CS160: User Interface Design, Prototyping and Evaluation

Prof: John Canny
GSI: Jingtao Wang
Some changes will be lost. Exit Video Player?
How do you cancel?
Hi! I am Clippy, your office assistant. Would you like some assistance today?

[Buttons: Yes, No]
The Game: X-TRACT PAPERCLIP
Microsoft Bob
Apple’s Cyberdog
We’re studying the science of UI design, not the art.
This course

Is about reliably building very good interactive systems.

This semester has a focus on serious games.

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.
Instructor: John Canny

Professor in EECS
Joined Berkeley in 1987

Work in HCI, Education, Health
Language learning games
Persuasive technologies
Mobile applications
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 – PC, phone or gamebox
- 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

HCl = design, prototyping, evaluation, & implementation of UIs
Why Study User Interfaces?

Major part of work for most commercial programs
  – Approximately 50%

You will work on software for a “market”
  – 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

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Is the pilot to blame?

What is Usability?

Intuitive
  – The design should seem natural

Ease of learning
  – Faster the second time and so on...

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

- Design
- Prototype
- Evaluate
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

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

UI builders
  – Interface Builder, Visual Studio, NetBeans
Evaluation

Test with real customers (participants)

Build models

Low-cost techniques
- expert evaluation
- walkthroughs

Higher cost
- Controlled usability study
Game Design

Same idea!
Game Design

- Conceptualization
- Brainstorming
- Focus groups
- Acting out

Prototype

Evaluate

Design
UI Design

Prototype
Design
Evaluate

Structured observation
Usability heuristics
Walkthroughs
Quantitative analysis
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
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
  – 3 or 4 students to a team
  – Work with students with different skills/interests

Cumulative
  – Apply several HCI methods to a single interface
Theme: Serious Games
Educational Games

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

Most of it is “game-like”
Fitness Games

Nintendo’s Wii provides gaming experiences with genuine fitness benefits.

Gamers burn significant calories playing Wii games, but usually much less than the real games.
Health Games

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

• 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

• **XNA**: Microsoft’s game platform for PC and Xbox.
  - Free development tools for Visual Studio 2005 (XNA Game Studio 2.0).
  - Good hardware support: PC and Xbox game consoles, Wii remotes.

• **Adobe Flash**: Not free, but
  - Runs on almost any platform (Flash Lite for phones)
  - Good for prototyping as well as developing.
  - Good outcomes in earlier offerings of CS160.
Suggested Hardware

- Hardware: easiest to stick with PCs, but you can explore...

  - Xbox
  - Wii remote
  - Flash Lite
  - Ugobe Pleo
Course Mechanics
TAs, Office Hours, Sections

Teaching Assistants
  – Jingtao Wang: EECS grad student

Office Hours
  – John Canny: M 2-3pm, Tu 3-4pm in 637 Soda Hall
  – Jingtao: Friday 12:00PM-1:00PM in 417 Soda Hall
  – Also by appointment

Sections
  – Friday 10-11AM, 11-12N, 405 Soda Hall
  – Will cover new material. You should attend!
  – 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://bid.berkeley.edu/cs160-fall08/
Create Wiki Account

Your 1st assignment (due before class W Sept 3)
Course Petition

Your 2nd assignment (due before class W Sept 3)

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 for waitlisted students
Readings

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

Most readings will be posted on wiki
  – Some require username/password:

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

Class participation (20%)
Individual assignments (20%)
Group project (40%)
Midterm (20%)
Policies

Late Assignments
- Most assignments will be due before class on the due date
- Group assignments will not be accepted late
- Individual assignments lose 20% per day

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](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


Will need username/password for this one