

dt+UX: DESIGN THINKING FOR USER EXPERIENCE DESIGN + PROTOTYPING + EVALUATION

CS 147 Introduction & Course Overview

Design Thinking for User Experience Design, Prototyping & Evaluation

Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2018
September 24, 2018

Hall of Fame or Shame?

weather.com

Hall of Shame!

weather.com

what is the "first read"?
videos
advertisements
not weather!

Hall of Fame or Shame?

bing.com/weather


Hall of Fame!

bing.com/weather

good!
less clutter
eye drawn to current weather
bad!
feels boring

Hall of Fame or Shame?

weather.yahoo.com




Hall of Fame!

weather.yahoo.com

good!
aesthetic
clean typography
& icons

bad!
image is 1st read

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Hall of Fame!

iOS yahoo weather

good!
aesthetic
clean typography & icons

image recedes to background w/ flick

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Who are We?

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James Landay

- Professor in Computer Science at Stanford
 - formerly professor at Cornell Tech, University of Washington & Berkeley
 - spent 3 years as Director of Intel Labs Seattle
- PhD in CS from Carnegie Mellon '96
- HCI w/ focus on ubiquitous computing, smart input/output (pens, speech), web design (tools, patterns, etc.) & human-centered AI
- Founded NetRaker, 1st in web experience management (sold to Keynote)
- Co-authored *The Design of Sites* with Doug van Duyne & Jason Hong
- Office Hours: TBD in 390 Gates
 - we will also monitor CS147 Piazza site (signup @ piazza.com/stanford/fall2018/cs147)
- Email: landay@[insert usual Stanford email domain]

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Yanyan Tong (Head CA)

- CS Undergrad @ UCSD, Stanford CS Masters
- Interested in education, organizational behavior, food, music, and fashion
- I love massage
- Office Hours
 - before & after studio on Thur
 - or by appointment
- **Thur 5:00 pm – 6:50 pm @ Gates 392**

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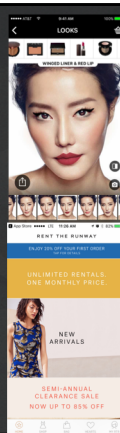
Shopping Reimagined

Online shopping has fundamentally changed how we buy things, but given that lots of services and goods could only be delivered in physical forms, there is still huge room for improvements. With mobile devices and new technologies like VR, AR, shopping could be a much more fun and integral experience by connecting the online and offline world. In this studio, we will explore new possibilities for shopping.

Examples

Sephora Virtual Artist, <https://sephoravirtualartist.com/>
Rent-the-runway, <https://www.renttherunway.com/>

Thur. 5:00-6:50 pm @ Gates 392



Cat Xu

- Symsys undergrad (HCI), CS Masters
- Interested in behavior design, affective computing, conversational interfaces
- I worked for a podcast (check it out - *Death, Sex, and Money*)
- Office Hours
 - 30 minutes before class on Mondays
 - by appointment
- Fri 12 :30 pm – 2 :20 pm @ TBD
- Fri 2 :30 pm – 4 :20 pm @ TBD

Transforming Living Spaces

Online Technology is changing the way we live, by transforming where we live. Today, smart home technologies (i.e., Alexa, Google Home, IoT) connect every element of our home, from the lightbulbs to the refrigerator to the sprinklers, and enable us to control everything from our phones. Apps like Mody use VR/AR to help us visualize how furniture will look in our living room. Delivery services like Amazon Prime bring goods right into the home. In this studio, you'll explore how today's up-and-coming technologies shape our living spaces, and envision what the home of the future will look like.

Fri 12:30 pm – 2:20 pm @ TBD
Fri 2:30 pm – 4:20 pm @ TBD



Minh-An Quinn

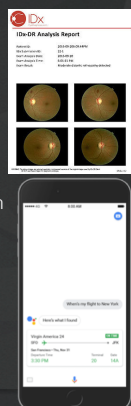
- CS Undergrad, CS Masters in AI & HCI
- Interested in AI, design, diversity in tech, travel, and painting
- When I was younger, I had a monkey as a pet
- Office Hours
 - 30 minutes after class on Mondays
 - by appointment
- Fri 10:30 am – 12 :20 pm @ TBD
- Fri 2:30 pm – 4:20 pm @ TBD

Augmented Humans

How can AI help you be more efficient? More creative? Make better decisions? With the rise in AI technologies, we see increased opportunities for using AI to assist in our everyday lives - from helping doctors diagnose eye diseases, to scheduling and booking meetings for you. In this studio, we will explore how we can use AI to build products that can augment human capabilities.

Examples: Google Assistant, Ada, Pandora, IDx-DR

Fri 10:30 am – 12:20 pm @ TBD
Fri 2:30 pm – 4:20 pm @ TBD



Carah Alexander

- CS Undergrad & CS Masters both with focuses in HCI
- Interested in UX and Edtech Research
- Did Taekwondo as a youth
- Office Hours
 - 30 minutes before class on Mondays
 - by appointment
- Fri 9:30 am – 11 :20 am @ TBD
- Fri 12:30 pm – 2:20 pm @ TBD

Democratizing Education

There are presently many institutional barriers in the systems we use to teach and learn. We teach to specific cultural, financial and social backgrounds and make assumptions about ability and learning style. How can we make the process of learning and teaching more accessible and engaging? This section is geared towards breaking down those barriers.

Examples: Duolingo, ModMath, Voice Dream Reader, English for Kids

Fri 9:30 am – 11:20 am @ TBD
Fri 12:30 pm – 2:20 pm @ TBD



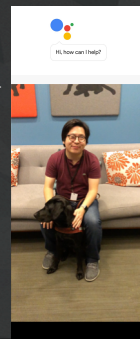
Chris Yoon

- Music & CS minor Undergrad, CS Masters (HCI)
- Interested in accessibility, design, musical theater!
- Office Hours
 - 30 minutes before class on Mondays, after section
 - by appointment
- Fri 9:30 am – 11:20 am @ TBD
- Fri 1:30 pm – 3:20 pm @ TBD

Voice Interaction

In 2007, the iPhone revolutionized touch screen interaction through the use of multi-touch. Now, voice assistants like Google Assistant, Alexa, Siri, and Cortana are paving the way for a future of multi-modal interactions that involve voice and other input/output modalities. However, they are siloed into a few niche use cases like timers, music streaming, and random fact inquiries. In this studio, we will explore ways to incorporate voice UIs into our daily productivity and/or lifestyle and redefine the paradigm of voice interaction.

Fri 9:30 am – 11:20 am @ TBD
Fri 1:30 pm – 3:20 pm @ TBD



Trijeet Mukhopadhyay

- BS / MS Computer Science – HCI
- Interested in interaction design, design theory and methodology, tools for creative expression, and computer music
- My name literally translates to "three wins" in Sanskrit (*Tri = three, jeet = win*), so at this stage of my life I've pretty much cashed in all my wins and everything is downhill from here
- Office Hours
 - 12-12:30 pm on Friday
 - by appointment
- Fri 12:30 pm – 2:20 pm @ TBD
- Fri 2:30 pm – 4:20 pm @ TBD

Arts and Culture

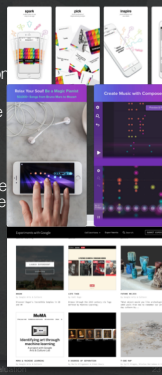
Creators, Curators, and Consumers

Art and culture are integral to a vibrant, diverse, and cooperative community. Appreciation and engagement with art and culture spurs personal growth through self-expression and response, and brings people together over common values and shared experiences. In this studio we will explore arts and culture from the lenses of the creator, curator, and consumer, across any media of your choice — literature, design, performance, music, journalism, visual arts, etc. Some questions to ponder upon: How can technology enable someone to execute on their creativity? How can we increase engagement with cultural centers such as museums? How can we leverage mobile technology and social networks to help one discover content which they resonate with?

Examples

Google Arts and Culture, Music Memos, Soundshare, Smule Music Piano and Qazrina, Brainsparkr, Dribbble.

Fri 12:30 pm – 2:20 pm @ TBD
Fri 2:30 pm – 4:20 pm @ TBD

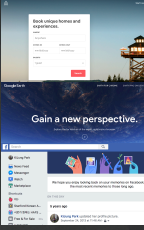


KiJung Park

- Product Design Undergrad, CS Masters (HCI)
- Interested in design thinking, UX, UI
- I was offered a job in the Korean CIA back in high school
- Office Hours
 - after class on Wednesdays
 - by appointment
- Fri 10:30 am – 12:20 pm @ TBD
- Fri 1:30 pm – 3:20 pm @ TBD

Travel

Travel takes us to new places — whether it's a time travel or spacial travel; whether it's a physical or emotional travel — travel always leaves us with inspirations that we can take with us. There are many mobile applications these days that assist us in traveling that almost no one travels without the help of technology. In this studio, we will explore various aspects of traveling and meet existing services that makes traveling better. How can we use technology to make traveling easier and fun for everyone and enhance the traveling experience?



Examples
Airbnb, Google Earth, Facebook Memories

Fri 10:30 am – 12:20 pm @ TBD
Fri 1:30 pm – 3:20 pm @ TBD

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Outline

- Who are we?
- AI & User experience design
- Balancing design thinking & technology
- Design discovery & exploring ideas
- Rapid prototyping & evaluation
- Goals of the course
- Course format & schedule
- Example projects
- Tidbits

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AI Needs User Experience (UX) Design



Tesla Model S "Autopilot"
Future of autonomous cars
How do we design the UX?



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AI Needs User Experience (UX) Design



"Alexa, turn on my TV."
"Alexa, what is the time now?"
"Alexa, play my Spotify."
"Alexa, turn on living room light."
"Alexa, what is the answer of 88 x 28?"

Amazon Echo & other Smart Speakers use Voice UI
How do we design them to deal with natural human conversation?
How do we design to support multimodal input? (e.g., + screen or vision)

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AI Needs User Experience (UX) Design




Computer vision-based skin cancer detection getting better and better

What is appropriate to show a patient?
What should be the interface for the doctor?

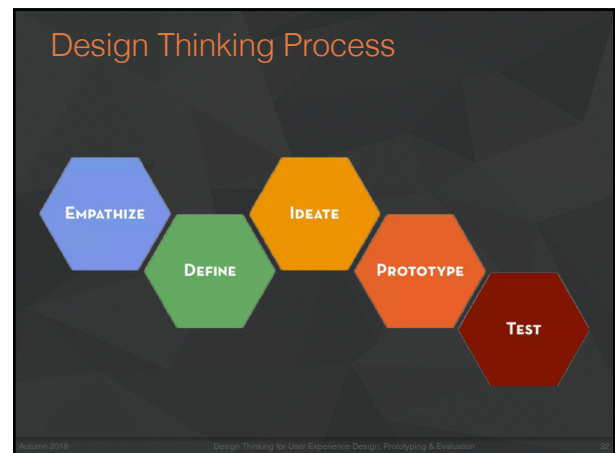
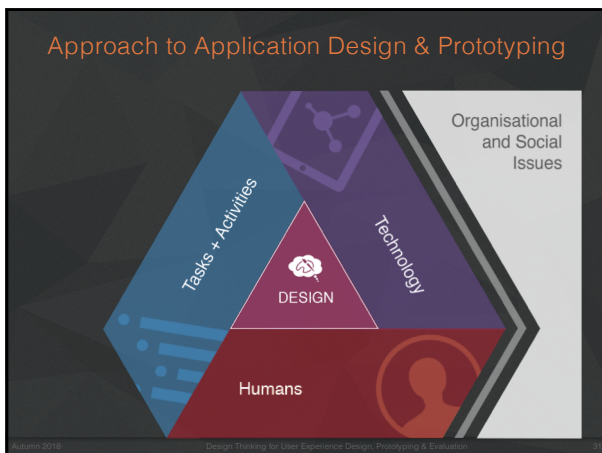
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BALANCE

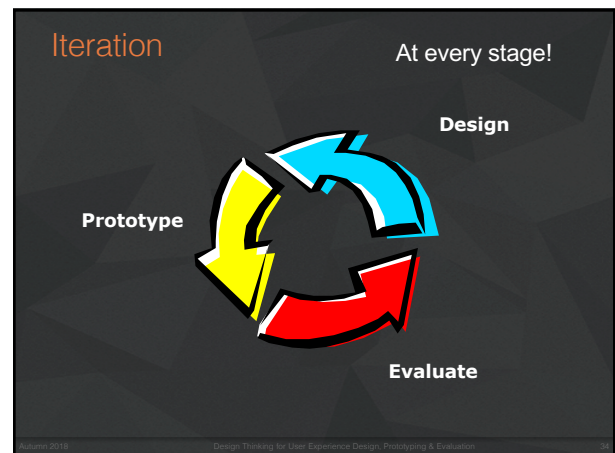
DESIGN TECHNOLOGY



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- ### How to Design and Build Good UIs
- Iterative development process
 - Usability goals
 - User-centered design
 - Design discovery
 - Rapid prototyping
 - Evaluation
 - *Programming*
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Usability(?)

According to the ISO:
The *effectiveness, efficiency, and satisfaction* with which specified users achieve specified *goals* in particular environments

This doesn't mean you have to create a "dry" design

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- ### Usability/User Experience Goals
- Set goals early & later use to measure progress
 - Goals often have tradeoffs, so prioritize
 - Example goals(?)
 - Learnable
 - faster the 2nd time & so on
 - Memorable
 - from session to session
 - Flexible
 - multiple ways to do tasks
 - Efficient
 - perform tasks quickly
 - Robust
 - minimal error rates
 - good feedback so user can recover
 - Discoverable
 - learn new features over time
 - Pleasing
 - high user satisfaction
 - Fun
-
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User-centered Design

"Know thy User"

- Cognitive abilities
 - perception
 - physical manipulation
 - memory
- Organizational / educational job abilities
- Keep users involved throughout
 - developers working with target customers
 - think of the world in users' terms

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37

Design Discovery

Needfinding & Task Analysis

- Observe existing practices for inspiration
- Make sure key questions answered
- Ethical questions in design w/ underserved communities



ChoreoLab observed/interviewed dancers in studios... and out in the streets ...

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38

Unpacking the Needfinding



ChoreoLab

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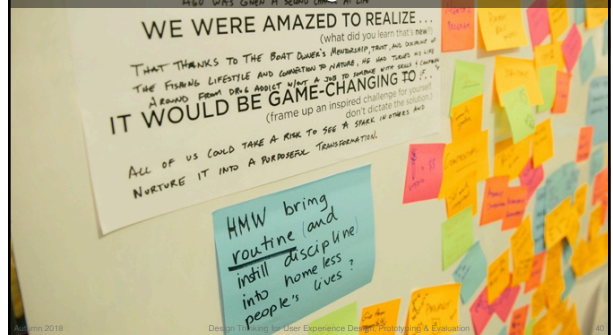
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39

Develop Point of Views

(Person + Insight + Challenge)

Brainstorm on How Might We Solve

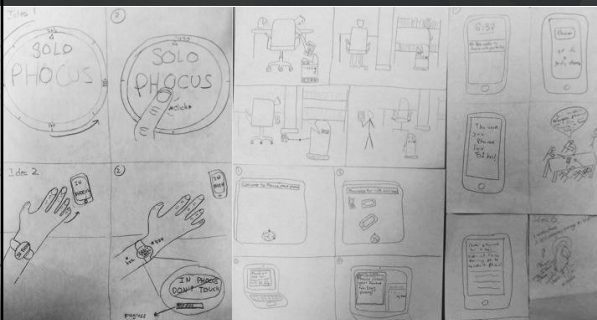


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40

Sketching & Storyboarding



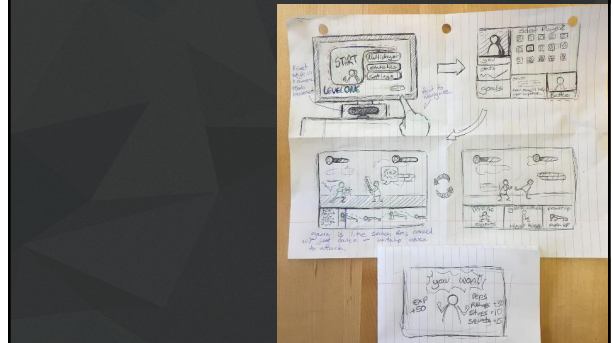
Phocus

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41

Sketching & Storyboarding



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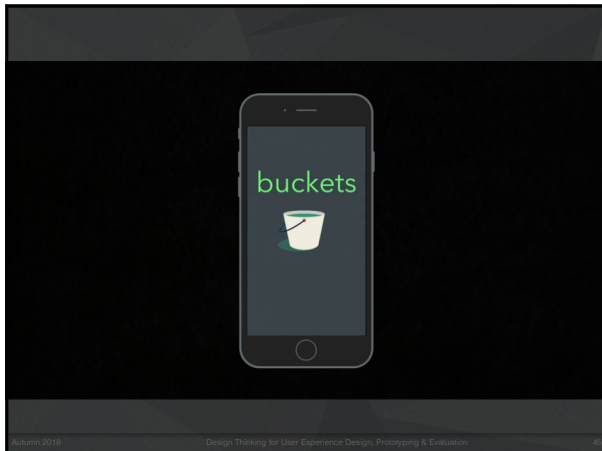
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42

Concept Videos

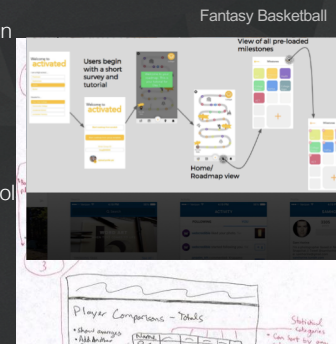
- Illustrate context of use rather than specific UI
- Quick & inexpensive
- Forces designers to consider details of how users will react to the design

Concept Videos: Planning Storyboards



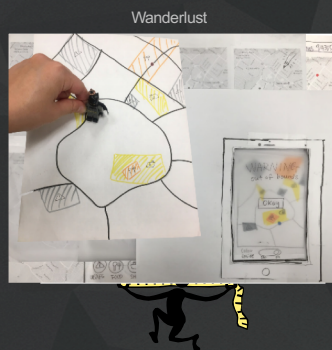
Rapid Prototyping

- Build a mock-up of design so you can test it
- Low fidelity techniques
 - paper sketches
 - cut, copy, paste
- Interactive prototyping tool
 - HTML, Balsamiq, Axure, proto.io, Sketch+Marvel, Modao, etc.
- UI builders
 - Expression Blend + Visual Studio, Xcode Interface Builder, etc.



Evaluation

- Test with real customers (participants)
 - w/ interactive prototype
 - low-fi with paper "computer"
- Low-cost techniques
 - expert evaluation
 - walkthroughs
 - online testing



Goals of the Course

- 1) Learn to design, prototype, & **evaluate** UIs
 - the **needs & tasks** of prospective customers
 - **cognitive/perceptual** constraints that affect design
 - technology & techniques used **to prototype** UIs
 - techniques for **evaluating** a user interface design
 - importance of **iterative design** for usability
 - how to work together on a **team** project
 - **communicate** your results to a group *key to your future success*
- 2) Understand where technology is **going** & what UIs of **the future** might be like

Course Format

- Interactive lectures → you speak!
- Each week
 - 2 lectures on techniques & background
 - reserved 20-30 minutes team meeting each lecture → you need to be here to work with your team
 - 1 studio hands-on activity or team presentation
- Quarter-long project
- Readings
- Course material will be online
 - slides, exercises, readings, schedule
 - no lecture video
- Have fun & participate!

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49

How dt+UX Fits into CS Curriculum

- Most courses for learning technology
 - compilers, operating systems, databases, etc.
- dt+UX concerned w/ *design & evaluation*
 - technology as a tool to evaluate via prototyping
 - skills will become very important upon graduation
 - complex systems, large teams

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50

Projects

- Each team will propose a UI-oriented project
 - fixing something you don't like or completely new idea
 - based on **team needfinding**
- Theme
 - each Friday studio has a theme
 - all projects mobile/wearable/off desktop
- Groups
 - 3-4 students to a group
 - work with students w/ different skills/interests
 - **CS students should have had 142/193p/193a or equivalent experience** (non-majors need not)
 - If not take CS47 (Tu/Thur 12-1:20pm), learn ReactNative, dual use project for CS47/147
 - groups meet **in class & studio** weekly
- Cumulative
 - apply several HCI methods to one interface

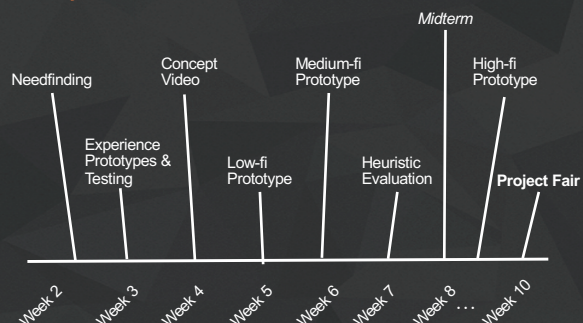


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51

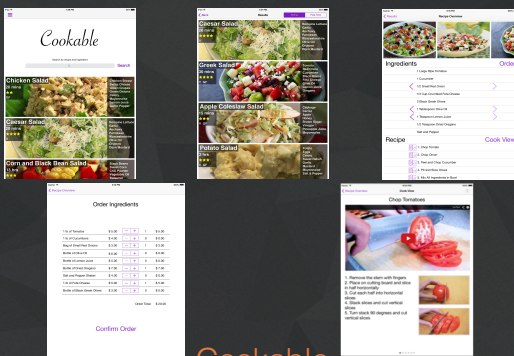
Project Process Timeline



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52

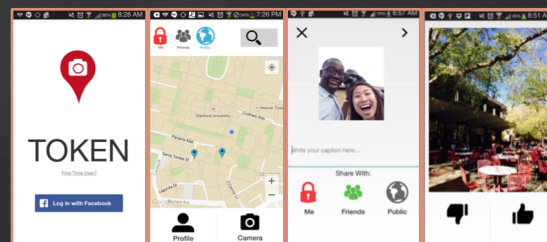


Cookable

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53

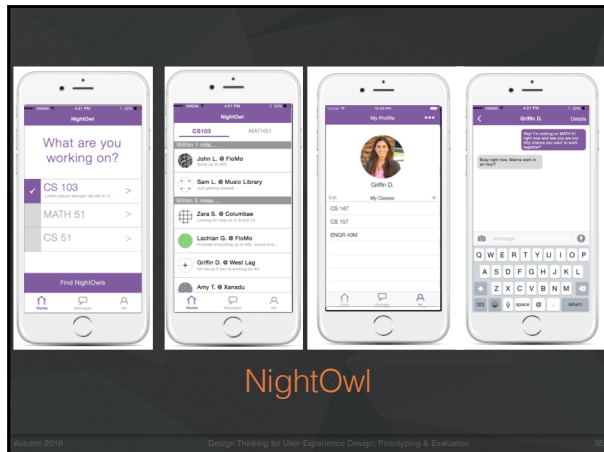


Token

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54



Books

- We will give you web links to all necessary readings/videos
- Recommended textbook (if you need one)
 - *Designing the User Interface: Strategies for Effective Human-Computer Interaction* by Shneiderman et. al, 6th edition (2016)

Assignments

- Individual
 - 1 presentation each
 - 1-2 written (handed in online)
 - **class & studio participation (graded)**
 - 4 pop in class quizzes (drop 1)
- Group
 - 10 assignments
 - 4-5 presentations with 3-4 write-ups + video + poster
 - all group work handed in online
 - team web site & online submission site

Grading

- A combination of
 - individual assignments & presentation (10%)
 - class/studio participation (10%)
 - midterm (20%)
 - group project (60%)
 - presentations/poster (group component)
 - project write-ups
- No final
 - must present at project fair on Fri., 12/7 instead (tentative date)

Tidbits

- Late Policy
 - no lates on group assignments
 - individual assignments lose one letter grade/day
- Course web site
 - <http://hci.stanford.edu/courses/cs147/2018/au/>
- Studio preferences & team signups
 - <http://bit.ly/cs147-18au-studios>
 - due Wed at 5 PM

Summary

- UX design is an important part of most of today's software
- Getting the interface right is hard, but...
- Solution in *Iterative Design* including repeated cycles of
 - Design
 - Prototyping
 - Evaluation

Next Time

- Design Discovery
- Read
 - Tom Kelley, The Perfect Brainstorm,
Excerpt from The Art of Innovation (pw: hcid)
 - Holtzblatt & Beyer, Ch. 3 from Contextual Design