Low and Medium Fi Prototyping

Acknowledgement: Some of the material in these lectures is based on material prepared for similar courses by Saul Greenberg (University of Calgary), Ravin Balakrishnan (University of Toronto), James Landay (University of California at Berkeley), Monica Schraefel (University of Toronto), and Colin Ware (University of New Hampshire). Used with the permission of the respective original authors.

Prototyping

Early design
- Brainstorm different representations
- Choose a representation
- Rough out interface style
- Task centered walkthrough and redesign
- Fine tune interface, screen design
- Heuristic evaluation and redesign
- Usability testing and redesign
- Limited field testing
- Alpha/Beta tests
- Low fidelity paper prototypes
- Medium fidelity prototypes
- High fidelity prototypes / restricted systems
- Working systems

Late design
Low fidelity prototypes

- Paper-based prototypes
  - a paper mock-up of the interface look, feel, functionality
  - “quick and cheap” to prepare and modify

- Purpose
  - brainstorm competing representations
  - elicit user reactions
  - elicit user modifications / suggestions

Low fidelity prototypes

- Sketches
  - drawing of the outward appearance of the intended system
  - crudity means people concentrate on high level concepts
  - but hard to envision a dialog’s progression

Computer Telephone

Last Name:
First Name:
Phone:

Place Call  Help
Low fidelity prototypes

- Storyboarding
  - a series of key frames
    - originally from film; used to get the idea of a scene
    - snapshots of the interface at particular points in the interaction
  - users can evaluate quickly the direction the interface is heading

Storyboard of a computer based telephone
Ink Chat
Low fidelity prototypes

- **Pictive**
  - “plastic interface for collaborative technology initiatives through video exploration”
  - design is multiple layers of sticky notes and plastic overlays
    - different sized stickies represent icons, menus, windows etc.
  - interaction demonstrated by manipulating notes
    - contents changed quickly by user/designer with pen and note repositioning
  - session is videotaped for later analysis
    - usually end up with mess of paper and plastic!
Low fidelity prototypes

- Pictive
  - can create pre-made interface components on paper
  - eg, these empty widgets were created in visual basic and printed out:

  ![Empty widgets](image)

- Tutorials and manuals
  - write them in advance of the system
  - what are they?
    - tutorial for step by step description of an interaction
      - an interface “walk-through” with directions
    - manual for reference of key concepts
      - in-depth technical description

  - if highly visual, then storyboard is set within textual explanations

  - does this work?
    - people often read manuals of competing products to check:
      - interface
      - functionality
      - match to task
You see this dialog box:

A directory title shows you the name of the folder you're presently working in—in this case, the TeachText folder. The box beneath it shows you all the other items in the TeachText folder that you can open with this application—in this case, only the Memos folder.

To open the Memos folder, click the Open button.

As you open the Memos folder, you move down through the hierarchy. The directory title changes to remind you where you are in the hierarchy, and the box shows you what's on the next level you just moved to—in this case, the two documents in the Memos folder. The selected document is the one that will open when you click the Open button. If you want to open the other document, click anywhere on the other document's name to highlight it, and then click the Open button.
Why use low-fi prototyping

- Traditional methods take too long
  - sketches -> prototype -> evaluate -> iterate

- Can simulate the prototype
  - sketches -> evaluate -> iterate
  - sketches act as prototypes
    - designer “plays computer”
    - other design team members observe & record

- Kindergarten implementation skills
  - allows non-programmers to participate

Medium fidelity prototypes

- Prototyping with a computer
  - simulate or animate some but not all features of the intended system
    - engaging for end users

- Purpose
  - provides a sophisticated but limited scenario to the user to try out
  - provides a development path (from crude screens to functional system)
  - can test more subtle design issues

- Danger
  - user’s reactions are usually “in the small”
    - blinds people to major representational flaws
  - users reluctant to challenge / change the design itself
    - designs are too “pretty”, egos…
  - management may think its real!
Medium fidelity prototypes

- Approaches to limiting prototype functionality
  - vertical prototypes
    - includes in-depth functionality for only a few selected features
    - common design ideas can be tested in depth
  - horizontal prototypes
    - surface layers include the entire user interface with no underlying functionality
    - a simulation; no real work can be performed
  - scenario
    - scripts of particular fixed uses of the system; no deviation allowed

- Approaches to integrating prototypes and product:
  - throw-away
    - prototype only serves to elicit user reaction
    - creating prototype must be rapid, otherwise too expensive
  - incremental
    - product built as separate components (modules)
    - each component prototyped and tested, then added to the final system
  - evolutionary
    - prototype altered to incorporate design changes
    - eventually becomes the final product
Medium fidelity prototypes

- Painting/drawing packages
  - draw each storyboard scene on computer
    - neater/easier (?) to change on the fly than paper
  - a very thin horizontal prototype
  - does not capture the interaction “feel”

Control panel for pump 2

<table>
<thead>
<tr>
<th>Coolant flow</th>
<th>Retardant</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>45%</td>
<td>20%</td>
<td>100%</td>
</tr>
</tbody>
</table>

DANGER!

Control panel for pump 2

<table>
<thead>
<tr>
<th>Coolant flow</th>
<th>Retardant</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>20%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Shut Down

Medium fidelity prototypes

- Scripted simulations and slide shows
  - encode the storyboard on the computer
    - created with media tools
    - scene transition activated by simple user inputs
    - a simple horizontal and vertical prototype
  - user given a very tight script/task to follow
    - appears to behave as a real system
    - but script deviations blows the simulation

Control panel for pump 2

<table>
<thead>
<tr>
<th>Coolant flow</th>
<th>Retardant</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>45%</td>
<td>20%</td>
<td>100%</td>
</tr>
</tbody>
</table>

DANGER!

Control panel for pump 2

<table>
<thead>
<tr>
<th>Coolant flow</th>
<th>Retardant</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>20%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Shut Down

(next drawing)

(on mouse press over button)
Medium fidelity prototypes

- Interface builders
  - tools for letting a designer lay out the common widgets
  - construct mode
    - change attributes of objects
  - test mode:
    - objects behave as they would under real situations
    - excellent for showing look and feel
      - a broader horizontal prototype
      - but constrained to widget library
    - vertical functionality added selectively
      - through programming

Wizard of Oz

- A method of testing a system that does not exist
  - the voice editor, by IBM (1984)
Medium fidelity prototypes

- **Wizard of Oz**
  - human simulates the system's intelligence and interacts with user
  - uses real or mock interface
    - “Pay no attention to the man behind the curtain!”
  - user uses computer as expected
  - “wizard” (sometimes hidden):
    - interprets subjects input according to an algorithm
    - has computer/screen behave in appropriate manner
  - good for:
    - adding simulated and complex vertical functionality
    - testing futuristic ideas

Wizard of Oz Examples

- IBM: an imperfect listening typewriter using continuous speech recognition
  - secretary trained to:
    - understand key words as “commands”
    - to type responses on screen as the system would
    - manipulating graphic images through gesture and speech

- Intelligent Agents / Programming by demonstration
  - person trained to mimic “learning agent”
    - user provides examples of task they are trying to do
    - computer learns from them
  - shows how people specify their tasks

- In both cases, system very hard to implement, even harder to change!
What you now know

- Prototyping
  - allows users to react to the design and suggest changes
  - low-fidelity prototypes best for brainstorming and choosing representations
  - medium-fidelity prototypes best for fine-tuning the design

- Prototyping methods
  - vertical, horizontal and scenario prototyping
  - storyboarding
  - Pictive
  - scripted simulations
  - Wizard of Oz

Readings


Optional:
- Chapter 6 of Lewis and Rieman