CAMBRIDGE
INTERNATIONAL EXAMINATIONS

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level

COMPUTING   **9691/3**
PAPER 3

SPECIMEN PAPER   2 hours

Additional materials:
    Answer paper

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.

This question paper consists of 4 printed pages

[Turn over

1 (a) Explain the difference between the use of a compiler and an interpreter in the translation of a high level language program into executable form. [4]

(b) State in what circumstances it would be preferable to use

    (i) a compiler rather than an interpreter [1]

    (ii) an interpreter rather than a compiler [1]

(c) Explain how a stack can be used to control calls to procedures. [4]

2 (a) Express the decimal number +76 in binary in an 8 bit byte. [1]

(b) Express the decimal number +76 in hexadecimal. [1]

(c) An A level computing student chooses to computerise the running of a school bookshop as her project. Details of each book, including the barcode and price are stored on a file. When the student tests the program she is puzzled to find that after inputting a barcode the program reports the price of the book as 4.990001 dollars, despite the fact that 4.99 dollars had been originally entered. Explain what has happened and describe the methods that the student might use to overcome the problem. [4]

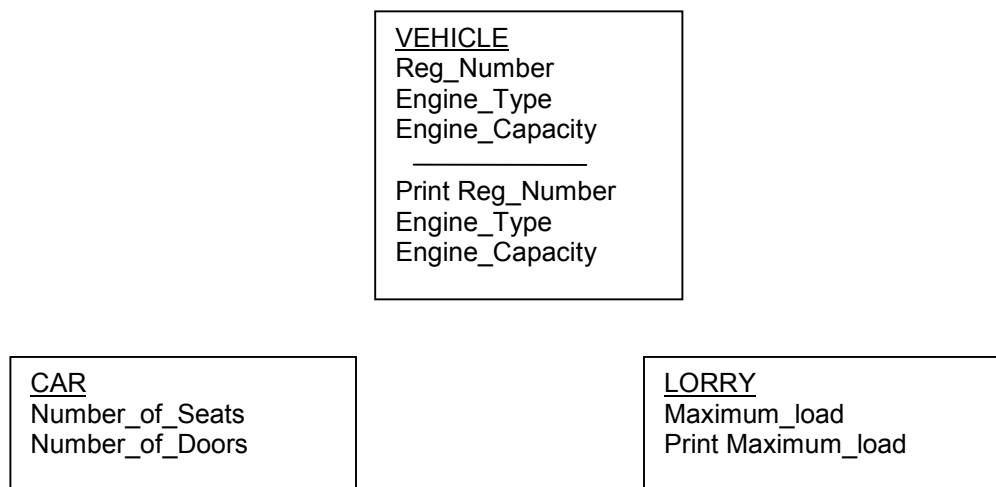**3** Fig. 3.1 shows three classes called VEHICLE, CAR and LORRY.

Fig 3.1

Using this example, explain the meaning of

    (i) derived classes,

    (ii) inheritance. [4]

(b) Using the VEHICLE class, explain the meaning of encapsulation. [2]

4 **(a)** Explain how 2 PCs, running the same operating system, can start up with different configurations. [2]

(b) Explain why, when loading a new applications package onto the hard disk of a PC, files may become fragmented. [2]

(c) A PC user has created a number of large files to be printed. Explain how a print spooler is used to handle these jobs while the PC can be used for other tasks. [6]

5 **(a)** Describe the fetch – execute cycle using an ADD instruction as an example. You should include reference to

- program counter,

- current instruction register,

- memory address register,

- memory data register,

- accumulator

in your answer. [6]

(b) State how the fetch - execute cycle will differ if the instruction is a JUMP instruction. [2]

(c) An array (MATHS) stores the Maths marks of 100 students. A similar array (ENGLISH) stores the English marks of the same 100 students.
Explain how parallel processing can be advantageous when working out each pupil's mean score, but not when working out the mean maths score. [3]

6 The owner of a flower shop uses a relational database to store information about orders placed by customers and the types of flowers in stock.

(a) One entity is defined as CUSTOMERS. List four attributes which you identify as belonging to this entity. [4]

(b) Another entity is identified as the orders placed by customers, CORDERS. Explain the relationship between the entities CUSTOMERS and CORDERS. [2]

(c) A third entity is FLOWERS, defined as the types of flowers in stock. Draw an entity – relationship diagram for these three entities. [2]

(d) Explain why the diagram in your answer to **(c)** causes a problem and show how the problem can be solved. [2]

7 (a) Explain how electronic mail transfers a message from a user's computer in Malaysia to a user's computer in Cambridge, England. [6]

(b) A newspaper reporter is at the scene of a major news story. Describe how technology can help the reporter send the news story to the newspaper offices, without having to leave the scene. [3]

8 The staff operating a nuclear power station need to be trained to handle emergencies that may occur. The danger of the situation is such that it would not be sensible to set up emergency situations in real life. The staff are trained on a simulator, which involves a computer creating a simulated emergency.

(a) State **two** other situations other than danger which would be sensible to simulate, giving a reason why each needs to be simulated. [4]

(b) One part of the system in the nuclear power station automatically controls a heater and a safety valve in a pressure chamber. The system must maintain the temperature and pressure within the chamber within certain parameters.

(i) Explain why the control system must be real time. [2]

(ii) Describe the input and output hardware necessary to allow the system to safely maintain the system in equilibrium. [5]

(c) The computer system requires maintenance throughout the time it is in use. Discuss the maintenance requirements in this example. [6]

9 A museum management decides to improve the profile of the museum by creating a presence on the internet.

(a) Discuss the advantages to the museum management of maintaining a site on the internet. [4]

(b) It is suggested to the museum management that an Intranet made up of similar museums around the world would be more appropriate than a site on the internet.

(i) Distinguish between the internet and an Intranet. [2]

(ii) What advantage would there be to the local history department in the museum of putting their work on the Intranet rather than on the internet? [5]