Midterm Exam (revised)

ENGR3220 Human Factors and Interface Design

Spring 2005

You may take this exam at a time and place of your convenience. You will probably find it helpful to have an internet connection available although you should use it only for the designated portion of the examination.

Please 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 not intended to be an open book exam – it should test what you actually know, not how fast you can look things up – but you may make limited use of written resources to jog your memory provided that you carefully and completely document each instance of this use. (As a rule of thumb, no additional time is provided for use of resources.)

If there is something unclear about the exam, you may try to contact me. I can generally be reached between 7:30am and 10:30pm by some means, including a phone call at home. If you cannot reach me, simply make a reasonable assumption and document that assumption in writing on your examination. Otherwise, you should not discuss this exam with anyone until after the exam period has ended on Friday morning.

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

> 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 after 10am on Friday April 8, 2005.

Please sign your name to indicate that you have abided by all rules and conducted yourself according to the Olin College Honor Code. If you cannot write out this phrase and sign your name to it, please explain. 

Your exam should be turned in to Holly Bennett in OC360 by 10am Friday 7 April.

**DO NOT TURN THIS PAGE UNTIL YOU ARE READY TO BEGIN**

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1 This text courtesy of Professor Sarah Spence.
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.

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 AT WHICH YOU BEGIN THIS EXAM:  

Questions:

1. [10 points] Pithy Sayings

Why do we say both "The user is always right" and "The user is not always right" when discussing design and design guidelines? Be specific; give an example (or two).
2. [10 points] Car Door Open/Display of Information

Figure 1, below, shows the “door open” indicator on a 1991 Honda Accord. It is shown in three configurations: (a) with all doors closed (b) with one door open (c) with all four side doors and the rear tailgate open.

(a) Name one (1) design principle that is well illustrated by this indicator. Explain briefly.
(b) Identify a problem with the design of this indicator. State what the problem is and why it is a problem. Suggest a design alternative that would fix this problem.
3. [10 points]  Car Horn/Design of Controls

Figure 2 shows the steering wheel of a 1991 Honda Accord. The two buttons on the horizontal spokes of the steering wheel control the horn (push to honk). They are identified with red boxes. The white marking visible on the right button is a trumpet (horn); there is a similar marking on the left button.

In the box on the next page, **Identify two (2) aspects** of the horn design that illustrate either good or bad usability. (You may choose one good and one bad aspect, or both may be the same polarity.). In each case, **indicate the feature** of the button design that is either good or bad and **cite the design principle** that justifies your judgement. Be as specific as possible. Try to choose examples that demonstrate two different aspects of design.
4. [20 points] Cell Phones and Cognitive Considerations

(a) Name two (2) different ways that a typical cell phone uses modes in its interface. Be sure your two examples are quite distinct from one another. For each, state whether these are good or bad uses of modes.

(b) Name three (3) different ways that a typical cell phone gives feedback to users. Be sure your three examples are quite distinct from one another.
(c) Which aspects of the land-line phone mental model does a cell phone violate?

(d) How does cell phone use relate to Jef Raskin's notion of locus of attention?
5. [25 points] Heuristic Evaluation/Redesign

Easyaddressing.com is a web site that allows purchasers of formal invitations to order matching custom addressed envelopes. (For example, if you are ordering wedding invitations, you can supply your guest list through easyaddressing.com and the envelopes will be printed to match.) Screen shots of the operation of the site are attached at the end of this exam, but you are STRONGLY ENCOURAGED to visit the live site (http://www.easyaddressing.com) in order to try out some of its features and to be better able to answer this question.

Specifically, I encourage you to create a new list and to try building an address list in order to get a better feel for the way that this site works. You may also close out your own list (by hitting the “finish list” button) if you want to see the final screens.

Be sure to look at the examples provided by easyaddressing’s etiquette tip sheet to understand the format of addresses. You may also rely on your own knowledge of US and international addressing conventions as well as your intuitions and experiences in addressing. Assume that a typical address list contains friends and relatives from both near and far.

Here is a quote from a prototypical user:

We are very excited about Chris and Pat’s wedding. They are such a wonderful couple. They picked a lovely invitation – very elegant and graceful, without all the foofraw you sometimes see on wedding invitations – and are ready to order it soon. We just need to finalize the guest list so that we can place the order. It is hard – they have so many friends, and Chris’s family is really quite large – we are still trying to figure out how to keep the wedding size manageable and have been going back and forth about the guest list for weeks now. I think Pat’s third cousin’s ex-stepfather has been on and off the list twelve times now....

IMPORTANT NOTE: For the purposes of this question, please ignore the spreadsheet upload option entirely. Everything else on the site is fair game.
(a) First, describe in a paragraph or so the main problems that you’ve identified with this interface.
(b) Next, describe at least three and no more than five distinct problems with
the interface. In each case, list the problem as well as the guideline that this
problem violates. (You do not have to give an exact guideline title, but you
should provide a title or description that makes it clear why this is a problem.)
Also indicate how severe a problem you think this is.

(1)  

(2)  

(3)  

(4)  

(5)  

Name____________________________________
(c) Finally, for each of the problems that you have identified, indicate how you might change the easyaddressing web interface design to solve the problem.

(1)

(2)

(3)

(4)

(5)
6. [25 points] Formal Experiment Interpretation and Design:

Various studies have shown that much of what people search for is information that they have already seen. Recognizing this, the SIS project designed a search system that provides a unified index over many types of information. The system starts by indexing everything on a user’s desktop, and then issues a timestamp every time the user accesses an information resource. This includes Word and pdf files, email messages, web pages that are viewed, and calendar appointments.

The project team designed and evaluated two variations of a search interfaces for this system. This interface allows for both sorting and filtering by metadata type. The two designs are shown in the handout. They differ only in the placement of and selection interface type for some filtering options. One is called Top View and the other is called Side View.

The team deployed the system for use by 234 people over 6 weeks and collected log file data.

About half of the users (111) started with Sort by Date as the default, and about half (122) started with Sort by Rank as the default. To use a non-default sort option, the user clicks on the sort column above the search results. Table 3 shows the number of sorting operations conducted by both groups as determined by the log files after the 6 week usage period. (N stands for Number of participants in the condition.)

<table>
<thead>
<tr>
<th>START:</th>
<th>Date</th>
<th>Rank</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>111</td>
<td>122</td>
<td>233</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USE:</th>
<th>Date</th>
<th>Rank</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>3062</td>
<td>1975</td>
<td>5037</td>
</tr>
<tr>
<td>Rank</td>
<td>508</td>
<td>1530</td>
<td>2038</td>
</tr>
<tr>
<td>Title</td>
<td>250</td>
<td>186</td>
<td>436</td>
</tr>
<tr>
<td>Author</td>
<td>340</td>
<td>83</td>
<td>423</td>
</tr>
<tr>
<td>Path</td>
<td>73</td>
<td>93</td>
<td>166</td>
</tr>
<tr>
<td>To</td>
<td>57</td>
<td>52</td>
<td>109</td>
</tr>
<tr>
<td>Other</td>
<td>26</td>
<td>19</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>4316</td>
<td>3938</td>
<td>8254</td>
</tr>
</tbody>
</table>

Table 3 Use of sorting options for results presentation.
(a) What does this table suggest about user sorting preferences?

In addition, half the participants started with the Top view, and half with the side view, but they were free to switch views using the Options menu. Table 2 shows the number of uses of each view by both sets of users:

<table>
<thead>
<tr>
<th>START:</th>
<th>Top</th>
<th>Side</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>115</td>
<td>115</td>
<td>230</td>
</tr>
<tr>
<td>USE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top</td>
<td>3043</td>
<td>1567</td>
<td>4610</td>
</tr>
<tr>
<td>Side</td>
<td>1621</td>
<td>1986</td>
<td>3607</td>
</tr>
<tr>
<td>Total</td>
<td>4664</td>
<td>3553</td>
<td>8217</td>
</tr>
</tbody>
</table>

Table 2. Use of layouts for results presentation.

(b) What conclusions can or cannot be drawn from these numbers?
(c) Design an experiment that would better tease out causes behind the differences in Table 3. Assume that this is also a log-based study, i.e., all actions taken by a user of the system are recorded and you can extract any information contained in these logs. Participants in this study simply use the system for their work (rather than being assigned tasks). Sixty-four (64) people will participate. Use the structure shown below for your experiment design.

Hypotheses:

Independent Variables, and their levels:

Dependent Variables, and their levels:
Blocking of experiment, including within-subjects versus between-subjects, which levels of each factor are used in each condition, how many participants are in each condition.

This is the end of the exam. The following pages contain screen shots from www.easyaddressing.com.

Please copy the honor code declaration (from the front page of the exam) below and sign your name. Also include the time at which you completed this exam.
Envelop Addressing Etiquette

BASIC RULES OF ETIQUETTE

It is traditional to use the complete formal name and address of your invited guests on the outer envelopes of a double enveloped set or any of the outside of a single envelope. Do not use abbreviations other than “Mr.” or “Mrs.” Spell out American street names as well as foreign street names. See the “Basic Rules of Etiquette” section under “Mailbox Etiquette” to review detailed tips on how to write the right envelope size and style used on the outside of the envelope.

The inner envelope of a double envelope set contains only the last name of the guest on the left and the guest address on both sides. The outer envelope of a single envelope contains the first and last name of the guest on the left and the guest address on both sides. The first name of the guest is optional for a single envelope.

If the envelope is addressing a lake,海洋 or ocean name or any other body of water, be sure to spell it correctly and to include the city, state, and zip code of the lake, ocean, sea, or other body of water.

Sample Addressing Formulas (100% Accuracy)

1. Invitations with 1 single envelope

- If you are using a single envelope with your invitations, here are some suggestions for addressing the outside of the single envelope:

  * For married couples living in the same household:
    
    **Mr. and Mrs. [Family Name]**
    
    123 Main Street
    
    City, State, Zip Code

  * For unmarried couples living in the same household:
    
    **Mr. [First Name]** [Last Name] and **Ms. [First Name]** [Last Name]
    
    123 Main Street
    
    City, State, Zip Code

2. Invitations with 2 envelopes

- If you are using 2 envelopes with your invitations, here are some suggestions for addressing the inner and outer envelopes:

  * For married couples living in the same household:
    
    **Outer Envelope:**
    
    **Mr. [First Name]** [Last Name] and **Ms. [First Name]** [Last Name]
    
    123 Main Street
    
    City, State, Zip Code

    **Inner Envelope:**
    
    **Mr. [First Name]** [Last Name]
    
    123 Main Street
    
    City, State, Zip Code

  * For unmarried couples living in the same household:
    
    **Outer Envelope:**
    
    **Mr. [First Name]** [Last Name] and **Ms. [First Name]** [Last Name]
    
    123 Main Street
    
    City, State, Zip Code

    **Inner Envelope:**
    
    **Mr. [First Name]** [Last Name] and **Ms. [First Name]** [Last Name]
    
    123 Main Street
    
    City, State, Zip Code
<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Insert Envelope Easy</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Smith</td>
<td>123 Main St, Anytown, USA</td>
<td></td>
</tr>
<tr>
<td>Jane Doe</td>
<td>456 Oak Ave, Anotherville, CA</td>
<td></td>
</tr>
<tr>
<td>Harry Brown</td>
<td>789 Pine Rd, Someplace, MI</td>
<td></td>
</tr>
<tr>
<td>Addressed</td>
<td>Quantity</td>
<td>Price</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>Other Envelopes</td>
<td>150</td>
<td>$294.60</td>
</tr>
<tr>
<td>Return Addresses</td>
<td>200</td>
<td>$589.20</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$883.80</td>
</tr>
</tbody>
</table>

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