You may take this exam at a time and place of your convenience. However, you should treat this exam as a (self-administered) in-class examination rather than a take-home; it is intended to be completed in single sitting lasting approximately **2 hours**. You may give yourself additional time, within reason, to complete the work, but you should not take the exam over several sessions or use more than double the allotted time.

This exam is to be taken **closed book**. You should not consult any books, notes, classmates, electronic or other resources in completing the exam except as explicitly noted. Other than the instructor, you should not discuss this exam with anyone until Tuesday November 24.

You may complete this exam electronically (e.g. as a word document or pdf) or by hand on paper. Because it contains some images, it may be helpful to (be able to) view it online or to have relatively high resolution color printouts of those pages. If you work on paper, please use a dark pen or some other method that will scan/copy legibly.

Please **put your name on every page** of this exam and (if applicable) on any additional pages that you wish to turn in. Please also **number any additional pages** and indicate that you have done so in the appropriate place at the end of this exam.

If there is something unclear about the exam, you may try to contact me. I can often be reached between 7:30am weekdays/9:30 am weekends and 10:30pm by some means, including email, IM, or a phone call. If you cannot reach me, simply make a reasonable assumption and document that assumption in writing on your exam. Also note that I may be difficult to reach between mid-Wednesday and late Friday.

After you have completed the exam, please copy the following statement onto the final page, filling in the appropriate times and dates, and sign your name:

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I began this exam at <fill in time and date> and completed it at <fill in time and date>. I have neither given nor received unauthorized assistance during the completion of this work. I agree not to discuss this exam in any way until Tuesday November 24.
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If you cannot write out this phrase and sign your name to it, please explain. ¹

Your exam should be turned **by emailing it to las by the end of Monday, November 23**. If you complete the exam on paper, you should email it using the handy dandy scan-to-email features of the Olin copiers or similar means; in this case, please arrange to leave your original exam with (or mail it to) Holly Bennett in OC361.

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¹ This text courtesy of Professor Sarah Spence Adams.
Instructions:

Concise, accurate answers are better than long semi-accurate answers. The amount of space provided is meant to act as a guideline for the length of your answer. Note that these boxes are intended for handwritten answers; typed answers should be shorter!

I recommend that you quickly look through all the questions first and then begin answering them. Some questions are worth more points than others, so budget your time accordingly. There are 6 questions worth 100 points total. Partial credit will be awarded.

PLEASE INDICATE THE TIME AND DATE AT WHICH YOU BEGIN THIS EXAM:

Questions:

1. [25 Points] Design Principles

Provide a definition of each of the following design properties. For each one, also describe/draw and an example of the property from your own project or -- only if there really isn't one in your project -- from another system that you have used.

a. VISIBILITY
b. CONSISTENCY

c. AFFORDANCE
d. CLEARLY MARKED EXITS

---

e. either MAPPING or MATCH BETWEEN SYSTEM AND REAL WORLD (your choice of term; please indicate which)
2. [10 points] Analyzing data

The graph below comes from Krzysztof Gajos. It shows the movement time of a particular user operating a particular pointing device. The five lines represent different target sizes (10, 15, 25, 45, and 60 units from top to bottom). Note that movement time is nearly random (though slow) for the smallest target size, and otherwise nearly constant regardless of target distance.

![](image_url)

a. This is a surprising graph. Explain why an educated designer would not expect movement time curves to look like these.
b. Explain or draw a picture of a more typical relationship between distance/target size and movement time would look like.


c. What explains the data Gajos obtained?


3. [25 points] Explaining designers

a. Alan Cooper says that his most controversial assertion may be that all error message boxes should be eliminated. Why does Cooper believe that error message boxes should be eliminated? Give at least two distinct reasons why error message boxes are a bad idea.

b. Describe two design techniques/approaches that can be used effectively to eliminate error message boxes.
c. "Who's going to use your product?"
"Everyone!"
"And what will they do with it?"
"Everything!"

Mike Kuniavsky introduces his chapter on User Profiles with this imagined conversation, immediately disparaging this approach. What is the problem with targeting such a broad audience?

d. Bruce Tognazzini says: "The industrial designers let loose on the Mac have screwed up most of the keyboards by cutting their function keys in half so the total depth of the keyboard was reduced by half a key. Why was this incredibly stupid?" Answer Tog's question as specifically as you can.
e. Jeff Johnson recommends that designers "deliver information, not just data." What is the difference Johnson describes between information and data, and why does it matter? Illustrate with a concrete example.
4. [15 points] Cognitive scaffolding

a. Explain the difference between recognition and recall. Why is this difference important in the design of usable interfaces?

< continued on the next page >
b. Describe a specific interface that could make use of either recognition or recall; sketch or explain both versions; and indicate which is preferable and why.
5. [15 points] Concept models

Breadcrumbs are an interface design technique that helps the user to stay oriented. The images below show breadcrumb traces from three different web pages: Target.com, Zappos.com, and the HFID wiki. In each case, the breadcrumbing is outlined in a contrasting colored rectangle (red on Zappos.com and the HFID wiki, blue on Target.com). **These images are also reproduced on separate pages at the end of this exam.**

In answering this question, you may visit these web sites (but not others!) if navigating around these sites would help you to understand the behavior of the breadcrumbs on these sites. However, it should be entirely possible to answer this question without doing so.
Course Calendar, Fall 2009

This calendar will remain firm for what has already happened but always subject to revision going forward. Mostly, underspecified details will get filled in, but some specifics may also be subject to (minor) changes.

See also CourseReadings, which contains links and bibliographic citations, and WhatToDo, which gives much more detail on exactly what the assignments are. All readings marked e-reserves are on the HFID site at http://courses.oii.n.edu (don't forget to log in!)

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a. Explain briefly how breadcrumbing works and how it helps the user.

b. Although each of these sites uses breadcrumbs, the three sites use this technique differently and to different effect. Compare and contrast (i.e., say what’s similar and what’s different about) the use of breadcrumbs on these three sites, paying particular attention to the underlying concept model assumed by each.
6. [15 points] Affordances and modes in design

[This question adapted from MH]

The image above is a photo of controls for the lights in a room at UC Berkeley. These switches control three sets of lights located in the upper part of the room.

The switch on the right controls the lights in the main (central) part of the ceiling. The middle and left switches both control upward-facing lights that are hidden behind moldings around the perimeter of the room. These two sets of lights alternate; that is, you can think of the lights as being ordered A B A B A B, and so on, all the way around the perimeter of the room. The left switch controls the As and the middle switch controls the Bs.

Full brightness in the room is achieved only if all three sets of lights are turned on fully.

Pressing on the flat rectangular switch toggles the on-off state of its set of lights. It doesn’t matter where you press on the rectangle; the effect is the same.
The tab slider on the right side of each rectangular switch acts as a dimmer. When positioned at the top of the slider, the corresponding set of lights is set at its brightest. As the tab is slid downwards, the corresponding lights get dimmer, and are almost entirely dark when the tab is at the bottom.

a. Consider a newcomer to this room, perhaps a faculty candidate giving a talk – someone who is in a very stressful situation – who has to adjust these lights in order to make a good presentation. Describe the kinds of errors such a user is likely to make using these switches. Be sure to relate your answer to the concepts of modes and affordances, and use any other concepts from class that you feel are appropriate for explaining the errors with this design.
b. Design an alternative that makes better use of affordances and resolves the other issues you identified.
This is the end of the exam. Any pages following this one may be removed from the exam if you find them useful to have separately; they need not be turned in with your exam.

If you have added pages to this examination to show extra work, etc., please number them consecutively following this page and indicate here the final page number:


PLEASE INDICATE THE TIME AND DATE AT WHICH YOU FINISH THIS EXAM:


Please copy the honor code declaration (from the front page of the exam) below and sign your name.


Copy of images for question 5
**Course Calendar, Fall 2009**

This calendar will remain firm for what has already happened but always subject to revision going forward. Mostly, underspecified details will get filled in, but some specifics may also be subject to (minor) changes.

See also CourseReadings, which contains links and bibliographic citations, and WhatToDo, which gives much more detail on exactly what the assignments are. All readings marked e-reserves are on the HFID site at [http://courses.olin.edu](http://courses.olin.edu) (don't forget to log in!)

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