

UNIVERSITY OF EDINBURGH
FACULTY OF SCIENCE AND ENGINEERING
DIVISION OF INFORMATICS

Computer Literacy 1h

Resit Examination
Sample answers

Date: September 2002

Time: ?

Board of Examiners
Chair: D. K. Arvind
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 and the total for the exam is 70.

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) Give four examples that outline the historical evolution of the user interface to computer systems [2 marks]

hard wiring; front panel; paper tape/cards; teletype; VDU; GUI ... natural language (Slide 2.10 refers)

- (b) Name one part of a computer-based service that does not obey Moore's law and a consequence of this. [2 marks]

People. Services become an increasingly important part of the bundle when selling hardware as this is where the profit is made. Slide 2.19

- (c) Using reasonable size estimates, show approximately how many 3-minute sound tracks encoded as MP3 will fit on a CD-ROM. [2 marks]

MP3 track is 3 Mb, CD-ROM is 650-700 Mb., so 200-250. Any small number of Mb accepted for MP3, they should know a CD-ROM is 650 Mb +/-

- (d) What is the main application of a Linear Programming package? [2 marks]

Optimising problems with many variables such as production process, delivery schedules, oil tanker and aircraft routes. Slide 10.14 refers

- (e) What is the principal weakness of single-key encryption systems? [2 marks]

Having to send the other party the password somehow.

2. (a) Cascading Style Sheets (CSS) are a mechanism for specifying the style of headings, page layouts etc. Explain why you would use Cascading Style Sheets rather than just writing plain HTML. [4 marks]

Web pages should be designed for ease of maintenance. This is generally achieved by separating style and content and CSS allow you to make a single definition of a stylistic element which is then inherited by every page that refers. Changing the style can then be done by a single change rather than a change to every page.

- (b) The spreadsheet fragment below shows part of an expenses claim for a contract, itemized and totalled in Pounds (£) and Euros (€). Rows 8 to 12 have been hidden but contain entries for Visit 3 to Visit 7 inclusive.

	A	B	C	D	E	F
1		Conversion: £/€:		1.5		
2						
3	Item	Consultant costs (£)			Consultant costs (€)	
4						
5		Fees	Expenses		Fees	Expenses
6	Visit 1	300	600		450	
7	Visit 2	1000	800			
13	Visit 8	200	100			
14	Total					

- i. Write down formulae for the missing totals in B14 and C14. [2 marks]

=SUM(B6:B13); =SUM(C6:C13)

- ii. Cell E6 contains a formula for converting cell B6 into Euros. Explain what you would do to generate the values in E6:E13 and F6:F13 using the mouse only (i.e. without any further typing). Write down a suitable formula for cell E6. [4 marks]

*Click on cell E6 to highlight it; drag the marker on the cell corner downwards then across (or across then downwards) to propagate the formulae to the relevant cells. The formula needed is =B6 * \$D\$1 (a relative reference * an absolute one)*

3. (a) Describe some of the functions you would expect to find in a database query language. [4 marks]

Lecture 11 refers. I'm looking for you to demonstrate understanding of basic DB relational operators at least at the level of filtering (restricting) a list by keyword, joining by column, merging (union) the rows of two lists, returning the common elements between two lists (intersection) and that queries can be built up from combinations of these

- (b) List two qualities you would expect of "good" management information. [2 marks]

Any two of: Comprehensive, Accurate, Relevant, Timely. Slide 10.13

- (c) List four of the key functions of an operating system. Choose **one** and explain how it contributes to the performance or smooth running of a computer [4 marks]

Lecture 9. Any four of: Basic control of hardware (BIOS), task management and scheduling, resource management, file system, bootstrap and shutdown, protection and security, configuration management, (GUI).

Scheduling: ensures all programs get a fair share of resources and that priority activities get through, optimising performance overall. Virtual memory: ensures programs can still run even if their combined memory requirement exceeds RAM. Protection: prevents rogue programs from writing over each other, grabbing

resources and not letting go and so on. GUI (I'm treating this as part of the O/S here): presenting a convenient and easily learned interface to the user. File system (ditto): allows programs optimised access to a variety of devices.

4. (a) List three possible types of error in computer communication. [3 marks]

bit transmission errors; loss of synchronisation; lost or invalid messages; errors in addressing; deadlocks; excessive delays; unauthorised access. Slide 20.21

- (b) Briefly describe three physical media used to provide links between computers. [3 marks]

co-ax, twisted pair, fibre-optic cable, microwave, satellite, radio, Infra-Red ...Slides 21.11, 21.12

- (c) Write a note summarising the key features of **one** of
i. TCP/IP
ii. Ethernet [4 marks]

all coherent and sensible contributions accepted. Slides 24.7, 26.2

5. (a) Outline the function of a *firewall* in a computer network [2 marks]

Slides from lectures 27, 29, 30

- (b) Briefly describe an *ethical* issue that has arisen with the spread of computer communication [2 marks]

Lecture 31 refers

- (c) Briefly describe a *legal* issue that has arisen with the spread of computer communication [2 marks]

Lecture 31 refers

- (d) i. Describe the process of an *Insertion Sort* [2 marks]
ii. Illustrate Insertion Sort on the following set of numbers:

17 9 13 5 18 15

17 9 13 5 18 15

9 17 13 5 18 15

9 13 17 5 18 15

5 9 13 17 18 15

5 9 13 15 17 18

Show the set after each step, with the final sorted set having the smallest value on the left and the largest on the right. [2 marks]

Part "B"

Answer ONE question only from this section

- B1.** Describe some of the ways in which e-business is now changing the way firms operate and comment on the likely benefits and possible problems. [20 marks]

An invitation to brain-dump any and practically all of lecture 25. New communication and distribution channels, new products and services, new concepts of value, new types of relationship, new kinds of information, greater pace; results include call centres, integration between different parts of organisations and their suppliers, profiling, trading hubs, you name it. Problems: technology ahead of legal and ethical framework – privacy, multinational contractual processes; authentication, handling change, legacy systems, lack of business models, customer trust etc. etc. Benefits: lower operating costs, flexibility, wider reach, better customer information, better customer service, better management information, quicker and more accurate response to problems and opportunities, new opportunities

- B2.** Many computer-related projects go catastrophically wrong or go way over budget. Describe some of the principles you would apply when asked to contribute to an IT-based project and the kind of problems that might be expected if you failed to do so. [20 marks]

There are at least two ways into this question. I'm looking for you to say that you would first get a proper statement of the problem then start to deconstruct it. You would need to consider the background and skills of all concerned, which parts of the problem were computer problems and which required subject-related input; you should ask "why?" a lot to identify any false underlying assumptions; you need to consider the environment in which the project fits – if it is a business, who you talk to and work with for instance. You need to consider the existing framework (legacy systems) etc. You need to consider solutions appropriate to the scale and resources of the business. The system needs to be documented and tested; people need to be trained at the right time. Failure in any of these will result in the project being delayed, going over budget or not meeting expectations. (Lecture 14, an invented case study, refers)

Another way into this question would be to regard this as a question on bugs and talk about the inherent bugginess of software and talk about failures in requirements, specification or implementation and quote Ariane-5 etc. This thread goes on to consider topics like defensive programming, the need for sound design, good ergonomics, then formal procedures for implementation and testing. Lecture 15 refers.

B3. Briefly describe what you understand by each of the following and explain how they are related:

- The ARPANet
- The Internet
- An intranet
- The World Wide Web
- Bluetooth

[20 marks]

For each section, 3 marks for a description and one for explaining how it relates to some or all of the others.

B4. Predicting technological change is notoriously difficult, especially in communications. Outline what you know of capabilities provided by static and mobile computing/communicating devices now available. Describe what you see as likely developments in technology and services in the next few years.

[20 marks]

Technological: current devices – computers/laptops, TV, PDAs, mobile phones, WAP, G3, position-aware mobiles, in-car systems, general convergence.

Services: interactive TV, computer systems configured ‘on-the-fly’, in-car information services, mobile position-related information, mobile office, mobile video.

Lecture 32 refers