CMSC 434 – Spring 2008
Prof. Bederson
Final – May 19, 2008
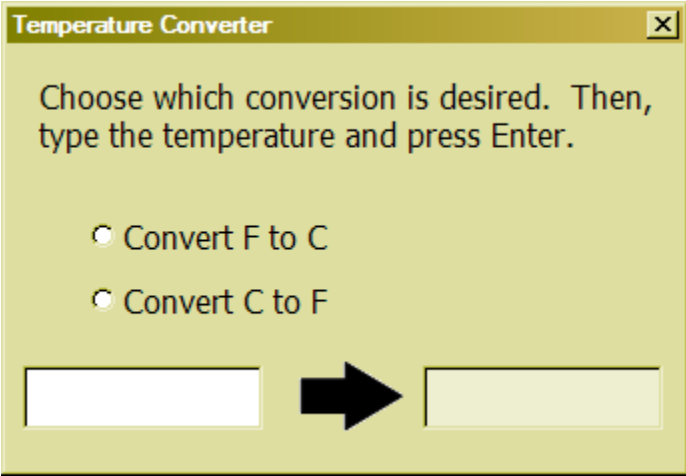# 120 Minutes - 5 Questions – 100 Points

Answer each question as simply and clearly as possible (while answering the question). Full sentences are not necessary. Less is more.

1. **HIP (10 pts)**

   a. **(3 pts)** Name the three **processing** units in the HIP model defined by Card, Moran and Newell.

   b. **(7 pts)** Using the HIP, estimate how fast a person can read text. Assume that it takes 230 milliseconds for the human eye to make a saccade (a movement from one position to another). Be sure to write down any assumptions you make, and write both the formula you make for creating this calculation and the numerical result in words per minute.

2. **KLM – Keystroke Level Model (12 pts)**

   a. **(4 pts)** What kinds of analyses is KLM good for, and what is KLM not good for?

   b. **(2 pts)** How is KLM-GOMS different from CMN-GOMS?

   c. **(6 pts)** Perform a KLM analysis on the following design, estimating how long it will take to use the interface to convert 92.5° Fahrenheit to Celsius.

Assume that:

- Focus is initially in the dialog box, but not on any particular component.
- The tab key cannot be used to move between components.
- The user starts with her hands on the keyboard.
- The temperature is entered as "**92.5**" (4 characters, no quotes)
- K: pressing a key: 0.2 sec
- P: pointing the mouse (without pressing button): 1.1 sec
- H: Homing (switching device): 0.4 sec
- M: Mentally prepare: 1.35 sec

3. **Design Principles (30 pts)**

   a. **(6 pts)** Define and distinguish between the design principles of Visibility, Affordance, and Mental Model. Along with your definition, for each principle, give an example which clearly illustrates the principle and shows how it is different from the other two.

   b. **(3 pts)** Name three *important* challenges that make designing an application for a mobile device differs from designing an application for a desktop computer?

   c. **(6 pts)** Name three ways the human mind perceives grouping, specifically as dictated by Gestalt Principles. For each technique give an example of how it can be used by designers to design better user interfaces.

   d. **(4 pts)** What is the difference between a mistake and a slip? Name 3 things that designers can do to prevent or reduce the consequences of user slips.

   e. **(3 pts)** What are the three requirements that need to be kept in mind when it comes to color?

   f. **(4 pts)** One of the Apple OS X design guidelines we discussed was "modelessness". Why can modes be problematic? When is it OK to use modes? List 2 situations.

   g. **(4 pts)** Name four of the Nielsen heuristics covered in class (lecture or readings). For each one, briefly describe what it is used for.

4. **Evaluation (43 pts)**

   a. **(9 pts)** For each of the following evaluation procedures, (i) briefly explain what the core elements of the procedure are, (ii) briefly explain the characteristics of a situation that would make it most appropriate to use this procedure, and (iii) briefly explain the relative strengths of that approach compared to the others.

   Cognitive walkthroughs

   i)

   ii)

   iii)

   Heuristic analysis

   i)

   ii)

   iii)

   Quantitative, controlled empirical study

   i)

   ii)

   iii)

   b. **(6 pts each)** A smoothly run usability test can appear deceptively simple. A test facilitator is like a duck – serene on the surface, but paddling like heck underneath. There are many judgment calls that a facilitator makes in every usability test. ("Introduction to Usability Test Facilitation," Paper Prototyping, Carolyn Snyder, pages 177-186). Name the three roles of a good facilitator and briefly describe the responsibilities of **each**.

c. **(6 pts)** For __each__ of the following questions taken from a sample questionnaire, briefly explain one thing that is good about the particular question and also one reason why it is not a good survey question. Base your answers on content from this course about questionnaires.

- "After using our product, do you now have any final thoughts concerning problems that you ran into, things you would like improved/changed, or things that you particularly liked?"

- "(Circle a number) The content presented in this course was presented:
  Clearly   1   2   3   4   Unclearly"

- "(Circle one) How often do you floss your teeth?
  Rarely / Occasionally / Sometimes / More often than not / Always"

d. **(8 pts)** Forgiveness is the notion that designs should help users avoid errors and correct them without negative consequences. Name and briefly describe **4** (four) ways to incorporate the concept of forgiveness into an interface design.

e. **(4 pts)** You are part of a three person development team that is planning to conduct some kind of qualitative analysis of your product. You have the option of employing one of the following techniques: Interviews, Think aloud method, or Constructive interaction. Choose the technique you believe to be the most effective and justify why you think it to be the most effective. You may optionally specify made-up details of the situation (i.e. type of product) if necessary to support your argument. Specifically compare and contrast the benefits and drawbacks of each, in order to support your decision.

f. **(4 pts)** Briefly define and explain Type I and Type II errors. Which is considered more of a problem?

g. **(6 pts)** There are special rules that need to be followed when dealing with human test subjects in any experiment. List 3 human subject protocols and give a brief explanation for each why each one is important.

5. **Philanthropy (5 pts)**

Briefly propose (in ~2 sentences) a new philanthropic project to help the aid efforts in Myanmar. Say who the donors, beneficiaries, and 3rd party users are, and briefly give one interface-related risk that could have potential social consequences.