

# **CSI 60: User Interface Design, Prototyping and Evaluation**

Prof: John Canny  
GSI: Anuj Tewari

# Theme for this semester: Mobile apps



# Where does the UI begin and end?



# Does User Experience design matter?

There are 50,000+ apps in Apple's App Store. Many variants of the same idea.

How do you stand out?

People don't want to sit down and figure out how to use a mobile application. They want to do and not think.

We're studying the science of UI design, not the art.



# Top selling smartphones in Q1, 2009:

- 1.) RIM [BlackBerry Curve](#) (all 83XX models)
- 2.) Apple iPhone 3G (all models)
- 3.) RIM [BlackBerry Storm](#)
- 4.) RIM BlackBerry Pearl (all models, except the Flip)
- 5.) T-Mobile G1.

Moral: Capturing everyone's attention is an art.  
Capturing market share is still largely a science.

# This course

Is about the science of **Usability**.

It's also about the process of **user-centered design**.

This semester the focus is **mobile applications**.

The goal is not to build a working system, but an  
“interactive prototype.”

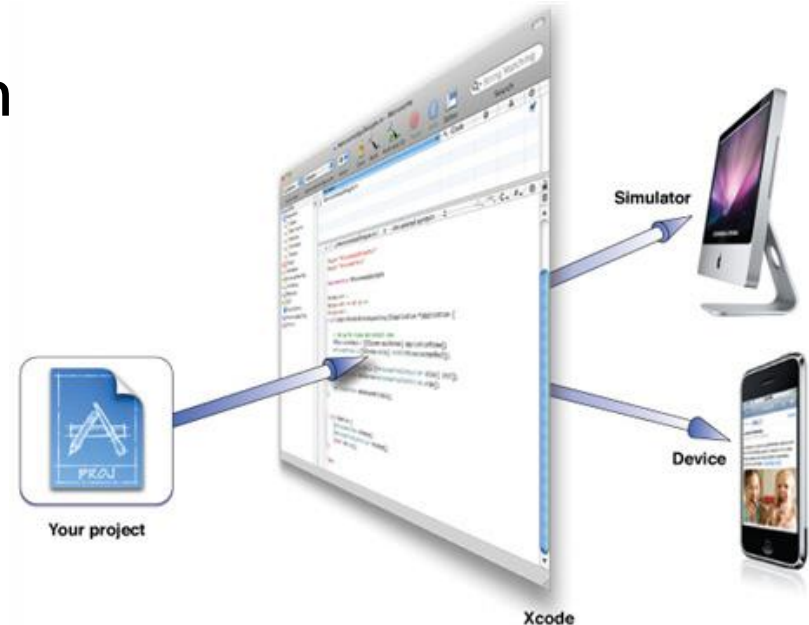
Emphasis is on rapid prototyping and user testing to  
avoid obvious and not-so-obvious mistakes.

# Preferred Platform: iPhone

Excellent set of development tools + style guides

State-of-the-art interaction

- Multitouch
- Accelerometer
- BT sensor API



Soft keyboard and UI



# Preferred Platform: iPhone

iPhone development requires an Intel-based Mac running OS-X. We encourage you to use your own machine.

Otherwise there is a new lab in 200 Sutardja-Dai Hall (The CITRIS building) with new Macs G5's with the iPhone SDK.

# Instructor: John Canny

## Professor in EECS

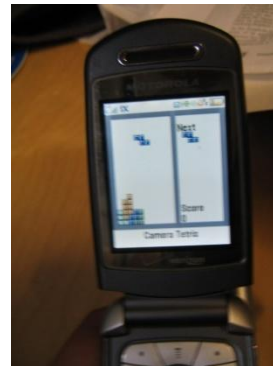
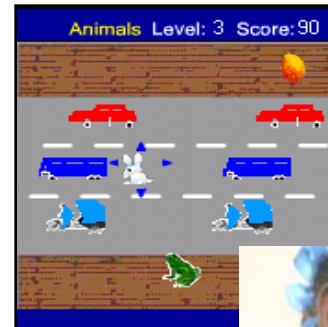
Joined Berkeley in 1987

## Work in HCI, Education, Health Tech

Language learning games

Persuasive technologies

Mobile applications



# Topics

- Course Overview
- Project Description
- Course Mechanics

# Course Overview

# User-Centered Design

Starts with a user, then their interaction, then backend logic.



# Why Study User Interfaces?

Major part of work for most commercial programs

- Approximately 50%

You will work on software for a market

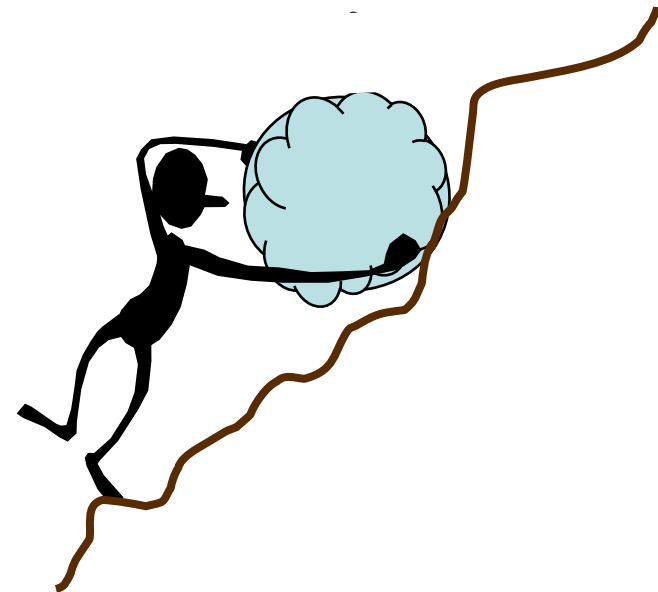
- Intended for people other than yourself

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

Is the pilot to blame?

[http://en.wikipedia.org/wiki/American\\_Airlines\\_Flight\\_965](http://en.wikipedia.org/wiki/American_Airlines_Flight_965)

# 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



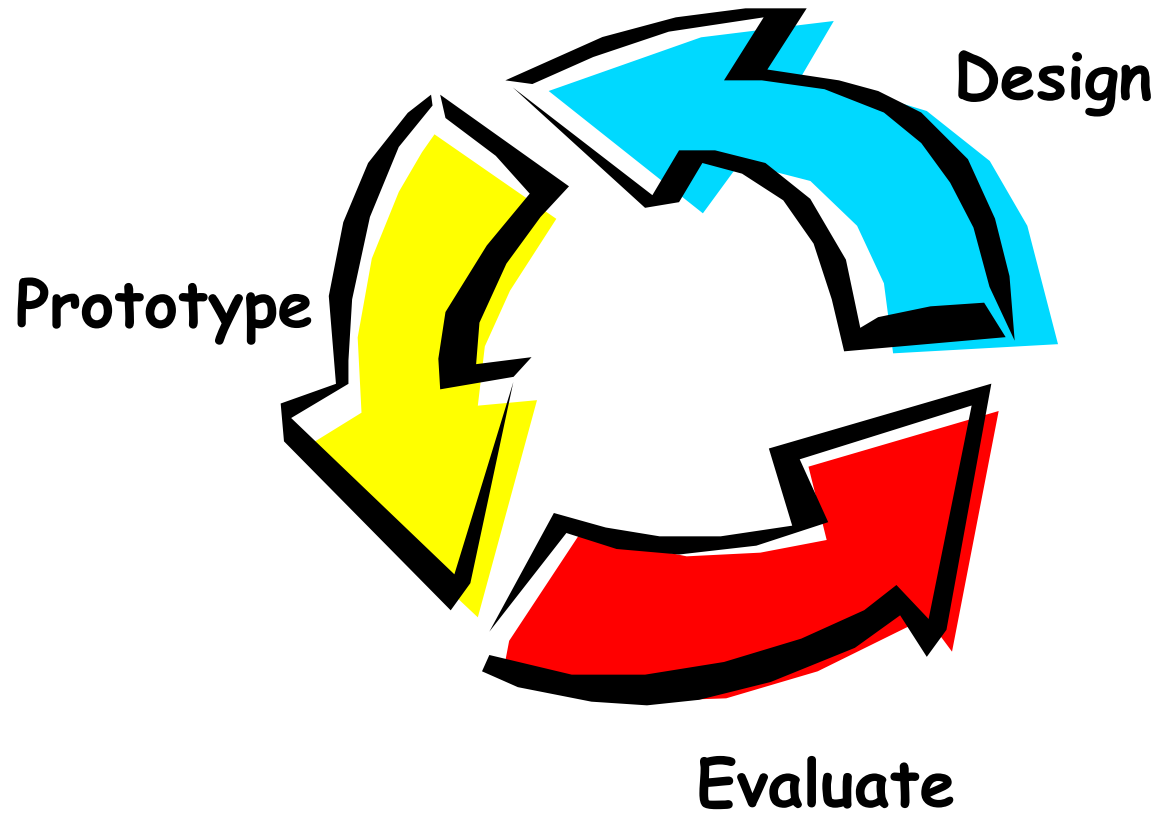
# Who Builds Interfaces?

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



# Building Successful Interfaces

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

Evaluation brings **real users** into the design loop.

Design stays **user-centered** throughout the process.

# Why not simulate the user?

People have certainly tried. Its useful in certain special cases, e.g. pointing and typing evaluation.

For most applications, people are far too complex to simulate. Behavior depends on just about every external factor.

Users are their own best simulation.  
In fact they are ground truth...

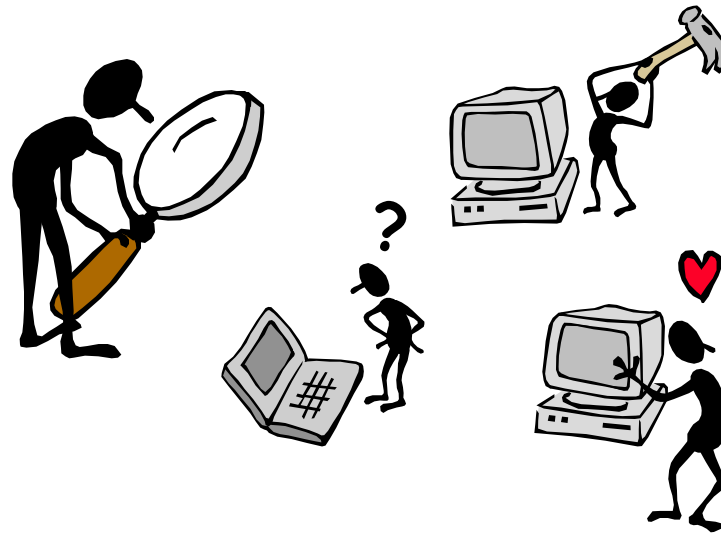


# Task Analysis & Contextual Inquiry

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

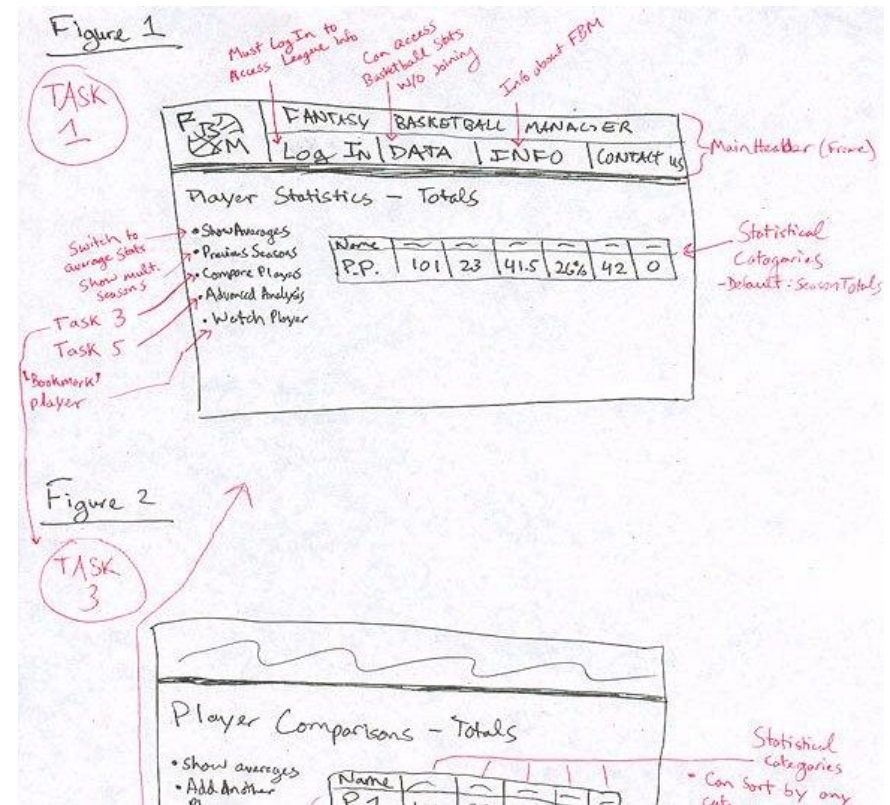
- Paper sketches
- Cut, copy, paste

Interactive prototyping tools

- HTML, Flash, Javascript, Visual Basic/C# etc.

UI builders

- Interface Builder, Visual Studio, NetBeans



Fantasy Basketball

# Evaluation

Test with real customers (participants)

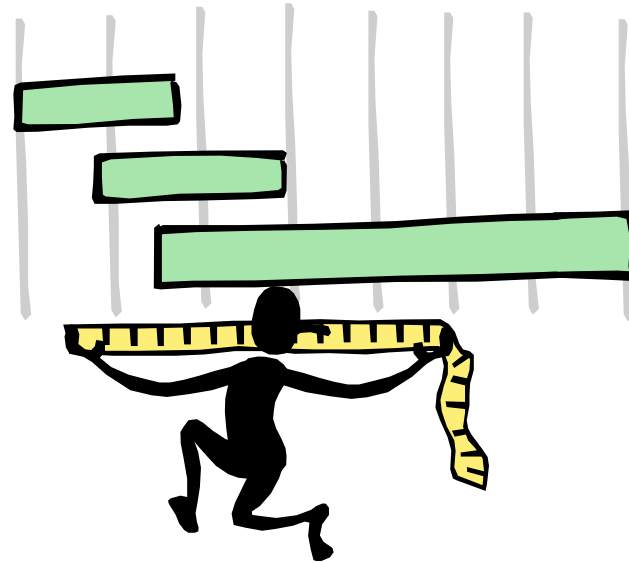
Build models

Low-cost techniques

- expert evaluation
- walkthroughs

Higher cost

- Controlled usability study



# 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



# CSI 60 and the CS Curriculum

Most courses for learning algorithms and technology

- Compilers, operating systems, databases, etc.

CSI60 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

# Outline

Good design involves many iterations – improvements based on user testing.

Coding is too slow for this purpose. Instead we use low-fidelity, paper prototypes.

Your first several project milestones will involve low-fi prototypes.

You don't need to write any code until well into the semester.

# Theme: Mobile Apps



# Successful Apps

Ports of familiar PC apps.



The image shows a promotional graphic for the Twitter for iPhone app. At the top, it says "twitter for iPhone" with a red "New" badge. Below that, it says "Get your Twit on." and "The most Twitter like experience you will find for your iPhone." It features logos for CNET.com, Apple, and Twitter. A central image shows an iPhone displaying the Twitter app interface. Text on the right side of the graphic includes "Follow your friends", "View Profiles", and "Add new friends from iPhone".



The image shows the top navigation bar of the Facebook mobile app. It features a blue header with the "facebook" logo. Navigation options include "Status", "Home", "Profile", "Friends", "Inbox", "News Feed", "Events", and "Requests (1)". A red notification badge with the number "1" is visible next to the "Inbox" option.

Alli Hsieh is singing the 20th century FOX song.

Jen Taillon added new photos.



Dana Hornbeak removed "piano" from her interests.

Dave McClure posted a video.

**Toronto Garage**

Download not available The user has chosen not to allow download of this file. If you need it badly, send a request on his/her slidespace.

facebook

Facebook presentation by meagan marks @ Toronto FB Dev Garage. Interesting stats & metrics info, worth checking out.

# Games

PC and non-PC ancestry



# Thinking outside the box

Usually engineers approach design problems with a familiar “frame” for the problem.

This can overly constrain the solution.

Its very useful during early design to reframe the problem – to think about it in an entirely different way.



# Thinking outside the box

Cell phones as cameras – Camera bag pro



# Thinking outside the box

Cell phones as motion sensors – RunKeeper



# Thinking outside the box

Cell phones as motion sensors - Greenmeter



# Thinking outside the box

Cell phones as barcode scanners - Redlaser



# Thinking outside the box

Cell phones as speech devices – Talking phrasebooks



# Thinking outside the box

Cell phones as audio instruments – Sonar Ruler



# **Course Mechanics**

# TAs, Office Hours, Sections

## Teaching Assistant

- Anuj Tewari: EECS grad student

## Office Hours

- John Canny: M 2-3pm, Tu 3-4pm in 637 Soda Hall
- Anuj: Friday 12:00PM-1:00PM in 544 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](mailto:cs160@imail.eecs.berkeley.edu)

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

# Class Wiki

The screenshot shows a Microsoft Internet Explorer browser window with the following details:

- Browser Title:** Main Page - CS 160 Fall 2008 - Microsoft Internet Explorer
- Address Bar:** [http://bid.berkeley.edu/cs160-fall08/index.php/Main\\_Page](http://bid.berkeley.edu/cs160-fall08/index.php/Main_Page)
- Page Content:**
  - Page Navigation:** page | discussion | view source | history
  - Header:** Main Page
  - Text:** Welcome to CS 160 Fall 2008: User Interface Design, Prototyping and Evaluation
  - Diagram:** A cycle of three boxes: Design (red), Prototyping (green), and Evaluation (purple). Arrows indicate a clockwise flow: Design to Prototyping, Prototyping to Evaluation, and Evaluation back to Design.
  - Footer:** Course Control Number: 26488
- Left Sidebar:**
  - User Interface Design, Prototyping & Evaluation CS160 Fall 2008**
  - site navigator:** Main Page, Class Schedule, Project Groups, Participants, Recommended Reading, Links of Interest, Recent changes, Help
  - search:** Search box with Go and Search buttons
  - toolbox:** What links here, Related changes, Upload file, Special pages
- Taskbar:** Windows Explorer, Main Page - CS 160 F..., Introduction3.ppt [C...], 8:59 PM

<http://bid.berkeley.edu/cs160-fall09/>

# Create Wiki Account

Your 1<sup>st</sup> assignment (due by this Friday)

Creating a New Account - Cs160-sp08 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://vis.berkeley.edu/courses/cs160-sp08/wiki/index.php/Creating\_a\_New\_Account

Google Search

Maneesh Agrawala my talk my preferences my watchlist my contributions log out

## User Interfaces

cs160 Spring 2008

navigation

- Main Page
- Community portal
- Current events
- Recent changes
- Random page
- Help
- Donations

search

Go Search

toolbox

- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link

## Creating a New Account

To participate in the discussion on this wiki you will need to create an account.

- Please use your full name as your user name.** Note that your username can contain a space between the first and last name.
- Include a valid email address when you create the account as shown in the example below.
- Follow [this link](#) to make your account.

Afterwards, please add some descriptive information about yourself on your personal page -- click your login name (next to the person icon) at the top of the page to access your personal page. Here is an example from [my page](#).

Example of creating an account. Make sure to use your full name as your user name as well as a valid email address.

### Log in / create account

#### Create account

Already have an account? [Log in](#).

Username:

Password:

Retype password:

E-mail \*:

Real name \*:

Remember me

\* E-mail (optional): Enables others to contact you through your user or user\_talk page without needing to reveal your identity.  
\* Real name (optional): if you choose to provide it this will be used for giving you attribution for your work.

# Course Petition

Your 2<sup>nd</sup> assignment (due by Friday)

Petition for Admission to CS160

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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](mailto: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/Final will include things only in readings

Most readings will be posted on wiki

- 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 (10%)**

**Individual assignments (20%)**

**Group project (40%)**

**Midterm (15%)**

**Final (15%)**

Score distribution is high with small variance. So every point counts! Make sure you turn in all the reading comments.

# 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

# 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