CMSC 434 – Spring 2009
Prof. Bederson
Midterm – March 12, 2009
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 (25 pts)**
   a. **(5 pts)** According to the HIP model, what are the key steps necessary to "understand" that a number presented on a screen is odd? Summarize your answer in terms of the number of each type of processorin the HIP model.

   b. **(5 pts)** The HIP model states that the basic Perceived - Recognize - Act loop is around 240ms. Why, then, can a pianist play so fast?

      For the next three parts of this question, you can use this formulation of Fitts' law:

   $$T = I_M \log_2(D/S + 0.5)$$

   c. **(5 pts)** A telephone has square buttons that are 0.5" on a side with 0.25" gap between each button. How does Fitts' law predict what will happen to the performance of a person using this telephone if the entire keypad (buttons and gaps) is doubled in size?

   d. **(5 pts)** How does Fitts' law predict what will happen to the performance of a person using this telephone if the gaps between the buttons are doubled, but the buttons do not change size?

   e. **(5 pts)** The cursor is known to be within 10 pixels of the exact center of a 20", 1600 X 1200 pixel screen. You will place a single-pixel target on the screen that the user must point to exactly. List the five pixel locations on the screen that the user can access fastest.

2. **Design Principles (25 pts)**

(25 pts) List five design principles from either Norman's "The Design of Everyday Things", or Lidwell's "Universal Principles of Design". For each principle, give a one sentence definition, and a brief example of an interface (real or imagined) that does *not* follow the principle. Include a simple sketch of the poor interface if you feel it will help you describe the situation.

3. **Design process (25 pts)**
   a. **(6 pts)** List three reasons why successful design be done by teams and not by individuals?

   b. **(6 pts)** List three differences between a brainstorm and a regular meeting.

   c. **(4 pts)** Describe one positive role of failure in the discovery process.

   d. **(4 pts)** List two reasons you should create a low-fidelity prototype before going further in the product creation process.

   e. **(5 pts)** List the four levels of working with users in the design of software described by Druin. Briefly describe the most in depth way of working with users (i.e., the outermost circle in Druin's illustration of these four levels).

4. **Design (25 pts)**

   a. **(5 pts)** Describe the term "perpetual intermediate" and how this idea might change how you design an interface.

   b. **(5 pts)** What does "chart junk" refer to?

   c. **(15 pts)** List five Gestalt visual perception principles, and give a very brief example that illustrates the principle. Feel free to create a sketch if it helps with the description.