

Human Computer Interaction

March 15, 2006

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!** Mark the 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. **At completion of your exam, hand in the question sheet together with your answer sheets.** The exam starts at 10.00 hrs and ends at 13.00 hrs. Success!

Question 1 (30 points)

Answer the following fifteen statements by first stating whether it correct or incorrect and then followed by a ONE-sentence motivation of the answer.

- a) Visibility of an emoticon is expressed by a known metaphor.
- b) In LowFi prototyping the user is testing interaction using drawing software.
- c) The Stroop Effect is an illustration of interference with automated cognitive processing.
- d) HSL refers to an additive color model for defining screen colors.
- e) The Model Human Processor is used in HCI to model complex cognitive processes.
- f) Affordance of an icon is purely depending on graphics design of the icon.
- g) In incremental prototyping the next prototype is an improved version of the current.
- h) DRUM provides an excellent metric for usability studies of UbiComp activities.
- i) The aim of task analysis is to reveal sequence for an automation process.
- j) Gestalt is important to HCI as it offers tools to understand scenes.
- k) The "Hawthorne effect" is the influence of testing environment on user behavior.
- l) In augmented reality a screen is composed of a computer animation of the reality.
- m) Negative affect influences performance on difficult tasks positively.
- n) Petri Nets can be helpful in modeling concurrent activities in a user interface.
- o) A mental model includes explicitly what is right and wrong.

Question 2 (25 points)

In User-Centered design usability of a new product is an essential component. In the design process the usability specifications are set and evaluation is used to obtain information about the usability of a design. It may be applied at several distinct occasions in the design trajectory.

- a) Name the four (4) components of usability.

Prototyping is essential in to come to a product that can be evaluated. The stage of the design process in some way dictates the choice of the prototyping method. Let us simplify the design process in three stages: Conceptual design, Interaction design and Presentation design.

- b) Give the four (4) types of prototyping taking into account the status of the design. For each of the types of prototyping give an example of a specific technique with respect to granularity.

Prototyping has limitations which causes the outcome of a test to produce incorrect results.

- c) Describe (at least 3) some of the limitations in prototyping.

Once the process of product implementation has started usability engineering will be used to evaluate a prototype.

- d) Name and briefly explain the major forms of usability evaluation in HCI (minimal 4).

Several design models (life cycles) can be chosen in the development of a new software product. The position of prototyping and evaluation differs in these models.

- e) Explain why the waterfall model is less suitable for User-Centered design? What are the specific characteristics of the waterfall model with respect to evaluation?

Question 3 (15 points)

Groupware is subject to the same rules as other non-groupware Interfaces. However, space and time are sometimes separated in groupware applications.

- a) Give the typical Time/Space Matrix for groupware and give an example for each of the cells of the matrix.
- b) What is the major concept in groupware; briefly explain why.
- c) In groupware three types of systems are considered. Name two of such systems and explain how these would be place in the space-time matrix. For each of the two systems you also describe how to cope with visibility of its principal function.

Human Computer Interaction

March 15, 2006

Question 4 (30 points)

In this assignment you are presented a case study for which you develop a satisfying solution using the techniques discussed in the lectures. Read all items of the question before answering!

A manufacturer plans to use the new PlayStation Portable (PSP) of Sony to introduce a new service for educational purposes. The company is elaborating an idea for university courses together with university lecturers: the EduPad. The EduPad uses the controls and features of the PSP to introduce a science student in a laboratory environment. The EduPad can communicate with all devices in the laboratory and in this manner the PSP informs the user on the mode of operation and the current state of a device he/she is using in a practical assignment. The high quality video is used to give instructions. If the student is making wrong decisions, the EduPad can suggest other approaches. All kinds of user interaction can be included in the EduPad applications.



PSP features (see figures above): 333 Mhz processor, 32 Mb RAM, UMD-disk (mini-DVD): 1,8 GB, MPEG 4, Stereo Sound, HighRes 10 cm Screen, WIFI, USB 2.0, 5hrs Accu.,

- Write a *scenario* for the suggested use of the EduPad. This scenario is employed in this assignment as the bases for an application that you further develop. Use at least one typical *persona* that you characterize at the onset of the scenario.
- Name the stakeholders for this particular application. Where does your persona(s) fit in?
- Sketch a paper design of an interface for your EduPad application based on the scenario given in part (a) of this problem. Include suggestions for an easy to use interface of the video instruction software. Indicate the interaction style(s) that your EduPad is using?

In early design it turns out that simple gestures can be used to simplify the interface. An additional USB wire-less pen is used to input these gestures. This requires recognition of these gestures.

- Elaborate a few (at least 3) gestures that would be helpful in this interface. The gestures must have clear visibility; explain visibility and how you think to accomplish this in the framework of your application.

To further formalize your application and in support of the prototyping and implementation you have to decompose the tasks that you wish to address in your EduPad application.

- What is hierarchical task analysis; List the 4 principal questions of task decomposition.
- Draw a task hierarchy diagram of the major tasks in your application and indicate function allocation (with a color).

At some point in the design trajectory a usability evaluation of your EduPad application with intended users is performed.

- Write and motivate a specification for a usability study including levels and time dimensions.