

## **CS1Q Resit Exam**

### **Solutions**

1.

a) Please provide BRIEF answers to the following questions:

i) How does desktop virtual reality differ from immersive virtual reality?

[Seen problem] Desktop virtual reality relies on the standard hardware that we see on desktop computers. In contrast, immersive systems typically provide access to head mounted displays and 3D input devices (1 mark). Desktop virtual reality offers a lower cost approach (1 mark), however, there can be significant usability problems associated with pseudo-3D interaction in systems like QuicktimeVR and VRML (1 mark).

ii) Give two weaknesses of predictive texting?

[Unseen problem] Predictive texting can make false predictions (1 mark). There is a repair overhead associated with correcting these mistakes (1 mark). The system may continue to make these mistakes if there is no associated learning algorithm (1 mark). Users may fail to spot the mistake and this can create considerable confusion (1 mark).

iii) When would you use a serif font?

[Seen problem] Serif fonts, such as Times (1 mark), can be used in printed documents (1 mark) especially in situations where there is a compact body of prose (1 mark). They are less good for displays because the serifs may not reproduce well (1 mark) and there are usability issues associated with the on-screen reading of large bodies of text (1 mark).

iv) What impact does cognition have on human-computer interaction?

[Seen problem] Cognition describes the processes that extract meaning from the data that we perceive in our environment (1 mark). These processes include recognition and longer term learning (1 mark). They can also include the processes that shape actions based on our interpretation of cues in our environment (1 mark). Hence cognition lies at the heart of human computer interaction.

v) What is cooperative evaluation?

[Seen problem] Cooperative evaluation is a low cost, formative validation technique (2 marks). Designers provide users with sample tasks (1 mark) and think-aloud protocols can be used to elicit feedback as users perform those tasks (1 mark).

[2 marks per answer, 10 marks in total]

b) Briefly explain why a designer's model of a system will be different from the end-users'.

[3 marks]

[Seen problem] Designers, typically, have some understanding of the way in which a system is implemented (1 mark). They are also likely to have more expertise and experience with a range of information technologies and interaction techniques (1 mark). This makes it difficult for them to place themselves in the position of a novice user with an interactive system (1 mark). Conversely, many designers lack the everyday domain knowledge that is possessed by end-users (1 mark). Hence they may fail to adequately consider the working practices that must be supported by software (1 mark). Note: in the lectures they have seen various diagrams representing different user models possessed by the designer and the end-user so some answers may sketch these for 2-3marks.

c) Task analysis breaks users activities into a series of goals and sub-goals. In order to print a document, you must first select the 'print' command. You must then select the printer, the number of copies and so on. Briefly describe the benefits that task analysis can offer to the design of interactive computer systems.

[5 marks]

[Seen/Unseen problem]

The most obvious benefit is that complex tasks can be broken down into their components (1 mark). Hierarchical task analysis provides a systematic way for designers to go about the design of a complex system from a user perspective (2 marks). The focus is on tasks and sub-tasks not menus, scroll bars and other widgets (2 marks). Task analytical techniques can also be documented. The resulting diagrams can be shown to other designers and even end-users to act as a focus for subsequent development (1 mark). The other benefits include the ability to focus evaluations on particular aspects of interaction revealed in the task analysis – good answers might refer to the use of tasks in cooperative evaluation mentioned in the first question (2 marks). Users can be given particular goals to achieve rather than simply asking about subjective satisfaction (1 mark). Task analysis can also provide links to others forms of systems development. For example, sub-goals have been associated with methods in object-oriented development. However, I would not expect many answers to draw on these more advanced approaches. It would be enough simply to mention a link between interface design and coding (2 marks).

Note: this is a resit so I have deliberately been quite generous in presenting the background associated with each of these more complex questions. I could simplify it even more if others think this is necessary...

d) A number of HCI researchers have recently criticised task analysis. Task analysis, typically, assumes error-free, expert performance. These critics argue that task analysis also fails to consider 'contextual factors'. Users may be able to perform tasks and sub-tasks using an interface under ideal conditions. However, they may have great difficulty when they are faced with the 'contextual' issues that characterise 'real' working environments. For example, a colleague may interrupt you while you are trying to print a document. Task analysis, typically, does not model the effects of these interruptions. Do you consider that these criticisms are significant problems for the design of interactive computer systems?

[7 marks]

[Unseen problem]

This is intended to be an open-ended question. Many different answers are possible but hopefully the question provides sufficient clues for students to begin their answer. For example, one approach would be to focus on the assumption of error-free, expert performance. The initial interaction with many systems can determine whether software is ultimately accepted (1 mark). Similarly, many applications including web-based systems are aimed at a mass market where a strong background in computing cannot be assumed (1 mark). Hence, the presumption of expert level interaction may not be justified (1 mark). Task analysis can be adapted to avoid these criticisms by using the expert's model as a template to guide analysis. Designers ask 'what could go wrong for a novice' in each subtask (2 marks). Errors can be assessed in a similar way by expanding this analysis beyond just novice users (2 marks). In the question,

designers might ask what could go wrong if interruptions occurred during the performance of various tasks and sub-tasks (1 mark).

There are further problems. With complex tasks, it would be infeasible to consider all of the places that interruptions might occur. Hence, designers must identify those situations where such problems might have a critical impact on key tasks such as deleting files (2 marks). Also, interruptions represent a very small fraction of the many different contextual and performance shaping factors that might be considered (2 marks). For example, in a mobile environment these factors may include changing climactic conditions. Direct sunlight can prevent users from viewing the screen of their device. In car-based systems, contextual factors include the need to simultaneously control many different systems. Decomposing individual tasks and sub-tasks can ignore the way in which users must attend to gradual changes, for example the task of navigating using a GPS should not obscure the fact that the car is slowly running out of petrol. Hot and noisy offices can prevent users from successfully completing a task. In contrast, other users may successfully complete the goals described in the same task analysis if they are protected from these contextual factors (1 mark for each example). Because these factors vary from domain to domain and so the abstract modelling of task analysis must be informed by direct observations of a working environment (2 marks).