



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

COMPUTING

9691/03

Paper 3

May/June 2007

2 hours

Additional Materials: Answer Booklet/Paper



READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **4** printed pages.



- 1 (a) Describe the following features of a network operating system.
(i) Transparency
(ii) Directory services
(iii) Security [6]
- (b) Describe **two** of the main components of a typical desktop PC operating system. [4]
- 2 A school is to buy computer systems for its English language department, which also teaches drama. Give examples of the uses to which the systems may be put and discuss the hardware requirements. [7]
- 3 Jobs that require printing, by a network printer, are stored until the printer is ready. Their addresses are placed in a queue to await their turn for printing. Addresses of new jobs are placed at one end of the queue. These job addresses are taken from the other end when the printer is ready.
(a) State **two** reasons why it would be preferable to store the queue in a linked list rather than an array. [2]
(b) If the queue is held in a linked list, describe an algorithm for
(i) inserting an address into the queue,
(ii) reading an address from the queue. [5]
- 4 A retail business is to open a web site which will allow customers to order and pay for goods. Explain the problems that can arise due to the confidential nature of some of the data. State ways of overcoming these problems. [8]
- 5 (a) Give an example of an application where data held electronically has commercial value to an organisation. [1]
(b) Describe **three** features which make electronic storage of data valuable to an organisation. [6]

6 A name is passed as a parameter to a function.

The function uses a loop structure to search for the name in an array.

It returns the details found to the calling program.

(a) The name to be searched can be passed either

(i) by value, or

(ii) by reference.

Using this example, explain what is meant by a parameter being passed by value and by reference. [2]

(b) Using examples from this function, explain what is meant by a

(i) local variable,

(ii) global variable. [4]

(c) Two types of translator are interpreters and compilers.

Describe the difference between an interpreter and a compiler and state why both would be used with this function. [4]

(d) Explain the purpose of a loader in the running of the final program. [2]

7 (a) Describe what is meant by Von Neumann architecture. [2]

(b) (i) Explain how parallel processing differs from serial processing. [2]

(ii) State an application which would use parallel processing, giving a reason for your answer. [2]

8 (a) A robot is being developed to carry out procedures in a nuclear reactor.

Give **three** reasons why simulation would be used in testing the design of the robot. [3]

(b) A robot lawn mower is being developed for sale to the general public. Suggest why simulation is **not** appropriate for the development of this robot. [2]

9 A computer stores numbers in floating point form, using 8 bits for the mantissa and 8 bits for the exponent. Both the mantissa and the exponent are stored in two's complement form.

(a) Explain the effect on the

- range
- accuracy

of the numbers that can be stored if the number of bits in the exponent is reduced. [4]

(b) Give the denary number which would have 01000000 00000000 as its binary, floating point representation in this computer. [2]

(c) Explain why it is not possible to represent zero as a normalised floating point number. [2]

10 A variable name is defined in a particular system as:

- one or two letters, followed by
- any number of digits(including zero) followed by either a
 - \$ sign if there are no digits,
 - & sign if there are any digits.

Draw a syntax diagram which describes a variable name.

[6]

11 (a) The structure of a database management system (DBMS) consists of three levels;

- External level,
- Conceptual level,
- Internal level.

State the meaning of each of these levels.

[3]

(b) Describe the purpose of the following:

(i) the data description language (DDL),

[2]

(ii) the data manipulation language (DML).

[2]

12 A building supply business has been using paper-based administration systems for many years. The decision has been made to computerise all their procedures.

Discuss the training requirements necessary to successfully implement the computerised systems. Include in your answer any problems, to do with training, that may arise.

[7]