Welcome to Bootcamp!

Surviving bootcamp

... and learning to be an interaction designer

- Don't argue — stop talking and do it!
- Work fast — sketch ideas, avoid perfection
- At least three alternatives, no more than 5
- Create, reflect and reuse design artifacts
- Take the user's perspective — not the technology's
- Focus on the interaction!
Learning to observe interaction

To play the violin
first learn to hear the music

To paint a portrait
first learn to see a face

To design interactive systems
first learn to observe interaction

<table>
<thead>
<tr>
<th>HCI Bootcamp Schedule</th>
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<tbody>
<tr>
<td><strong>Room EE004</strong></td>
</tr>
<tr>
<td><strong>Monday</strong></td>
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<tr>
<td>Interv. users</td>
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<tr>
<td>29 Oct 9h-17h</td>
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<tr>
<td>Final presentation</td>
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<tr>
<td>5 Nov</td>
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HCI Bootcamp: one intense week!!

Lectures (in class)
Some fundamentals & principles
Complete design process

Design activities (in class or at home)
Individual, pair, and group
Each exercise builds upon previous results

Project (in class and at home)
Groups of 4
Goal: produce a grounded video prototype
HCl Bootcamp project

Create a video prototype of a redesigned interactive map that meets the needs of real users in a real setting.

Work in groups of four.

Attendance is critical!

Grades

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>40%</td>
</tr>
<tr>
<td>Individual interviews</td>
<td></td>
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<tr>
<td>Group interviews, introspection</td>
<td></td>
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<tr>
<td>Group class &amp; homework exercises</td>
<td></td>
</tr>
<tr>
<td>Video prototype #1</td>
<td>15%</td>
</tr>
<tr>
<td>Final presentation</td>
<td></td>
</tr>
<tr>
<td>Video prototype #2</td>
<td>45%</td>
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</tbody>
</table>

Two Story interviews due: today

Individual activity:
- Interview (at least) two people
  using critical object technique
  to generate (at least) two detailed, real stories

You should all have initial feedback.
You may revise them for credit.

Video prototype #1 due: Wednesday, 31 Oct

Use your interviews, web search, brainstorming, design exercises to create a complete design.

Be able to explain:
- Who is the user?
- What is the design concept?
- Which design resources did you use?
- How is it used?

Turn in:
- Storyboard
- Video prototype (5-7 minutes)
<table>
<thead>
<tr>
<th>Video prototype #2</th>
<th>due: Friday, 2 Nov</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete redesign of video prototype #1</td>
<td></td>
</tr>
<tr>
<td>Revise the design to address breakdowns</td>
<td></td>
</tr>
<tr>
<td>new interaction points</td>
<td></td>
</tr>
<tr>
<td>new design feature(s)</td>
<td></td>
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<tr>
<td>CAREFUL:</td>
<td></td>
</tr>
<tr>
<td>Must show improvement from video prototype #1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Final presentation</th>
<th>due: Monday, 5 Nov</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group presentation</td>
<td>15 minutes</td>
</tr>
<tr>
<td>design problem</td>
<td></td>
</tr>
<tr>
<td>user profile</td>
<td></td>
</tr>
<tr>
<td>design alternatives</td>
<td></td>
</tr>
<tr>
<td>final design</td>
<td></td>
</tr>
<tr>
<td>video prototype</td>
<td>(maximum 5 minutes)</td>
</tr>
<tr>
<td>justification</td>
<td>(include improvements)</td>
</tr>
<tr>
<td>Class discussion</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Every group asks at least one question</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Hand in:</th>
<th>due: Monday, 5 Nov</th>
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</thead>
<tbody>
<tr>
<td>Folders with unused materials</td>
<td></td>
</tr>
<tr>
<td>Ipads</td>
<td></td>
</tr>
<tr>
<td>Revised storyboard</td>
<td>#2</td>
</tr>
<tr>
<td>Video prototype (5-7 minutes)</td>
<td></td>
</tr>
<tr>
<td>Presentation slides</td>
<td></td>
</tr>
<tr>
<td>Course evaluations (anonymous)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User-oriented thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good interaction design requires taking the user's perspective</td>
</tr>
<tr>
<td>Who is the user?</td>
</tr>
<tr>
<td>What do they want to do?</td>
</tr>
<tr>
<td>What is the current context?</td>
</tr>
<tr>
<td>What about “designing the user experience”?</td>
</tr>
<tr>
<td>You can control part, but never all, of the user’s experience</td>
</tr>
</tbody>
</table>
Discovery

Who is the user?

Invention

What is possible?
Design
What should it be?
Evaluation

Does it work?

Researcher

Subject 1

Text Editor

interactive design platform

run platform

runable

script

sample
data log

experiment summary

analysis scripts

table

log

cinematic
data

analysis platform

jmp

R

scripts

techniques

corpuses

measures

criteria
Redesign
How to improve it?

There’s method in this madness …

Though this be madness
Yet there is method in it …

Hamlet, by William Shakespeare

Generative Design
Discovery
Who is the user?

Invention
What is possible?
Generative Design

Discovery
Who is the user?
Invention
What is possible?
Design
What should it be?
Evaluation
Does it work?

Each phase contributes to the other phases:

- The process is iterative
- Jump from any phase to any other phase as needed

Four interconnected phases

Generate new ideas
Design the system
Understand the user
Evaluate the system

Generative Design

Each phase includes:
Collecting or sampling information
Analyzing information
Generating design resources

Who is the user?
Design alternatives
design
tech possibilities
design space
design brief
design
interpret
design possibilities
profile
user insights
implications for design
user profile
Who is the user?
Design
design
alternative
design
interpret
implications for design
user profile
user insights

Who is the user?
Design
design
design
design
interpret
implications for design
user profile
user insights
implications for design
user profile
user insights
Design Brief 

Redesign Google Maps or other map app

Find examples of real user needs
when using a map app on a phone

Create a new design that addresses a real problem
and illustrate with a video prototype

Redesign the app using principles of instrumental interaction

---

Design brief

Find a real group of users
with a real-world problem* to solve

Listen to their stories
  What went wrong? What worked well?
  What surprised you?

Design a technology innovation to
help these users in a particular setting

Start with a specific audience
You can generalize later

* including things like having fun
Where do we start?

Could be anywhere …
but it is best to start by finding out about the user

Gather user data

Reminder: How to ask questions

The form of the question provides the form of the response (habitable sub-languages)

If you want specific, real answers, you must ask the questions correctly

If not, you will get vague general answers that provide little help with design

Careful! We are not conducting marketing surveys
Our goal is to better understand users to design a better system
Take advantage of human memory

Long-term memory is organized into two major categories:
- declarative
- non-declarative

Declarative memory involves:
- semantic memory including facts & figures
- episodic memory including events, times

Non-declarative memory involves:
- procedural memory including skills & habits
- emotional responses can be primed

What does the interview give you?
- Descriptions
- What does this technology look like?
- Explanations
- How does this technology work?
- Stories
- How did that user use that technology that time?
- Data
- How many times did they use the technology?

Types of Interviews

- **Story interviews**  
  Best for design
  Elicit real stories that include: user context, breakdowns, work arounds and user innovations

- **Tutorial interviews**  
  Lacks breakdowns
  Describe how it is supposed to work, not how it actually works

- **Opinion interview**  
  Lacks detail
  Highlights ‘pain points’, not very useful for design

How to ask questions

- Careful!
  To design better systems, you must understand how users interact with technology in real-world situations

- Good design interviews result in:
  - concrete, specific stories
  - NOT opinions (market surveys)
  - NOT tutorials (how it is supposed to work)

  Preserve context, identify breakdowns & patterns over time
Choose questions that support design

Question order matters!!!
First specific then general
First concrete then abstract
First directed then open-ended
First facts then opinions

Story Interviews

Goal: Get a detailed story of interaction

Question types:
- Critical object: Describe how you made this
- Critical incident: Negative memorable event
- Flashbulb memory: Positive memorable
- Bright spot: Very recent event

Use as much context as you can to help people remember

Example: Asking questions about email

Bad question:
- How do you manage your email?
- Why?

Better question:
- Critical object: What specific object did you use to manage your email?
- Critical incident: What memorable negative event?
- Flashbulb memory: What positive memorable event?
- Bright spot: What recent event?
- Recent event: Very recent event?

Why?
- Leads to general statements and opinions
- Does not ask for a story
Example: Asking questions about email

**Good question:**
Tell me about the last time you looked for a particular message.

Probe for more context:
- Why did you need it?
- Why couldn't you find it?

Probe for more detail about the interaction:
- What did you do first?
- How did the system respond?
- Was that OK?
- What did you do next?
... 

Story interview question types

**Critical Incident question:**
Did you try to find a specific email in the past few days?
Can you walk through exactly what you did to find it, step by step?

**Critical object question:**
Do you have a draft message you have not sent?
If it is not confidential, can you describe the steps you went through to write it and why it was not sent?

**Recent event:**
Did you read mail this morning? (If yes …)
Can you describe the process you went through?

Choose questions that support design

**Question order matters!!!**
- First specific then general
- First concrete then abstract
- First directed then open-ended
- First facts then opinions

**Questionnaire questions**

Specific, directed

1. How many messages did you receive today? (count)
2. How many times did you read your mail yesterday?
3. Did you read every message?
4. How many messages did you delete without reading?
5. Is this a typical day? If not, why not?
Marketing Survey questions

General, directed
1. What do you think of this email system?
2. Which preference settings do you use?
3. When do you prefer to use:
   email, telephone, face-to-face meetings?
4. How does this system compare to other systems?

Focus group questions

General, open
1. Describe how you use your email.
2. Describe how you classify your messages.
3. When do you prefer to use:
   email, telephone, face-to-face meetings?
4. Has the Information Lens changed how you communicate
   with your colleagues?

Choose questions that support design

- Question order matters!!!
- First specific then general
- First concrete then abstract
- First directed then open-ended
- First facts then opinions

Remember

- The form of the question provides the form of the response
  - If you want specific, detailed answers, ALWAYS start with a SPECIFIC, RECENT question
  - NEVER START WITH A GENERAL QUESTION
  - Avoid yes/no questions or short answers
  - PROBE for details: What happened next
  - Get them to TELL YOU THE STORY
Red flags:
If you hear these, change the interview!

Usually …
Sometimes …
Normally …
When I do this, …

YOU NEED TO SAVE THE INTERVIEW!!

Probe for a specific story,
NOT how they usually do things

Important!!

Good interviews that find real, surprising stories will
- make this course interesting and fun
- produce innovative ideas
- help you really learn and understand these techniques

Poor interviews that result in explanations will
- make this course frustrating
- producing boring, useless ideas
- not teach you much

THIS IS THE MOST IMPORTANT PART OF THE CLASS!!

Interaction points

Miniature storyboards that describe interaction
between the user and the system

Title: What does the user want to accomplish?

Sketches and descriptions
- What did the user do?
- How did the system react?
- How did the user react?

Focus on surprises:
- breakdowns, workarounds, user innovations
Interaction Points: Summarize interviews

Create Interaction Points

Title: Summarize what happened

Identify the sequence of events:
- User acts – System reacts – User reacts
- System acts – User reacts – System reacts

For each segment:
- Sketch what happened
- Describe what happened

Discovery
Who is the user?
Peer Introspection

The designer tries the system
What works, what does not?
You can do this systematically:
Begin with a clearly defined, real task
Set aside a limited amount of time
Make sure that you are not interrupted
Begin the task
Record while you talk aloud or take notes
Analyze what you did:
Positive and negative aspects
Surprises
Ideas for making it better

Introspection is very, very common
but is the technique most susceptible to errors

This is a design method
but NOT a scientific research method

If you use introspection as part of a design process:
follow a protocol
do not forget that your opinions and experiences
are rarely the same as those of other users
seek insights and inspiration, rather than “truth”
Analysis

Analyzing user data

| Gather together: | Specific examples and anecdotes
Include typical and unusual events
Look for surprises, breakdowns and user innovations |
|-----------------|------------------------------------------------|
| Summarize:      | In a table, spreadsheet or video
Qualitative: organize around themes
Quantitative: count instances |
| Interpret:      | Identify the key problems, needs and opportunities for design
List requirements and critical points |

Creating design resources

Once you have gathered information about users, you must analyze it:
Thematic Analysis

and create design artifacts:
User profile
Persona
Extreme character
Use scenario

To help you to choose and refine your design concept

Breakdown analysis
Thematic Analysis

Based on ‘Grounded theory’: Qualitative data analysis technique
Emphasizes external validity (based on reality)

Coding
- Identify the key points from the interviews
  and give each one a code
Concepts
- Group codes with similar content
Categories
- Create broad groups of similar concepts
to generate a theory
Theory
- Create explanations and testable hypotheses

We are primarily interested in steps one and two (in blue) because our goal is to identify real-world opportunities for design.

Breakdown Analysis

Focus on identifying user problems and challenges
includes workarounds, that work and that do not work

Go through your data (interviews, interaction points)
Describe breakdowns in a phrase
Group them by category

Exercise: Breakdown Analysis

Roles:
- Moderator
- Scribe
Resources:
- Interviews
- Questionnaires
- Design Brief
- Observation
Procedure:
- Reread the interviews and interaction points
- Identify breakdowns: incidents where
  users need a better solution
- Organize them into categories
- Give each category a code name

Tips

Focus on user problems, not technologies
- Not “no signal”
- But “too many steps to get to goal”
- Not “missing information”
- But “mismatch between user’s vocabulary
  and system vocabulary”

Use your own experiences and observations as well as the interviews
User Profile

User profile

Factual description of the needs and characteristics of the target group of users

Top-down analysis of the user population:
- Who is the audience for the system you are designing?
- What did you discover from your studies of users?
- What are the key problems to solve?
  (Consider surprises, breakdowns and user innovations)
- What are the user’s most important, relevant characteristics?
  Use the thematic analysis categories you identified
- Which of the users needs will you address?
  Forms the basis for the design your system

Exercise: User Profile

Roles: Moderator Scribe

Resources: Interviews Design Brief

Thematic analysis categories

Procedure: Describe the characteristics of these users
- Age? Profession? Gender? Country?
- Specific problem they face
- Consider how they solve the problem now and how they address it

Personas & Extreme Characters
Persona

Personal details:
- Name, age, gender
- Physical description
- Occupation, relevant activities
- Representative or Extreme user?

Personality:
- Describe the person with design-relevant details
  - Likes, dislikes?
  - Capabilities, weaknesses?
  - Unusual characteristics?

Activities:
- Typical, breakdowns, user innovations
- Identify the relationship with real users interviewed or observed.

Extreme character

Identify people who are extreme along one or more dimensions:
- Normal hands
- Arthritic hands
- Takes vitamins
- Cancer patient
- Exercises regularly
- Athlete
- Adult
- Child

It is useful to brainstorm ideas about what it means to be extreme in the context for which you are designing, even if you do not end up using such extreme characters.

Exercise: Persona / Extreme character

Roles:
- Moderator
- Scribe

Resources:
- Interview
- User Profile

Procedure:
- Create two personas
- Create one extreme character

For each:
- Name
- Personal characteristics
- Situation

Creating design resources

Goal: Ground the system design in real-world use

1. User profile
   - Description of the needs and characteristics of users

2. Persona or extreme character
   - A specific, imaginary person who represents a member of the user population. Normally, personas represent typical users. However, it is sometimes useful to create extreme characters to help you push the limits of the design.

3. Use Scenario
   - A realistic description of a series of events and activities of one or more users (personas) in a real-world setting. Scenarios provide a composite view of the most important or relevant actions identified in interviews and observation.
Use Scenario

Goal: Create a realistic description of the user in context emphasizing opportunities for design

Procedure
- Identify specific interaction points from multiple users based on your interviews, introspection, observations, etc.
- Include: normal and unusual situations, planned and unplanned activities, effective and problematic incidents
- Choose a specific day, setting and hypothetical, realistic user
- Tell a story, step-by-step of what the user does
  - include relevant detail in a series of interaction points
  - Ideally, go over the scenario with at least two users

Writing a use scenario

- Design resource:
  - Data you have collected about users
- Raw data you gather yourself:
  - Observation of people in real-world situations
  - Interview stories about actual user experiences
  - Introspection stories (if applicable)
- Data from other sources:
  - Research literature
  - Analysis of user characteristics and needs
  - Design brief / design requirements
  - Personas and extreme characters

Use scenario: What happens now

- Like a tiny, branching one-act play, sub-divided into one-paragraph micro scenes that describe a series of ‘interaction points’
- Create one or more personas (characters), each with:
  - name, age, gender, motivation
  - usually with a profession, expertise
  - usually with a goal or motivation
- Create one or more realistic setting(s):
  - date, time, place, context
- Assemble the interaction points into a coherent story, a series of events over a period of time
Exercise: Use Scenario

Resources:
- Breakdown analysis categories
- Personas
- Interaction points

Procedure:
- Choose relevant personas
- Choose category
- Identify a series of ‘interaction points’ to make one coherent story
- Animate the personas to show how they currently address the problem

All three personas must fit into one story

Generative Design

Discovery: Who is the user?

Invention: What is possible?

Design: What should it be?

Evaluation: Does it work?

Goal: Create a Design Concept

- Base your design concept on the user profile, grounded in your interviews
- “Animate” your personas to walk through the use scenario
- Create a design scenario choose your favorite video brainstormed ideas
- Illustrate what happens at each interaction point
- Create a sequence of events in the storyboard

Friday:
- Shoot a video prototype to illustrate the concept in context
Invention
What is possible?

How do you find the design concept?
- Based on your studies of users, choose a problem to solve specific to your audience.
- Generate a variety of ideas that offer potential solutions.
- Create a design space to embody the set of alternatives.
- Choose a concept to explore not just functionality, but also interaction.

Invention
Standard Brainstorming

Generate new ideas
- Brainstorming: Imagine different situations in which users might interact with technology in a new way that meets a need or helps them do something new.
- Focus on interaction in context not just a list of functions.
## Standard brainstorming rules

**Phase I**
- Generate the **maximum quantity** of ideas
- Everyone participates
- Record every idea
- … and everyone contributes at least one stupid idea

**Phase II**
- Reread all the ideas
- Everyone has three votes: mark your favorite ideas
- Rank the ideas according to the number of votes
- Discuss these ideas with respect to your design concept
- Don’t forget weird or unusual ideas

## Brainstorming

**Do not:**
- Discuss ideas
- Criticize ideas
- Argue why an idea is good/bad
- Ignore each other’s ideas
- Shift topics
- Jump to abstractions
- Get stuck

**Instead:**
- Just state each idea
- Just ask a question to clarify
- Move to the next idea
- Use them to create new ones
- Stick to the key topic
- Keep it specific
- Think orthogonally

## Opposites Technique

If you get stuck, push existing ideas in new directions

**Opposites:**
- simple - complex
- short - long
- direct - indirect
- good - bad
- text - graphic - haptic
- funny - serious
- process - objet
- start - end
- single - sequence

## Exercise: Standard brainstorming

Each group:
- **Moderator:** Ensures that everyone participates
  - Stops discussions and critiques,
  - Keeps the time
- **Scribe:** Writes every idea
  - Reads the ideas at the end

Remember:
- Generate the **maximum number** of ideas
  - without evaluating them
- Quantity is more important than quality
- Everyone must participate
- Everyone has to give at least one ‘stupid’ idea
Invention

Video Brainstorming

How to express interaction?

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>explain an idea in words</td>
<td>(Standard brainstorming)</td>
</tr>
<tr>
<td>Sketch</td>
<td>draw to illustrate an idea</td>
<td>(Standard brainstorming)</td>
</tr>
<tr>
<td>Mockups</td>
<td>interact with paper prototypes</td>
<td>(Rapid prototyping)</td>
</tr>
<tr>
<td>Theater</td>
<td>Act out the idea</td>
<td>(Rehearse brainstorming)</td>
</tr>
<tr>
<td>Video</td>
<td>Capture interaction details</td>
<td>(Video brainstorming)</td>
</tr>
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</table>

Video brainstorming

Goal: Capture the interaction between the user and the system being designed

For each idea:
- Choose a director who has complete control over:
  - Describing and illustrating the idea
  - Recording the idea
  - Assigning roles
- Scribe: fills out video title card and idea list, keeps materials
- Camera person: videos the title card and the action
- Makers: create the paper prototype
- Actors (talent): perform the interaction, record voice-overs

Exercise: Video brainstorming

Goals:
- Capture as many ideas as possible
- Illustrate the interaction: show the user's experience
- Explore a theme and variations
- Only one director per idea
- Do not waste time arguing, the director decides
- If you disagree, be the director for take 2
- Each idea is short:
  - NOT scenarios
- Use post-its, transparencies …
In other words,
Shut up and start shooting!

Homework exercise: Web search

Each person:
Find 10 examples of existing technologies that are relevant to your design problem

Look for alternatives:
Which technologies?
Which interaction techniques?
Which metaphors?
Which use settings?

Bring to class Tuesday morning