

# THE BRITISH COMPUTER SOCIETY

## THE BCS PROFESSIONAL EXAMINATIONS BCS Level 6 Professional Graduate Diploma in IT

### REALISING THE USER INTERFACE

22<sup>nd</sup> April 2008, 10.00 a.m.-1.00 p.m.

Answer THREE questions out of FIVE. All questions carry equal marks.

Time: THREE hours.

*The marks given in brackets are **indicative** of the weight given to each part of the question.*

|                                                         |
|---------------------------------------------------------|
| Calculators are <b>NOT</b> allowed in this examination. |
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1. Shneiderman's eight Golden Rules of interface design, which have been derived and refined over two decades, are:

- strive for consistency
- cater to universal usability
- offer informative feedback
- design dialogue to yield closure
- prevent errors
- permit easy reversal of actions
- support internal locus of control
- reduce short-term memory load

- a) Choose **three** of these *Golden Rules* and briefly (one paragraph for each) describe the scientific (physiological, psychological etc) theories upon which they are based. Clearly reference the theories to which you refer.

**(9 marks)**

- b) The *Golden Rules* provide a useful starting point for designers - however they have their limitations. Briefly (one paragraph each) identify and describe the limitations of **three** of the rules.

**(9 marks)**

- c) Shneiderman (2005) suggests that each of the *Golden Rules* "must be interpreted, refined, and extended [according to] the environment".

*Interpret, refine and extend two* of the rules to accommodate and differentiate design for each of:

- i) mobile; and
- ii) desktop platforms.

**(7 marks)**

**Turn over]**

## The CalCutter Scenario

A health club has approached you to develop CalCutter - an application to monitor an individual's energy intake and consumption (calories/joules) on a daily basis. Functionality of the application will include:

- i) Capturing personal characteristics such as height, weight, gender and age.
- ii) Capturing the details of food and drink consumed including date, time of day and quantity.
- iii) Accessing an existing database of food and drink items, providing the energy value for a standard quantity.
- iv) Accessing an existing database of methods of exercise, providing the energy consumed for a standard unit of measurement (such as distance or time).
- v) The application will be web-based and accessible through a number of platforms such as desktop PC, mobile phone, PDA and networked games consoles.
- vi) Indicating to the user the amount of three common physical activities (e.g. jogging, swimming and cycling) required to burn off the energy just consumed.
- vii) Providing daily, weekly and monthly summaries and *ad-hoc* reports as required (such as warning if the energy balance profile may lead to health risks).

2. This question refers to the CalCutter scenario provided above.

- a) Write a brief report (no more than 200 words) to your client explaining why you intend to use a *prototyping* approach to the user interaction design, involving users at all stages of the development process.  
(7 marks)
- b) Prototyping is often referred to by its fidelity. Explain this concept and briefly describe the difference between low and high fidelity prototypes.  
(3 marks)
- c) Briefly describe **three** low-fidelity prototyping techniques that can be used to capture user requirements and reactions at early stages of development.  
(6 marks)
- d) Storyboards/Concept Boards and interactive prototypes are two examples of high fidelity prototypes. Provide a short summary of each of these, advising your client on their function and resource requirements (time, technology, etc.), and justifying the use of each.  
(6 marks)
- e) Your manager has come across the term "Wizard of Oz" prototype. Provide a short explanation of this technique.  
(3 marks)

3. You will need to make use of the CalCutter scenario in answering this question.

a) A CalCutter user may wish to access the application on a variety of different platforms. Two example platforms are:

- Mobile phone (240x320 pixel screen, 16 colours, standard telephone keypad, up/down/left/right buttons)
- Desktop PC web browser (800x600 pixel viewable area, keyboard and mouse input)

For each of these two platforms, design a home page with appropriate navigation options consistent with the functionality listed in the scenario. Present your design solutions using (for each platform) one well-formed sketch and a single paragraph justifying your design decisions (use no more than 100 words in each of the two paragraphs).

**(8 marks)**

b) Recent initiatives of the W3C advocate a web design philosophy based on the separation of style, content and behaviour. (In both parts below, use the CalCutter application to illustrate your answers.)

i) Explain what is meant by the phrase “separation of style, content and behaviour”.

**(2 marks)**

ii) Describe the technologies that can be used to support this design philosophy.

**(3 marks)**

c) Web accessibility is one driving force behind this design philosophy. Define web accessibility and explain why it is important. Explain the role of the WAI in promoting web accessibility.

**(4 marks)**

d) Describe how adhering to the idea of separation of style, content and behaviour can help in increasing the accessibility of your site.

**(4 marks)**

e) Aside from web accessibility, state **three** other benefits that this design philosophy might yield.

**(4 marks)**

4. You work for TechMob, a small development company that specialises in designing and building mobile applications. The latest offering from TechMob is an application known as RemoCell that, once loaded and running, allows a mobile phone to be used as a remote control device for a TV.

The RemoCell application is based on touchscreen technology and is designed to work with mobile phones with a minimum screen size of 240px by 320px. The application utilises the infra-red beam to communicate with the TV.

Functionality of the mobile remote application is limited to channel selection, volume controls, on/standby and sound muting.

A prototype of RemoCell has been designed and implemented by your colleagues and your job is now to design a user-testing regime to evaluate the **usability, functionality, and visual appeal** of the application on a number of suitable mobile phones across a range of manufacturers. You have been tasked to collect qualitative as well quantitative data as part of the evaluation process.

- a) Your team leader has asked you to provide a rationale to Senior Management on why this user testing and evaluation process is required. As part of your rationale, briefly discuss the goals of evaluation of the RemoCell product.

**(7 marks)**

- (b) With specific reference to the RemoCell application, briefly clarify the difference between quantitative and qualitative data and give **two** examples of each you may be able to collect from user-testers.

**(6 marks)**

- (c) The decision has been made to undertake a **heuristic** evaluation of the RemoCell design. Outline your approach to the implementation of the heuristic evaluation in a summary document to be presented for discussion and approval at your next RemoCell team meeting. The document should provide details of the nature and stages of such an evaluation and, using two examples, define heuristics.

**(12 marks)**

5. SeeSaw, a small mobile communications company, is planning to build a screen-less mobile phone for the visually impaired. As well as being able to dial out and receive calls in the usual manner, the device will have a phone book facility, enable the user to send and receive SMS text messages and inform the user of the identity of a caller. Other regular functions such as indicating battery status, signal strength, call history, ring tone options and volume settings are also required.

Your brief, as an interaction designer working for SeeSaw, is to advise on initial design ideas and solutions.

- a) A sound-based interface to the device could form part of the design solution. However, sound as an interface has problems; for example: *annoyance*, *discrimination* and *transience*. Annoyance is the affect on other people in the vicinity of the user. Discrimination is the issue of being able to distinguish between similar device sounds or between device sounds and background noise. Finally, sounds are transient in nature, i.e. they do not persist.

Sketch out the slides for a short PowerPoint® presentation to be presented to the product design team giving possible solutions to each of these problems (use one slide for each and use no more than six bullet points per slide).

**(9 marks)**

- b) i) Briefly, what is an *earcon*?

**(2 marks)**

- ii) Write a short report to the Project Director (no more than 250 words) on how earcons might be used as the principal form of interaction for navigating a typical mobile phone menu system.

**(5 marks)**

- iii) What design considerations need to be taken into account when producing a coherent set of distinct earcons for such a task?

**(5 marks)**

- c) The company CEO has emailed you asking for your view on the potential for using forms of interaction utilising sensory inputs other than sound, in a phone for the visually impaired. Draft your response using no more than 150 words. The CEO expects you to be creative in your thinking.

**(4 marks)**

**\*\* END OF PAPER \*\***