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

COMPUTING **9691/12**

Paper 1 **October/November 2010**

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 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.

UNIVERSITY of CAMBRIDGE
International Examinations

[Turn over

1   Describe **four** functions of an operating system.

2   **(a)** **(i)**   Describe what is meant by source code.

   (ii) Explain why source code needs to be translated into object code.   [2]

   (b) State what is meant by the following types of programming error:

   (i)   syntax error   [1]

   (ii) arithmetic error   [1]

   (c) Explain what is meant by:

   (i)   white box testing,   [2]

   (ii) alpha testing.   [2]

3   **(a)** A school information system stores data about each student in the school.
        For each of the following data items, state the most suitable data type. Justify your choice.

   (i)   Home telephone number   [2]

   (ii) Number of subjects studied   [2]

   (iii) Whether or not the student is going on the school trip   [2]

   (b) Using the example of the school information system, explain how fields, files and records
        are related.   [3]

4   Describe the need for the following components in an expert system used in medical diagnosis:

   (a) knowledge base   [2]

   (b) rule base   [2]

5   Describe how the stock in a shop can be controlled automatically by a computer system.   [6]

6   **(a)** State **two** items of hardware and **one** item of software used to create a
        local area network (LAN) with a number of computers.   [3]

   (b) Draw a labelled diagram to show a star network topology.   [3]

   (c) When data is transmitted around a network it is possible that the data becomes corrupted.

        Explain how parity checking can be used to detect such transmission errors.   [4]

7 A piece of software is written to interrogate past records of summer temperatures to ~~~~~~~~~~ for global warming.

The software needs to read the average summer temperature for each year from 1900 to ~~~~ It must work out the mean (M) of these average summer temperatures for the 110 years.

The user can now enter any year from 1900 until 2006. The software will calculate the mean of the temperatures over a four year period, starting from that year. (For example, if 2000 is entered, then the mean of the temperatures for 2000, 2001, 2002 and 2003 is calculated.) If this mean is more than 4 degrees higher than M, it will then report "Hot".

Produce an algorithm for the software.   [10]

The remaining questions refer to the following information.

A factory production line produces parts for a car manufacturer. The management of the decide to computerise the production line.

A systems analyst is employed to oversee the computerisation.

8   The analyst needs to collect information about the present system.

State **one** advantage and **one** disadvantage of each of the following methods of information collection.

   (i) Observation [2]

   (ii) Interviews [2]

   (iii) Document collection [2]

The new system has been introduced to the production line.

9   When a piece of metal is sent to one of the machines its length must be measured.

   (a) Describe how the length of the piece of metal can be automatically measured by the system. [2]

   (b) (i) Describe a validation check which can be done on the measurement. [2]

   (ii) The operator inputs the required length of the finished piece.

   Describe **two** ways that this length can be verified. [4]

10 The machines on the production line are arranged in groups of six. One operator oversees the work of a group of six machines. The machines are controlled by the computer system.

State **three** different types of output format which would be appropriate for the operator. Justify your answers. [6]

11 The operator sometimes needs to alter the type of work done by a machine. A form-based HCI is used to input the new data.

   (a) State **two** output peripherals that would be used for the HCI. Justify your answers. [4]

   (b) Describe a form-based HCI and explain why it would be used in this case. [4]

12 Before the new system was introduced, the company employed operators for each of the machines on the production line.

   Describe the effects that the introduction of the new system will have had on these workers. [5]