

THE BCS PROFESSIONAL EXAMINATION
Professional Graduate Diploma

April 2004

EXAMINERS' REPORT

User Interface Design

General Comments

The main problems that occurred in some responses were that candidates did not answer the question but chose to write at length about more general issues relevant to user interface design and book-learned guidelines for user centred design. Candidates should read the questions carefully and be clear as to what the question is asking in terms of a response.

Question 1

You have been asked to translate a PC based spreadsheet package, for example Microsoft Excel, to work on a Personal Digital Assistant or PDA. A PDA is a small handheld computer with an LCD screen of around 15cm by 10cm.

What changes would you make to the design of the software to ensure that the PDA application is (1) fit for purpose and (2) is compatible with the PC version of the software? (25 marks)

Answer Pointers

There are a number of problem areas that would need to be considered:

- Different size of screen area
- Reduced workspace
- Lack of keyboard
- The PDA may not support colour
- Reduced processing power
- Reduced RAM
- Size & volume of information in dialogue boxes
- Size & complexity of graphics

Some functions may have to be eliminated or replaced by simpler use interfaces. For example if there are complex dialogue boxes in the PC version of the software, then it may be necessary to simplify this, perhaps by providing a wizard to lead the user through the stages completing the information required in the dialogue box.

Some functionality of the PC version may not be present in the PDA version, however all functionality of the PDA version would need to be supported by the PC version if transfer of documents was to take place.

Examiner's Guidance Notes

This was a popular question that was generally answered well. The better answers discussed the impact of CPU speed, RAM, Storage Space, Monitor real estate, and the changes in user interaction level. Not many candidates discussed the need to understand the features that people require on a PDA and the constraints that the screen size would have on some aspects of the design; for example, are there features that just cannot be displayed? A few candidates discussed "fit for purpose" considering the possibility of configuring functions of the PDA based product to meet use requirements. The question was not "what is a PDA?" and the answer was

not “use smaller fonts”. Some answers considered the problem using Schneiderman’s rules – the successful answers provided relevant examples for each rule.

Question 2

You are the chief software architect for a company that makes digital cameras. You have been asked to design a program that will allow customers to store, edit, archive and find images once the images have been transferred to the customer’s PC. Describe your design for such a system, including drawings as necessary. Highlight the reasons why you made each of your design choices. (25 marks)

Answer Pointers

This is essentially a database type application. There are a number of facilities that would be useful in such an application.

- On transfer, labelling of images with names.
- Storing images in a database structure.
- Allowing the user to change the categories e.g. add “Expeditions” category then add “Trip to Iceland, April 2002” as a sub category.
- Providing search facilities to find specific images.
- Providing the ability to modify the image (increasing brightness levels etc.).
- Allowing the user to save the file in different formats e.g. compressed JPEG for future uploading to websites.

The question is looking to see if the candidate is able to provide a design that meets good user interface principles.

Examiner’s Guidance Notes

This question was answered reasonably well. The better answers considered some of the aspects of the design denoted above. There were too few descriptive diagrams and few candidates discussed the need for a backup facility – critical if you are storing important images.

Question 3

A software house, “No-Quiche-4-U”, has developed a new user interface based on virtual reality.

Design, in outline, an evaluation study to answer the following question:

Does the new User Interface offer advantages in performance to users as compared to a conventional Windows based graphical user interface?

Your answer must address issues such as setting usability criteria, how data should be collected, who should participate in the study, tasks to be performed and where and how the study should take place. (25 marks)

Answer Pointers

This is an open ended question where students are expected to come up with different solutions but with common characteristics. In each of the categories fundamental issues must be addressed and the suggested solution must be judged realistic and “do-able”. Good answers should cover usability criteria, how data should be collected, who should participate in the study, tasks to be performed and where and how the study should take place. The key issue here is control, i.e. how will usability be defined in relation to a comparison with “something else”.

Examiner's Guidance Notes

Overall, the question yielded a number of good answers in which candidates addressed the issues realistically, pragmatically and with knowledge. This demonstrated a good level of problem solving.

However, in a number of cases there were problems with answers. The most frequent problem was that candidates did not answer the question. The question asked candidates to address quite specific issues relating to designing an evaluation study. Each issue should be addressed and good answers demonstrated this. However, a number of candidates presented general book learned information on general issues relating to user interface design, guidelines for designing user interfaces or other general HCI material not directly related to the question. A few candidates discussed the nature of VR but this is not relevant to the question. In general, candidates should bear in mind that a question like this requires a focus on the issues requested in the question and a detailed answer that addresses all those issues.

Question 4

As a consultant you have been asked to provide advice on the design of a Tree Structured Menu System for a Graphical User Interface.

Briefly outline the advice you would give on each of the following and justify your answers:

- Depth, Breadth and Organisation of menus.
- Categorisation and ordering of menu items.

(25 marks)

Answer Pointers

An answer could include the general guidelines such as a Depth of 2 levels and a Breadth of 8. In terms of Organisation answers might include logical categories with no overlap, familiar terminology, groupings that account of all possibilities. Categorisation and organisation can include semantic or alphabetic categorisation. Also, ordering by usage.

Examiner's Guidance Notes

A number of candidates chose to tackle this question and good answers were produced. In a few cases there seemed to be confusion between tree-structured menus in user interfaces and tree-structured hierarchical file systems. Some candidates provided personal accounts of their experiences in designing menu systems and while this can greatly enhance an answer, the accounts must be placed into the context of answering the specific concerns posed by the question.

Question 5

User Modelling and Task Analysis are key activities in the design and implementation of user interfaces and interactive systems.

Outline the main approaches to Task Analysis used in designing interactive systems.

Almost all Task Analysis methods involve observing user behaviour when carrying out tasks including computer-based tasks. Discuss the question of whether observing users at work for the purposes of carrying out Task Analysis can take into account how users think and make decisions. (25 marks)

Answer Pointers

The main approaches to Task Analysis are:

Decomposition based upon observable behaviour (such as Hierarchical Task Analysis HTA) and extensions, which attempt to take into account user knowledge and cognition. In more detail:

Task decomposition, (e.g. Tasks and subtasks, Procedure(s) (order) for carrying out the tasks) and Knowledge based techniques, (e.g. Focuses on what users need to know about objects and actions in a task, Organisation of the knowledge). Also acceptable to include: Entity-relations-based analysis, (e.g. Object oriented approach, Identifies Actors and Objects, Relationships between Actors and Objects, Actions performed by Actors and objects).

Part 2 is open ended.

Standard Task Analysis methods such as HTA are intended for behavioural descriptions and works well as such e.g. for safety critical work.

Users of for example HTA often confuse what is meant by cognition (thinking and decision making). Taking cognition into account and describing cognition – these often get confused. Can't get away from implying and thereby describing cognition, e.g. checking that the kettle is full of water implies cognition and "takes some account of cognition".

This is very different from describing cognition formally, e.g. perception, memory retrieval, recognition, decision making etc.

Here methods such as HTA are perhaps not the most suitable and hence extensions such as Knowledge-Based Task Analysis have been developed.

Students can come to their own argued conclusion to answer the question – the key issues being that the answers demonstrate general knowledge of Task Analysis, the characteristics of the main approaches and have given some thought to what happens during Task Analysis.

Examiners' Guidance Notes

This question produced a number of very good answers from candidates and these were characterised by an understanding of the question, solid knowledge and good problem solving skills. However, other answers were frequently characterised by candidates not having read or understood the question and consequently what was required. In such instances answers provided material that was not relevant to the question, e.g. general material on user interface design or usability evaluation. In a few cases candidates seemed to confuse requirements analysis with formal task analysis, while a few candidates took task analysis to mean "the tasks needed to be carried out to design a system" rather than formal task analysis. The question was in two parts and while all candidates who answered this question addressed the first part, many chose to ignore or skim lightly over the second part, which represented the most important problem-solving element of the question.