

Human Computer Interaction

August 26, 2004.

The exam text is in English. You should answer the questions either in English or in Dutch. In either language and for all answers you should be **concise**! The exam consists of 5 questions (2 pages). Mark each answer with the question number and use a new page for each of the answers. Clarity in the arrangement of the answers is much appreciated as it greatly helps correction of the exam. The exam starts at 10.00 hrs and ends at 13.00 hrs. Success!

Question 1 (20 points)

Answer the following ten statements with correct/incorrect followed by a ONE-sentence motivation of the answer (motivation is required!!).

- a) Visibility learns us about the type of manipulations and operations that can be applied to the object.
- b) Fitts' Law helps to quantify usability of menu structures in direct manipulation interfaces.
- c) Icons are compact visualizations and this hampers interpretation.
- d) A spider-web is a metaphor for the Internet.
- e) Text legibility is improved by using only capital letters.
- f) The star life cycle model uses validation and verification at each step.
- g) In pervasive computing the interface is situated in the environment without the user realizing this.
- h) Visibility of an earcon is expressed by known meaning of the sound.
- i) On a computer screen the text density should be about 30%.
- j) When color is used in a graphical user interface, saturated color pairs are preferred.

Question 2 (15 points)

In order to explain the cognitive processes underlying human computer interaction the model human processor was described.

- a) Name three (3) sub systems that cooperate in this model human processor.
- b) Further, the model human processor is built of memories and processors. Explain how these building blocks are related. You may use a drawing in your explanation.
- c) What are the implications from the model processor with respect to interface design?

Question 3 (15 points)

Several types of prototyping are used in interface design.

- a) What, with respect to HCI, are the most important aspects of prototyping. Give a clear motivation of your answer.
- b) What are the differences between throw away prototyping and evolutionary prototyping.
- c) Describe granularity in prototyping by explaining and discussing the successive stages of the prototyping process.

Question 4 (20 points)

A prototype website in which a new system for the room booking for the University (campus wide) has been completed. You are to evaluate this site within the following constraints:

- Yourself as the only evaluator
- Three working days
- Access to a single version of the fully functional website
- Access to unlimited users
- Video facilities
- Within given time a report must be presented.

Create a proposal to carry out an empirical evaluation of this website. What methods would you include in such evaluation and how would you configure those methods to accommodate the given constraints.

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Question 5 (30 points)

In the lectures a *scenario* is described as an informal narrative description. A scenario is preferably written in natural language. In this manner, a scenario can be exploited to do requirements engineering. All stakeholders of a product should understand the scenarios. This will be elaborated in a case study for which you develop a satisfying solution using the techniques discussed in the HCI lectures. Read the all the items of the question before you start answering!



A company plans to introduce the intelligent refrigerator: the ScreenFridge. This refrigerator incorporates a PC that helps attributing intelligence to it. Software has been developed with which the inventory of the refrigerator is kept. The PC is has a web interface and the inventory can be requested via a PDA or cell phone.

The designers have proposed the idea to allowing the owners to interact with their refrigerator by a touch-screen that is integrated in the door. The touch screen is typically used to program the ScreenFridge. In this manner the ScreenFridge can be programmed to send messages, shopping lists to the owners so that appropriate actions can be taken. No keyboard nor mouse device will be used.

Initially, the company aims at the classical family as the users for this machine. A typical family has more than one computer at home and is familiar with the use of cell phones and PDA's. Apart from being practical, the ScreenFridge is a toy to this family. Once the ScreenFridge is on the market it is planned that adapted versions will come available for other target groups (elderly people). The adapted versions will also be smaller in size than the family model.

You are now asked to develop the first prototypes for this touch screen interface.

- How would you classify the type of computing that is strived at with this apparatus?
- Write a scenario for such use of the ScreenFridge, taking into account the fact that the manufacturer wants to introduce this device as a typical family product. You may assume that all software required for the intelligence, as described in the introduction, works properly. This scenario will be used for this assignment, so you have to establish the major tasks of this apparatus and its user interface.
- Sketch a paper design of an interface for the ScreenFridge using a touchscreen as the major human interface. Discuss the relation of the systems image with the mental model that you adapt.
- Draw a hierarchical task diagram of the use of the major tasks, i.e. writing and sending email, in your interface with the sketchpad and pen.

At some point in the design trajectory a usability study with the intended users is carried out. Product evaluations are planned at several stages in the development process.

- Write a specification for this usability study that includes levels and time dimensions. Motivate your answer.
- With the intended group of (initial) users in mind select a good evaluation method that will help to exclude flaws and support the successful introduction of the new product. Motivate your answer.