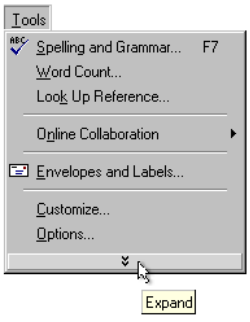
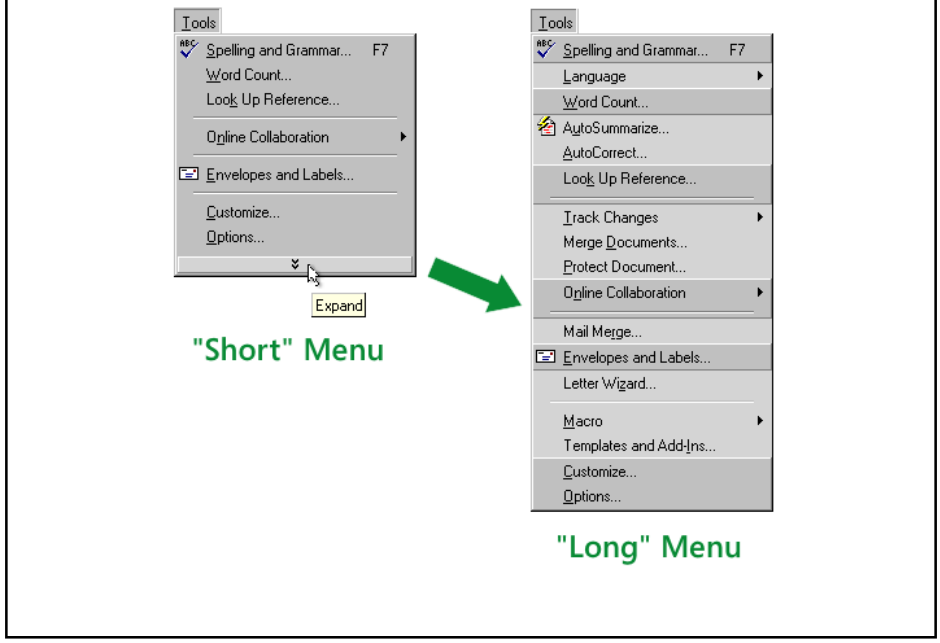
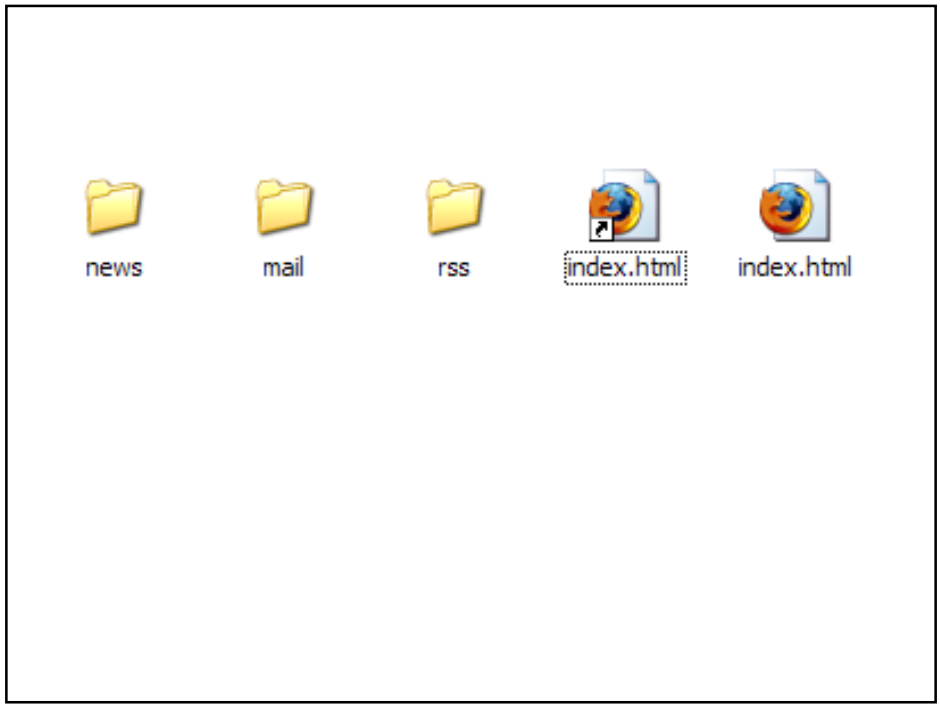
CS160: User Interfaces

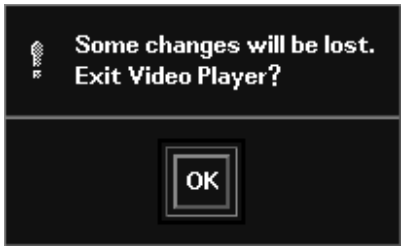
Maneesh Agrawala and Jeffrey Nichols

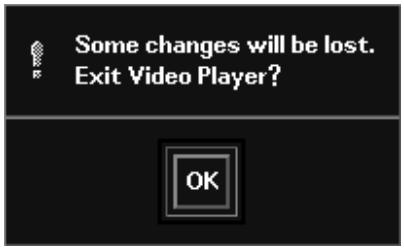



Tools
Spelling and Grammar... F7
Word Count...
Look Up Reference...
Online Collaboration
Envelopes and Labels...
Customize...
Options...
Expand
"Short" Menu
Tools
Spelling and Grammar... F7
Language
Word Count...
AutoSummarize...
AutoCorrect...
Look Up Reference...
Track Changes
Merge Documents...
Protect Document...
Online Collaboration
Mail Merge...
Envelopes and Labels...
Letter Wizard...
Macro
Templates and Add-Ins...
Customize...
Options...
"Long" Menu

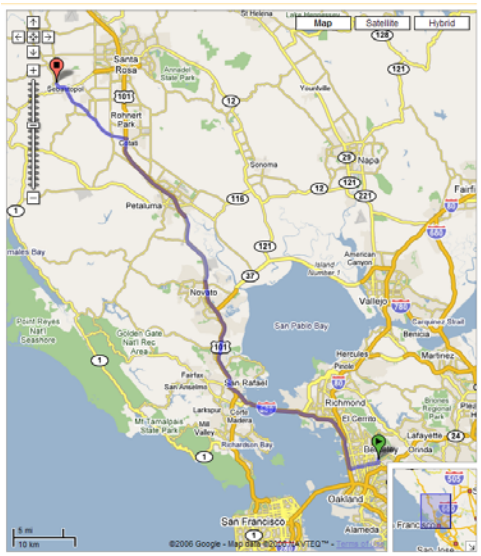

news
mail
rss
index.html
index.html

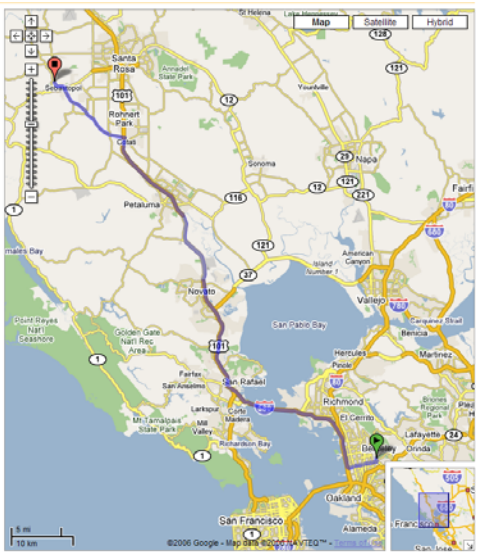
- Hard to tell the difference between the icons
- File and shortcut have exactly the same name



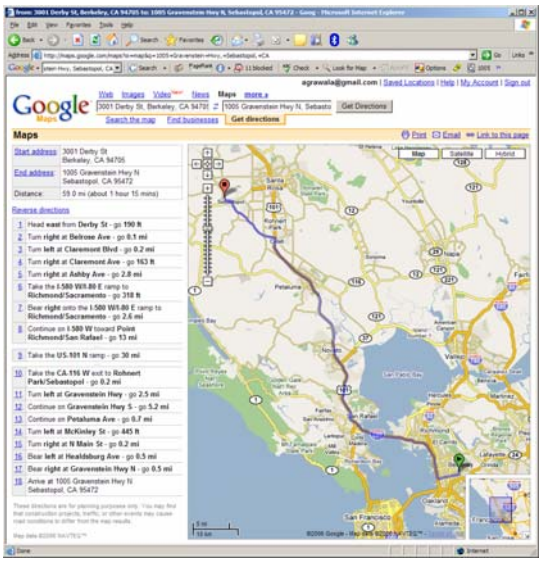


How do you cancel?





Where do I need to turn?

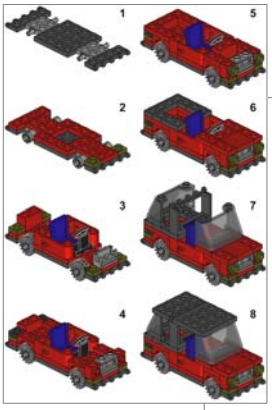


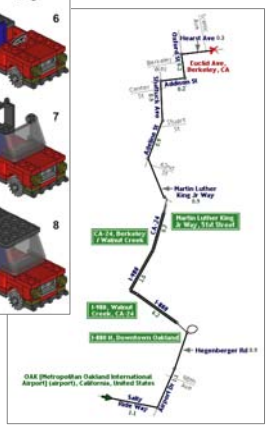
Where do I need to turn?

Instructor: Maneesh Agrawala

Asst. Professor in EECS
Joined Berkeley Jan. 2006

Work in HCI, Graphics, Vis.
Visual interface design
Perception/cognition of displays





Instructor: Jeffrey Nichols

Researcher at IBM Almaden
San Jose, CA
Joined IBM December 2006

Work in HCI, Mobile, Web
Automatic interface generation for handheld devices
Multi-device communication infrastructures
Programming-by-demonstration and end-user programming for the web

GSI: Nicholas Kong

Ph.D. Student in EECS
Started Aug. 2008

Work in HCI, InfoVis
Collaborative visual analytics
Perception/cognition of displays

This Course

Is about reliably building very good interactive systems

This semester we focus on **games with a purpose**

The goal is not to build a working system, but an "interactive prototype"

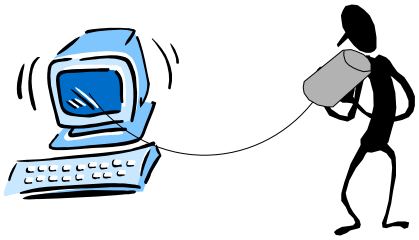
Emphasis is on rapid prototyping and user testing to avoid obvious and not-so-obvious mistakes

Topics

- Course Overview
- Project Description
- Course Mechanics

Course Overview

Human-Computer Interaction (HCI)



Human
- End-user of program
- Others in the organization

Computer
- Machine the program runs on
- Often split between clients & servers

Interaction
- User tells the computer what they want
- Computer communicates results

User Interfaces (UIs)

Part of application that allows
- People to interact with computer
- Computer to communicate results

Can include hardware design
- Buttons, sliders, other sensors

HCI = design, prototyping, evaluation, & implementation of UIs

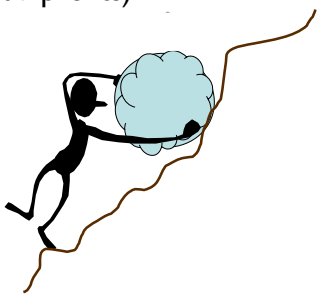
Why Study User Interfaces?

Major part of work for "real" programs
- Approximately 50%

You will work on "real" software
- Intended for people other than yourself

Bad user interfaces cost
- Money (5%↑ satisfaction → up to 85%↑ profits)
- Lives

User interfaces hard to get right
- People are unpredictable



Life-Threatening Errors

1995 Am. Airlines jet crashed into canyon wall killing all aboard
- On approach to **Rozo** airport in Colombia
- Pilot skipped some of the approach procedures
- Pilot typed in "R" and system completed full name of airport to **Romeo**
- Guidance system executed turn at low altitude to head for Romeo airport
- 9 seconds later plane struck canyon wall

http://en.wikipedia.org/wiki/American_Airlines_Flight_965

Life-Threatening Errors

1995 Am. Airlines jet crashed into canyon wall killing all aboard

- On approach to **Rozo** airport in Colombia
- Pilot skipped some of the approach procedures
- Pilot typed in "R" and system completed full name of airport to **Romeo**
- Guidance system executed turn at low altitude to head for Romeo airport
- 9 seconds later plane struck canyon wall

Is the pilot to blame?

http://en.wikipedia.org/wiki/American_Airlines_Flight_965

What is Usability?

Ease of learning

- Faster the second time and so on...

Recall

- Remember how from one session to the next

Productivity

- Perform tasks quickly and efficiently

Minimal error rates

- If they occur, good feedback so user can recover

High user satisfaction

- Confident of success

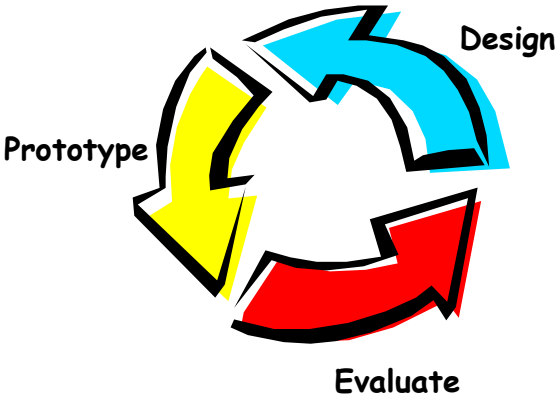
Who Builds Interfaces?

Ideally a team of specialists

- graphic designers
- interaction / interface designers
- technical writers
- marketers
- test engineers
- software engineers
- customers

Some engineers become very good at user-centered design, but its not for all engineers.

Interface Design Cycle

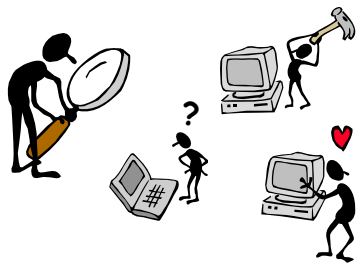


Building Successful Interfaces

- Task analysis & contextual inquiry
- Rapid prototyping
- Evaluation
- Iteration

Task Analysis & Contextual Inquiry

Observe existing work practices
Create scenarios of actual use
Try-out new ideas before building software



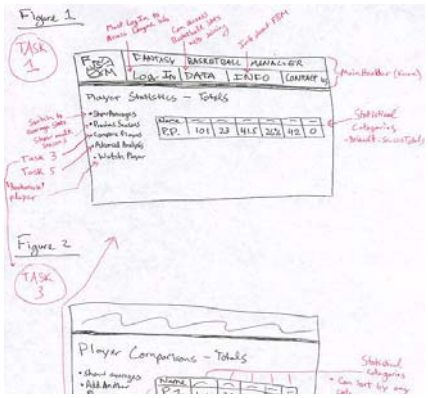
Rapid Prototyping

Build a mock-up of design

Low fidelity techniques
- Paper sketches
- Cut, copy, paste
- Video segments

Interactive prototyping tools
- HTML, Flash, Javascript, Visual Basic, C#, etc.

UI builders
- Interface Builder, Visual Studio, NetBeans



Fantasy Basketball

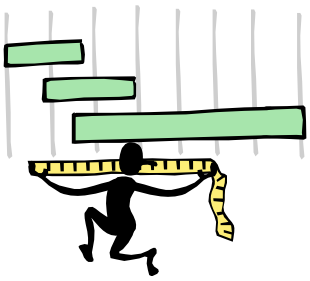
Evaluation

Test with real customers (participants)

Build models

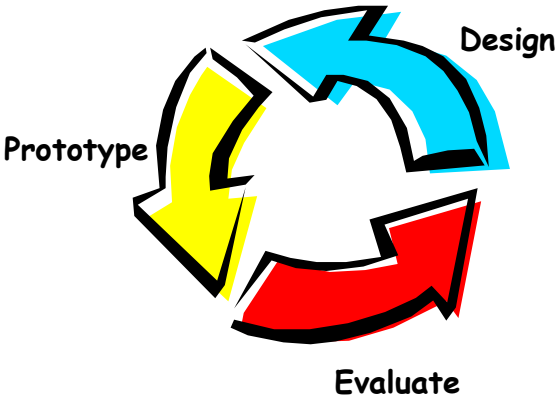
Low-cost techniques
- expert evaluation
- walkthroughs

Higher cost
- Controlled usability study



Iteration

At every stage!



Goals of the Course

Learn to design, prototype, evaluate interfaces

- Discover tasks of prospective users
- Cognitive/perceptual constraints that effect design
- Techniques for evaluating an interface design
- Importance of iterative design for usability
- Technology used to prototype & implement UI code
- How to work together on a team project
- Communicate your results to a group

Many of these will be key aspects of your future jobs

CS160 and the CS Curriculum

Most courses for learning algorithms and technology
- Compilers, operating systems, databases, etc.

CS160 concerned with ***design***, *implementation* & ***evaluation***
- Assume you are comfortable programming
- Technology as a tool to evaluate via prototyping
- Skills will become very important upon graduation
  - Complex systems, large teams

Team Project Description

Teams

Each of you will individually propose an interface idea
- Fixing something you don't like or a new idea
- Novelty and creativity will be considered

Groups
- 4 or 5 students to a team
- Work with students with different skills/interests

Cumulative
- Apply several HCI methods to a single interface

Theme: Games with a Purpose

Theme: Games with a Purpose

Games that provide a benefit to the player

Games that solve a problem

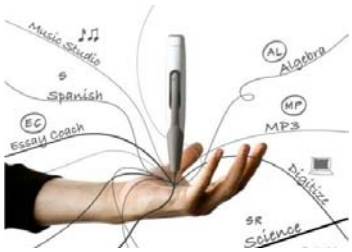
Player Benefits: Educational Games

Play is the oldest form of learning

Player Benefits: Educational Games

Computer learning software is showing signs of success in Govt. studies in elementary and middle school.

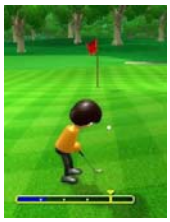
Most of it is "game-like"



Player Benefits: Fitness Games

Wii provides gaming experiences with genuine fitness benefits

Gamers burn significant calories playing Wii games, but usually much less than the real-world games



Player Benefits: Health Games

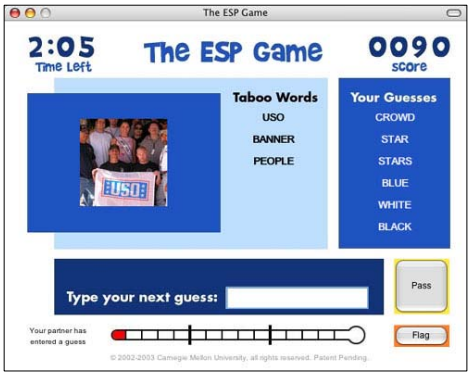
Researchers have developed games to encourage healthy eating and tooth-brushing. See http://mll.csie.ntu.edu.tw/hchu.php

Problem Solving: Labeling Images

The act of playing a fun game solves difficult problems

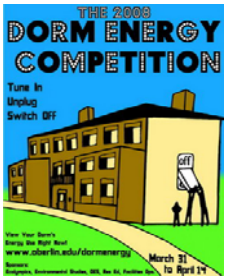
ESP Game: play game to label images

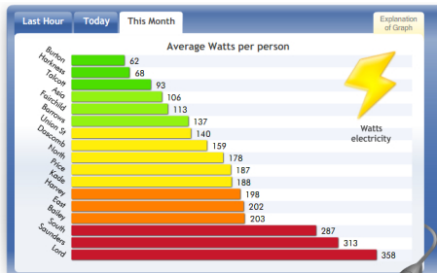
Luis Von Ahn at CMU
http://www.gwap.com/



Problem Solving: Saving Energy

Energy use in Oberlin College's dormitories was cut dramatically when they ran an energy-use competition.
See http://www.oberlin.edu/dormenergy/news.htm





Why games with a purpose?

Lots of innovation right now – it's a rich design space

Motion sensing hardware opens up many new game genres and interaction styles.

Platform support is good, development is getting easier.

Suggested Platforms

Adobe Flash

- We have free licenses for the semester!
- Runs on almost any platform (Flash Lite for phones)
- Good for prototyping as well as developing.
- Good outcomes in earlier offerings of CS160.

XNA: Microsoft's game platform for PC and Xbox.

- Free dev tools for Vis Studio 2005 (XNA Game Studio 2.0).
- Good hardware support: PC and Xbox game consoles, Wii remotes

Suggested Hardware

Easiest to stick with PCs, but you can explore…

Xbox

Flash Lite

Wii remote

Ugobe Pleo

Course Mechanics

TAs, Office Hours, Sections

Teaching Assistant

- Nicholas Kong: EECS grad student

Office Hours

- Maneesh: T 1-3pm in 635 Soda Hall
- Jeff: MW 11-12noon in 6th floor alcove Soda Hall
- Nick: F 1:30-3:30pm in 283E Soda Hall
- Also by appointment

Sections

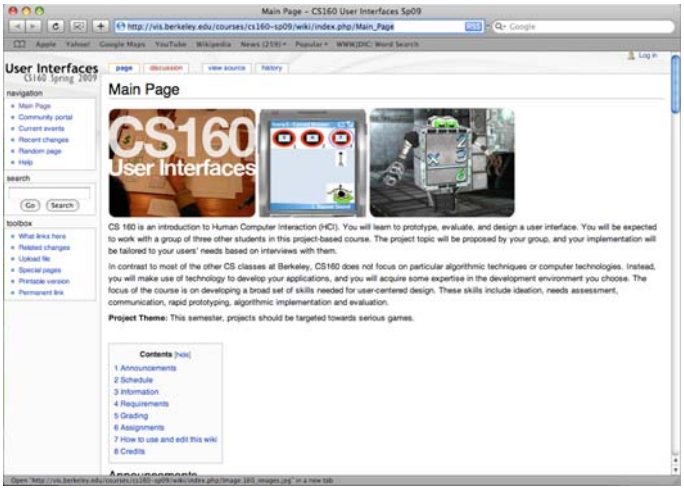
- W 1-2pm 320 Soda, W 2-3pm 320 Soda, Th 1-2pm 320 Soda
- You **must** attend to get full credit for design assignments
- No section this week

Reaching Us

Email: cs160@imail.eecs.berkeley.edu

- Mail sent here will get the fastest response
- Please avoid mailing us directly

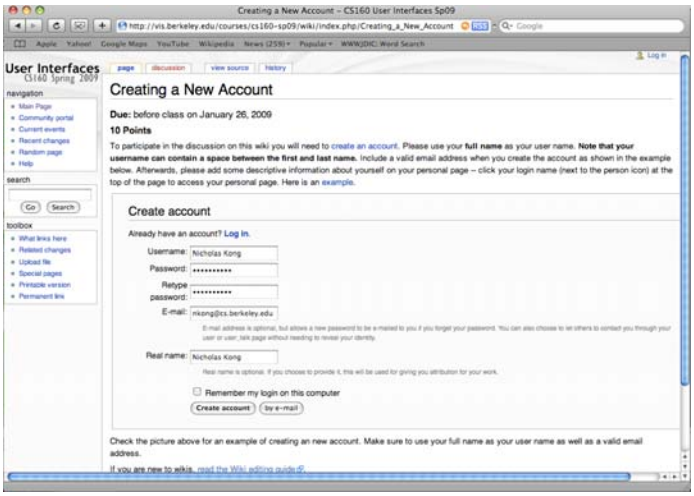
Class Wiki



http://vis.berkeley.edu/courses/cs160-sp09/wiki/index.php/Main_Page

Create Wiki Account

Your 1st assignment (due before class M Jan 26): 5pts



Course Petition

Your 2nd assignment (due before class M Jan 26): 5pts

Petition for Admission to CS160

Name:

Email:

Major:

Year: (Freshman, Sophomore, Junior, Senior)

GPA:

Are you committed to remaining in the course through the semester and collaborating with teammates on a group project?:

Reasons for taking the course:

What skills you would bring to team projects:

Relevant experience (employment or undergraduate research):

Email: cs160@imail.eecs.berkeley.edu

Both **enrolled and waitlisted** students should send us petition

Information **will determine admission** into course

Design Assignments

Design Assignments

Weekly individual assignments

- Focus on sketching and initial interface designs
- Stretch your visual communication and design abilities

Logistics

- Sketches should be uploaded to wiki before M class
- Assignments discussed in section
- Submit hardcopy of sketches at the end of section

Grading (10 points)

- 6 pts for completing the assignment
- 4 pts for quality of work
- Participation in section graded separately

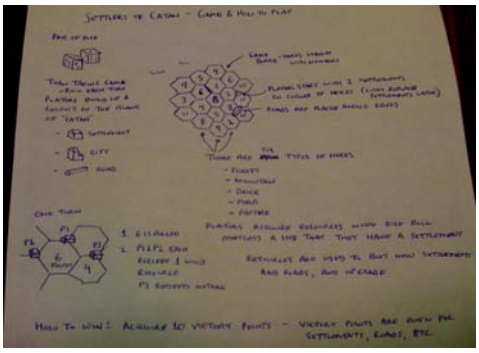
Design Assignment #1

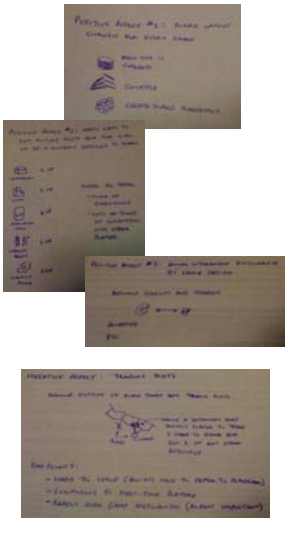
Play & Analyze a Game (due before class M Jan 26): 10 pts

- Choose a game
  - Any medium (video game, card game, board game)
  - Pick carefully
- Play it!
  - Get your friends together if necessary
- Analyze the game's "user interface"
  - Identify at least 3 positive aspects and 1 negative aspect
- Produce 5 sketches:
  - 1 sketch describing the game and how it is played
  - 3 sketches describing positive aspects of the game interface
  - 1 sketch describing a negative aspect of the game interface

Example Solution

Game: Settlers of Catan (Board Game)





Readings

Readings are very important to the class
- Make sure you do the reading *before class*
- Midterm will include things only covered in readings

Most readings will be posted on wiki
- Some require username/password: **cs160/cs160Readings**

Online reading discussions (ongoing assignment)
- Must post ***one substantial comment*** per lecture
- We will **not** accept late comment
- Will be the major factor in you class participation grade

Grading

Class participation (10%)
Design assignments (20%)
Project assignments (50%)
Midterm (20%)

Schedule of Assignments

- Create Wiki Account (Design) (1/26)
- Course Petition (Design) (1/26)
- Play and Analyze a Game (Design) (1/26)
- Individual Project Proposal (Project) (2/2)
- Design Assignment 1 (Design) (2/9)
- Group Brainstorm (Project) (2/9)
- Design Assignment 2 (Design) (2/17)
- Contextual Inquiry and Task Analysis (Project) (2/18)
- Design Assignment 3 (Design) (2/23)
- Individual Coding Project (Design) (individual) (3/2)
- Design Assignment 4 (Design) (3/9)
- Low-Fidelity Prototype (Project) (3/11)
- Plan a User Study (Design) (3/16)
- Interactive Prototype (Project) (4/6)
- Team Assessment (Project) (4/13)
- Pilot Usability Study (Project) (4/20)
- Final Presentation and Report (Project) (5/4)
- Final Team Assessment (Project) (5/11)

Some weeks lighter than others (plan accordingly)
Most assignments turned in through the wiki
Mix of design and project assignments

Policies

Late Assignments

- Most assignments will be due before class on the due date
- Design assignments will be due before class on Mondays
- Group assignments will not be accepted late
- Individual assignments lose 33% per day (weekends count)

Cheating (official)

- Will get you an **F** in the course
- More than once can get you dismissed from Cal
  http://www-inst.eecs.berkeley.edu/~cs160

Assessment

Goal of cs160 is to teach you to *design* and *evaluate* interfaces

- There is often **more than one good design**
- But, there are also **lots and lots of poor designs**
- Be critical of your own work (point out pros and cons)
- As in many design disciplines, grading will be qualitative

Specific assessment guidelines will be given in each assignment

Good **communication** expected in oral & written presentations

Groups **self-assess** participation

- Should monitor it throughout the project
- Meet with us as soon as problems emerge

Next Time

The Design Cycle and Brainstorming

- The Task-Centered Design Process. *Task-Centered User Interface Design.* Chap 1. Lewis & Rieman
- The Perfect Brainstorm. *The Art of Innovation.* Kelley
  Will need username/password for this one