

THE BRITISH COMPUTER SOCIETY

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

USER INTERFACE DESIGN

3rd May 2007, 10.00 a.m.-1.00 p.m.

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

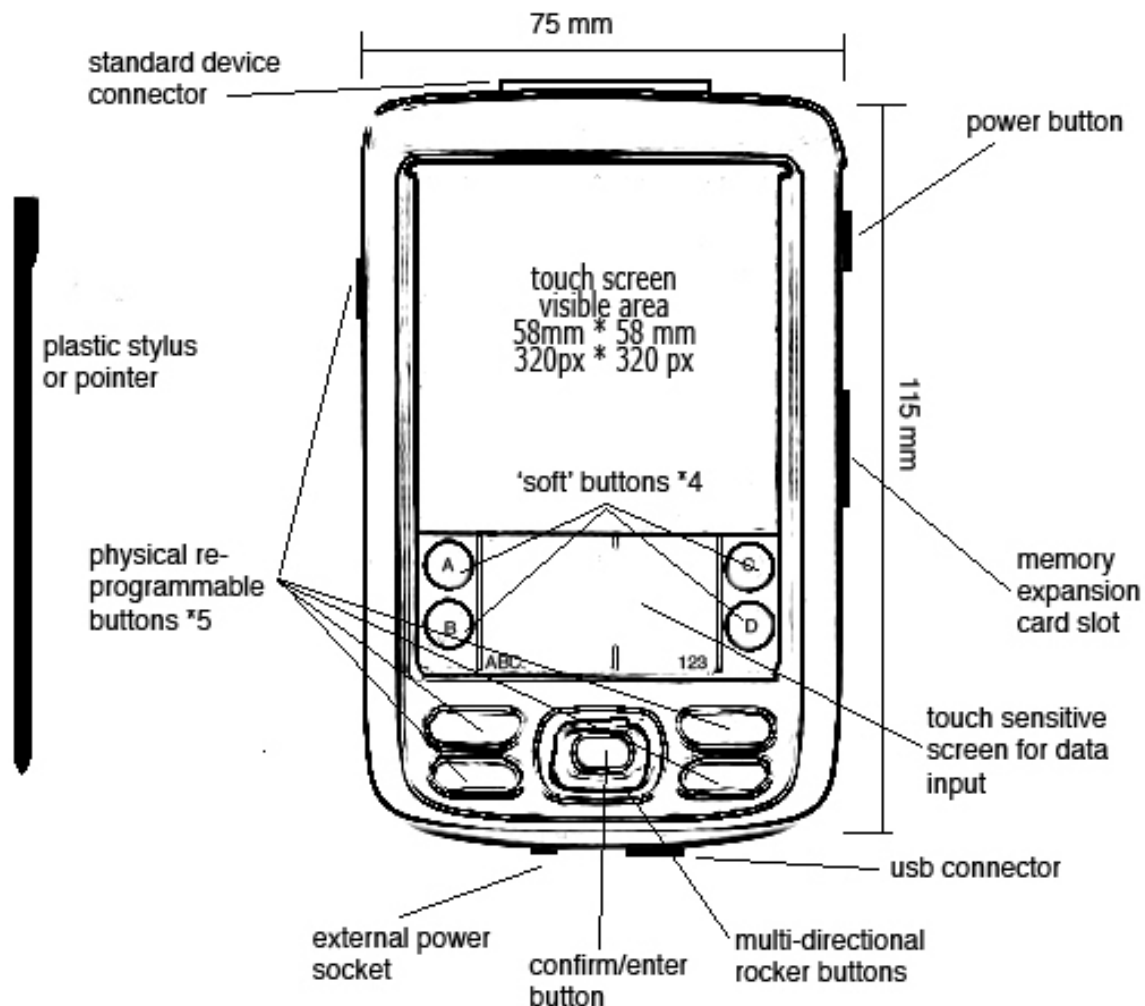
Time: THREE hours.

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

Calculators are NOT allowed in this examination.

1. A typical handheld PDA is illustrated in the diagram below.

[In answering this question, you will need to make use of the PDA device description and illustration given below.]



The interface to this device consists of a colour screen with a visible area of 320 x 320 pixels. The screen is touch-sensitive and interaction is typically via a plastic stylus. Most applications for the device can use direct manipulation of interface elements (i.e. drag and drop) on this screen as one means of interaction. When not in use the stylus is stored in a slot in the back of the device. There is a further area of screen that is used for data

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input via the stylus and a form of handwriting recognition. The left side of this area is used for alphabetic characters and the right side for numeric characters. Double tapping either area will replace this screen area with a representation of an alphanumeric keyboard, with which users can tap out characters rather than using the handwriting screen.

The input area also has four 'soft' buttons (i.e. invoked by tapping the button with the stylus) that are reprogrammable according to application. Additionally there are five 'hard' or physical buttons that are generally used, but are also completely reprogrammable, to invoke high level PDA functions and applications, e.g. diary and clock. Finally, there is a central set of buttons that mirror the functions typically found on a mouse. The four-way rocker buttons move pointers or screen focus either left, right, up or down and the central button fulfils the 'click' function of a mouse.

The device can interface with a personal computer through a standard USB connector or via Bluetooth. There is also a standard device connector to allow supplementary devices such as a camera or scanner to be fitted to the PDA. A memory expansion slot allows additional flash memory to be used.

Scenario

You have been given responsibility for creating a set of six icons to represent the high level functions of the PDA. These will appear as the first screen on start up of the PDA.

The six functions are:

- clock;
- diary / calendar;
- to-do list;
- contacts / address book;
- calculator;
- note pad.

The PDA design team have already decided that they do NOT want to supplement the icons on this screen with text labels, so your designs must be graphical only. The set of icons must have a coherent look and feel to them. The PDA screen limits the size of each icon to 64px * 64px.

Tasks

- a) i) Show in sketch form your designs for each of the six functions. **(6 marks)**
- ii) Write a brief report (no more than 100 words) to your colleagues on the PDA design team giving the rationale behind your design decisions. **(6 marks)**
- b) Jef Raskin, author of the Humane Interface (2000) and Apple GUI pioneer said, "An icon is a symbol equally incomprehensible in all human languages. Whatever language you know, you have to learn the meaning of an icon anew." (jef.raskincenter.org/published/ubiquity.html). Describe the issues inherent in graphical icons that make their use problematic as the sole method of interaction with a machine. **(13 marks)**

2. You run a small HCI Consultancy and are engaged by a client to evaluate their website, but on a **modest budget** and **tight time scale**. The website belongs to a small, ambitious independent music producer who uses it to promote the emerging bands they have as clients. The website also hosts fan forums, promotes concerts and sells downloadable and CD versions of their music.

Website traffic and sales have been below expectation and the client would like you to write a report evaluating the website to see if the navigation and functionality, or other factors, are responsible and suggesting revisions.

Using your knowledge of standard usability evaluation techniques applied to web site evaluation:

- a) Describe how you would use **expert user evaluation**. (10 marks)
- b) Outline a realistic **user testing** strategy you could use, within the budgetary and time constraints. (10 marks)
- c) What should your **report** include? (5 marks)

3. You work as a web-developer for Somesuch College, a regional provider of higher education. Whilst providing traditional face-to-face lectures, seminars and workshops to support students, the college also offers opportunities to study from home, through an extensive collection of web-based materials, resources and discussion groups. Your line manager has asked you to take responsibility for communicating a number of web-related issues to various groups of staff in the college. The tasks are listed below.

- a) Write an article for the staff newsletter explaining the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C). The newsletter is mainly read by academic staff who are knowledgeable, but not necessarily technically aware, with regards to the web.

The length of your article must be limited to 150 words and needs to be pitched at a suitable level for the expected readership of the newsletter. (10 marks)

- b) A number of your colleagues in the web-development department of the college still insist on coding web pages using tables and other HTML structures to layout the design. Draw up a set of slides (to be implemented in, for example, Microsoft PowerPoint®) to convince your colleagues that they could and should be using more recent approaches to web-design.

Suggested topics to include in the presentation are:

- Reasons for separating out content structure, visual design and behaviour
- Accessibility issues
- Web standards and the move from HTML to XHTML
- Cascading Style Sheets (CSS)

Your presentation is limited to 10 minutes and should contain no more than six slides. It is not necessary to include a title slide. Each slide should contain a number of succinct bullet points highlighting the key elements of your presentation.

In your answer, sketch out how each slide will look. Do not add any other information (e.g. slide notes or explanations and justifications for the slides) to your answer. (10 marks)

- c) Write a brief (100 words) FAQ (frequently asked questions) for the college website explaining the answer to the question: “why don’t the links to external sites on the college webpages open in a new browser window?” Focus your answer on the reason for the absence of the `target=“_blank”` attribute to the `<a>` tag in XHTML 1.0 Strict. (5 marks)

4. Using speech as a means of communication with machines is often a goal of user interaction designers.

- a) List FIVE advantages (write no more than one sentence for each) that speech input may have over other means of user interaction. (5 marks)
- b) List FIVE problems (write no more than one sentence for each) inherent in implementing speech input as the primary means of user interaction. (5 marks)
- c) As an interaction specialist, you have been engaged by a client to advise on implementing a speech-based input system for two applications:
 - to enable a person with a physical disability to control a number of functions in his/her home – for example, turning on lights, controlling electrical devices such as the TV and stereo and adjusting the central heating;
 - to act as an information point to assist travellers arriving or departing an airport with such things as directions to check-in desks, restaurant facilities and hand-baggage regulations.

Write a report (of no more than 500 words) to your client explaining the main differences in conditions for the two applications that designers will need to take into account and highlight why your client cannot assume that development work on one application will necessarily be of use on the other application.

(15 marks)

5. a) What does it mean if a software system has good **learnability**? (2 marks)
- b) You are asked to evaluate the **learnability** of a software system. How would you go about it in terms of:
- i) type of evaluation method you would employ; and (6 marks)
 - ii) data parameters you would collect. (4 marks)
- c) What is **flexibility** in a software system and how does it help usability? (5 marks)
- d) **Flexibility** of a software system can be designed into the system at a number of levels. Describe these levels and give examples of how this can be implemented. (8 marks)