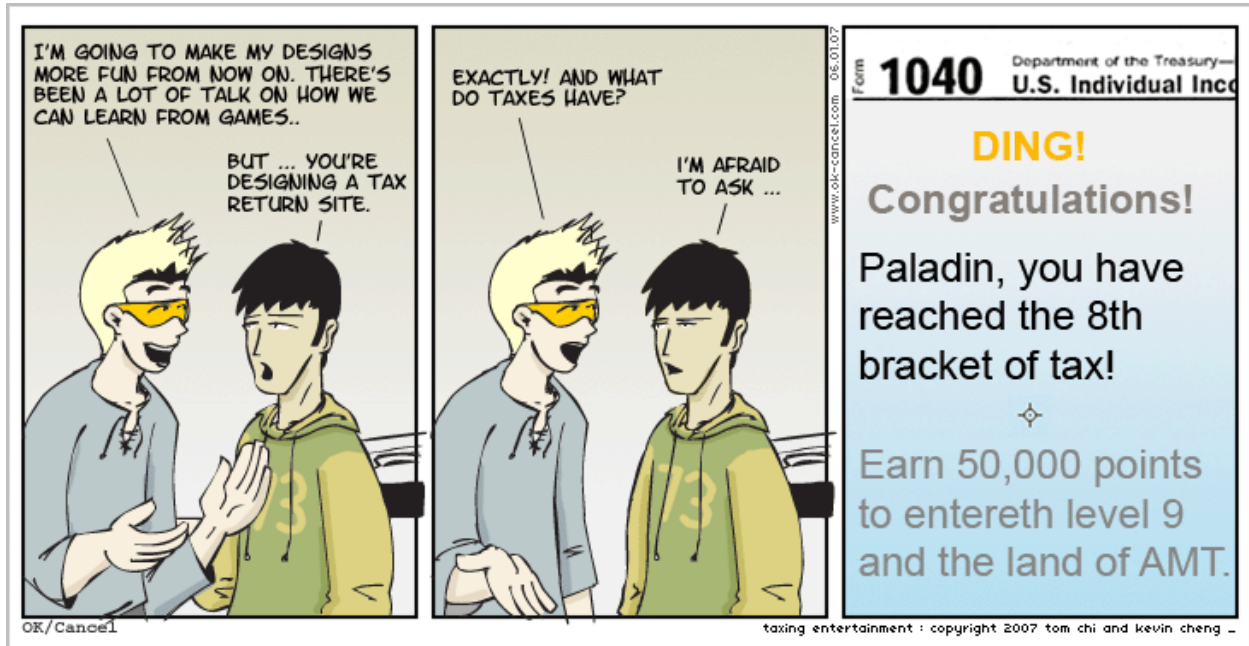


# Comprehensive Exam in Human-Computer Interaction

Scott Klemmer, 30 October 2007



1	/ 25
2	/ 16
3	/ 20
4	/ 10
5	/ 10
<b>Total</b>	<b>/ 81</b>

This is a closed book, closed notes exam.

**MAGIC NUMBER:**

**I. A friend is designing the interface to a new operating system, cheeryOS. She has several questions for you. Answer each part in 2-3 sentences. (25 points total)**

- 1) First, she asks, "Should I use a graphical user interface or a command line?"
  - a. Please begin by using ideas from the Hinckley reading on input to argue for one of the two based purely on error-free expert performance. (4 points)
  - b. "Of course, expert performance isn't the only consideration," you continue. Explain the two "gulfs" described in the Hutchins *et al.* reading, and advocate for the interaction style that minimizes them. (4 points)
  - c. What are the two types of distance that contribute to those gulfs? Pick one of those two types, and describe a means of reducing that distance. (4 points)
  - d. Finally, draw on a concept from another reading that suggests the graphical user interface. Explain both a benefit and a caveat to using this concept. (4 points)

2) "Thanks for explaining the difference," your friend says. "I've been thinking about other options as well. What do you think about agents?" Present two ideas from the readings that argue for or against the use of agents in cheeryOS. (4 points)

3) "Ah, I see. What if we were to do something more radical, beyond the screen. What if I were to use a tabletop interface, where the input was provided through physical icons, rather than a mouse. From a user experience perspective, how would this be different than a graphical interface?" Draw on the Dourish, Norman, and Hutchins readings. (4 points)

"Thank you so much! I think now users can milk cheeryOS for all it's worth..."  
(1 point free for enduring the bad pun)

## II. User Testing (16 Points total)

To make use of your newly acquired expertise in HCI, you volunteered as a peer reviewer for an academic conference, and you were invited to review a paper submission entitled "PARROT: A note-taking support system" Read the following excerpt from the paper's "Evaluation" section.

To evaluate my system, I invited undergraduate CS students enrolled in my course to participate in an experiment for extra credit. I explained to them that they would be comparing an old system for note-taking (Microsoft Word) to a new data entry system that I had been building for three years. Five participants were asked to enter one page of data, first using Microsoft Word, and then using my PARROT system. I then asked participants to rate both systems on an integer scale from 1 (bad) to 4 (phenomenally awesome). Word received an average rating of 3, while PARROT received an average rating of 3.5. Several subjects commented that PARROT was "easy to use" and "intuitive."

Point out four problems with the experimental methodology, and suggest a way to fix each problem. (4 points each)

### III. Prototyping (20 points total)

You are helping the designer of a home climate control system. The system should enable the user to do things like program the temperature for different times of day and for different days, such as weekends and weekdays, summer versus winter, and so on. Here are three alternate versions that are potential designs.

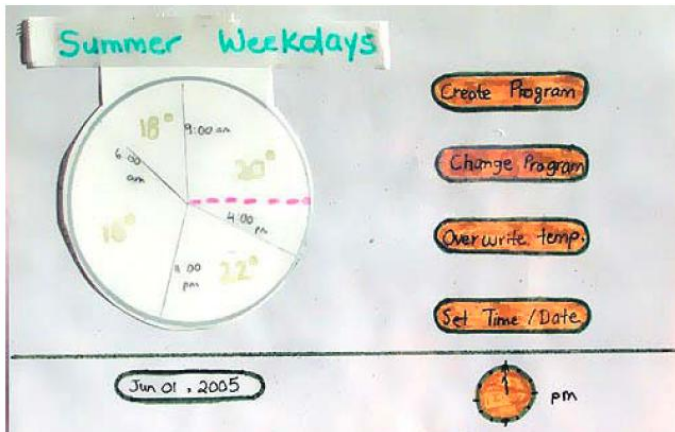


Figure 1. The "Circular" paper prototype

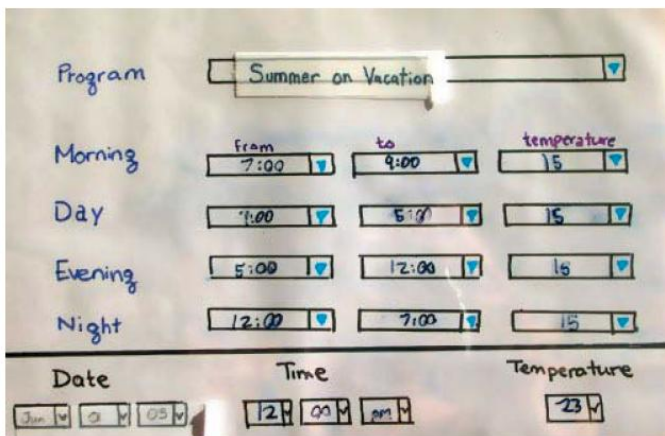


Figure 2. The "Tabular" paper prototype

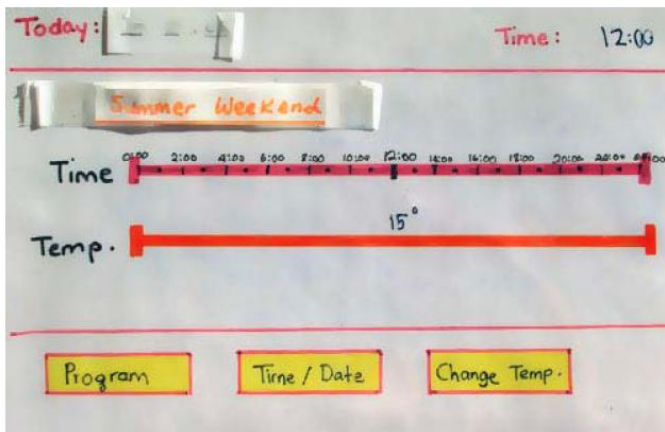
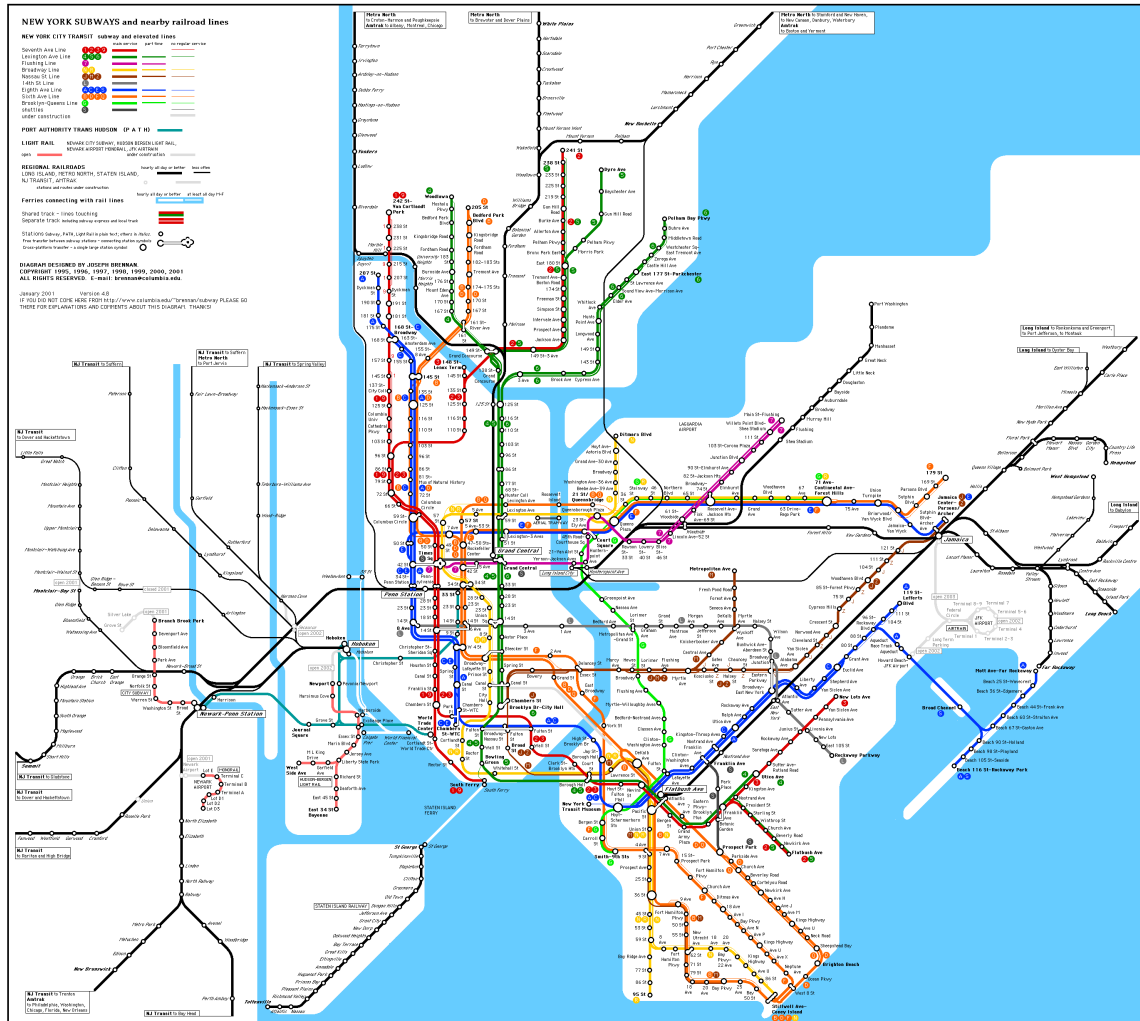


Figure 3. The "Linear" paper prototype

- a. In one sentence, use Houde and Hill's model to describe what these prototypes accomplish. (5 points)
  
  
  
  
  
- b. Use the ideas of conceptual models and affordances to describe the relative merits of the different designs. (5 points)
  
  
  
  
  
- c. Ask and answer four standard task analysis questions for a home climate system. (10 points)

#### IV. Interaction Design (10 points)

Here is a map of the New York subway system. From the perspective of the readings, write a paragraph that explains what the important differences are between this map and a traditional cartographic map, why those design decisions are made, and when tasks this map is and is not preferable.



## V. Evaluation (10 Points)

(a) Circle the **one** answer that **best** completes the sentence (5 points)

A **within-subjects** experimental design:

- A. means that each participant uses all of the systems being compared.
- B. specifies what occurs between the time you test two different participants.
- C. means that each participant uses only one of the systems being compared.
- D. reduces the variability in the results.
- E. is best for testing low-level interaction techniques.

(c) Norman makes the distinction between two types of errors. What are these two types, and what is their distinguishing characteristic. (5 points)