

**CPSC 444: User Interface Design**  
**2006-07/Term 2: Final Exam Review Questions**

*Note: these review questions concentrate mostly on material from lectures, but the exam will cover tutorials and the labs (project) as well.*

**Question 1: Experimental Design and Statistical Analysis**

Recall that Hick's Law defines a log-linear decision-time relationship for choosing one item from  $n$  equally-likely alternatives. Suppose you wanted to verify Hick's Law as part of developing general design guidelines for a menu-based GUI. Design a simple user study task that verifies Hick's Law and explain what kind of statistical analyses would be appropriate for this study. You do **not** have to provide a description of your subject pool and you do not need to provide a complete description of your equipment/apparatus.

**Question 2: Experimental Design and Statistical Analysis**

Buggy Inc. is a company that specializes in the development of visual debugging interfaces for large, complex software engineering projects. They have recently developed a software package that uses an innovative scheme to highlight syntax errors in code. Because their package has the exact same functionality as a software package sold by their competitors, they want to run a controlled user study to see which of the two software packages is more usable (hoping they can say their package is more usable than their competitor's). They hope that their interface will be better for both novices and experts, but suspect it may only be the case for novices. They are most interested in comparing how rapidly users can find syntactic errors in their code and how quickly their interface allows them to make corrections.

- (a) What are the independent and dependent variables for this user study? In terms of a statistical test, what is the relationship between the independent and dependent variables?
- (b) Describe the most powerful statistical test to compare how quickly users can find syntactic errors in their code and whether there is an impact of expertise? What are the possible outcomes from the statistical test? Specify one assumption that must be satisfied before you can use the test.
- (c) When designing a user study such as this one, what are two possible threats to validity that need to be considered? **Explain** how they threaten validity.
- (d) What is a nuisance variable? Give one example of a nuisance variable in this kind of situation and explain how you might accommodate for it.

### **Question 3: Field methods**

The following questions refer to the CHI 2002 paper: “An Evaluation of a Multiple Interface Design Solution for Bloated Software” by McGrenere et al.

- (a) What commercial software application was used in the research?
- (b) Briefly describe the setting where the experimental study took place.
- (c) There were two independent variables in the experimental study. What were they and what were their specific values?
- (d) Name two limitations to this study as it was conducted **and** briefly provide alternative study designs that would address each of the limitations.

### **Question 4: Video**

- (a) In 444 you used video to capture data in a lab experiment of a hi-fi prototype. Video can also be a powerful tool in the early stages of design, as demonstrated by Wendy Mackay. Briefly explain what those early stages are, how video is used in those design stages, and why it is a useful tool.
- (b) Name and explain one primary drawback to using video in these early stages of design.

### **Question 5: History of HCI**

List 5 innovations by Doug Englebart as described and shown in Alan Kay’s lecture and explain to what extent HCI has evolved today with respect to those innovations.

### **Question 6: Cognitive Engineering**

One heuristic in Heuristic Evaluation is to “Help users recognize, diagnose, and recover from errors.” Which of the two “gulfs” identified in Norman’s 7-stage model of human-computer interaction does that heuristic best attempt to address. Explain your answer.

### **Question 7: HCI research and industry**

You have been asked to design a technology supported small workroom to support face-to-face collaboration for small to medium size groups (2-6 people). Identify and briefly explain five factors that you need to consider in terms of how to outfit that room with displays.