UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level

COMPUTING **9691/03**

Paper 3 **October/November 2008**

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.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1   State **four** reasons for using simulation to test a design.
    For each of your four reasons, give an example of a situation where a simulation would

2   Interpreters and compilers can be used to translate high level language code into a form
    understood by a computer.

    (a) State what is meant by

        (i)   source code,

        (ii) object code.   [2]

    (b) With reference to object code, explain **one** difference between interpretation and compilation.
                                                                                                  [2]

    (c) **(i)**   State **one** reason for using a compiler rather than an interpreter to execute a piece
                of high level language code. Justify your answer.   [2]

        (ii) State **one** reason for using an interpreter rather than a compiler to execute a piece of
                high level language code. Justify your answer.   [2]

3   Part of a school database consists of a table of student details and a table of teacher details.
    A teacher teaches many students.
    A student is taught by many teachers.

    (a) **(i)**   State the type of relationship between the two tables.   [1]

        (ii) Explain how the relationship between the student and teacher tables can be normalised.
                                                                                                  [2]
        (iii) Draw the normalised relationship between the tables in the form of an entity-relationship
                (E-R) diagram.   [3]

    (b) Explain what is meant by each of the following terms and give an example of each from the
         tables in part **(a)**.

        (i)   Primary key

        (ii) Foreign key   [4]

4   Describe **three** features that would be available in a mark up language.   [6]

5 A company introduces a new computer system in its headquarters building.
Each of the offices has a network of computers. The individual networks are joined to allow communication throughout the building.

(a) Explain the purpose of the following network components and how they would be used in the company's offices.

(i) Bridges

(ii) Routers

(iii) Modems [6]

(b) The staff need to be trained to use the new system.
Discuss the advantages and disadvantages of providing staff with a training course accessed on the network, rather than having time-tabled sessions with a tutor. [6]

(c) A large amount of software and files are used on the system.
State the meaning of a software audit and explain what would be included in the software audit for the company. [6]

6 Explain how memory is managed in a typical modern computer system.
You should use the following as headings for your answer.

(i) Paging [3]

(ii) Segmentation [3]

(iii) Virtual memory [3]

7 (a) State what is meant by

(i) a procedure,

(ii) a parameter that is passed to a procedure. [2]

(b) Explain how a stack is used to handle procedure calling and parameter passing. [4]

8 (a) Describe basic Von Neumann architecture of a computer. [3]

(b) (i) Explain what is meant by a parallel processor system. [2]

(ii) State the advantages and disadvantages of using parallel processing for weather forecasting. [4]

9 The names of 20 students in a computing class are stored in an array called
NAME(X) where X stands for a number between 0 and 19.

(a) Describe an algorithm to find the position of a particular student in the array, using a
search.

(b) (i) Explain why the search in part (a) would **not** be suitable if the array was large
enough to store the names of all 1000 students in the school. [2]

(ii) Suggest a better method of searching for a particular name, justifying your answer. [3]

10 The following rules define <WORD> in a piece of text.
<LETTER> :: = A│B│C│D│E│F│G│H│I│J│K│L│M│N│O│P│Q│R│S│T│U│V│W│X│Y│Z
<WORD> :: = <LETTER>│<LETTER><WORD>

(i) State why

Hello

is not a word. [1]

(ii) <SENTENCE> is a set of words ending with a full stop (.) or a question mark (?)
Define <SENTENCE>.

(There is no need to rewrite the rules for <LETTER> and <WORD>). [5]