

UNIVERSITY OF EDINBURGH
FACULTY OF SCIENCE AND ENGINEERING
DIVISION OF INFORMATICS
SCHOOL OF COMPUTER SCIENCE

Computer Literacy 1h

Degree Examination, June 2001

Specimen Solutions

Part "A"

1. (a) Identify two distinguishing characteristics you would use when comparing A4 document scanners. [2 marks]
"Resolution, colour depth, nature and speed of the interface". If one of those were included in the answer I would accept: bundled software, facilities, ease of use etc.
 - (b) A 1.7GHz processor chip is nearly 15% faster than a 1.5GHz chip yet 1.7GHz PC systems perform barely any faster than 1.5 GHz systems. Explain why this might be so. [2 marks]
"Because the processor is only one component in the system. Overall performance depends on many other factors such as speed of memory, hard disk, motherboard and in some cases the graphics board"
 - (c) Describe the result of anti-aliasing a character or graphical object and why the technique would be used. [2 marks]
"The result of merging the foreground and background colour at the edge of a graphical object resulting in a smoother appearance."
 - (d) What is data mining? [2 marks]
"The analysis of large volumes of data to find (subtle) patterns and relationships"
 - (e) Approximately how many full CDs could be copied onto a 75Gb hard disk - 1, 10, 100 or 1000? [2 marks]
"one CD ~ 750 Mb; 75Gb = 75000 Mb or 100 CDs"
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2. (a) High quality content is one feature you would look for in a good web site. Describe two others. [4 marks]
"Good style, function that is well matched to the purpose, good structure (easy to navigate), fast download time, reliability, ease of use by disabled people etc." You did an essay assignment on this .
 - (b) 'flaming' is an intemperate outburst over e-mail or on a bulletin board, often leading to a storm of similar mail in response. Why is e-mail more susceptible to this kind of phenomenon than other means of communication between people? [3 marks]
"Because the lack of real-world cues tends to make people overlook the fact that they are dealing with real people; because the lack of visible body language reduces feedback; because a message can be sent off extremely quickly without adequate thought"
 - (c) Widespread availability of good application software reduces tedious data handling and makes it possible to tackle large problems. What are some of the

pitfalls of computerising a previously manual operation? [3 marks]

"Trusting the results of an application too much; Computerising poor organisation without thinking about the organisation itself; Information overload". I would also accept answers relating to the process such as underestimating the amount of work involved.

3. (a) A spreadsheet is one of the class of *decision support systems*. Describe some of the functions of a spreadsheet and how a spreadsheet assists decision making. [4 marks]

"Calculation, sorting, visualisation, filtering, simulation ... A spreadsheet assists decisions through visualisation and being able to ask 'what-if?' questions"

- (b) Outline some of the steps employed in taking a mathematical model of a cube and turning it into a real-world view of a child's building block in a living-room. [4 marks]

"Creating an isometric(technical drawing) representation. Adding perspective; Deleting hidden lines; Adding simple coloured polygonal shading; applying texture; applying realistic lighting, shadows and reflections"

- (d) What class of application would you choose

- (i) To determine the value of properties at risk of flooding in Scotland?

"A Geographical Information System (GIS)"

- (ii) To optimise passenger routes for an airline?

"A Linear Programming Package"

[2 marks]

4. (a) Briefly describe the role played by a modem and a packet-switching network when you use your computer to transfer a file from the USA. [4 marks]

"Keywords are: (Modem) – interface, modulation, translation, bits, electrical wave, computer, telephone, point-to-point; (packet-switching) – file, packet, routing, WAN, sharing"

- (b) How do synchronous and asynchronous transmission differ? [3 marks]

"start/stop, continuous, character by character, timing, overhead, speed, complexity, expense"

- (c) Explain how 'sharing' can be viewed as the key to worldwide computer communication. [3 marks]

"Exclusive access is potentially wasteful – share servers and transmission links; aim to avoid excessive queueing delays"

5. (a) Briefly explain the following steps in relation to programming: design; code; test; maintain [4 marks]

"(design) – problem, algorithm, pseudocode; (code) – statements in"

programming language; (test) – show it works as intended; (maintain) – documentation, adjust to changing contexts, fix bugs”

- (b)** Briefly describe three other steps in the complete process of creating a computer-based solution to a large problem. [3 marks]

”investigation – determine problem, feasibility study; analysis – understanding existing system, data gathering; implementation – conversion to new system, possible existence in parallel; maintenance – revision, additions, new compiler; retirement – phase system out, switch off, start new cycle”

- (c)** Choose one programming language. Explain which generation it belongs to and why it is considered important. [3 marks]

”All sensible points accepted”

Part "B"

- B1.** Outline the major steps and influences in the evolution of modern Information Technology and offer a prediction of what will be the next major development(s). Justify your assertions. [20 marks]
"WWII brought about the first recognisable computers to support code-breaking efforts. These were large one-off machines for military use. Next step was the evolution into the mainframe computer, still huge and manufactured in small numbers for corporate business and scientific use. Following on from that was the minicomputer and the beginnings of networking, then the move from paper I/O to VDUs and windows/mice/menus mode of interaction and the rise of the personal computer. I identified the Internet and WWW as the next major development and led you to predict wireless communication, the breakup of the PC into task-specific items – PDAs, phones etc plus intelligent networks as a future trend. Alongside each of these you can chart activity as going from military to corporate business/scientific to office and personal use then the slightly rocky rise of e-business and the .com world. I'm looking for a general understanding of how we reached where we are now"
- B2.** Information Technology pervades most of business and society. Describe some of the considerations that will be in the minds of those developing e-businesses or influencing the evolution of an information-rich society. [20 marks]
"There are many ways this question could be answered, centring on security, privacy, interaction between old (legacy) and new systems, reaching everyone (no information-poor underclass), safety from predators such as paedophiles, information overload, pace of change, cost of maintenance, modes of access, mobile access, new types of information, new types of relationship, new markets, technologies (evolution of WWW from HTML (content) to XML (meaning)), etc. etc." Two lectures covered related material and one essay assignment touched on these issues.
- B3 (a)** The following terms are sometimes loosely used as if they were interchangeable: "an internet", "The Internet", "The World Wide Web". Explain their correct use. [8 marks]
"an internet – network of networks, defined, owned, controlled; The Internet – worldwide network, not defined, owned, controlled, growing, TCP/IP; WWW – distributed browsing and searching system"
- (b)** Briefly describe six important advances in communication over the last 200 years [12 marks]
"All reasonable candidates accepted"

- B4 (a)** Explain how a Quicksort is a poor choice of sorting algorithm if the data is nearly sorted at the start [3 marks]
"Quicksort makes no use of existing order and immediately starts moving items, some of which might have been in the correct place. In this case it does additional work to eventually return them to the correct site."
- (b)** Describe the operation of a firewall in a computer network [3 marks]
"Acts as a gateway control only allowing external access to specific services on the protected system. May also control outgoing access to the Internet"
- (c)** Briefly discuss the issue of computer security in relation to hardware, software and data from the viewpoint of both a personal computer user and a large organisation [14 marks]
"Keywords: theft, backup, redundancy, fault-tolerance, disaster recovery, illegal copying, IPR, alteration, copying, audit trails, logs, employees, passwords, access control"