

# Human Computer Interaction

March 25<sup>th</sup> 2013

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 13.45 hrs. and ends at 16.45 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.

- For *Cognetics* only the reflective mode is of importance.
- In CUSTOM the technology is of minor importance.
- A summative evaluation is applied to the  $\beta$ -release of the software.
- Perceived affordance refers to cognitive appeal of an interface element.
- Schemata introduced to help understanding of interactions in new situations.
- In incremental prototyping the next prototype is an improved version of the current.
- MUSIC provides a quantitative metric for usability studies.
- The law of *Similarity* relates to how humans simplify of patterns for interpretation.
- The gulf of execution refers to user anxiety to complete an interactive process.
- In groupware, awareness is a major concept that is embedded in the time/space matrix.
- The *perceptual set* expresses the link between expectation and perception.
- Cognitive Complexity Theory is a *post-hoc* method for cognitive interaction modeling.
- A touch point indicates the haptic element in service design.
- Visibility of an *Earcon* is expressed by a known metaphor.
- A functional mental model is what a user will address in understanding interaction.

## Question 2 (18 points)

Evaluation and usability engineering take a central role in the HCI development cycle. In the run of the HCI course a number of key concepts have been addressed.

- Which two other key concepts in HCI are directly related to evaluation and usability engineering? Name and explain these concepts in relation to evaluation.
- What is the relation between usability and evaluation?

For evaluation a number of techniques have been designed. These can be categorized in 5 different classes. These classes can be grouped into expert and empirical evaluations.

- Explain the characteristic of empirical evaluation.
- Name and explain 3 methods that are grouped as empirical evaluation.

Evaluation data should be gathered with care. Nevertheless there are some known malpractices that one should be aware of.

- Describe 3 pitfalls in evaluation.

## Question 3 (15 points)

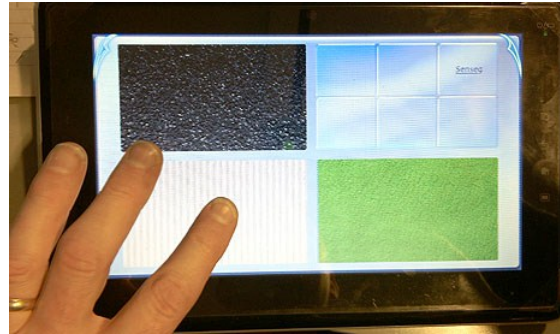
HCI is concerned with designing the good interaction and interfaces so that tasks can be completed with ease and comfort. For the next three subjects explain (1) what it stands for, (2) how the subject is embedded in HCI and (3) which HCI aspects you consider relevant for the subject. Provide a short motivation of your answers (addressing sub 1, sub 2 and sub 3) regarding these three subjects:

- Soft Systems Development & CATWOE.
- Virtual Characters.
- Norman's 7 stages Interaction Framework.

**Question 4** (27 points)

In this assignment you are presented a case study for which you develop a satisfying solution using the techniques discussed in the lectures. Carefully read the questions before answering!

**Origin:** Skype technology is often used with a webcam and it is known that this augments communication. The new trend is the multi-sensory internet and in view of that Microsoft wants to investigate the strength of touch as a sensory augmentation in Skype. To that end a university team is asked to investigate E-Sense, a touchscreen developed by Senseg with which tactile sensations can be transferred using the Coulomb effect. Through small electric fields the users' touch sense is activated. The research is performed on an extended Windows-8 based tablet.



**Case:** *Personal contact of sales representatives are appreciated by customers. For very specialist products like fabrics it is difficult to maintain these contacts in a face-to-face fashion. Skype calls provide fast and visual contact; however, for the communication of fabrics the touch sense is required. The university development team decides to address this as a case study for their “touch” screen. Textures of the fabrics are displayed while at the same time the touch sensation is generated using the Senseg screen. In this manner the augmentation is investigated.*

In order to develop understanding of the potential users it is decided by the team to use personas and have these personas act in a typical scenario.

- What are the advantages of this approach for the development of the product?
- Write a *scenario* for the use of this product; first introduce the *personas* that play a role in the scenario.
- Name the stakeholders for this particular product – Indicate the stakeholder status of your persona(s).

In order to experiment with the system, a library of 50 fabrics is used with a range of different textures. The sensation of each of the textures is measured with a number of test persons and the resulting pattern is used for the Senseg technology. The library of fabrics consists of an image and the tactile pattern. A prototype Skype plug-in is made that displays the image and transfers the tactile pattern to the customer while the sales representative is “in view” and talking.

- Elaborate on Visibility and Affordance of the interactions in the prototype in order to make it suitable for evaluation.

To better understand the flow of conversation of a sales representative an analysis of tasks is performed and these are mapped to the new prototype.

- What is the benefit of a task analysis?
- Provide a short task analysis to support the development of this prototype.

As the interactions that are included in the application will learn a lot on how future users will understand the interaction and include it in their workflow, it is important to evaluate the prototype. To that end a development schedule need be worked out.

- Make a schedule for development of the prototype and how to evaluate this; What evaluation techniques are involved?

After one year, the software designers of Microsoft want take over the development of the product. You, as a member of the university team need to explain on the software lifecycle.

- Write a short description of the software development cycle your team has chosen. Motivate the choices and advise on future organization of the software development.