UNIVERSITY OF EDINBURGH


COLLEGE OF SCIENCE AND ENGINEERING


# Computer Literacy 1h


Class Examination



**Date:** 25 January 2003
**Time:** 09:30 a.m. – 11:00 a.m.
**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'
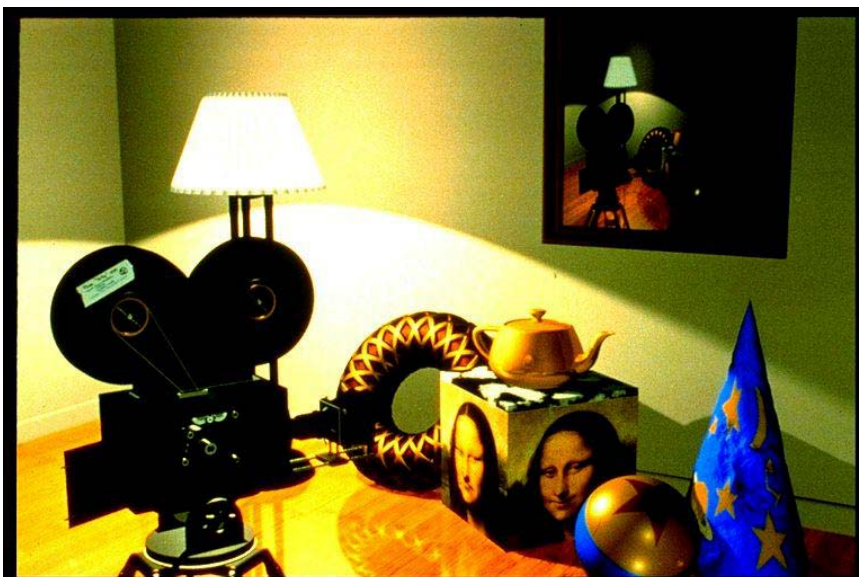
Marks for questions are indicated in brackets after each question and the total for the exam is 70.



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) What is e-mail 'flaming' and how can it be prevented ?           [2 marks]

    (b) What is Moore's law? Name one 'brick wall' that might prevent computer performance from following Moore's law indefinitely.           [2 marks]

    (c) What are the advantages and disadvantages of backing up data to tape versus CD-writer for:
    i.   300Mb of personal files ?
    ii.  The contents of an entire modern hard disk ?           [2 marks]

    (d) Windows filing systems delete files by returning the blocks to a free list and removing the file name entry from a table of contents. What does *not* happen and what is a consequence of this?           [2 marks]

    (e) GIF, TIFF and JPG are all image file formats. Describe a significant difference between any <u>two</u> of them and say how this affects the way they are used.
                                                                              [2 marks]

2.  (a) Describe or illustrate the key functions of
    i.   A Spreadsheet application
    ii.  A Linear Programming package
    iii. A Database Management System (DBMS)
    iv.  A Geographical Information System (GIS).           [4 marks]

    (b) i.   Give two advantages of displaying information in graphical as opposed to numeric form.           [2 marks]

    ii.  Outline some of the processes involved in producing a simulated real-world scene such as the one illustrated.           [4 marks]

3. **(a)** Describe some of the features you would expect to find in a well-designed software application. Illustrate your answer with examples from software you have used in the course. [5 marks]

**(b)** There were reputedly over 3000 bugs in Windows 95 yet aircraft control systems are just as complex and are expected to operate with failure rates of less than 1 in 1,000,000,000 hours flying time.

    **i.** How do you explain this apparent discrepancy? [1 mark]

    **ii.** What features of software design and implementation are needed to ensure a high level of software reliability? [4 marks]


4. **(a)** Give two similarities and two differences between e-mail and conventional postal communication. [2 marks]

**(b)** Explain how reliable communication can take place over unreliable links. [2 marks]

**(c)** Outline the differences between two wired physical media used for computer-computer communication. [2 marks]

**(d)** In the context of wireless telephony distinguish between 1G, 2G, 2.5G and 3G by listing one characteristic of each. [2 marks]

**(e)** Illustrate insertion sort on the following series of letters. Show the set after each change with the final sorted list having letters in alphabetic order from left to right. [2 marks]

    **A    Z    F    D    L    B**


5. **(a)** For each of the following, draw out and describe a suitable network topology and the relationship between clients and services:
    **i.**      Intelligent lottery terminals and their central server
    **ii.**     Student PCs within a university microlab
    **iii.**    The Napster music-exchange facility
    **iv.**    Point-of-sale terminals within a large supermarket.
[4 marks]

**(b)** Explain the function of **two** of:
repeater; bridge; gateway; router. [2 marks]

**(c)** What is a *mesh* network? [2 marks]

**(d)** A corporation is wiring up networked services within its sites and between sites nationally. Within the sites it can operate privately-owned networks. Give two ways it can join these together to form an *Extranet* . [2 marks]

**Part "B"**

**Answer ONE question only from this section**

**B1.** The purpose of a Web site is to support the objectives of the individual or organisation to which it belongs. Using examples where appropriate describe some of the likely objectives of businesses or institutions and the ways in which Web sites can support these.                                                           [20 marks]

**B2.** IT is used in business, government, education, health and many other aspects of everyday life. This brings benefits if used wisely but dangers if abused by individuals or repressive governments or exploited by terrorist organisations. Discuss some of the ways in which IT materially affects our lives for the better and the issues we all have to be aware of to prevent its abuse and maintain our safety, privacy and freedom.                                                           [20 marks]

**B3.** Describe the services and technologies involved in allowing me to send e-mail reliably and securely from my WiFi-enabled PDA at the bottom of my garden to my daughter at home in Singapore or at her satellite station in the Sahara.
                                                           [20 marks]

**B4.** The School of Informatics lost a building and a quarter of its computing resources in a catastrophic fire in December 2002. Describe what you would expect to have been the consequences in terms of IT. If you were faced with this situation what problems would you expect to have to deal with in what order to get everyone up and running again? What opportunities might exist to exploit new technology to rebuild the complete IT infrastructure of a university department from nothing ?                                                           [20 marks]