

Low-Fidelity Prototyping

CSI 60: User Interfaces

John Canny

Review

Usability heuristics make evaluation much more cost-effective.

How to conduct a heuristic evaluation.

Best to use in conjunction with real user studies.

Revised Heuristics

H2-1: Visibility of system status

H2-2: Match system and real world

H2-3: User control and freedom

H2-4: Consistency and standards

H2-5: Error prevention

H2-6: Recognition rather than recall

H2-7: Flexibility and efficiency of use

H2-8: Aesthetic and minimalist design

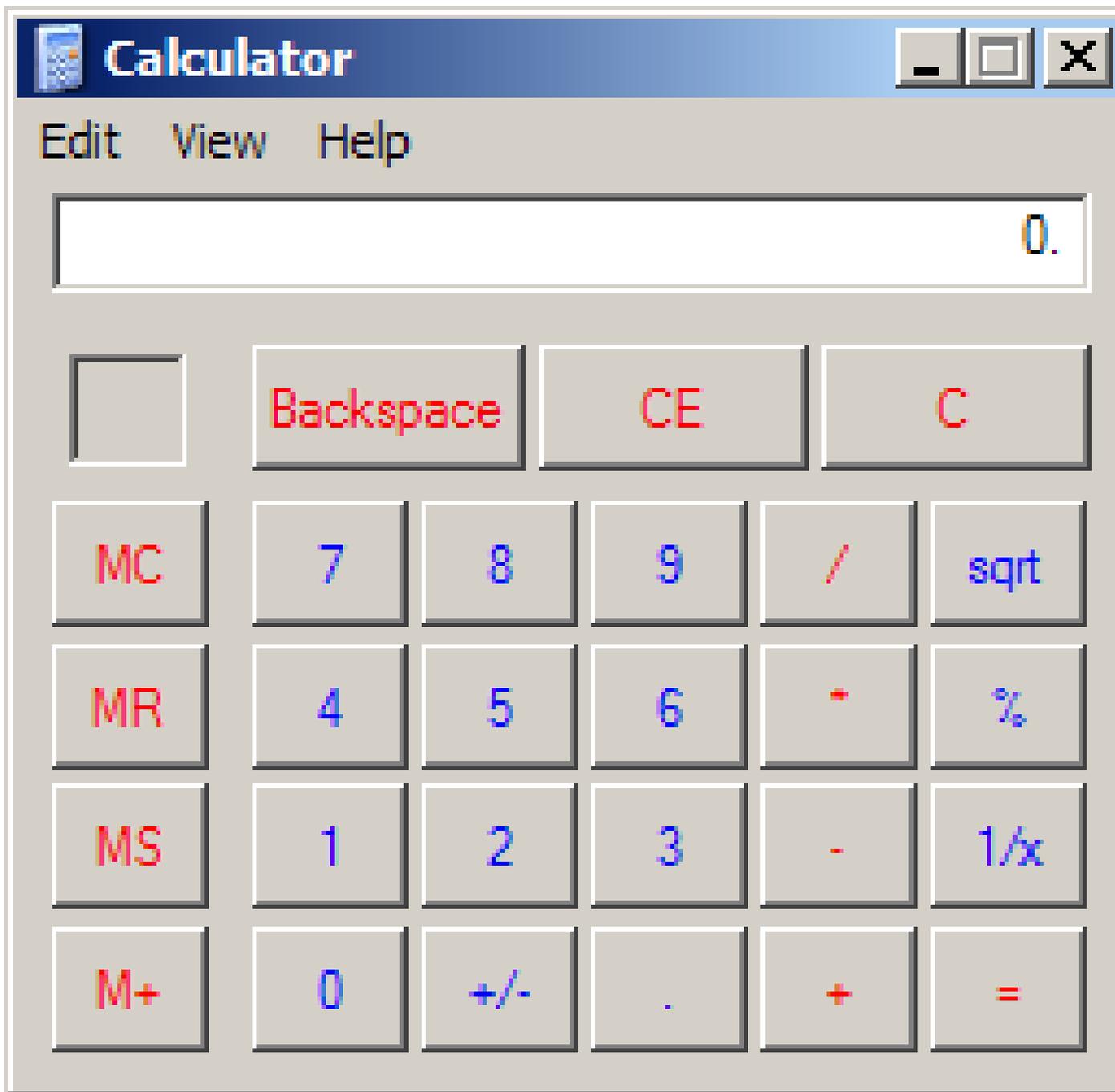
H2-9: Help users recognize, diagnose and recover from errors

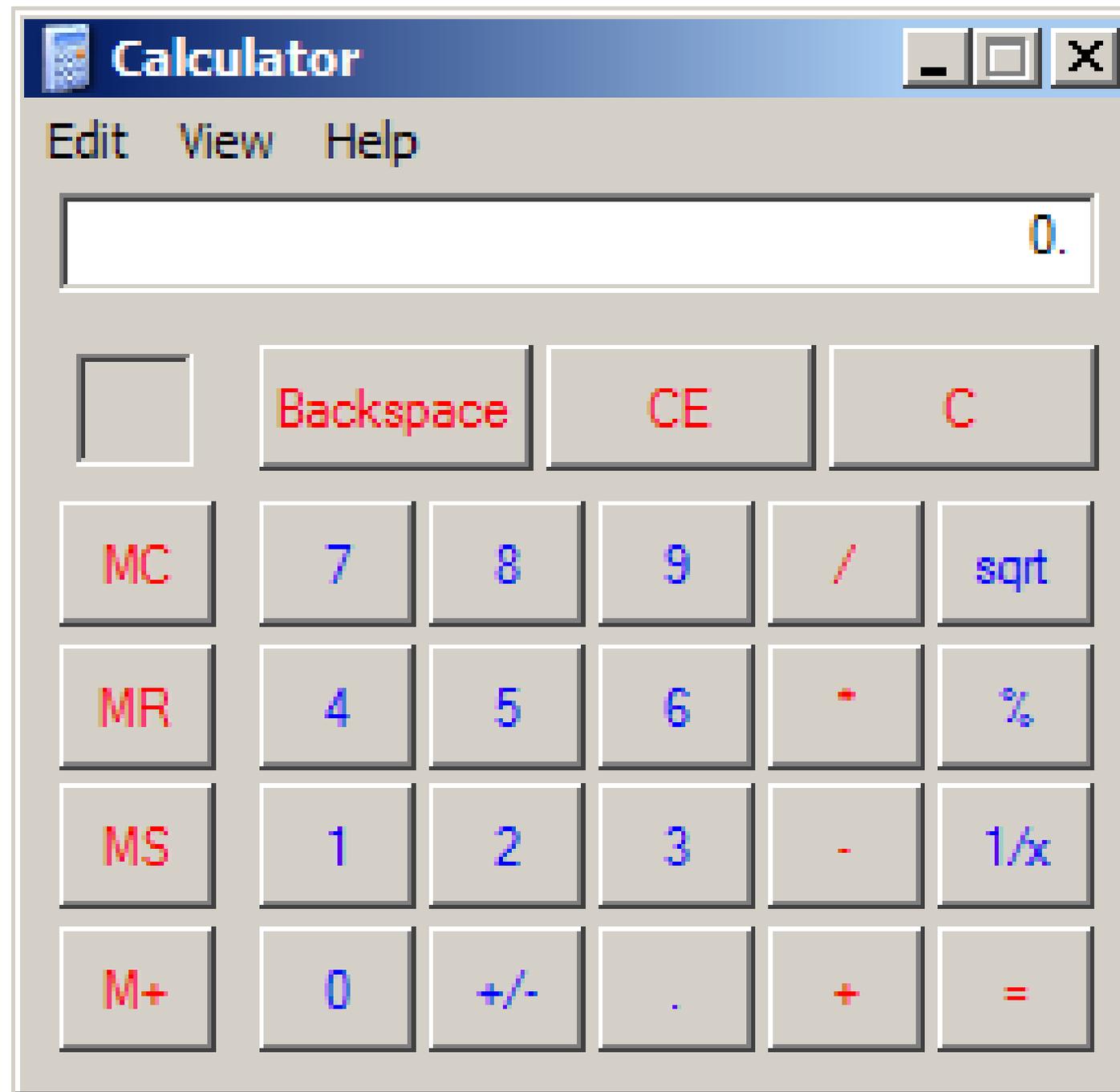
H2-10: Help and documentation

Review

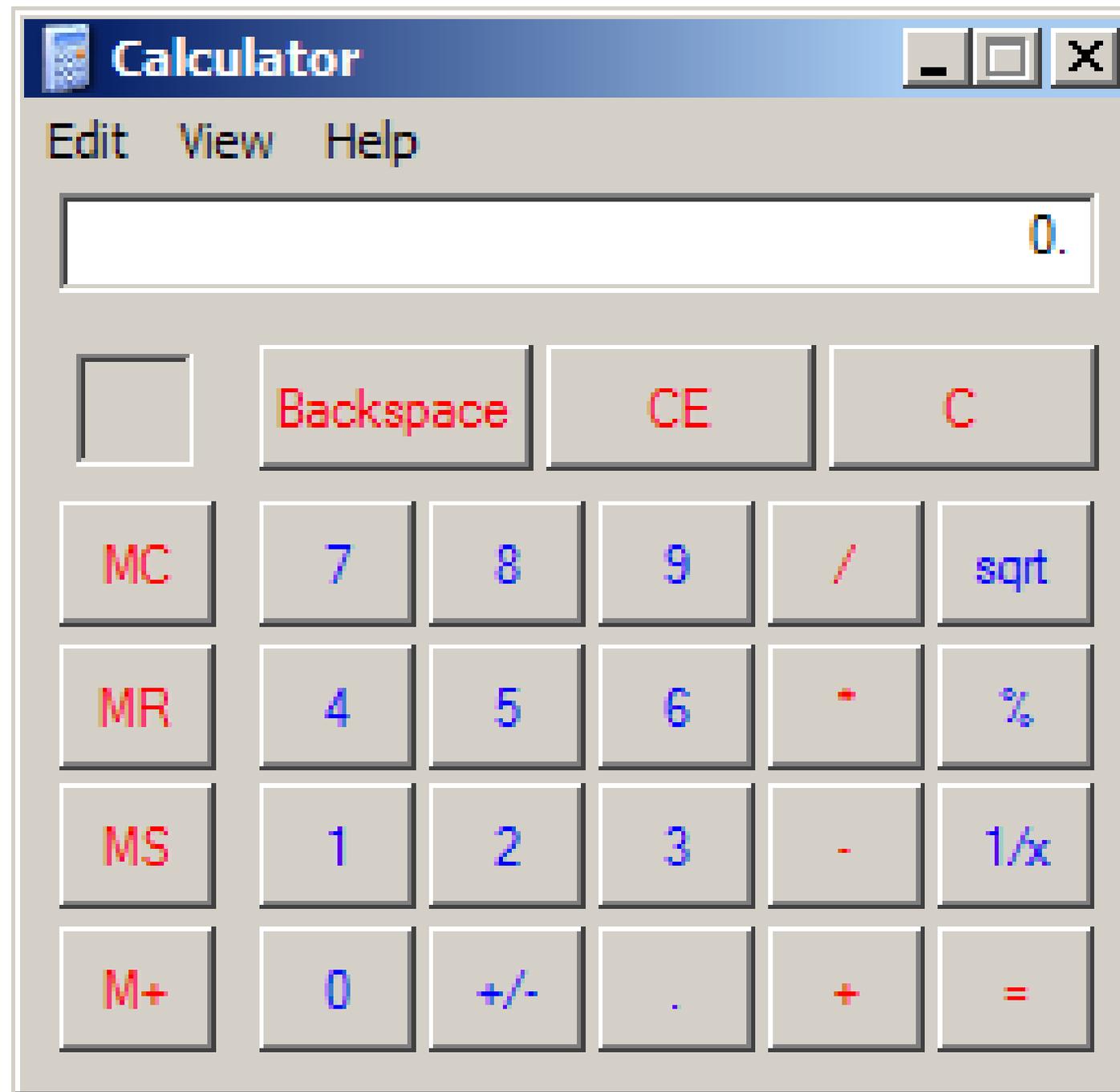
Challenges for usable software:

- Novelty vs. Consistency
- Distributed developers (OSS) – discount methods can help.
- Linux, the new Windows?





- Uses familiar calculator metaphor (Takes it too far??)
 - Cryptic labels (CE vs. C, M+, MS, MR, MS)
 - why not show what is in memory and allow drag-and-drop?
 - Single line of display text
- Can use keypad but affordance is not visible



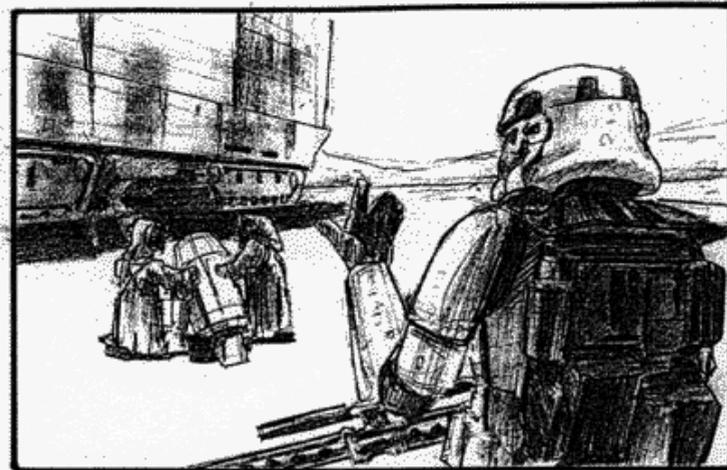
- Calculators less common than before?? – its not a metaphor but a cultural standard, and one that is weakening.
- Smartphones can run spreadsheets.

Topics

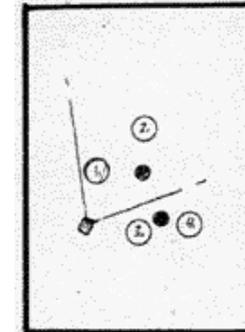
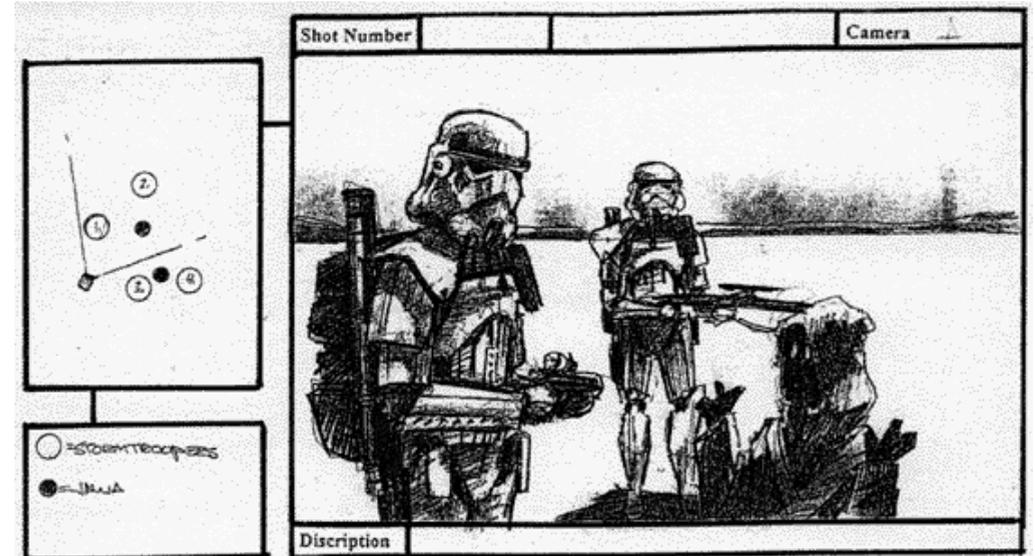
- Sketching and Storyboarding
- Creating a Low-Fi prototype
- Wizard of Oz prototype testing

Storyboarding

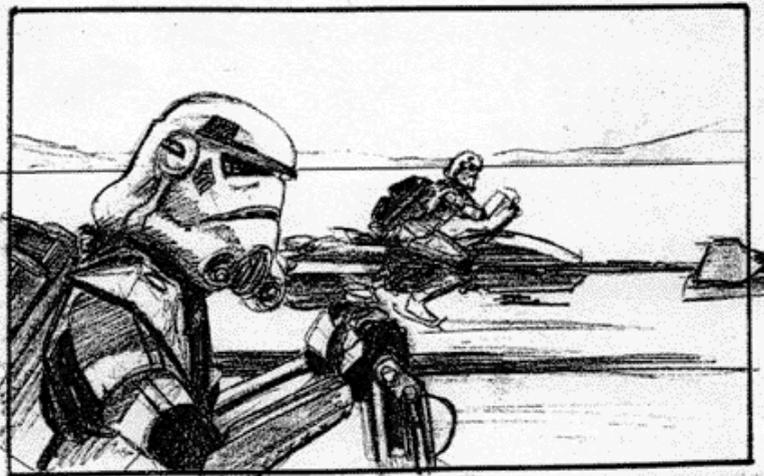
Troops



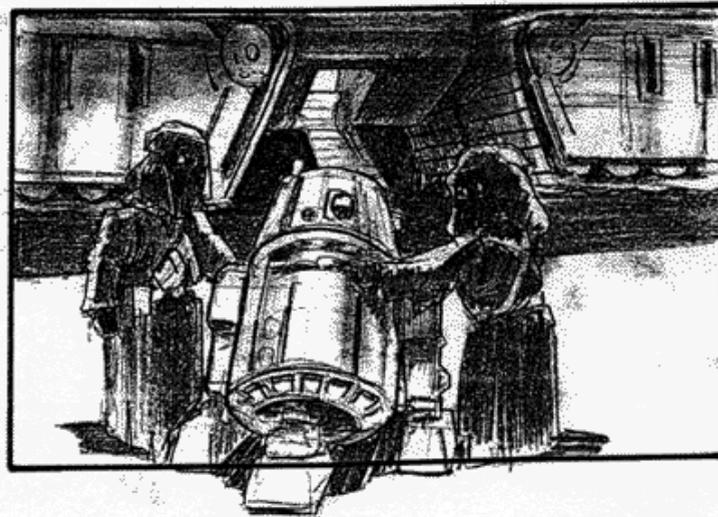
JYANIX
Excuses Me. You wanna come over here, please.



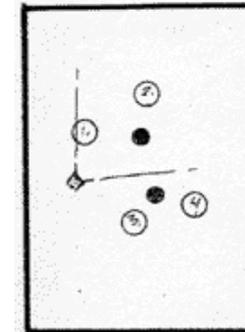
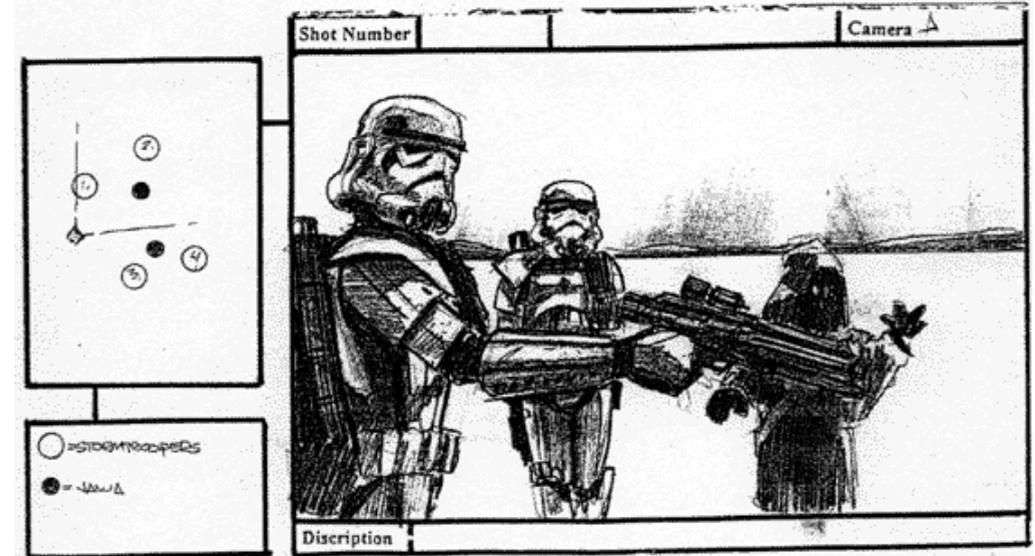
○ = STORMTROOPERS
● = JAWA



1A Camera Car/Two Shot/ Jyanix in FG. CG Trooper in BG A



The Jawas look surprised.



○ = STORMTROOPERS
● = JAWA

See <http://www.theforce.net/theater/shortfilms/troops/>

Storyboarding for Interfaces

Technique

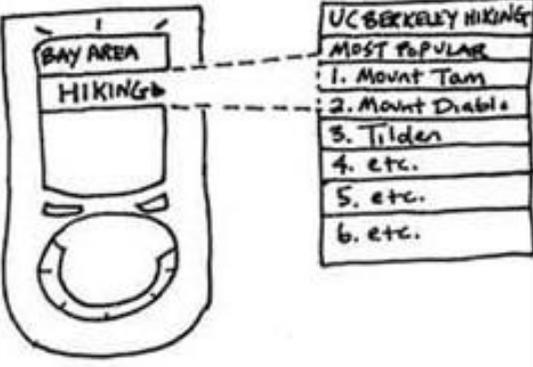
- Series of frames depicting key steps in reaching a goal
 - Can use a pin board for easy rearrangement/editing
- Describe the interaction in context
 - Often useful to show user in at least 1st frame (establishing shot)
 - Relationship between the user and its environment
 - Relationship between the user and the system
- Many frames may show screen shots only

Storyboards

1.  Will has moved to Berkeley to study at SIMS.

2.  An avid hiker, Will's anxious to discover places to hike in the bay area.

3.  On Saturday, he learns about REI (Recreational Evaluation Interface), an application for his Nokia 3650 cell phone.

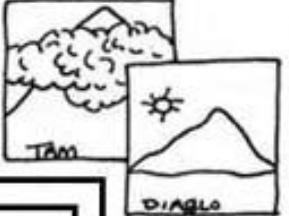
4.  He searches for hiking in the bay area and subscribes to the UC Berkeley Hiking Club, where he views photos of the club's most popular hiking destinations.

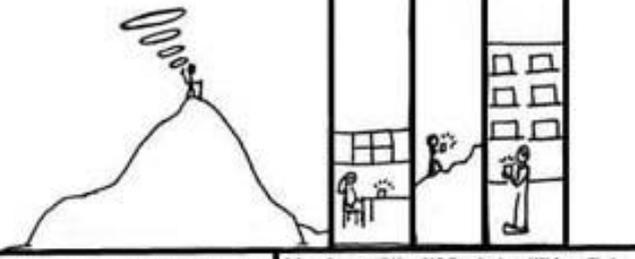
UC BERKELEY HIKING	
MOST POPULAR	
1.	Mount Tam
2.	Mount Diablo
3.	Tilden
4.	etc.
5.	etc.
6.	etc.

5.  Will browses through recently posted pictures of each location.

6.  Based on the photos he's viewed, he decides to go hiking tomorrow at either Mount Tamalpais or Mount Diablo.

7.  On Sunday morning, Will runs REI again and views photos taken early that morning at Mount Tam and Diablo.

8.  Mount Tam is enveloped in fog and drizzle, while Diablo looks bright and clear. Will decides to hike Mount Diablo.

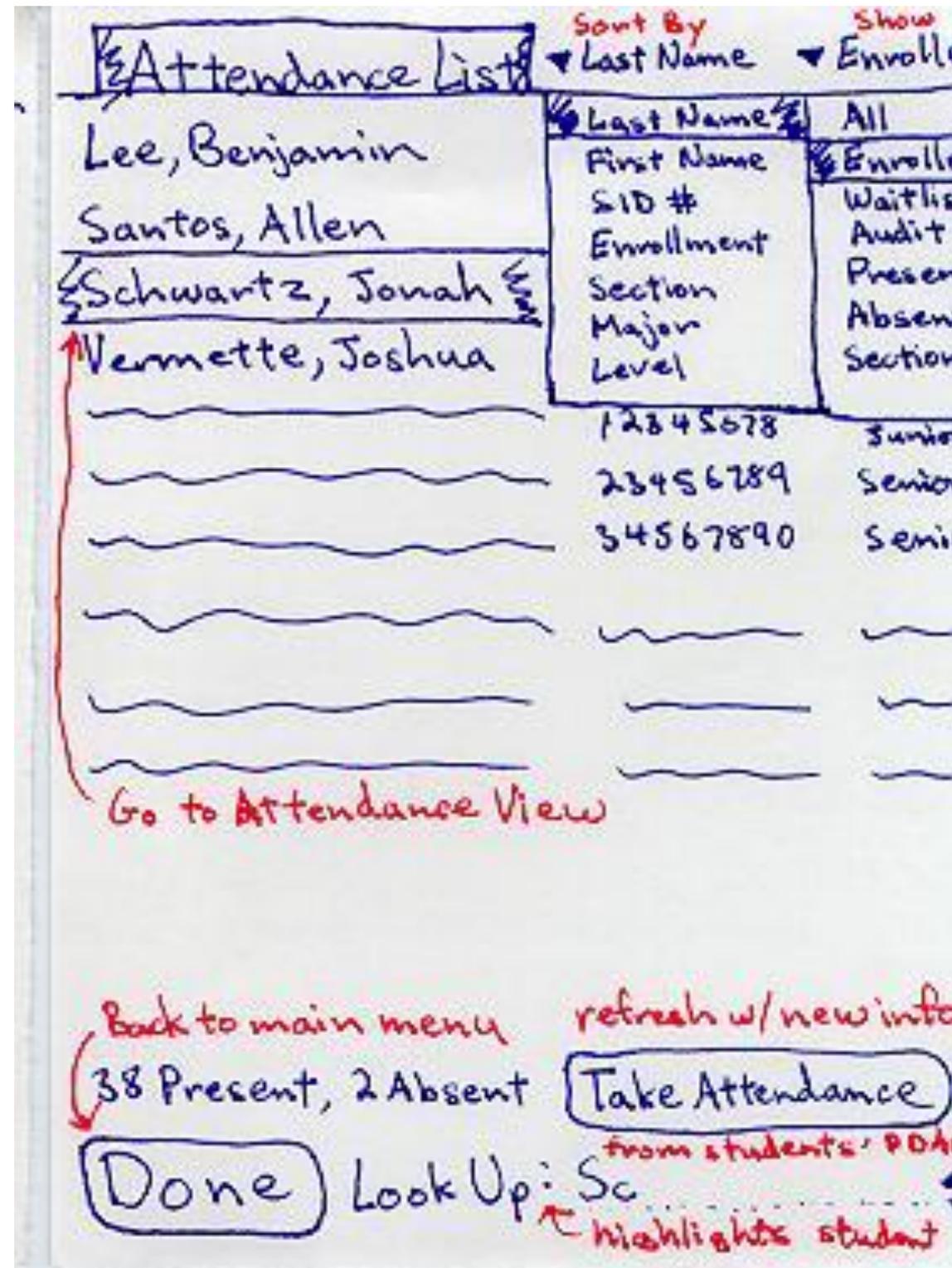
9.  Later that day, at the summit of Diablo, Will uploads photos of the day's hike to the UC Berkeley Hiking Club REI space. Members of the UC Berkeley Hiking Club can now view Will's photos, and see the current trail and weather conditions on Mount Diablo.

10.  Will also creates his own private group, so that he can share his photos with his family.

11.  Will's mother, Grace, receives an invitation to join Will's Family Group. She subscribes and is able to instantly see photos that Will takes.

From SIMS 202

Sketch: Single Display



Sketch: Single Display

Movies

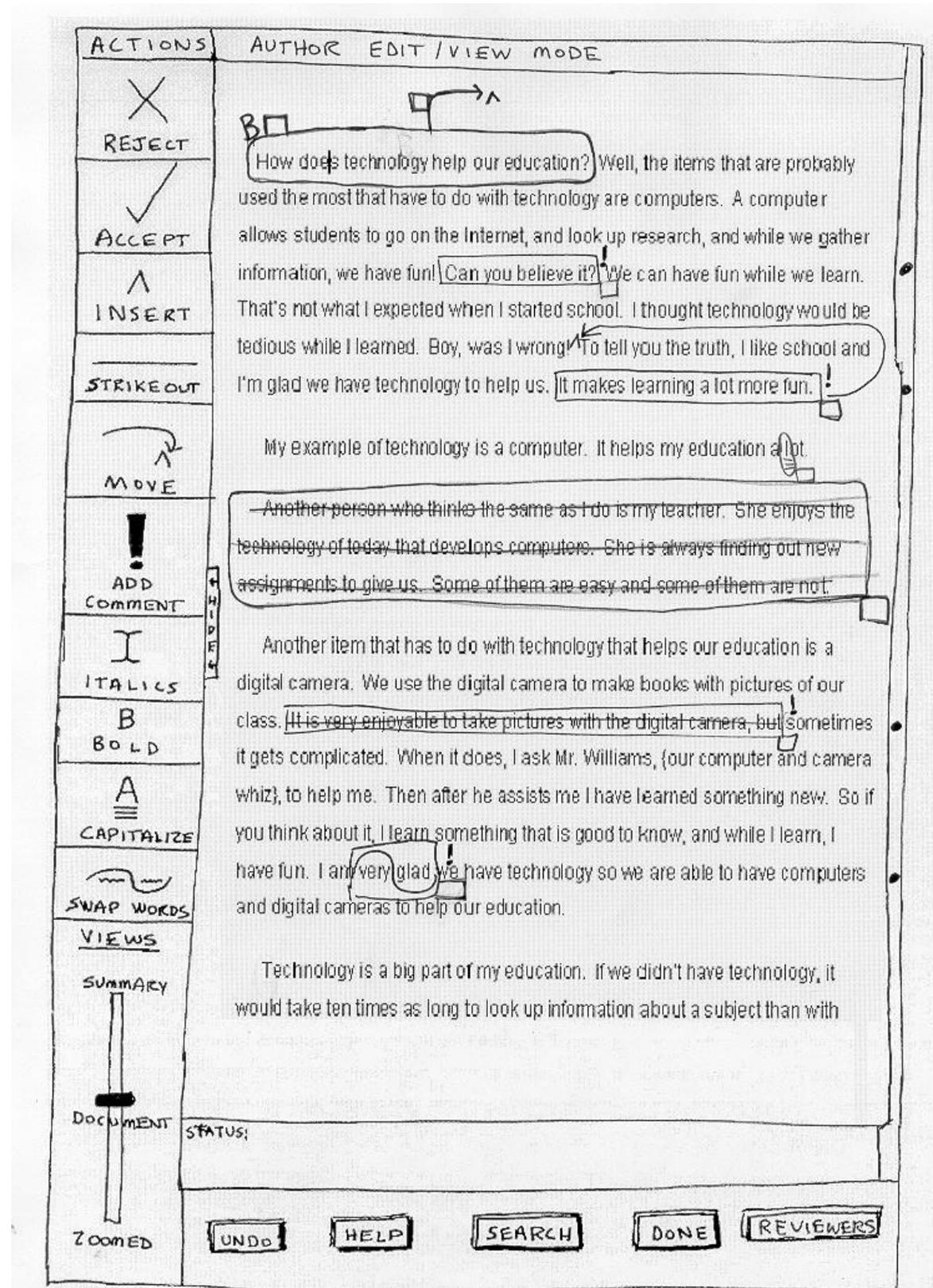
Theater: Shattuck Cinemas
Phone: (510) 665-1342 Dist: 1.5 mi.
Address: 2122 Shattuck Ave
Berkeley, 94709

Cost: \$8.50 normal, \$6.00 senior, \$4.50 matinee

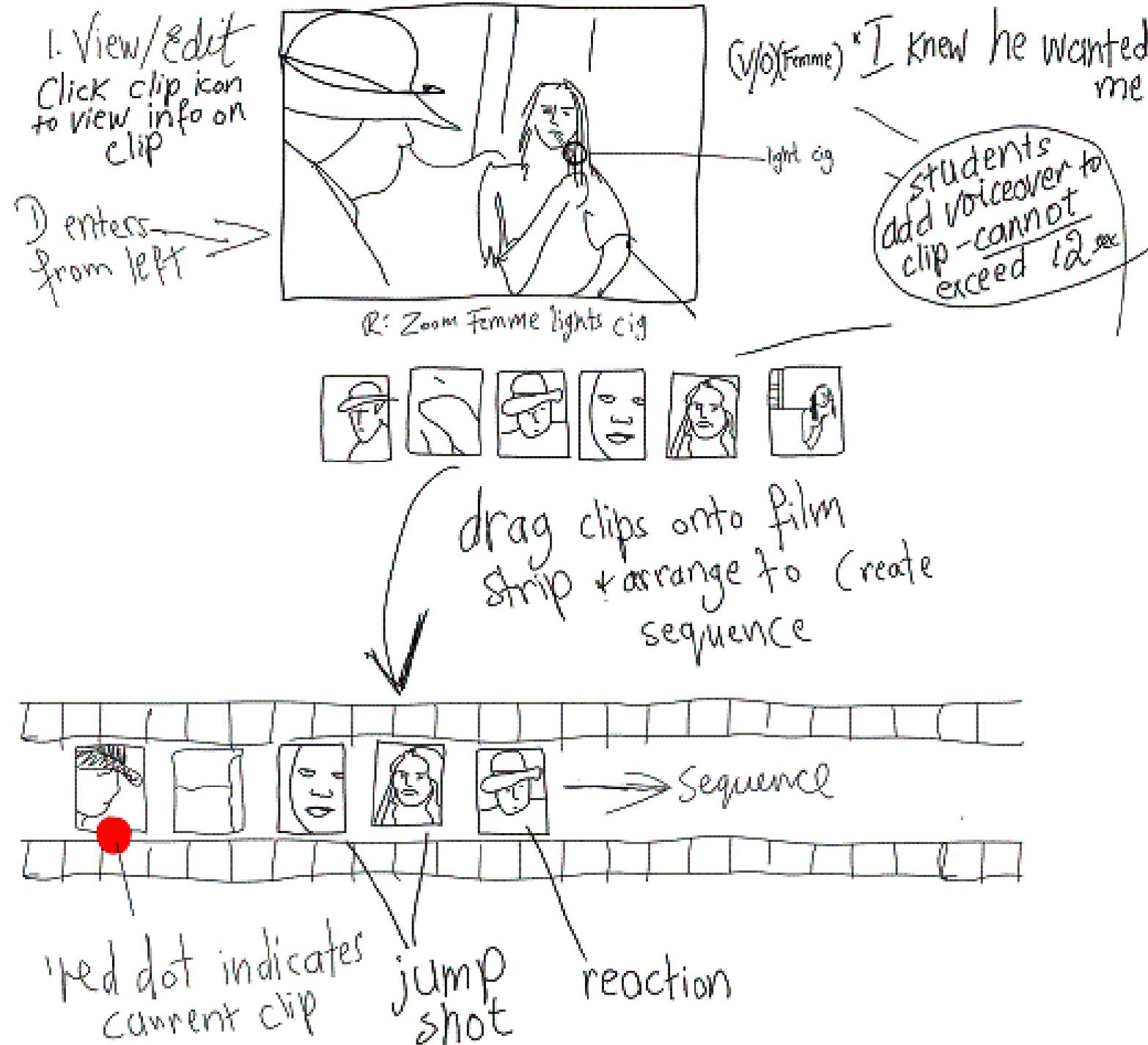
Map-It

<u>Art of War</u>	☆☆☆
(10:00)-(1:00)-4:00-7:00-10:00	
<u>Bittersweet Motel</u>	☆☆☆☆
(11:00)-(1:30)-4:00-6:30-9:00	
<u>Godzilla</u>	☆☆
(10:30)-(2:00)-5:30-9:00	
<u>The Cell</u>	☆☆☆☆
(11:00)-(1:00)-3:00-5:00-7:00-9:00	

Sketch: Single Display



Sketch: Single Display

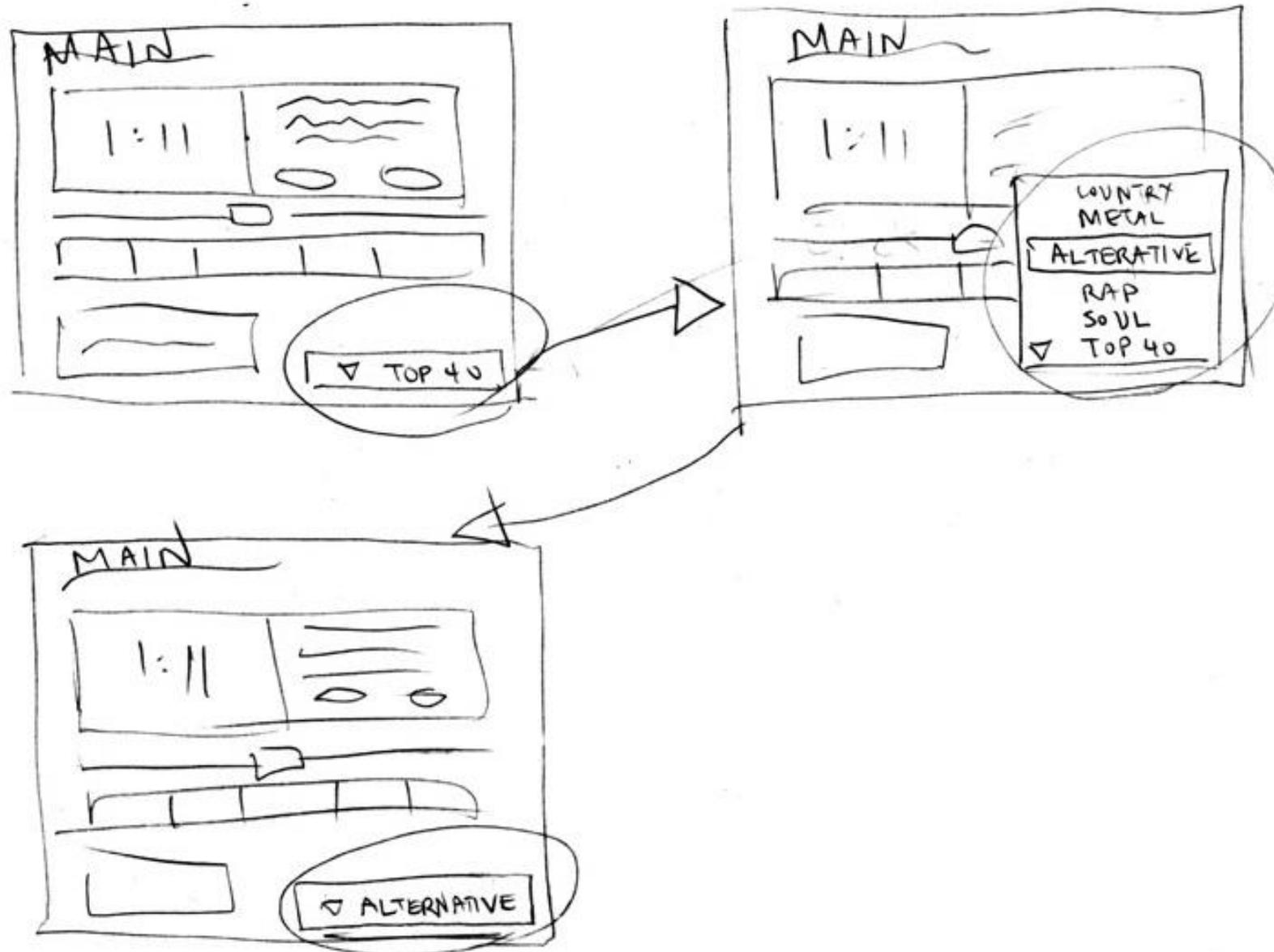


Film Editing Interface

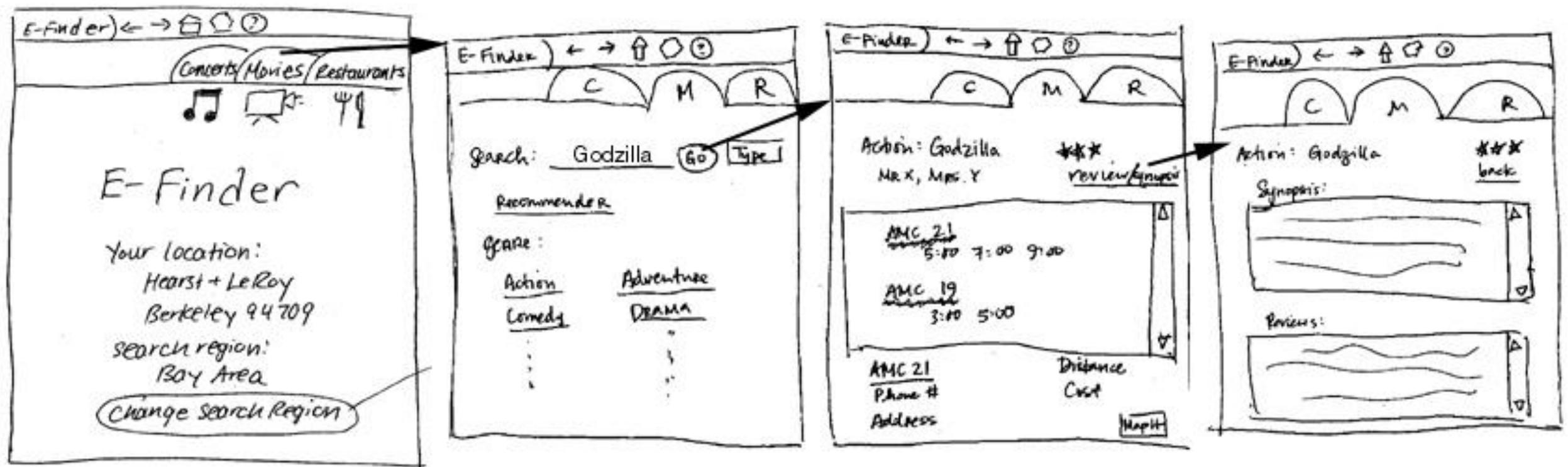
Storyboards: Multiple Frames

SCENARIO 1

"I want to listen to alternative music"



Storyboards: Multiple Frames



Test Storyboards with Users

Can be “played” in front of users (or other designers)

Check understanding of process users go through

- Observe user reaction
- Debrief users

Good reference point during the design process

Note

A storyboard is a linear sequence of actions.

It uses user interface elements, but is not a representation or simulation of the UI (coming next).

Creating a Low-Fi Prototype

Why Do We Prototype?

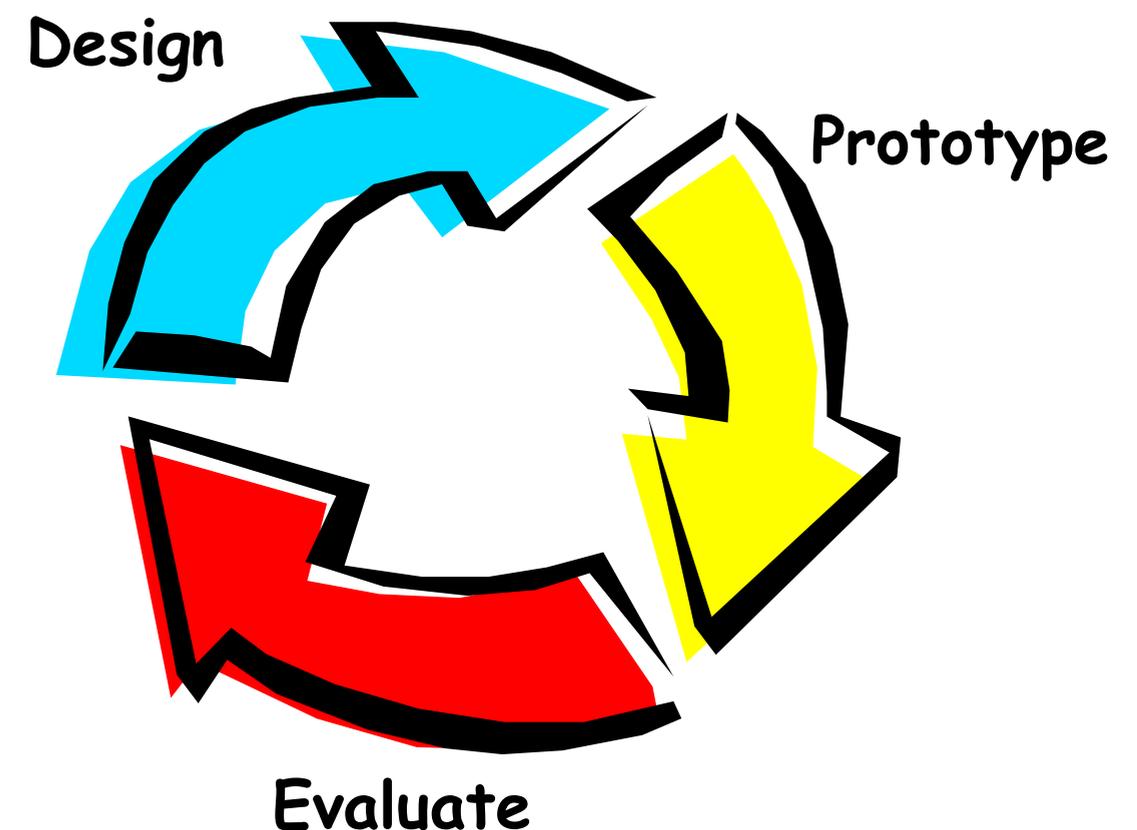
Get feedback on our design faster

- saves money

Experiment with alternative designs

Fix problems before code is written

Keep the design centered on the user



Fidelity in Prototyping

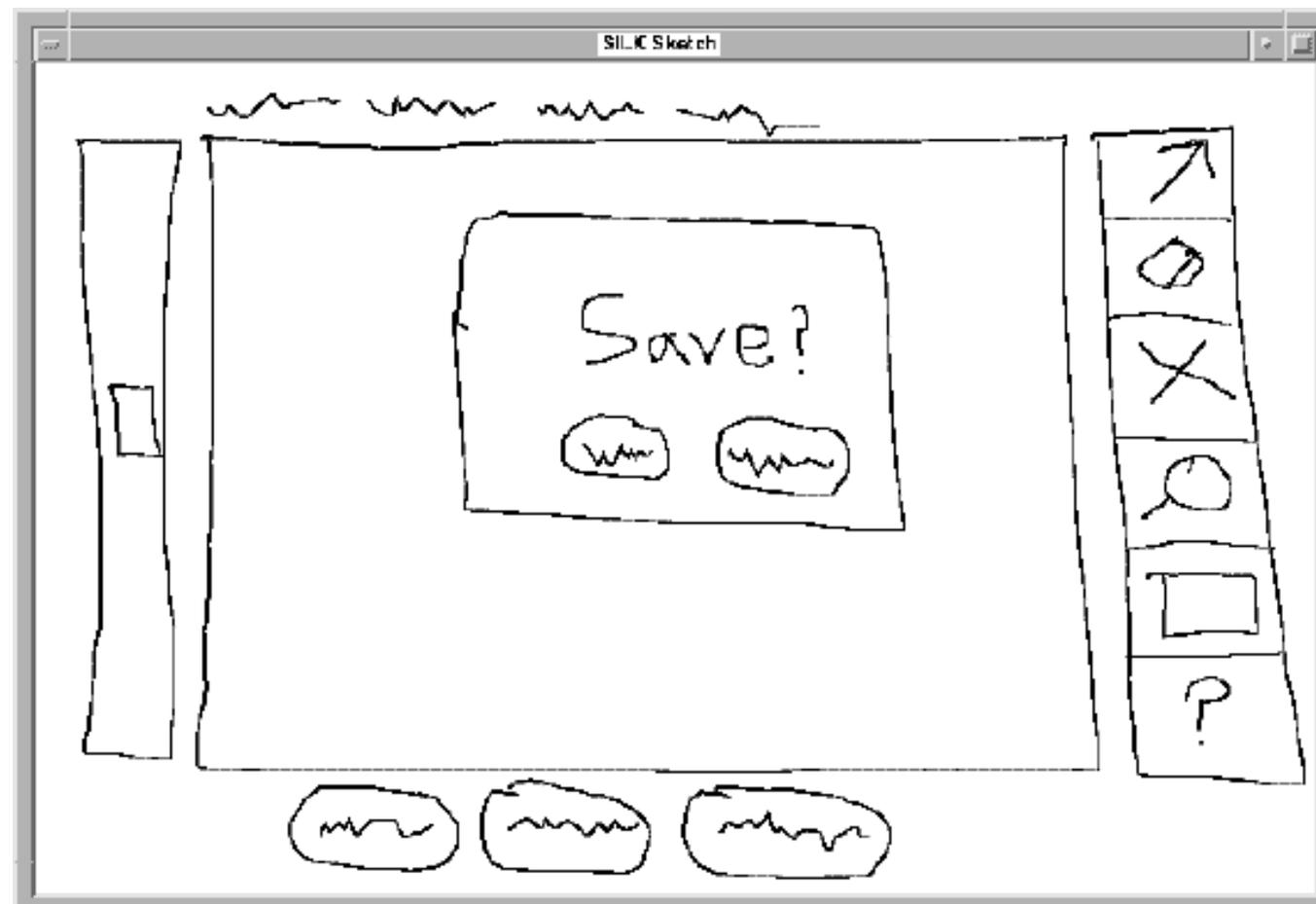
Fidelity refers to the level of detail

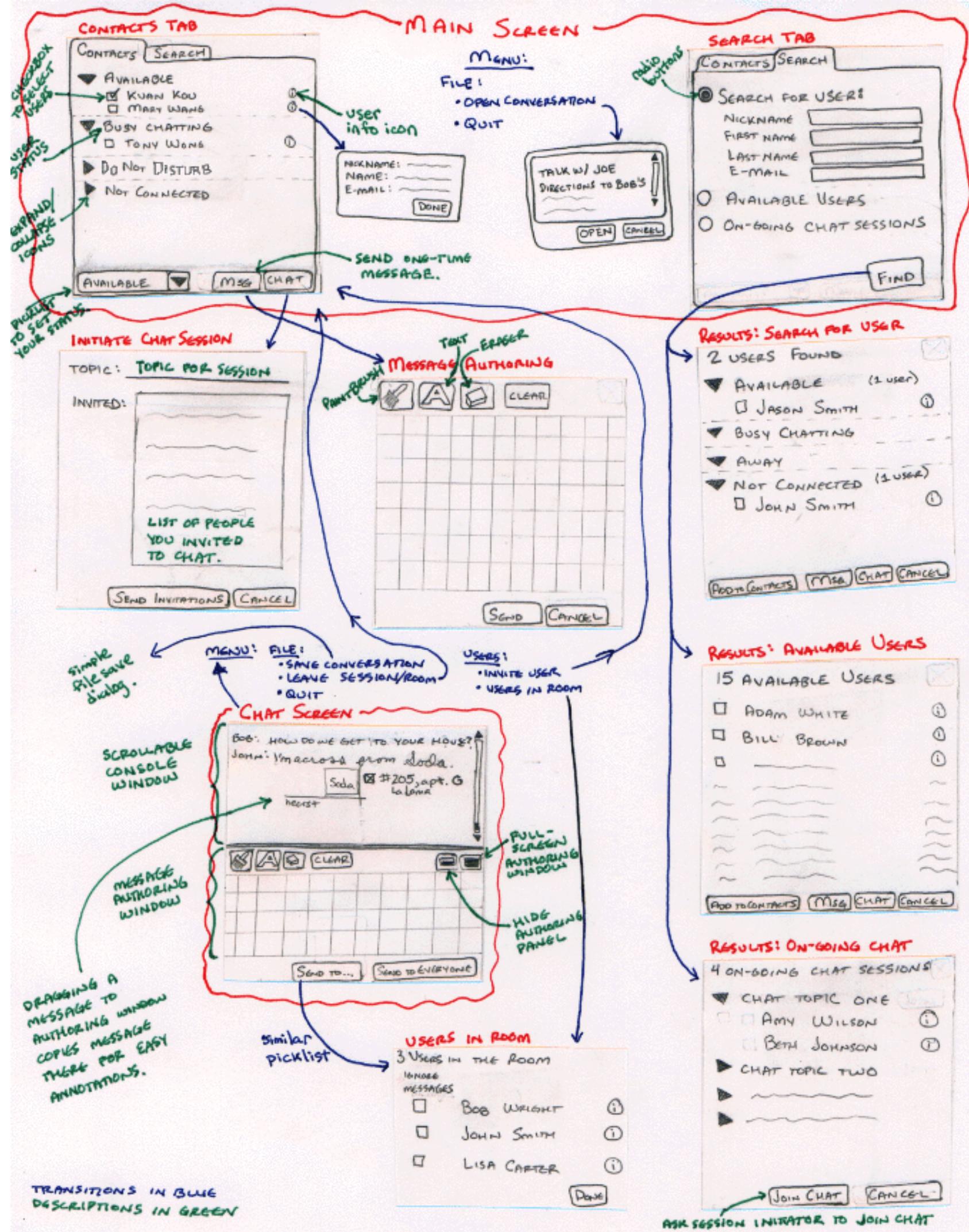
High fidelity,

- Prototypes look like the final product

Low fidelity,

- Artists renditions with many details missing





Ink Chat System

Color Coding

- Black: page content
- Red: page titles
- Green: annotations
- Blue: links

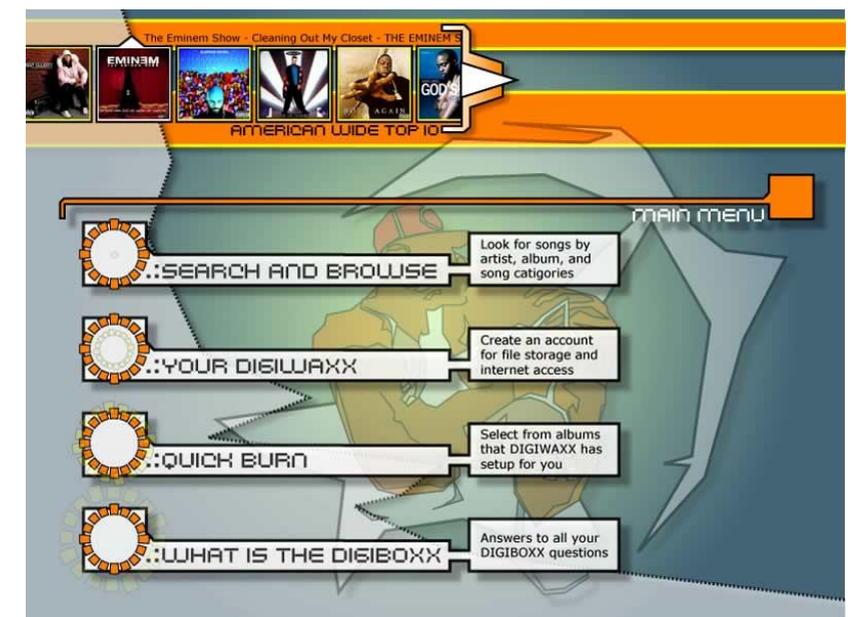
Hi-Fi Disadvantages

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
- Designers don't want to lose effort put into creating hi-fi design



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.



+ Add a course

- Drop a course

🔍 Search for a course

📄 View Requirement

? Help

⚙️ Preferences

🖨️ Print

🔄 Update telebears

💾 Save

🚪 Logout

	Monday	Tuesday	Wednesday	Thursday	Friday
8-9					
9-10					
10-11					
11-12					
12-1					
1-2					
2-3					
3-4					
4-5					
5-6					

ESP

EECS
Schedule
Planner

Welcome to ESP.

**Your Telebears session
is Tues. Sept. 21 @ 10am**

**Your current schedule
is empty. Please click
on Add a course to
continue.**

- + Add a course
- Drop a course
- Q Search for a course
- V View Requirement
- ? Help
- ≡ Preferences
- Print
- ⌨ Update keyboards
- Save

ESP EECS Schedule Planner

Add Menu

Help - Add Menu

- ▷ Select Department from drop down menu
- ▷ Enter course numbers
If you don't know course numbers, press SEARCH button
- ▷ Press ADD to continue transaction
- ▷ Click CANCEL to end transaction

CLOSE

	Monday	Tuesday
8-9		
9-10		
10-11		
11-12		
13-1		
1-2		
2-3		
3-4		
4-5		
5-6		

Dept. ▼

course

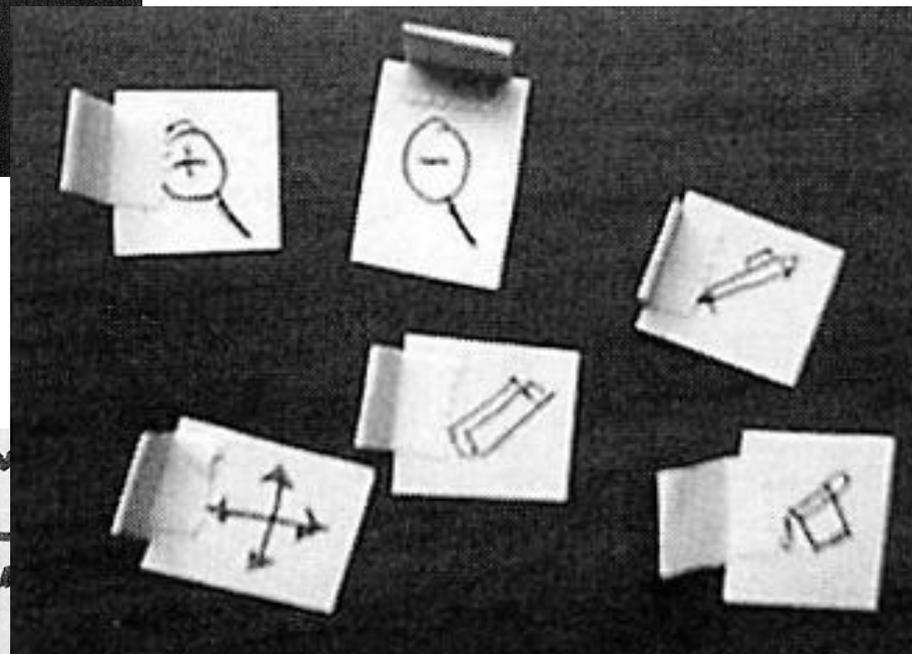
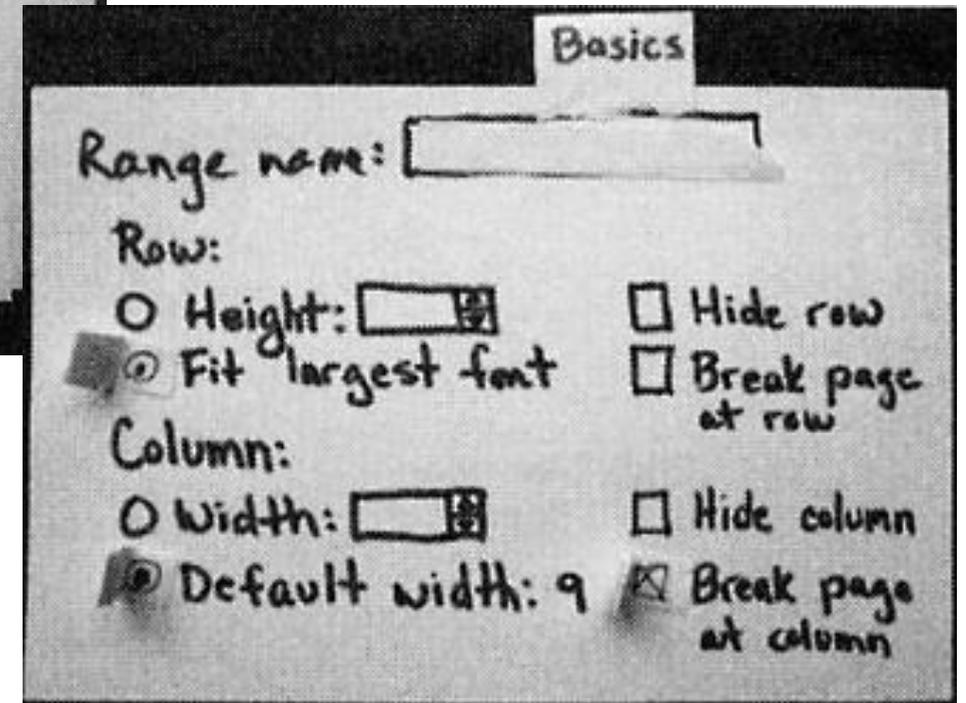
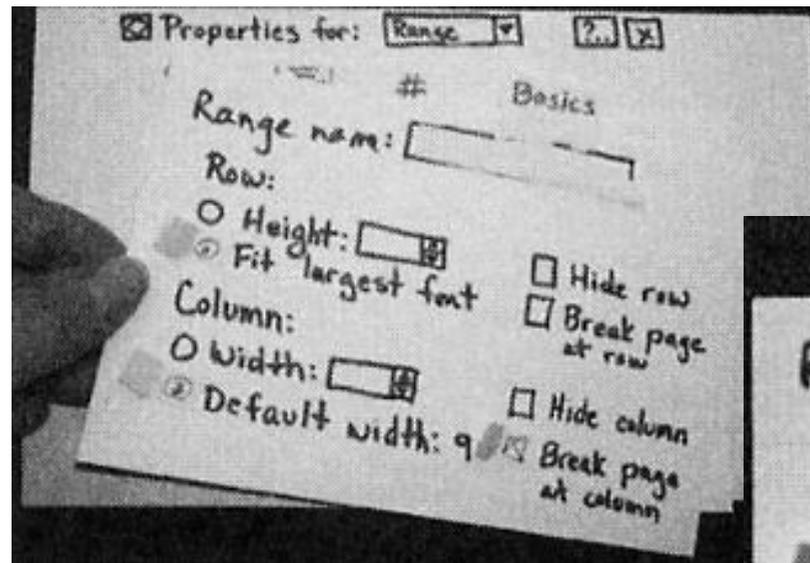
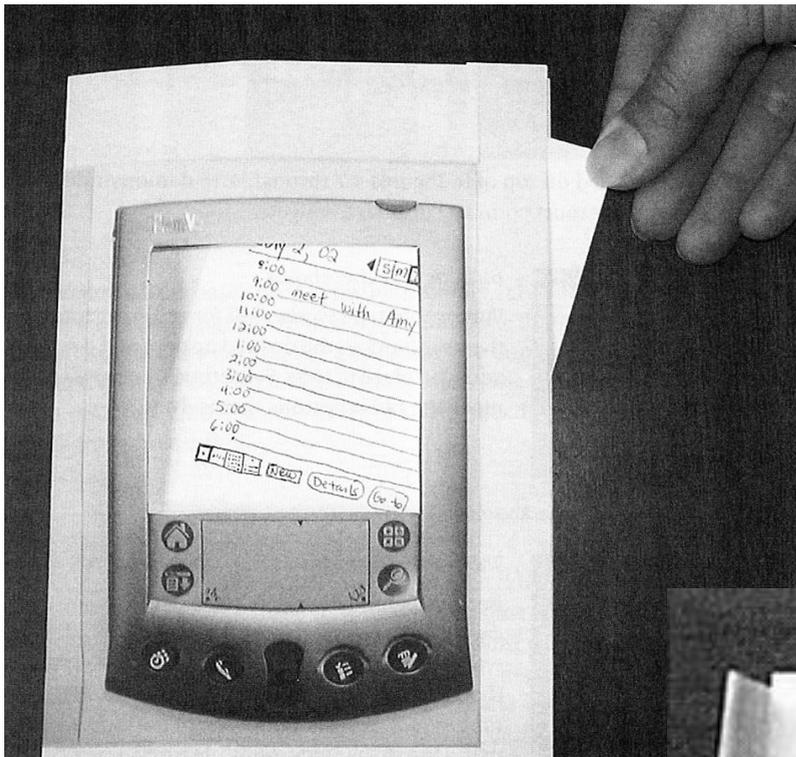
transaction.

SEARCH

if you don't know the course number.

HELP

Interface Elements



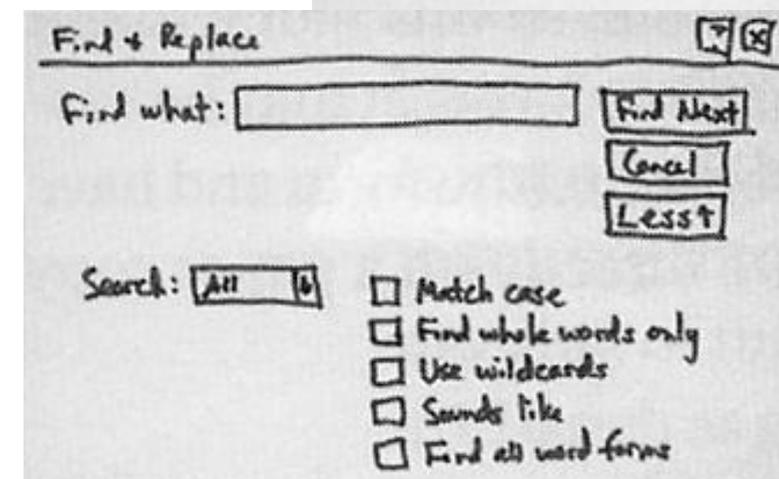
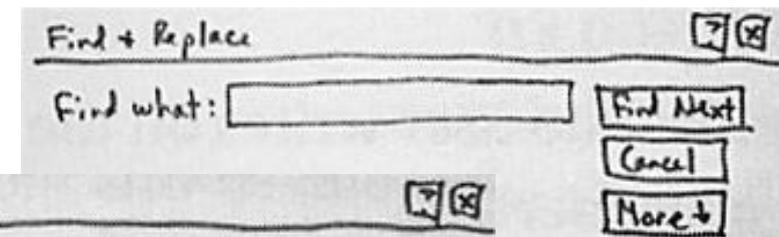
2. Select the Actions for your rule

- 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
highlight it with color



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

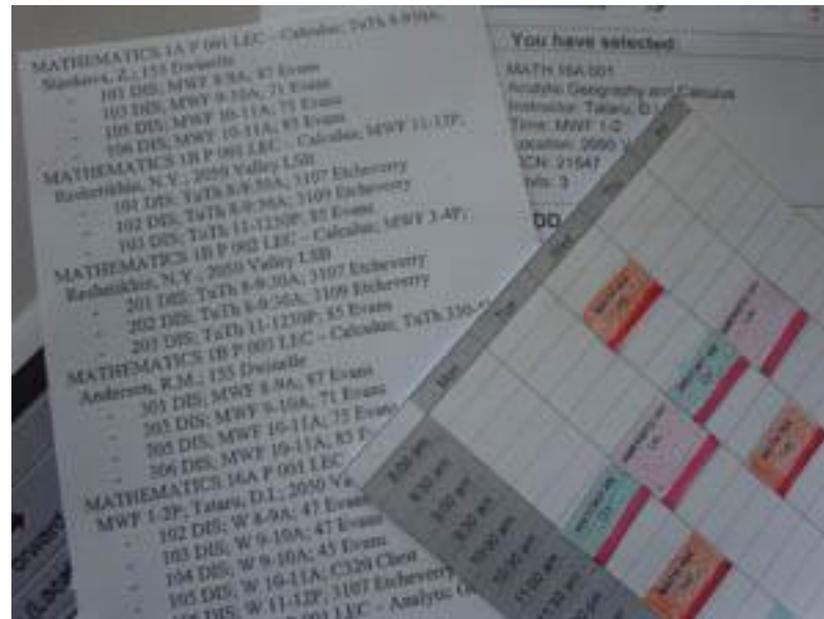
- Anything that moves, changes, appears/disappears
- Use greek-ing to indicate text if necessary 

Ready response for any user action

- e.g., Have those pull-down menus already made

Use photocopier to make many versions

Wizard of Oz Prototype Testing



SIMS 213 Project: Telebears redesign

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

Conducting a Test

Three or more testers

- **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

(Greeter can serve other roles)

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
 - Performs 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

The User Test

- The actual user test will look something like this:
 - Greet the user
 - Explain the test
 - Get user's signed consent
 - Demo the system
 - Run the test (maybe 1/2 hour)
 - Debrief

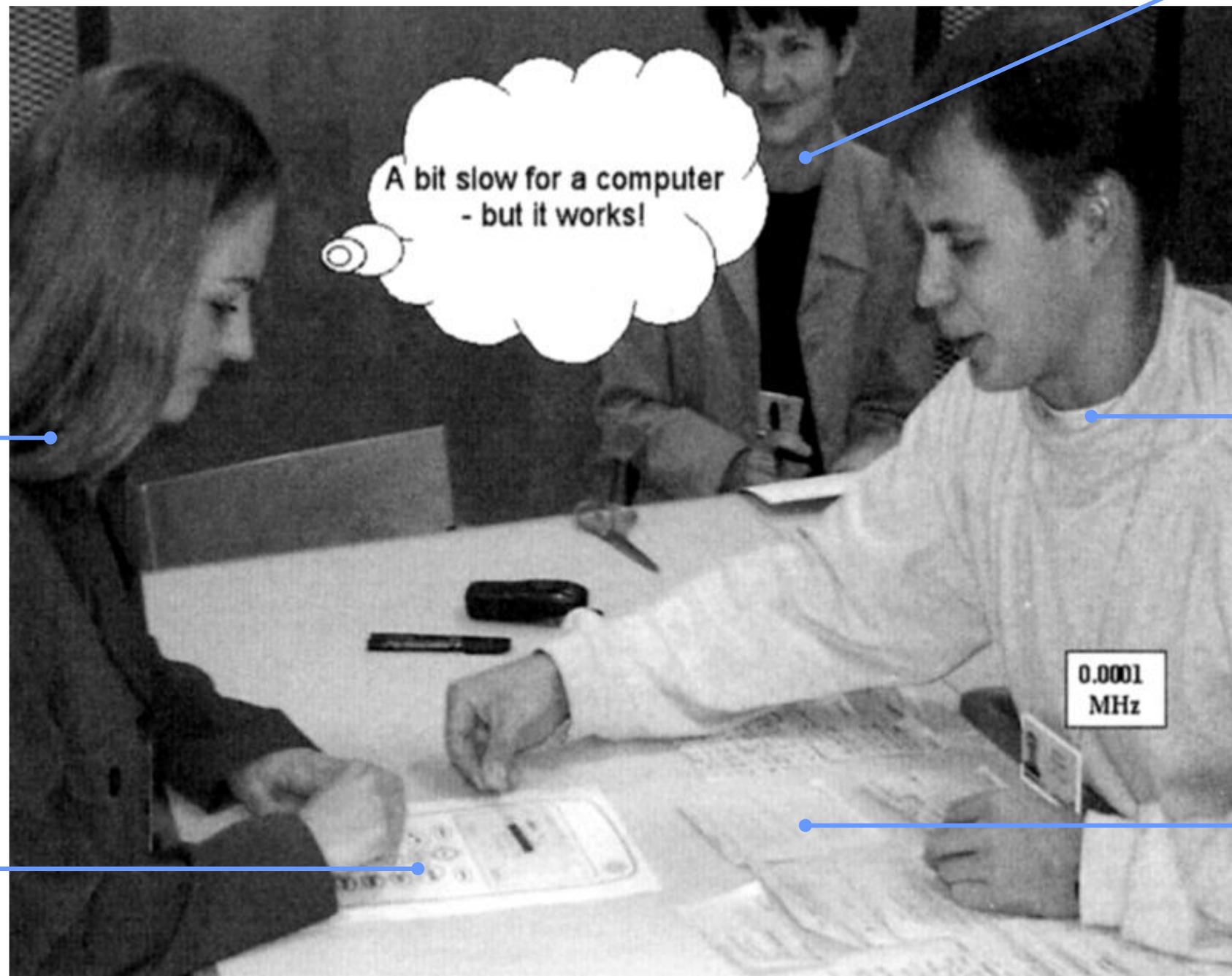
Critical Incidents

- Critical incidents are unusual or interesting events during the study.
- Most of them are usability problems.
- You write them up like heuristic violations.
- They may also be moments when the user:
 - got stuck, or
 - 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

Observer
(or video camera)



User

“Computer”

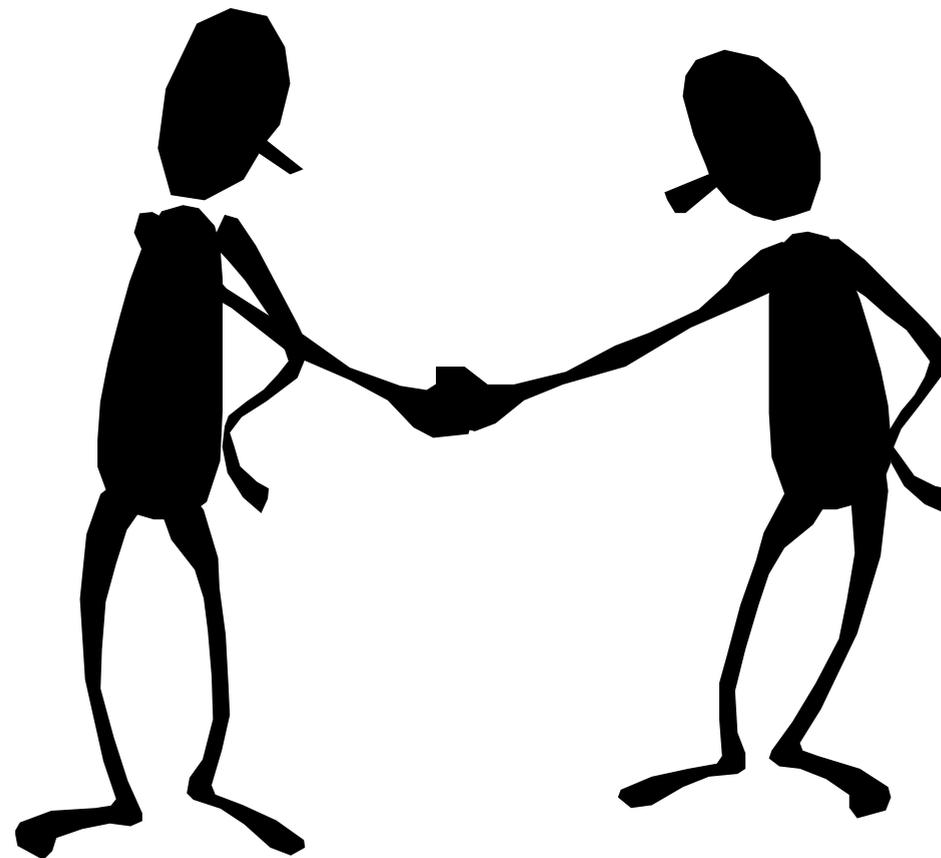
Interface

Interface elements

10 steps to better evaluation

1. Introduce yourself

some background will help relax the subject.



10 steps



2. Describe the purpose of the observation (in general terms), and set the participant at ease
 - You're helping us by trying out this product in its early stages.
 - If you have trouble with some of the tasks, it's the product's fault, not yours. Don't feel bad; that's exactly what we're looking for.

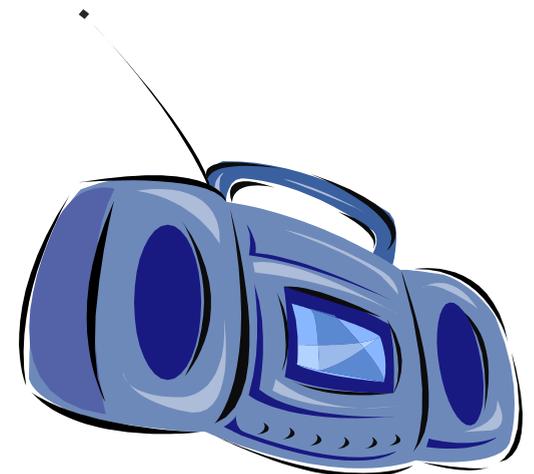
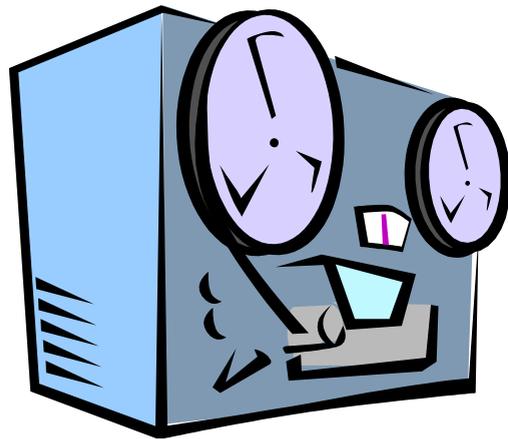
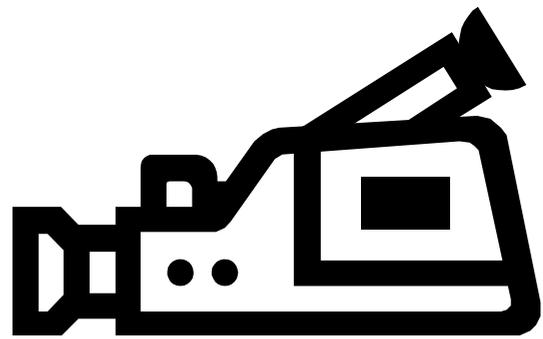
10 steps (contd.)

3. Tell the participant that it's okay to quit at any time, e.g.:
- Although I don't know of any reason for this to happen, if you should become uncomfortable or find this test objectionable in any way, you are free to quit at any time.



10 steps (contd.)

4. Talk about the equipment in the room.
 - Explain the purpose of each piece of equipment (hardware, software, video camera, microphones, etc.) and how it is used in the test.



10 steps (contd.)

5. Explain how to “think aloud.”

- Explain why you want participants to think aloud, and demonstrate how to do it. E.g.:
- We have found that we get a great deal of information from these informal tests if we ask people to think aloud. Would you like me to demonstrate?



10 steps (contd.)

6. Explain that you cannot provide help.



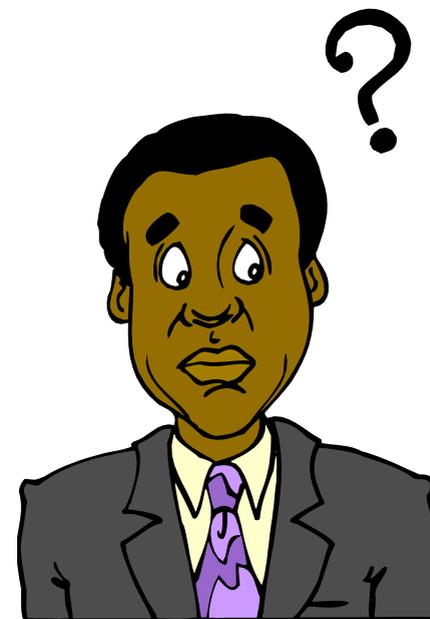
10 steps (contd.)

7. Describe the tasks and introduce the product.
 - Explain what the participant should do and in what order. Give the participant written instructions for the tasks.
 - Don't demonstrate what you're trying to test.



10 steps (contd.)

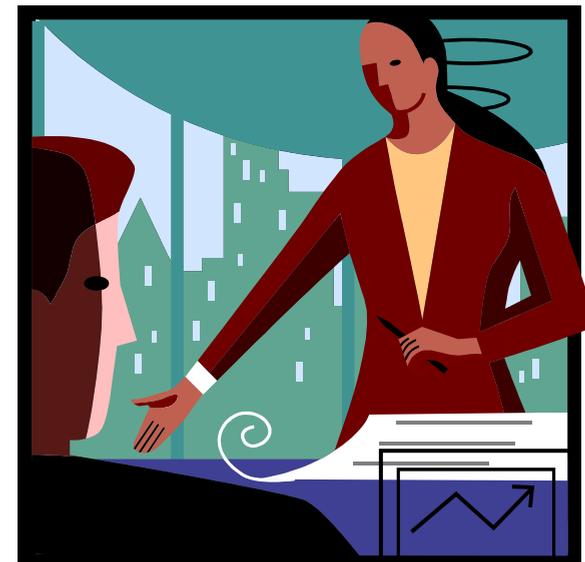
8. Ask if there are any questions before you start; then begin the observation.



10 steps (contd.)

9. Conclude the observation. When the test is over:

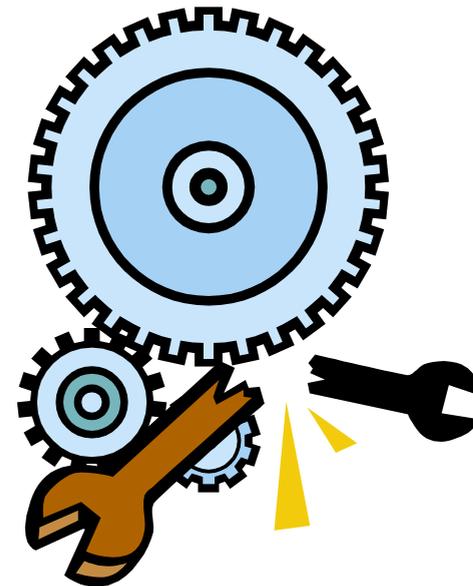
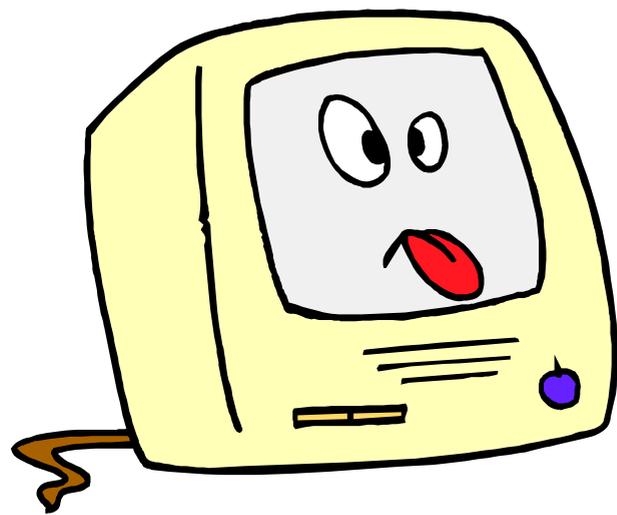
- Explain what you were trying to find.
- Answer any remaining questions.
- discuss any interesting behaviors you would like the participant to explain.



10 steps (contd.)

10. Use the results.

- When you see participants making mistakes, you should attribute the difficulties to faulty product design, not to the participant.



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

Exercise

Airport “wayfinder” for travelers

Problem statement:

When passing through airports, people often have difficulty finding the services they need. The availability of these services, as well as how to get to them, is not obvious, which can result in missed flights, weary travelers, and a stressful customer experience.

Target persona: Angela, ~31, business traveler

- Wants to travel without hassle
- 30 minute layover in unfamiliar airport
- What might she want to do in this time?
- What kind of interface would support her tasks?



Constraints

- PDA/Smart phone hardware
- Wireless infrastructure available
- Low resolution location information available



Exercise

Work with your project group

Your tasks

- Brainstorm about Angela's goals
 - What does she want to do at the airport
 - What information does she need
 - What kind of interface will support her tasks
- Create an initial low fidelity prototype
- Debug the interface with users from another group
 - Does the interface meet Angela's needs?
 - Is the interface hassle-free?
 - Is the interface confusing or difficult?

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

Solution from Cooper Design

Angela taps here to view a list of the types of services available in the airport.

Name	Minutes
Joe's Coffee	1
CoffeeCoffee	3
Moonbucks	4
Airport Coffee & Snacks	4
CoffeeCoffee	8
The Bean Shack	10
Moonbucks	10
Moonbucks	12
Lucille's	13

Services in the selected category are listed here. The location closest to her appears at the top of the list.

Or she can write the name of the service she is looking for here.

To choose a destination, Angela taps her choice in the list.

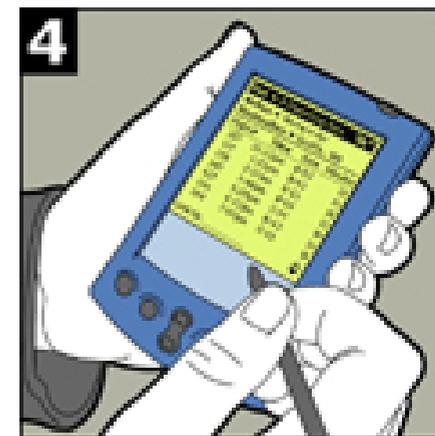
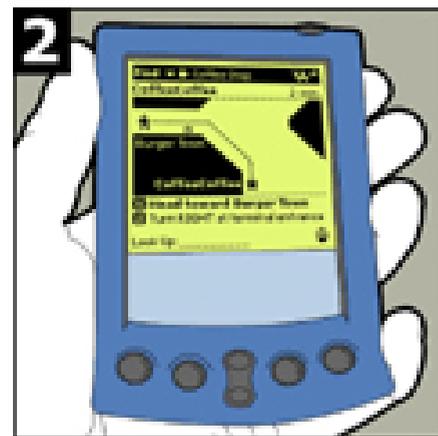
After making a selection on the List screen, Angela sees the Map screen, which shows her position, her destination, and the major landmarks on her route.

1 Head toward Burger Town
2 Turn RIGHT at terminal entrance

Angela can navigate by looking at the map, or by following the simple written directions below.

As she moves along her route, the appropriate direction moves to the top of the list.

Cooper Design's storyboard



Summary

- Sketching and Storyboarding
- Creating a Low-Fi prototype
- Wizard of Oz prototype testing