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

COMPUTING **9691/01**

Paper 1

October/November 2006

2 hours 30 minutes

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, music 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.

1 a) When a new piece of software is being planned it is necessary for the analyst to collect information about the present system.

State **three** ways of collecting information about the present system and give an advantage of each.

(b) It is important to maintain a system after it has been installed.

Give **two** reasons for system maintenance. [4]

2 A large factory employs many thousands of workers. The workers' times of arrival and departure are noted. At the end of each week the pay for each worker is calculated by a computer system and the pay slips are produced.

(a) Explain why this is an example of batch processing and give reasons why batch processing is sensible. [4]

(b) The employee file is stored as a sequential file.

   (i) Explain what is meant by a sequential file. [2]

   (ii) State **two** reasons why a sequential file is a sensible choice of file type in this case. [2]

(c) Give an example of a computer application which would need to be processed in real time. Justify your choice. [2]

3 (a) INPUT A, B
    IF B = 0   THEN C = A
                  ELSE C = A ÷ B
    ENDIF
    PRINT A, B
    PRINT C
    END

Write down the outputs produced by the algorithm if

   (i) A = 8, B = 2 [2]

   (ii) A = 6, B = 0 [2]

(b) An automatic fan is designed so that it turns on only when a person is in the room AND the temperature is above a set value (D).

The fan receives information from two sensors.

    1. A motion sensor which returns a value (M) dependent upon a person being sensed in the room.
    2. A thermistor (electronic thermometer) which returns the temperature in the room (T).

Produce an algorithm to control the fan. Your algorithm may be expressed in any form. [6]

4 (a) State what is meant by

   (i) a passive information system;

   (ii) an interactive information system.

(b) An analyst needs to design the human computer interface (HCI) for a control room in a manufacturing plant.

Describe the factors that the analyst should consider when designing the interface. [6]

5 (a) State what is meant by the following types of data transmission.

   (i) Simplex.

   (ii) Half duplex.

   (iii) Serial.

   (iv) Parallel. [4]

(b) Explain how buffers and interrupts are used in the transfer of data from primary memory to a hard drive. [6]

(c) State **two** of the modes of data transmission mentioned in part (a) which would be used to transfer data from primary memory to a hard drive. Give reasons for your answers. [4]

The remaining questions refer to the following information.

Authors send books to a publishing company. At this stage books are text documents with any illustrations being added at the end of the publishing process.

6 When a book is sent to the company by an author, it is sent in hard copy form as well as on a disk. It is read and, if accepted, is then sent electronically to a person called a copy editor. The copy editor reformats the text to make it suitable for publication.

(a) Explain why the original copy of the book is in

   (i) hard copy form; [2]

   (ii) electronic form on a disk. [2]

(b) The copy editors employed by the company work from home.

Give an advantage and a disadvantage of working from home from the point of each of

   (i) the company; [2]

   (ii) the copy editors; [2]

   (iii) society. [2]

(c) All copy editors are expected to have a stand-alone computer.
Copy editors need to communicate with head office. State what extra hardware and
the company would have to supply to each copy editor to allow this communication
reasons for your answers.

7   The communications system used by the company uses circuit switching for the transmission of
data between head office and the copywriters.

(a) Explain the difference between circuit switching and packet switching, giving an advantage of
each method.   [4]

(b) When texts are transferred large amounts of data are transmitted.

(i)   The characters are sent as ASCII characters.
Explain what is meant by an ASCII character.   [2]

(ii) During transmission data can be corrupted. Check sums and parity checks can be
carried out on the data.
Explain how check sums and parity checks are used to detect transmission errors.   [4]

8   The company needs all the copy editors to be using the same software for preparing the finished
books. A decision has to be made between using custom-written software and off-the-shelf
software.

Describe the difference between the two types and explain why the company would choose to
use an off-the-shelf software package.   [4]

9   State the purpose of each of the following pieces of utility software and say how each would be
used by the copy editors.

(i)   Disk formatting.   [2]

(ii) File handling.   [2]

(iii) Hardware drivers.   [2]

(iv) File compression.   [2]

(v)   Virus checker.   [2]

[Total 90]