Learning Objectives
- what interaction design is
- design methods and skills
- sketching techniques
- scenarios and storyboarding
- wireframing and prototyping
- thinking critically about design solutions

Lectures: Mondays, 8:30am-11:30am
Location: NQ 2245
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Office Hours: Tuesdays 9 to 11 or by appointment
Office Location: North Quad 4364
Website: http://tinyurl.com/si582-fall13-1

Summary
In this course, students will learn methods and skills involved in designing and prototyping interactive systems. The course covers the design process from the initial formulation of a design problem to creation of digital prototypes. The class structure is a mix of classroom design activities, lectures, and design critiques of student work by peers and instructor.

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Materials
No textbook is required for this class. Course readings will be posted as PDFs on the course website. Each week, you should bring to class a sketchbook and a dark pen, pencil, or other sketching tool(s) of your choice (e.g., an iPad or another tablet).

In-class Group Project
You will participate in an in-class group project. The purpose of the group project is twofold: first, it will give you an opportunity to practice skills we learn in class, so you can get some experience with them before you need to apply them to your individual projects. Second, it gives you a chance to work on a
second project during the semester, providing you with additional material for your portfolio.

Groups assignments for your in-class group project and your individual project peer critique group are posted in the Resources section of Ctools.

In-class group project topic: Music in the cloud

Music plays a large part in the lives of young people: we use it to define our peer groups, we share it as a form of bonding, we curate it in the form of personal music collections, playlists, mix CDs and the like. Increasingly, our access to digital music is becoming effectively unlimited through online/cloud-based services. While these services enable people to hear any song or album that they think of, the sheer volume of the material they contain, as well as their current designs, make a lot of the activities that people did with music previously, from curation to sharing to discovering new music, more difficult or impossible to do.

For your group project, select one thing that you would like to be able to do with music but which is currently poorly supported by streaming music services. Define what this activity is, why it is important, and why it is currently not adequately supported. Then, design a better way that that activity could work.

To ground your group project within a specific realistic set of constraints, pick an online music service of your choice with a public API as a concrete design context. Design your solution to be an extension to that service, for instance a Spotify-based app. To see what is currently possible, feel free to look at the services’ APIs (a brief list is below). However, don’t feel like you need to be completely limited by the current development resources these services offer. You should try to design a system that fits well with the service of your choice, but if to do so you need to assume you would have access to some information that the service’s API currently doesn’t provide, you can just imagine that the access will be available in the future.

Sample APIs:
- http://developer.rdio.com/
- http://www.last.fm/api

The purpose of the in-class group project is not necessarily to generate a perfect or polished end-result, but rather to continually practice the design techniques and topics we will be covering throughout the term. Learning by doing is more effective than through passive listening. To encourage you in this, your participation grade will be determined in part by your consistent and ongoing engagement with your in-class group project.

At the end of each class when we are doing group work, please submit your work from that day (paper, a link to a Google doc, etc.) with a list of all group members who were there and worked on the project that day. These artifact will serve as a base for your participation grade.

Individual Project

The centerpiece of this course is a design project that you will develop, over the course of the semester, from the conception of the problem you want to solve, through design research and ideation, to the stage of a digital prototype. Along the way, you will create a number of artifacts that represent different stages of the design process (sketches, personas, low-fi prototypes, etc.). We will use the class activities and
homework to move the projects forward. The project for this class is an *individual* project. The idea is that each student can focus on a problem she really cares about—whether because it connects to her research interests or an aspect of her personal life—and then get the experience of going through the steps of systematically developing a solution to that problem. A side effect of this setup is that at the end of the semester, each student will have a body of her own design work that she can use in your portfolio or as a starting point for developing the project further.

**Design Problem:** Each of you participates in a number of important relationships: with your parents, siblings, romantic partners, friends, and relatives. The current solutions for supporting relationships through technology--Facebook, Instagram, instant messaging, etc.--do not explicitly distinguish among relationship types, nor do they provide unique functionality for different types of relationships. (One exception to this is corporate groupware technology, but for the purposes of this project we are primarily considering non-work relationships.) One effect of this is that the distinct characteristics of specific types of relationships are not well supported by current social technologies. Your task for this project is to fix this situation.

Over the course of the semester, your project will be to design a system to support one particular kind of relationship that is important to you but which is not sufficiently well supported by current tools. As an additional design constraint, assume that the technology will be used to support this relationship while the people in the relationship are living away from each other (e.g., while one is in a different state or country for school). So, the purpose of the technology you are designing is to help you maintain, and potentially even deepen, the relationship while you--or the other relationship partner(s)--are away for an extended period of time.

As part of the project, you’ll need to define what the relationship is and what aspects of it you are trying to support. How that relationship is currently supported over distance, what doesn’t work about current ways of supporting it, and how your solution will do this better. The specificity of the relationship allows you to deeply think about what makes the relationship special and how you would best want to support it. So, dive in and see what you can come up with.

**Scoping:** One way to think about scoping is in terms of the number of steps or interactions that your system will support. Think about the process of shopping on Amazon. You first search, then the results page appears, then you click on a result to see the details for that item, then you add the item to cart, then you click to check out, etc. Each of these steps--entering a search term, clicking on a result, adding an item to cart—is a user interaction. Some of these interactions happen on the same page (e.g., adding to cart and clicking the Check Out button both happen on the item details page), while other interactions move the user to a new page (clicking on an item in the results list open the page with the detailed information for that item).

For your project, you should aim to prototype between **15 and 30 user interactions** (steps through the system) that take place across **5 to 10 panels** (e.g., web pages, screens of a mobile application). Most of the panels should be unique.

**Final note:** this is an *interaction design* class, which means that we are focusing on the front-end or user-facing aspects of technology: web pages, mobile apps, the control interface for home automation systems, etc. There are a lot of interesting problems which have a user-experience component, but which are ultimately not front-end problems. For instance, the order in which Yelp or Amazon results appear is fundamental to the user experience of these systems and is something these companies spend a lot of time thinking about and working on. However, determining the results order would not be a good project
for this class since this is an algorithmic problem, not a user interaction problem. Pick a project that lets you develop a set of interesting user interactions, not something that is fundamentally about under-the-hood machinery.

**Homework**

Each week there will be a homework assignment. Homeworks will be due before the start of the class each week. Please post all homework assignments to that week’s homework thread in the class forum on Ctools. Most homeworks are worth 4 points each. Late assignments will lose 1 point per day. While the focus is on quality instead of quantity, not following the directions will result in a deduction of points. Do not upload attachments to the forum. Submit your assignment as a link (e.g., to a Google Doc, a file shared through Dropbox, Box, SugarSync, etc.).

Reading Response: Each week you will also have a 3 paragraph reading response for the readings from that week. The reading response should reflect on the readings and discuss points from the reading you found particularly interesting—for instance, because you found them provocative, you disagree with them, you think they relate to your own project in an interesting way, etc. The purpose of the reading responses is to show (1) you did the readings (so you can discuss them intelligently during class) and (2) you thought critically about them. Reading responses that show you engaged critically with the material will receive 2 points. Reading responses that summarize the readings without much more thought will receive 1 point. Minimal or no responses will receive 0 points.

**Design Notebook**

As you begin to think about individual project, you should create a design notebook—a place (physical or digital) where you collect as much information that relates to your project as you can find (e.g., screenshots or pictures of other systems that address a similar problem, printouts of messages in online forums where people discuss the problem you are working on, photos of things you encounter in the street, replies from Facebook to a question you posed to your social network, etc.). As you will discover, the design notebook can be a wonderfully effective source of inspiration and will help you generate both more ideas and better ideas for how to proceed with your project.

**Grading**

You should do good work in this class because you care about the project you picked and because you want to learn how to design interactive systems. That said, the university makes us use grades, so here is how grades will work in this class:

- **Individual project: 68 points**
  - lo-fidelity prototype: 10 points
  - digital prototype: 20 points
  - other project homeworks: 4 points each (8 weeks * 4 points)
  - final presentation: 6 points
- **Reading responses: 20 points (2 points/class * 10)**
- **Class participation/In-class group work: 12 points**

You will submit homework and reading responses to the class forum on Ctools

Final Grades will be assigned according to the following scale:
Late assignments
Many of our classroom activities will involve getting feedback from your peers and the instructor on the work you did for your homework. For this reason, it is important that you finish your homework in time and come to class prepared to discuss it. To encourage timely completion of assignments—and, thus, your ability to fully participate in the class—late homework assignments (those valued at 4 points each) will be penalized 1 point per 24-hour period. Late readings responses will not be accepted and late prototypes will only be accepted in special circumstances and with prior arrangement with the instructor.

Attendance
This class does not have a formal attendance policy but your In-class group activities and class participation both rely on you being in class. We will do individual and group activities in class each week. You are responsible for finding out what you missed in class by referring to the syllabus and your classmates.

Schedule

Week 1: What is interaction design? Approaches to design

Resources:

Case Study: How to design breakthrough inventions: http://www.cbsnews.com/video/watch/?id=50138327n

Week 2: Design critiques

Readings:


Design Critique and the Creative Process [http://www.alistapart.com/articles/design-criticism-creative-process/]

Reminder: Reading responses (see above) are due in Ctools before lecture.

**Homework due this week:**

**Biography:** Add a one paragraph biography of yourself to the course forum on Ctools. Include your prior education, work experience if you have it, and your background in interaction design if you have any. This could be particular skills you have or any software tools you know how to use related to design, prototyping, etc. If you have developed any kind of interactive system before, please note that too.

**Individual Project Design Problem:** Submit a 1-page design problem for your individual project. Specify what particular type of relationship you intend to support and describe what the unique aspects of this relationship are for you. Describe what you currently do to maintain this relationship over distance and what works well and doesn’t work well about that current practice. Finally, think about what the essential functions are that a tool would need to have that would, from your perspective, help you maintain that relationship in a robust way (e.g., maintaining continuous awareness of the other person/people, being able to keep up with everything that’s going on in their lives, being able to see them/hear them, etc.)

Your goal is to consider the human and social nature of the problem and what existing designs lack in addressing the problem. You can optionally cite related work or resources that will not count towards your one page limit.

**Week 3: Ideation: sketching alternatives**

**Readings:**


**Homework due this week:**
**Approaches to the Individual Design Problem:** Submit a 2-page write-up that describes at least three different design approaches you could take in addressing your design problem. Try to make these approaches as diverse as possible from one another. For instance, consider the different types of technology or infrastructure you could leverage, or different strategies that you could embody in your system (e.g., for an application that helps you maintain context with an elderly relative, you might consider whether other caregivers will be interacting with the system; if the relative has sensory or cognitive impairments that will need to be addressed; whether the individual(s) in question would actually use a given type of technology or tool and so forth). Your approaches should be developed within the context of interaction design. Consider how users might interact with a proposed system, what problem it will solve, and why it would be an improvement over existing solutions.

**Bug List:** There are currently many different types of social software, some of which you probably already use to maintain the relationships you decided to focus on. For this assignment, take a critical look at these systems and articulate what their deficiencies are in respect to supporting your target relationship. In the industry, this is called “competitive analysis” and in academia “related work.” As you research these systems, compile a list of problems or frustrating aspects of the current solutions to your problem. This list can be a starting point for your thinking of how your own solution can do things better. Submit a link to your list of problems and frustrations with other systems as part of your homework assignment (Bill Buxton calls such lists the “bug list”).

**Week 4: Core concepts of Design**

**Readings:**

Selections from Lidwell et all “universal principles of design” (login via Mirlyn for full access): [http://my.safaribooksonline.com/9781592535873](http://my.safaribooksonline.com/9781592535873)
Sections: Affordance, Archetypes, Constraints, Consistency, Form follows Function, Flexibility-Usability Tradeoff, Hick’s Law, Ockham’s Razor.

**Homework due this week:**
*Sketching Alternatives:* Take a 11"x17" piece of white paper and divide this paper into 40 2"x2" squares. Sketch 40 solutions to your design problem, one in each square, writing a brief caption for each to help someone else understand the idea each sketch conveys.

A few important guidelines:
- Focus on quantity not quality
- No two ideas should be alike
- Include ideas from existing products or prior research
- Every caption should include an active verb, conveying what the solution does to address the problem.
- If you get stuck, think about different contexts in which your system could be used to inspire new ideas
Submit a link to a digital version of your 40 squares (a scan, a photograph, etc.).

Week 5: Design synthesis

Readings:


Homework due this week:
Group Brainstorm: You will need to meet with your Individual Project Peer Review Groups sometime during the week. Plan to schedule about 2 hours of out of class time for your meeting. Spend 30-40 minutes per group member brainstorming solutions for each group member’s project using the techniques we talked about in class. Type, handwrite, or sketch out the results of your individual brainstorming session and turn them in through Ctools (you can scan/photograph sketches or hand-written notes).

Week 6: Personas, Scenarios & Storyboarding

Readings:


Greenberg et al. Sketching User Experiences: The Workbook. Section 4.4: The Narrative Storyboard (p. 167 - 177)


Homework due this week:
Design Synthesis activity:
Take the alternatives you sketched out in week 4 and brainstormed on in week 5. Cluster them into ~3--5 high-level functional categories. Explain why these are clustered in this way. What is consistent? What was redundant? What is unrelated? Pick an approach: choose the one functional category that you want to develop for the remainder of the term, and articulate why this is the one chosen (best fit, most realistic
address to constraints, etc.) Type, handwrite, or photograph your results and turn them in through Ctools (you can scan/photograph sketches or hand-written notes).

**Week 7: Design Rationales**

**Readings:**

Case Study: [http://vesperapp.co/blog/how-to-make-a-vesper/](http://vesperapp.co/blog/how-to-make-a-vesper/)

**Homework due this week:**
*Scenario*: Create a set of task scenarios that demonstrate the sequence of actions the user(s) will have to go through in order to achieve their practical goals. You will use these scenarios both to guide your designs and to assess your designs throughout the rest of the project. You should end up with 3 to 5 primary scenarios; more than this will make it difficult to focus. You will also have to make a judgement call about how detailed to make the task descriptions but they should be at least as detailed as the examples in the Carroll reading.

*Storyboard*: Design a storyboard that shows how a user or users will interact with your design. The storyboard should highlight important aspects of how your design will be used along with transitional frames that show how a user will navigate through the system. Submit at least 1 storyboard with 5 frames (or 2 storyboards with 3-5 frames). The scenario is the story or script of how a user will use your system and the storyboard is a graphic depiction for how the story will play out in the system. A storyboard is an early version of paper prototypes of the screens in your system.

A note: to make storyboards useful, try to think about what you can learn from drawing your solution out, over what you can get from just a narrative scenario. In other words, a storyboard should be a little more than just a drawn scenario. Try to represent physical environment or other type of context (e.g., location of other people) which might help you think through how your system needs to work.

**Week 8: Paper Prototyping**

**Readings:**


Case Study: Wii: [http://iwataasks.nintendo.com/interviews/#/wiiu/miiverse2/0/0](http://iwataasks.nintendo.com/interviews/#/wiiu/miiverse2/0/0)

**Homework due this week:**
*Design defense*: Using QOC (MacLean et al) as inspiration, work through the design considerations for one critical feature of your project, based on your scenarios/storyboards. In ~1-2 pages of text, describe
your design rationale: articulate 3 different approaches to this feature and consider the tradeoffs between these approaches and which one you want to adopt.

**Week 9: Introduction to Prototyping Tools**

**Readings:**

+ Selection of tutorials targeted at specific tools

**NOTE:** No reading response due this week!

**Homework due this week:**
*Paper Prototype:* The goal of this assignment is to learn how to use low-fidelity prototyping in the early stages of design. Using paper, sticky notes, scissors, tape, and any other supplies you may want to use, create a paper-prototype of your project solution. Focus on tasks and interactions. You do not have to prototype the whole system, but try to prototype as many of the interactions you are planning to implement in your medium-fi prototype as you can. Prototype at least 10 tasks and at least 10 interactions (interactions can be as small as clicking a button to select an item and as large as searching for an item and having an entirely new screen show up). Try to have a reasonable balance of some bigger and some smaller interactions--I want to see a rich and diverse set of interactions in your prototypes. To make this exercise as useful to you as possible, make sure to prototype all the interactions about which you are uncertain and for which you’d like to get feedback from your peers and me. In your writeup, describe the design decisions you made, what did or did not work well in the process, and what you might do differently if you redesigned your prototype. Your write-up should be 1 page of single-spaced text plus photocopies or screenshots of your paper prototypes. *Bring your prototype to class for Week 9.*

**Week 10: Communication and Evaluation**

**Readings:**

+ TBA [case study/example proposal document, posted on Ctools in advance]

**Homework due this week:**
*Digital Prototype Version 1:* First version of digital prototype. This should be based on your scenarios and storyboards and your designs from earlier assignments. Figure out what tools you want to design your prototype in and start to translate your storyboard into an interactive prototype. Your final digital prototype should have at least 15 interactions, where an interaction is defined as having a trigger (e.g. click, button) cause an event (e.g. new screen). Your digital prototype should look polished and visually appealing, but the focus is on the interactions. It should look like something that you would be excited to show a client, or colleague, or boss.
**Week 11: Prototyping 2**

**Readings:**


**Homework due this week:**
*Digital Prototype Version 2*: Keep plugging away on your digital prototypes. Upload link to the current state of your project. (Version 1 and 2 are not graded individually; they are a process steps to ensure you are making progress on this large deliverable.)

**Week 12: Critical Reflection on Design**

**Readings:**


**Homework due this week:**
*Politics of design*: Earlier this year, Google released Google Glass, a wearable computer attached to eye glasses that contains a camera that can be used to unobtrusively take a picture of anything the user is looking at. There has been a lot of commentary about Glass since it was first released, ranging from enthusiastic endorsements to serious concerns about how the technology will change social relationships, people’s expectations of privacy, and our relationship with technology. In one two pages of text, think through what you see to be the important implications of a widespread use of technologies such as Glass. What kinds of issues—social, political, and personal—come up? When and how do the design decisions in Glass help Google the company versus helping the individual users of the technology? When and how are interaction designers responsible for these kinds of ethical trade-offs?

**Week 13: Presentations**

**Readings:**
none

**Homework due this week:**
The final prototype and write-up are due at midnight on December 9th. Presentation is (obviously) due in class.
Late submissions will have points deducted. If you aren’t able to meet this deadline and you have special circumstances, please contact me by December 2nd to discuss.
Final Medium Fidelity Prototype: Upload a link to your prototype or a video of your prototype to forum on Ctools. During class next week, everyone will do a brief presentation of their project. I will video your presentations (for my private use to make sure I have time to grade them fairly). Bring your laptop to class next week. If you have a Mac, bring a dongle.

Final Write-up: Your write-up should be 3-5 pages single-spaced with sketches and screen shots as appendices, these don’t count for the page limit. Please don’t feel the need to add as many screenshots as you possibly can. Select ones that convey useful information. Focus on quality and polish as if you were delivering it to a client.

Suggested outline for writeup:
1. Problem statement.
2. Solution overview
3. Describe the final design
   - Describe the functionality (i.e., what you can do with it)
   - Provide a description of the main parts of the design flow. This is important because it will provide you with a record of how the design worked or was intended to work, long after the implementation no longer works. It could in principle also act as a deliverable to hand off to an implementor.
   - What was left unimplemented?
   - Sketching techniques and approaches
   - Tool(s) you used to develop the design
   - Pros and cons of these approaches and tools for your project
4. Design Evolution
   - Describe how your design changed from initial sketches, brainstorming, low-fidelity prototype, to final design
   - Show what the major changes were and why they were made.
   - Relate your design process and choices to the readings.

Please upload your write-up as a PDF document to the Assignments section of Ctools (i.e., not the forum, as have been doing for previous assignments). Make sure that your write-up contains the link to your prototype.

Presentation details
Presentation length: 3 minutes. This length will need to be strictly followed to ensure that everyone gets a chance to present their project and that we finish the class on time.

Presentation content: The main purpose of the presentation is to showcase to the class what you have been working on this term. To do this effectively in such a brief time, I’d suggest something like the following structure:
   - A brief description of what problem you tried to solve in your project and why this problem is important.
   - A high-level overview of your solution. (e.g., “I created a prototype for a mobile-phone application that enable users to do X, Y, and Z.”)
   - A walkthrough of one of two key features of the application. You can do this with screenshots in your slides, or you can create a video that walks the audience through these features. Please don’t try to do a live demo! With 3.5 minute presentations, live demo just won’t work well.
Script what you want us to see and then either video-record it or practice to do the walkthrough effectively with slides.

- The design rationale for an important design decision you had to make during the project. This is to give us a flavor of the kind of thinking that went into the project.

The above is a suggested format, but this format is not required. If you think you can give an effective introduction to your project using a different format, go for it. Feel free to do whatever you think will give your peers and me a good understanding of what you did and how you thought about your project. As long as it doesn’t take any longer than 3 minutes.

Logistics: please bring your presentation on your own laptop or arrange in advance to share the laptop with another student in the class (and have the presentation preloaded on the machine). We’ll need to transition between people pretty quickly.

**Accommodation for students with disabilities**

If you think you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course, the assignments, the in-class activities, and the way we teach may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Office of Services for Students with Disabilities (SSD) to help us determine appropriate accommodations. SSD (734-763-3000; [http://www.umich.edu/~sswd/](http://www.umich.edu/~sswd/)) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. I will treat any information you provide as private and confidential.

**Academic integrity**

Unless otherwise specified in an assignment, all submitted work must be your own, original work. If you are referencing others' work, put it in quotes! If you are directly quoting, or building on others’ writing, provide a citation. See the Rackham Graduate policy on Academic and Professional Integrity for the definition of plagiarism, and associated consequences.

**Credit**

Thanks to Andy Ko, Julie Kientz, Marti Hearst and others for making their syllabi available to us. Parts of this syllabus are taken from their courses.