***** Sample Solutions *****

Xday, XX May 2002.

00:00 am - 00:00am

University of Glasgow

DEGREES OF BEng, BSc, MA, MA (SOCIAL SCIENCES).

COMPUTING SCIENCE - 3W:
Interactive Systems 3
(Answer one question from Section A and *one* question from Section B).

Section A (Chris' Questions)

1.
a) Briefly explain why web designers must understand the demographics of Internet usage.

[3 marks]

Notice that there are three marks allocated for this initial question. This implies that you should offer at least three reasons but also that you should not spend too long in answering this part. There are more marks in the subsequent sections. There are several reasons why web designers must consider the demographics of Internet usage:

1. The age, gender, cultural and economic profile of Internet users determines the market place for e-commerce applications. Hence, Internet demographics must be considered as part the market research for any web designer.

2. The demographics of Internet usage can also help to inform the design of web pages by identifying common disabilities that should be supported in a wide range of web-based applications if they are to be widely accessible.

3. The demographics of Internet usage can also help to establish who might be excluded from the use of a particular web site. This information can be used to provide additional complementary resources. For instance, a government could not consider moving all tax information submissions to the web until the demographics showed that anyone likely to complete a tax return could access the Internet.

b) A recent Ipsos-Reid survey found that over 70 percent of the US population had used the Internet at least once within the previous 30 days. In the UK the figure was 50 percent, in Urban China 30 percent, Urban India 19 percent and Urban Russia 8 percent.
Briefly comment on the reliability of such statistics and their implications for the future development of e-commerce.

[10 marks]

The reliability of these statistics depends upon the methods that were used to gather them. Typically, this is done by monitoring the performance of a small group of users or by asking individuals either over the telephone or in conventional street surveys. Extrapolation is then used to scale up from a relatively small sample to derive estimates for national characteristics. There are several problems with this. In particular, the smaller the sample size, in general, the less likely it is that the sample will reflect the entire population. Also simplifying assumptions can be made in constructing a sample. For example, in countries such as India the company arguably focused on monitoring the behavior of urban communities on the assumption that rural communities do not have Internet access. Such assumptions can be incorrect. Further problems can arise from self-reporting where people either over-estimate their Internet usage to seem better 'informed' or downplay their usage for fear of being regarded as an in some ways 'extreme' or addicted.

The former attitude is more likely to bias this survey as the response refers to 'at least once' without specifying an upper estimate on time spent on-line.

The implications of these statistics, if true, can be viewed in two different ways. Firstly, that there are vast markets of untapped users in China, India, Russia and the UK. It can also be argued that the US Internet development may be reaching a period of relative maturity where there is only limited room for growth in Internet usage. On the other hand, it might be argued that these statistics tell us more about economic development and that there may be financial barriers that will prevent the further penetration of Internet usage far beyond the levels described here. It is difficult to draw firm conclusions about this without further information on recent trends – is Internet usage growing at an increasing marginal rate in these countries or has the growth in usage started to decline for instance in the USA? Similarly, the implications of these statistics for e-commerce are hard to judge without knowing more about what the Internet usage actually focused on. What proportion of these 'one or more accesses per month' was related to e-commerce? How confident would individuals feel in each of these 'markets' about conducting e-commerce transactions? Without this more detailed information, the basic statistics tell us very little.

c) By 2008, it is estimated that there will be more people in the UK above the state retirement age than there are of school age. With this in mind, you have been asked to write a strategy document for a major international bank. The document is intended to provide senior management with guidance on how to develop their web services so that they are easily accessible to an aging user group. You should pay particular attention to the elicitation and testing strategies that must be used to support these potential customers on the web.

[12 marks]

There are many different solutions to this question. I'm looking for something that looks like a strategy document. In other words, there should ideally be a title, an executive summary and a detailed argument. The key concepts to be addressed include accessibility, elicitation and testing. The accessibility section should argue that the physiological, psychological and cognitive attributes of senior citizens will be different than for young people. This could have an impact on site development. For example, internal consistency will be important to reduce the learning overheads associated with different page layouts. The use of colors and fonts will have to be considered.

Elicitation is an important area in your report because the types of interactive services that senior citizens require can be very different from those of other sections of the community. They may have more leisure time, greater mobility problems, higher disposable incomes, reduced tolerance for technological complexity etc. These characteristics could be used to guide the development of web-based services. However, in order to establish and justify such decisions it would be important to validate them before any major investment were made. Questionnaires, focus groups and interviews can be used to elicit the opinions of these users and to validate your assumptions.

Once development begins, formative evaluation can be used to determine whether your system will support this user group. In any evaluation, you should talk about particular techniques that might be most appropriate here. For example, 'think alouds' get users to talk as they operate a system. This can reduce tension that is often involved for users in formal evaluation but the process of chatting with an investigator can reduce performance by introducing additional distractions. In any more formal evaluation, it is important to consider strong individual differences within elderly users that can spring from different rates of chronological and function aging. (Reminder – chronological aging is the rate at which faculties naturally decline over time, functional aging is the loss of ability at a rate greater than that normally expected for a person of a particular age).

2.
a) Explain how you would measure two different forms of workload.

[4 marks]

There are several different forms of workload. The most obvious distinction is between mental and physical. Mental workload is difficult to judge. It can be measured in terms of pure performance. For instance, how fast somebody is at completing a task. This can be misleading. One person might complete is without feeling any undue difficulty while another might complete the task feeling completely exhausted. One way of judging these different cases is to use secondary task measures. You give people more to do, for example simple arithmetic, and judge how well they cope with the additional workload. Physical workload can be measured using, for instance oxygen consumption as this is related to the amount of energy that a user will expend on a given task.

b) Briefly explain the importance of using a recognized tool, such as the Questionnaire for User Interface Satisfaction, when attempting to assess users' subjective responses to interactive systems.

[6 marks]

Simply asking a user whether or not they liked using a system will often yield misleading results. Biases can affect users who want to please an investigator. Alternatively, investigators may obtain a negative reaction if users are fearful that the success of a system will jeopardize their jobs. Further problems occur because it can be difficult to compare the results of a subjective satisfaction survey between different versions of a system tested at different times or between different systems. It can also be difficult to ensure repeatability. That is, will the same user provide consistent subjective satisfaction results from using the same system over a period of days or weeks. Standard test instruments avoid many of these problems because their developers, typically, will have tested them to ensure their reliability and repeatability. Because they are often publicly available it is possible to compare results of tests done by yourself and by other designers using the same questions. Finally, the level of detail in these standard questionnaires goes beyond simple issues of whether or not the user 'liked' the system. They ask about a number of different areas ranging from frustration, for example with retrieval delays, to subjective responses to the fonts and colors that are used.

c) Affective computing looks beyond task performance characteristics to examine users' subjective responses in more detail. For example, MIT's Media Lab's AffQuake project uses signals that relate to a player's emotional state in ID Software's Quake II game. The player's character alters its behavior to reflect aspects of the user's emotional state. If a player is surprised or startled then their character will jump back. The size of the player's character can also grow larger as their level of involvement, measured through Galvanic Skin resistance, increases. Write a brief technical report exploring whether or not affective computing is likely to have an impact upon more mainstream uses of Internet and web-based computing.

[15 marks]

This is an essay-style question. I would expect good answers to focus on the role of affect in entertainment and game playing. Altering the behavior of a program in response to the users 'mood' seems very appropriate in this context. Games might set confident players greater levels of challenge etc. However, it is less clear that this approach can be carrier over into the mainstream. Attempts to offer software 'personality' and to base that personality on estimates of user mood or intention have not always been successful. The Office Assistant is an example of one such application. A first class answer would go on to explore these issues and other problems such as the ethical problem of disclosing your physiological state to a machine that might be monitoring your 'behaviour'…

Section B (Rob's Questions)

3. [Total 25 marks]

4. [Total 25 marks]

[end]