

CAMBRIDGE

INTERNATIONAL EXAMINATIONS

**DIPLOMA IN COMPUTING
PAPER 3**

5218

NOVEMBER SESSION 2002

TIME 2 hours

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces provided on the answer paper/answer booklet.

Answer **all** questions.

Write your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

INFORMATION FOR CANDIDATES

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

You are reminded of the need for good English and clear presentation in your answers.



UNIVERSITY *of* CAMBRIDGE
Local Examinations Syndicate

This question paper consists of 4 printed pages.

- 1 (a) (i) State **two** places where the operating system for a PC may be stored. [2]
 (ii) Give **one** advantage of using one method as opposed to the other. [1]
- (b) Describe how the operating system deals with interrupts.
 You should include references to
- (i) types of interrupts and how the operating system distinguishes which to service [3]
 (ii) how the operating system knows how to service an interrupt [3]
 (iii) how the operating system is able to return to the original job that it was running [3]
 in your answer.
- 2 (a) State what a loader is and describe its purpose. [3]
 (b) Describe the purpose of a linker. [3]
- 3 (a) Describe what is meant by parallel processing. [2]
 (b) State one advantage of parallel processing over serial processing when a large number of calculations are to be performed. [1]
 (c) Explain why weather forecasting makes use of parallel processing. [2]
- 4 (a) (i) Some data is held on a computer system in no particular order. State the type of search used to find a data item, and explain why that type of search would be used. [3]
 (ii) A large amount of sorted data is held on a computer system. State the type of search used to find a data item, and explain why that type of search would be used. [3]
- (b) (i) The numbers
 16 43 27 19 2
 are to be sorted into ascending order, using a quick sort. Explaining clearly what you are doing, show the steps in the first pass of the quick sort. At the end of the first pass, 16 should be in its correct position. [7]
 (ii) Explain why a quick sort is suitable to be programmed recursively. [2]

- 5 A charity decides that it would be a good business decision to set up its own web site.
- (a) Explain how it could use the web site to its advantage. [5]
- (b) The charity maintains a register of supporters. A member of the public will be able to become a supporter by entering their information on the web site. People can also buy products from the charity through the site, using their credit card.
- Identify problems that may arise through the interchange of information and suggest possible solutions which may be implemented. [8]
- (c) The charity has commissioned a software company to write a set of accounts software. The company prides itself on its ability to monitor and maintain a customer's system. Discuss how the company would monitor and maintain the charity's system. [5]
- 6 A school has a network on one site for use in the teaching rooms. It has another site two kilometres away where there is a library. The school wishes to install a network of computers in the library to help with the management of books. It also wishes to link the two networks.
- (a) A ring network and a bus network have been suggested for use in the library.
- (i) Give **one** advantage of each type of network. [2]
- (ii) Give **one** advantage and **one** disadvantage of including a file server on the network. [2]
- (b) (i) State **two** problems that will arise when the networks are to be linked. [2]
- (ii) Give a solution to each of the problems identified. [2]
- (c) Describe how the library network will help in the management of books. [5]
- (d) The school administration network is to be added to the system. The three networks are to be connected to a single piece of hardware, which will automatically control the passing of data between the networks. State the additional problem that this piece of hardware will need to solve and state what it is called. [2]
- 7 The main door to a bank is to be computer controlled to maximise the effect of the air conditioning system. The door must open when a customer needs to enter or leave. It must not close if a person is in the way.
- (a) State **two** sensors which would be needed by the control system, saying why each is needed. [4]
- (b) Explain the need for actuators in this type of control system. [2]
- (c) Explain how feedback is used by the control system during the closing of the door. [2]

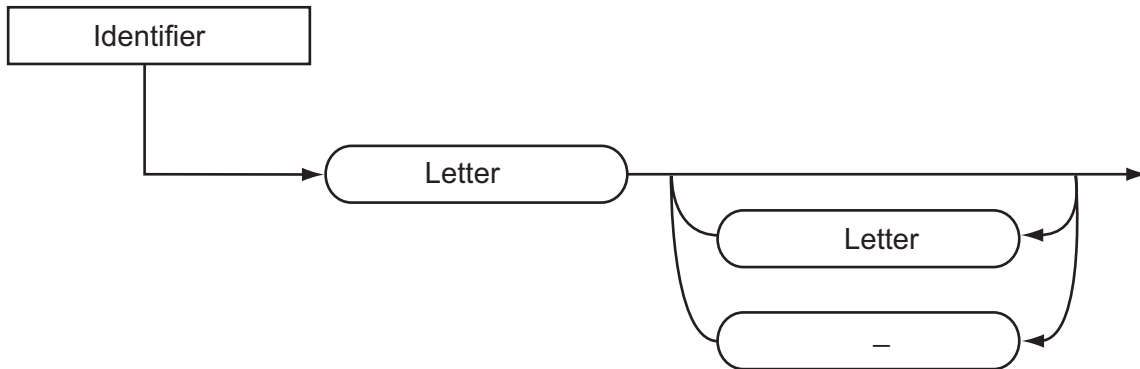
8 A database management system (DBMS) contains a data description language (DDL) and a data manipulation language (DML).

(i) State **two** functions of the DDL.

(ii) State **three** functions of the DML.

[5]

9 Below is a syntax diagram that defines legal user-defined identifiers for a particular programming language.



The category Letter consists of the 26 letters of the alphabet in upper case, for example G. The diagram also includes the dash , -.

(a) Using this syntax diagram state, with reasons, whether the following are legal identifiers or not.

(i) count

(ii) -COUNT

(iii) TOTAL-COUNT

(iv) COUNT3

(v) TOTAL COUNT

[5]

(b) We need to redefine an identifier to allow a digit from 0 to 9 to be included in any position but the first. Redraw the syntax diagram to take this into account.

[1]