P4 Integrating Physical and Digital

The body is the ultimate instrument of all our external knowledge, whether intellectual or practical... experience is always in terms of the world to which we are attending from our body. — Michael Polanyi

Physical media and electronic media have powerful—but distinct—sets of affordances. Today, our physical devices and electronic devices are proximate yet unaware of each other. Considering the limited interface of the PC, one might presume that current computers think we look something like the image to the right (drawing courtesy Dan O’Sullivan and Tom Igoe). However, our experiences in the world beyond the PC engage our entire bodies. This project is about putting mind and body, bits and atoms back together. You will use sensing and actuation technologies (mechatronics) to transcend the confines of the desktop and engage the user and their environment more fully. You will be working in groups of three or four, and the Digital Vision Fellows will be mentors again. Based on the results of a P3 connections prototype (not necessarily your own), form a group, and extend your chosen connection with a tangible interface. We suggest using d.tools, which we have made available, but you are welcome to use any physical interface components you are comfortable with.

The skills we will learn in this project are

- **Production** Until now, we have concentrated mostly on ideation and prototyping. In P4, completeness and panache count.

- **User Testing** Testing is an essential part of user-centered design, and a good way to get empirical information about how real users work with interactive systems.

- **Physical UIs** This project will focus on the controls and displays that your user interface provides. We will learn both the technology and the design skills for creating these interfaces.

- **Teamwork** This is the most comprehensive project of the course, and to make it work, you will need to work together as a team to acquire new skills and complete the assignment.

The deliverables are due on the following schedule

**Tue, 28 Feb**  
**Group Proposal**  
- Using the results of a P3 connections prototype as a starting point, form a group of four.  
- Write in your Idea Log one critique of the P3 you are building on, and one inspiration that seeing the prototype gave you.  
- Come in with a storyboard of your physical interaction design (in your Idea Log).

**Thu, 02 Mar**  
**Interactive Prototype**  
- Bring a prototype to class.

**Tue, 07 Mar**  
**User Test Preparation**  
- Bring in an updated prototype.  
- Bring in a plan for how you will conduct user testing. Turn in a copy of this plan at the end of class.

**Thu, 09 Mar**  
**Refinement**  
- Before this class, conduct a user test, recruiting 4-5 participants from outside the class (Stanford students are okay).  
- Your prototype should be complete by this class (though you will iterate based on the usability testing results).  
- Half of your grade will be based on your project as shown in this class; this is to insure that you have sufficient preparation time for the project fair.

**Tue, 14 Mar**  
**Project Fair (4:00pm – 6:30pm, Wallenberg Hall)**  
- Two minute madness: Prepare a two minute presentation describing your group’s work. By 6am, email one slide for this presentation as a 1024x768 PNG or JPEG file to cs247@cs. We will assemble all slides into a single, timed deck.  
- Have project available for walk-up use by presentation attendees  
- Demonstrate features and functionality  
- Prepare a poster showing inspiration, final designs, alternatives considered, testing results.  
- There will be outside visitors (and food!); feel free to invite friends, family, ...
Thu, 16 Mar  Course Recap

- We’ll review the P4 projects and discuss the course in general.
- Bring in a short final project report (1 to 2 pages) that summarizes your project (including a picture or two) and your user study.
- Idea Logs: Include a final reflection on the project and the course. Design a ‘user interface’ to your log that helps us find our way around.

Project Grading

10% **Concept**: How interesting and engaging is the problem? How appropriate is the scope?
20% How **inventive and effective** is the solution
20% **Implementation**: How complete and functional is the implementation

*To encourage you to finish in a timely fashion and not procrastinate, the grades for the above three items will be assigned on March 9th.*

10% **Presentation and Polish**: Did you clearly explain your idea at the project fair?

20% **Evolution and Iteration**: Given that the P3 prototype and heuristic evaluation results were the starting point, how much did you iterate and refine your ideas? How well did you incorporate the results of user testing?

20% **Final Report**: Quality of your user test and subsequent reflection; explanation of your ideas, motivation, and alternatives

*Other criteria, such as breadth of ideation, will be graded as part of the idea log.*

Preparing your final Idea Logs

- These are due on Thursday, 16 March, and we will look to them for insight into your individual engagement and participation in this project, as well as the course as a whole.
- Recall the basic definition of an Idea Log: A comprehensive and highly graphic record of all your thinking on the project.
- Use the log to show off all your ideas that didn’t make it into the project, and all the work that may not be evident in the final presentation.
- Work over your log to give it a “user interface,” adding things that make it accessible to someone else.
- Maybe go through with a different colored marker to add highlights and annotation that will help us find our way around and make sure we notice things that are important.
- Print out a few critical emails and add your annotation.
- Include group meeting notes, and add your own annotation.
- Add post-it flags as major signposts throughout the document.
- Find a way to bind it together into one piece, not a collection of loose pages.
- Provide cues or pointers to make it a little more coherent for us.
- Add your own final reflection on the final project and the course as a whole.