General Certificate of Education
January 2004
Advanced Subsidiary Examination

COMPUTING   **CPT1**

Unit 1   **Computer Systems, Programming and Networking Concepts**

Tuesday 13 January 2004   Afternoon Session

AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

No additional materials are required.
You may use a calculator.

Time allowed: 1 hour 30 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided. All working must be shown.
- Do all rough work in this book. Cross through any work you do not want marked.

Information
- The maximum mark for this paper is 65.
- Mark allocations are shown in brackets.
- You will be assessed on your ability to use an appropriate form and style of writing, to organise relevant information clearly and coherently, and to use specialist vocabulary, where appropriate.
- The degree of legibility of your handwriting and the level of accuracy of your spelling, punctuation and grammar will also be taken into account.

CPT1

Answer **all** questions in the spaces provided.

1 (a) Two of the components of a computer system are a processor and main memory which are connected together by three buses. Name **each** of these buses and explain their purpose.

1 Name ....

Purpose ....

....

2 Name ....

Purpose ....

....

3 Name ....

Purpose ....

....
(6 marks)

(b) In order to connect the computer system to a local area network (LAN) an additional piece of hardware is required. Name this piece of hardware and explain its purpose.

Name ....

Purpose ....

....
(2 marks)

(c) A printer is connected to the computer system using parallel transmission. Give **one** reason why parallel transmission may be more appropriate than serial transmission.

....
(1 mark)

(d) Give **one** reason why serial transmission is more appropriate for the local area network.

....
(1 mark)

10

2 (a) Give **one** example of a

   (i) first generation programming language

   ....
   (1 mark)

   (ii) second generation programming language

   ....
   (1 mark)

   (iii) third generation programming language.

   ....
   (1 mark)

(b) Give **two** advantages of programming in third generation programming languages, rather than in the previous two generations.

   1 ....

   2 ....
   (2 marks)

(c) Third generation programming languages may be compiled or interpreted. Describe the process performed by

   (i) a compiler

   ....

   ....
   (2 marks)

   (ii) an interpreter.

   ....

   ....
   (2 marks)

(d) When would it be appropriate to use **each** of the following?
   In **each** case give the reason for your choice.

   (i) a compiler

   Use ....

   Reason ....
   (2 marks)

   (ii) an interpreter

   Use ....

   Reason ....
   (2 marks)

Turn over ▶

13

3 (a) What is the binary representation of 63?

....
(1 mark)

(b) How many different bit patterns can be represented by an 8 bit word?

....
(1 mark)

(c) What is the largest pure binary number that can be stored in an 8 bit byte?

....
(1 mark)

(d) What is the bit pattern if the digits 154 are to be stored in BCD format in a 16 bit word?

(1 mark)

4 (a) With the use of an example in **each** case explain the following terms.

(i) Data

Example..

Explanation..

....

(2 marks)

(ii) Information

Example..

Explanation..

....

(2 marks)

(b) For a computer application give an example of

(i) a direct source of data

....

(1 mark)

(ii) an indirect source of data.

....

(1 mark)

$\frac{\quad}{6}$

TURN OVER FOR THE NEXT QUESTION

Turn over ▶

5 On the diagrams below draw the connections between the computers if the following Local Area Network (LAN) topologies are used. In **each** case show the direction of data transfer.
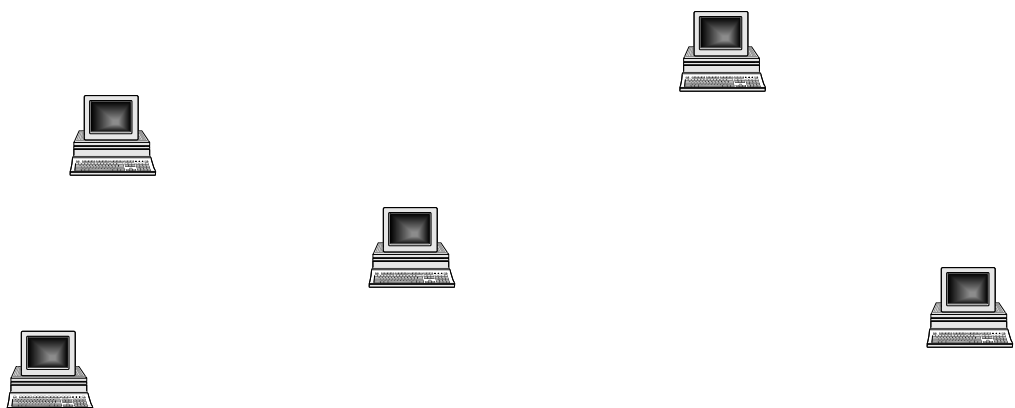
(a) Star
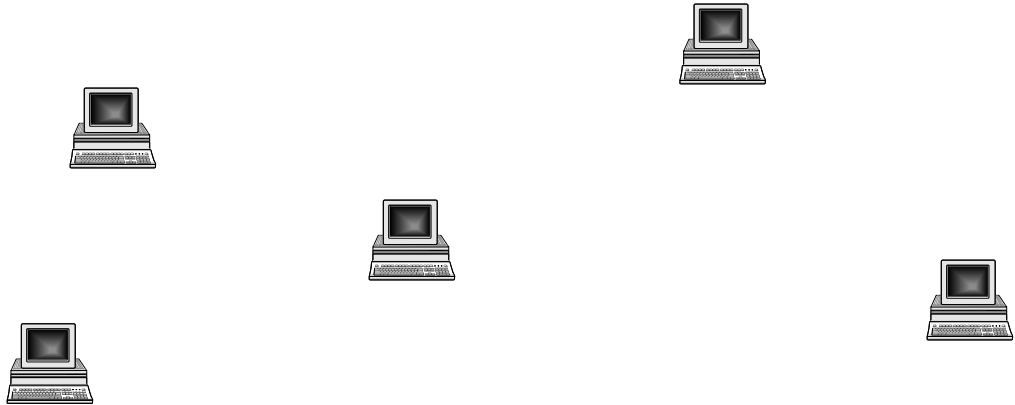
(2 marks)

(b) Bus
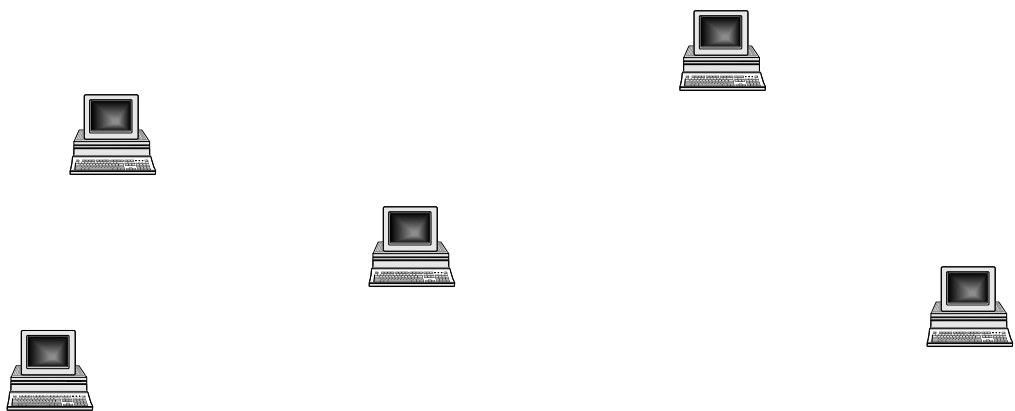
(2 marks)

(c) Ring

(2 marks)

6 In the context of communication and networking, what is meant by **each** of the following?

(a) Internet

....

....

(1 mark)

(b) Domain name

....

....

(1 mark)

(c) Intranet

....

....

(1 mark)

(d) URL

....

....

(1 mark)

(e) IP address

....

....

(1 mark)

(f) Dial up networking

....

....

(1 mark)

(g) Leased line networking

....

....

(1 mark)

Turn over ▶

7 (a) Name **two** different coding systems used to represent characters in a computer system.

1 ....

2 ....

(2 marks)

(b) In one coding system the character digits are assigned the decimal number codes 48 to 57.

The operators DIV and MOD perform integer arithmetic.
x DIV y calculates how many times y divides into x,
    for example 7 DIV 3 = 2.
x MOD y calculates the remainder that results after the division,
    for example 7 MOD 3 = 1.

(i) The following algorithm uses an array Result. Dry run this algorithm by completing the trace table below.

```
x ← 835
Index ← 0
REPEAT
    Index ← Index + 1
    Result[Index] ← x MOD 10 + 48
    x ← x DIV 10
UNTIL x = 0
```

x	Index	Result		
		[3]	[2]	[1]
835	0	–	–	–
83	1	–	–	53

(6 marks)

(ii) Explain the purpose of the algorithm.

....
(1 mark)

8 A stack is a type of abstract data type (ADT) that is often known as a LIFO data type. A stack with a single element 27 may be drawn as follows:

27
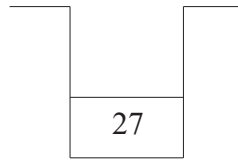
(a) What is the meaning of the term LIFO?

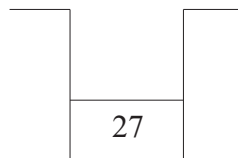..
(1 mark)

(b) A stack has two operations, **Push** and **Pop**. **Push n** adds item **n** to stack. **Pop** removes one item from the stack. A number of operations are performed, **in sequence**, on the stack drawn above. Using the stack diagrams below show the effect of this sequence of operations.
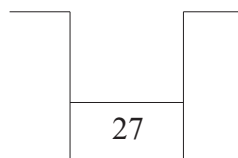
(i) Push 5

27

(1 mark)

(ii) Push 9

27

(1 mark)

(iii) Pop

27

(1 mark)

(iv) Push 6

27
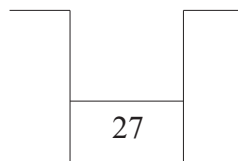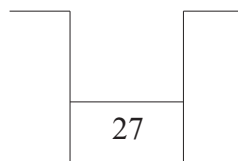
(1 mark)

(c) Give **one** example of the use of a stack.

....
(1 mark)

Turn over ▶

9 The following pseudo code represents a program that reads 10 integer numbers entered by a user and outputs the average.

        Program CalculateStatistics

        Table[10] : Array of Integers
        Result : Real Number

        Call Procedure ReadTenIntegers(Table)
        Call Procedure CalculateAverage(Table, Result)
        Call Procedure DisplayAverage(Result)

(a)   (i)   Name a parameter used in the above program.

....
(1 mark)

      (ii)   Explain how this parameter is used.

....
(1 mark)

(b)   Draw a structure chart to represent the above program.

(2 marks)

END OF QUESTIONS