reported by Myers

- Adobe Photoshop: 83%
- Adobe Dreamweaver: 66%
- Microsoft PowerPoint: 54%
- Adobe Illustrator: 52%
- Adobe Flash: 43%
- Microsoft Visio: 37%
- Adobe InDesign: 25%
- Omni Group Omnigraffle: 23%
- Microsoft Visual Studio: 19%
- Adobe Fireworks: 17%
- Adobe Director: 13%
- Microsoft Frontpage: 12%
- Adobe AfterEffects: 10%
- Axure RP: 8%
- Adobe GoLive: 6%
- Adobe Flex: 6%
- Microsoft Expression Blend: 4%

From: Myers
Video Prototyping
Video Prototypes

Narrative: You control the story!
Use existing software & images of real settings
Narration optional (but required for your assignment!)
  Explain events while others move images/illustrate interaction

With good storyboards, should be able to create video prototype in a few hours
Creating a Video Prototype

1) Review field data about users & work practices
2) Review ideas from video brainstorm
3) Create use scenario in words
4) Develop storyboard of each action/event with annotations explaining the scene. Put each element on a card.
5) Shoot a video clip for each storyboard card
   Avoid editing in the camera – just shoot in storyboard order
   Hold last frame of a section/shot for 1s
6) Use title cards to separate clips (keep it onscreen for 3s)
   if you make an error, rewind to last title card & reshoot
Video Prototypes from Spring 2010

RollCall:  
http://www.youtube.com/watch?v=jQnfCj8jZaU

CoachClass:  
http://www.youtube.com/watch?v=64mlf9_6yyM

Beer Tasting App:  
http://www.youtube.com/watch?v=kHld5DTIWq0

Whiteboard Planning App:  
http://vis.berkeley.edu/courses/cs160-sp10/wiki/index.php/LoFi-Group:RRBG

Food Allergy App:  
http://vis.berkeley.edu/courses/cs160-sp10/wiki/index.php/LoFi-Group:Epileptic_Eels
Tips & Tricks

Add structure to better explain context

- begin with a title
- follow with an “establishing shot”
- create series of closeup & mid-range shots, interspersed with title cards
- place a final card with credits at the end

Stop-motion lets images appear & disappear based on interaction

Be careful about taking video out of the original design setting for ethical reasons (context matters)
Higher Fidelity Videos

RFID Antennas + LED Backlights

RFID/UPC Reader

RFID
Advantages of Low-Fi Prototyping

**Takes only a few hours**
No expensive equipment needed

**Can test multiple alternatives**
Fast iterations
Number of iterations is tied to final quality

**Can change the design as you test**
If users are trying to use the interface in a way you didn’t design it – go with what they think! Adapt!

**Especially useful for hard to implement features**
Speech and handwriting recognition
Drawbacks of Lo-Fi Prototyping

- Evolving the prototype requires redrawing
  Can be slow (but reprogramming usually slower)

- Lack support for “design memory”

- Force manual translation to electronic format

- Do not allow real-time end-user interaction
Summary

Informal prototypes allow you to design (and test!) before writing code.

Rapid evolution and elimination of many problems happens in this phase.

Paper+ink is the traditional tool; many software prototyping techniques now exist, too.
Next Time

Engineering User Interfaces I: Event Handling

Reading response due before class.