

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

**Question 1: True False**

For each question, circle one of either true or false. You do not have to provide a justification for the answer you have given.

- (a) Construct validity refers to the causal relationship between independent and dependent variables. **True or false?**
  
- (b) If two distributions are normally distributed and have the same standard deviation, they will have the same variance. **True or false?**
  
- (c) Sending designers to interview workers in an office setting is an example of contextual inquiry. **True or false?**

**Question 2: Empirical Laws**

You are working on improving the usability of a horizontal toolbar in a word processing application. The toolbar consists of a single row of twelve 16x16-pixel icons. Using Fitts' Law, answer the following question:

- (a) **In no more than four sentences**, list two ways to make the toolbar faster and easier to use and use Fitts' Law to explain why these will make the toolbar more usable.
  
  
  
  
  
  
  
  
  
  
- (b) From Fitts' Law, you learned that circular popup menus are more efficient when compared to linear popup menus. Using Fitts' Law, **explain in no more than two sentences** what you can do to linear popup menus to better balance the access times for all items.

### **Question 3: Models of the User**

- (a) What role does attention play in human memory?
  
- (b) What are the two main differences between working memory and long-term memory?
  
- (c) Describe the interference model of forgetting?
  
- (d) Why are large areas of highly saturated colours hard on users?

### **Question 4: 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 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) What kind of statistical test might be most appropriate to compare how quickly users can find syntactic errors in their code? What does the statistical test tell you? 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 5: Controlled User Studies

Design an experiment to test **whether the horizontal application menu bars found in Microsoft Windows are faster to access than the horizontal application menu bars found on the Mac OS** by defining each of the following experimental components. These are the menu bars that have items like “File, Edit, and View” in every application. Note that there are many possible experiments: we are just looking for reasonable answers!

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**Subject Pool:**

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**Hypotheses:**

**Null:**

**Alternative:**

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**Independent Variable:**

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**Dependent Variable:**

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**Experiment Task (Be concise but specific – include details like instructions to subjects, time limits, etc.):**

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**Experimental Conditions (including randomization):**

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**Type of Statistical Analysis:**

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