

UNIVERSITY OF EDINBURGH

COLLEGE OF SCIENCE AND ENGINEERING

Computer Literacy 1h

Class Examination
Solutions

Date: Saturday, 24 January 2004

Time: 09:30 – 11:00

Place: Appleton Tower Concourse

Board of Examiners

Chair: M.R. Jerrum

External Examiner: R. Dyckhoff

Instructions to Candidates

Attempt **ALL** questions in part 'A' and **ONE** question from part 'B'

Marks for questions are indicated in brackets after each question. Each question in part 'A' is worth ELEVEN marks and the total for the exam is 75.

Candidates in the third or later year of study for the degrees of MA(General), BA(Relig Stud), BD, BCom, BSc(Social Science), BSc(Science) and BEng should put a tick (✓) in the box on the front cover of the script book.

Part "A"

Answer ALL questions from this section

1. (a) A text editor, word processor and desktop publishing system can all be used to produce paper documents. What are the differences between these three applications? [3 marks]

The core of this is 'style'. A text editor is for editing programs, data etc. and just edits plain text with no supplied formatting or style options at all. A word processor provides many options for laying out a readable and aesthetically pleasing document (and manages large reports etc.). A Desktop publishing system is all about style and is used for pamphlets etc.

- (b) Approximately how many CD-ROMs would it take to back up a typical modern PC hard disk? [2 marks]

I expect them to know that a modern hard disk is 40-160 Gb and that a CD-ROM is approximately 700 Mb. An answer of about 100 gets the marks.

- (c) Give an example of how using a computer under poor conditions could affect your health and how this could be avoided. [2 marks]

RSI (wrist rests); backache (better chair or posture, footrest); headaches (better lighting, position of monitor, check monitor is in good condition)

- (d) What is a *cache* and what is it used for? [2 marks]

It is a fast local store of information which is expected to be read (or written) more than once and which otherwise would be slow to access. Processors use caches to speed up memory access and Web browsers use caches to avoid repeatedly reading web page components from the network.

- (e) An *IP address* is written as four numbers, e.g. 129.215.200.7. Why will you never see an IP address containing numbers greater than 255? [2 marks]

255 is the largest positive integer that can be stored in one byte. We either know or can assume that IP addresses are or were stored one number per byte and hence had to be less than or equal to 255.

2. (a) What factors go into the *cost of ownership* of a computer? [3 marks]

Money for hardware, money for software, time for any initial installation, insurance/warranties, learning how to use it (or training others), subscribing to anti-virus packages, ISPs etc., taking time to install upgrades, bug-fixes etc., time and media to back it up, cost of sorting problems, eventual upgrade and replacement.

- (b) List some of the benefits and possible problems you would expect to see when computerising a manual process. [5 marks]

Benefits: ability to tackle large tasks or speed up and remove drudgery (and some sources of error) of more mundane ones. Frees the mind for creativity; Adds the ability to visualise information in many ways and ask 'what-if' questions, etc. etc. Drawbacks: unfounded credence given to computer-generated information; information overload; lack of sanity checks; project over-runs due to e.g. poor specification; training and mind-set issues, etc.

- (c) Applets are small Java programs that can be embedded in Web pages and run in the client PC.
- i. Why might one want to run a program from within a Web page?[2 marks]
Speed of response, e.g. input validity checking; client end of client-server system, security; animated effects e.g. options lists; running complete local programs. I wouldn't expect them to get more than two of these.
 - ii. Why might it be dangerous to do so? [1 mark]
Hostile code (e.g. viruses) can use this mechanism to attack a machine.
3. (a) Describe the benefits a company might expect through creating and maintaining a Web site. Give examples where appropriate. [4 marks]

Lecture 19. A manufacturer might use it to provide technical information and support (Microsoft) or pre-sales information e.g. component specs. (RadioSpares). Benefits – more efficient customer support or increased sales. A brand-led company would do it for brand maintenance (Coca-Cola). A university would use it to present course material and course details. A travel company would use it to allow potential customers to plan a journey. Companies may be selling direct through web pages (Amazon). In most cases the desired results are increased sales, increased awareness, direct feedback or business efficiency.

- (b) Describe the measures and criteria you would use to compare and contrast different complete home computer configurations when choosing one. [4 marks]

Applications the system will run (really Mac vs Windows); Speed of processor; speed and capacity of hard disk; amount of memory; resolution and type of monitor; resolution, speed and function of additional peripherals e.g. DVD/CD-ROM/writer, printer, scanner, cost, cost of ownership (e.g. warranties, bundled software) etc., confidence in and location of supplier.

- (c) Describe three different kinds of computer-mediated communication and the benefits and drawbacks of each. [3 marks]

e-mail. 1:1, Benefits: speed, convenience, location-independence, asynchronicity (as in conversing across disparate time zones). Drawbacks: can be forged, not guaranteed delivery, spam, flaming. IRC-style chat: 1:several or several:several; Benefits: more immediate and conversational; Drawbacks: less permanent, not everyone uses it. Desktop video: sense of who you are speaking to; Drawbacks: generally poor sound, no eye contact. All suffer from loss of body-language cues and all chat suffers loss of 'sync' - a chat item may arrive after the conversation has moved on. I also mentioned email lists, news-groups and bulletin boards – many:many; permanent often structured record.

4. (a) Explain how the laser may be viewed as the most important invention that has contributed to the growth of computer communications. [3 marks]

An invitation to link laser to light to fibre optic cable to speed, capacity, reliability. LANs to WANs. Success encouraged push for similar improvements in other link technologies as fibre quality of service became accepted as normal.

- (b) Explain the difference between client/server and peer to peer organisations in networks. [2 marks]

Client devices request data from servers, servers manage shared devices and supplied data. Peer to peer members of network are all equal and communicate directly.

- (c) Identify a similarity and a difference in the part played by satellites in GPS use and global communication. [2 marks]

GPS use relies on one way signals from satellites. In global communication a satellite is a relay for signals between ground stations and allows two way communication.

- (d) Compare and contrast Bluetooth and WiFi. [2 marks]

Any accurate references to wireless, distance, scale, applications, speed of growth/acceptance etc. will be satisfactory.

- (e) What is identity theft and how might it occur? [2 marks]

It is the fraudulent use of one person's personal information by another in order to impersonate them. It can occur if the victim does not pay enough attention to security of personal information or through a successful attack by some viruses or 'trojans'. It can also occur through lapses in 'real world' security such as careless disposal of credit card receipts.

5. (a) I have a large pile of essays in random order on the floor. Describe one way I could efficiently sort them into alphabetic order by author name before starting to mark them. [2 marks]

This is an invitation to describe the workings of any of the non-insertion sort algorithms covered in lectures (quick-sort uni- or bi-directional bubble-sort, selection-sort or merge-sort)

- (b) Alternatively I could have marked each essay from the random pile and sorted them as I went along rather than as a separate operation. What is this sorting method and how would it operate in this example? [2 marks]

This is an invitation to describe insertion sort. Each marked is inserted in its correct ordered position in a steadily-growing pile. In practice one would probably create several smaller piles and sort each in turn then concatenate or merge.

- (c) Explain how the interaction of computer networking and database technology can together lead to privacy problems. [3 marks]

Information about an individual may be entered into one database and be considered private, protected and secure. Some or all of the entry may be communicated to one or more databases and eventually used in a way that breaches privacy legislation. Computer networks linking databases make this much more likely.

(d) Briefly describe two differences in the approach to privacy rights in communications in two of the following: USA, UK, China. [2 marks]

US laws largely aimed at criminal activities. China concerned to maintain strict government control over individuals and communications with outside agencies. UK picture mixed and confused with strong public recognition of privacy and defence of privacy but recent laws placing substantial limitations on privacy

(e) The Anna virus featured briefly as a worldwide news media story in 2001. Other than alliteration what links this to 'Ananova' ? Is Ananova in any way also a threat or is it an opportunity? [2 marks]

Ananova is an on-line news service with an animated newsreader and would have reported the story. Threat – helps to blur distinction between virtual life and reality. Opportunity – possibility of keeping costs down by replacing humans with animations.

Part "B"

Answer ONE question only from this section

- B1.** A friend is about to begin her final year academic project, leading to a dissertation. This is the biggest computerised project she has ever undertaken, will take several months and will involve many hours in front of a PC. She will need to undertake background research, collect and analyse numerical data, test and cross-check her results then write them up and present them to a small audience. What advice would you give her on how to make best use of software tools? What other potential problems should she be aware of? [20 marks]

Use the web for background research but be aware of its limitations (a practical assignment related to this and highlighted the danger of treating secondary sources as primary). Processing numerical data – exploit packages such as Excel for numerical analysis and tabulation but be aware that Excel is a general tool and that for specific tasks she may need to turn to software like SPSS. She should be aware of the danger of errors creeping into her data and keep cross-checks (I recommended having redundant check sums or totals in any spreadsheet) and the need for doing sanity checks on the results. She could use the software to perform range or format checks on her data as it is entered. If she is writing a large document she can use styles, spell checkers and automatic indexing within any major word processing package. All the usual rules for writing any document apply. When presenting it she needs to think about style and content. In general terms she should back here data up (they'll get marked down if they don't mention this) and be sure she has a proper working environment that won't give her the health problems covered in Q4.

- B2.** Describe some of the underlying processes in *e-business* and the issues involved in using them to create more profitable and effective businesses. What else is required to allow customers to use e-enabled businesses with confidence? [20 marks]

Translation: write everything you can think of about e-business from lecture 33. Communication (e-mail and web), testing and modelling, marketing based on buying patterns (customer profiling) and post-code analysis; integration of call centres, back office systems, sales, support and administration; trading hubs and procurement systems. New types of product and service; better management of globalisation; content management. Additional factors are an appropriate regulatory and legal framework, I would also accept comments on authentication and security here. Issues include recreating real-world values such as customer loyalty, good experience, understanding customer behaviour over phone or e-mail, giving confidence about privacy and security,

- B3.** Briefly describe how computer internetworking provides global communications. Explain how radio, television and telephone services are also able to be provided by appropriate linkages rather than via completely separate networks. Outline important technologies and how services are provided. Discuss the difficulties that have to be overcome to achieve the impression and reality of one technology. [20 marks]

Keywords are:

LANs, WANs, Internet, analogue, digital, broadcast, wireless, cable, modem, cable modem, set top box. Deliver radio, TV and telephone services to PC but also email to TV. Protocols, standards, commercial interests, governments.

- B4.** (a) Explain what you understand by mesh networks and ubiquitous broadband. [6 marks]

Local self-configuring wireless networks where nodes can be fixed or mobile and all act as senders, repeaters, routers, receivers.

High-speed always-on Internet access. Requires either fixed connection via cable or ADSL or wireless access to Internet node which may in turn be linked via wired or wireless connection.

- (b) Describe how a traveller with a laptop can have access to the World Wide Web in central London, at an international airport, in a remote Afghan valley and a remote Scottish island without having to enter a building or insert any plugs. [14 marks]

Any sensible suggestion accepted for each of the four sites.