INTERNATIONAL BACCALAUREATE
BACCALAURÉAT INTERNATIONAL
BACHILLERATO INTERNACIONAL

MARKSCHEME

November 2001

COMPUTER SCIENCE

Standard Level

Paper 1

12 pages

SECTION A

1. 187 ***[1 mark]***

2. ***[1 mark]*** *for a suitable suggestion and* ***[1 mark]*** *for a reason.*
Anything on the following lines for suggestion
- entering exam marks
- multiple choice exam
- selection from menu
- questionnaire with multiple choice responses

For example
- fast data entry for large input
- avoids transcription errors

3. ***[1 mark]*** *for any of the following.* ***[max 2 marks]***
- server stores commonly used databases *etc.* that can be accessed from all machines
- may hold software to be downloaded
- holds usernames and passwords for logon
- has permission rights for user.

[1 mark] *for any of the following.* ***[max 2 marks]***
- client is a workstation that can access the server
- user has to be verified by server when logging on at any client
- temporary work stored on client whilst in use
- some software installed on client to speed up processing

4. ***[1 mark]*** *for any of the following.* ***[max 2 marks]***
- carries data, instructions and addresses
- between CU, ALU and main memory
- to fetch and execute instructions

[1 mark] *for any of the following.* ***[max 2 marks]*** *Overall* ***[max 3 marks]***
- max processing speed needed
- parallel carries all bits at the same time
- serial would mean one bit at a time so too slow
- immediate access needed

5. ***[max 2 marks]*** for advantage and ***[2 marks]*** for disadvantage ***[1 mark]*** for valid point and ***[1 mark]*** for description or justification.

Advantages
- no need to go to the doctor for trivial illnesses which saves time and money
- can be quickly reassured that illness not important
- doctor does not waste time with trivial complaints
- early warning of symptoms that could lead to serious illness
- some people feel too shy to explain their symptoms to a person and feel more secure with a computer.

Disadvantages
- medical expertise not easily transferred to program
- patients may not realise all the symptoms
- many illnesses need personal reassurance
- not a good way to find out that you may have a serious illness
- mistakes in input could have serious consequences in either direction

6. **Circular**

[1 mark] *for any of the following.* ***[max 2 marks]***
- confines the list to a predefined area in store
- problems if queue becomes greater than given space
- only two pointers needed but each time item is added have to ensure front and end do not coincide
- and check for wrap around each time an item added or taken
- in the case of wrap around calculation of pointer takes time
- items do not have to be moved

Linear

[1 mark] *for any of the following.* ***[max 2 marks]***
- if not moved up each time an item taken a lot of storage space is wasted
- very quick to add items as pointers quickly adjusted
- if list moved up when item taken then both pointers have to be adjusted and moving every item in a long list takes time

7. Either verification or validation ***[1 mark]***

verification ***[1 mark]*** *for each valid point up to* ***[max 2 marks]***
- data entered twice
- by same or different person
- first copy checked against second
- any differences corrected

validation ***[1 mark]*** *for each valid point up to* ***[max 2 marks]***
- each value entered checked against reasonable value
- by software
- unreasonable values rejected and retyped

8. (a) ***[max 2 marks]*** *with* ***[1 mark]*** *for each of the following points.*

- MHz Hz refers to frequency ***[1 mark]***
- of fetch execute cycles ***[1 mark]*** per second
- in this case 750 mega ***[1 mark]*** or binary million ***[1 mark]*** cycles per second

(b) personal computer or workstation or portable ***[1 mark]***

9. ***[1 mark]*** *for each valid point up to* ***[max 2 marks]***

- development of
  1. modern operating system ***[1 mark]***
  2. application software
  3. graphics interfaces
- need to hold a lot in RAM ***[1 mark]***
- otherwise processing too slow ***[1 mark]***

10. ***[1 mark]*** *for each valid point up to* ***[max 2 marks]***

- system needs change over time ***[1 mark]***
- some parts of the design will need updating ***[1 mark]***
- or expanding ***[1 mark]***
- hardware may no longer be capable of coping ***[1 mark]***
- update system in light of how it has performed

[1 mark] *for each valid point up to* ***[max 2 marks]***

- new sections of code may have to be written ***[1 mark]***
- some may need amending in the light of changing circumstances ***[1 mark]***
- for example new fields in records
- space for more records in a file

SECTION B

11. (a) 3,5,4 ***[1 mark]*** *if two are correct,* ***[2 marks]*** *for all three* ***[total 2 marks]***.

(b) *Award* ***[1 mark]*** *for each of the following points* ***[total 4 marks]***:
introduce a Boolean variable *e.g.* `FOUND`
set to false before starting
set to true when item found
loop until `LEFT>RIGHT` **`or`** `FOUND=`**`false`**

(c) *Award* ***[1 mark]*** *for each correct line:*

LEFT	RIGHT	POS	**output**
1	6	3	
4	6	5	
4	5	4	
4	3	3	

[total 4 marks]

12. (a) Optical Character Recognition. ***[1 mark]***

(b) *Award* ***[1 mark]*** *for each of the following.* ***[max 3 marks]***

- optical reader senses amount of light in each of the 35 squares
- if shaded in square then 1 allocated to the memory map
- otherwise 0
- each letter has pattern of 1 and 0 in memory
- software compares the read pattern with those for each letter in alphabet
- until exact or near match found
- ASCII code for that letter stored

(c) ***[1 mark]*** *for each of the following points.* ***[max 2 marks]***

- different fonts would cover different squares
- for the same letter
- difficult to compare against the same standard

(d) ***[2 marks]*** *for a valid difference or similarity* ***[max 4 marks]***

- OCR uses light to distinguish the shape of the letter
- MICR uses magnetic attraction to do the same
- once the pattern is picked up by the input device the conversion is the same

13. (a) ***[1 mark]*** description of HTML and ***[1 mark]*** for use of editor

- HTML is (hyper text mark up language) is universally recognised code for screen display and insertion of images from text
- HTML editor allows the user to change the code and hence the visual display

(b) Digital camera: ***[1 mark]*** *for advantage and* ***[1 mark]*** *for reason* ***[max 4 marks]***
better quality:

- image better for screen display
- since already digitised
- whereas scanner has to digitise image from photograph

easier to use:

- simpler to insert diskette with JPEG file
- rather than spend time with scanner getting the balance correct
- and saving in appropriate format

(c) ***[2 marks]*** *for description of web browser and* ***[2 marks]*** *for use of search engine*.

web browser:

- interprets the HTML code
- converts to screen image
- inserting objects as directed in code
- different browsers give separate defaults for unknown elements

search engine:

- takes key words entered by user *e.g.* holiday Spain
- searches for pages/sites that have these words as keywords or in title
- returns a list of sites found with addreses for viewing

14. (a) There are many possible solutions. *Accept any reasonable.* ***[1 mark]*** for suitable method ***[1 mark]*** for way in which device read and ***[1 mark]*** for validating and opening barrier:

- bar code/magnetic strip on badge fitted to windscreen
- read by bar code scanner/ magnetic reader as car passes
- barrier opened if valid

(b) ***[1 mark]*** for method of counting those with device ***[1 mark]*** for counting those who pay or ***[2 marks]*** for counting both in the same way.

- cars fitted with device simply have a count incremented each time a car passes
- for those who stop either the person who takes the money presses a button for each vehicule that passes
- or calculation made from money at end of day

alternatively

- sensor fitted at strategic part of road
- triggered when car passes
- converted to digital incrementation

(c) ***[1 mark]*** *for correct understanding of integrity and* ***[1 mark]*** *for identifying a problem.*

- loss of data integrity would mean wrong values sent across WAN
- wrong figures could mean no reaction to critical situation
- or over reaction and cost when not required.

(d) ***[1 mark]*** *for a suitable method* ***[2 marks]*** *for description*

- check sum digit incorporated into transmission
- after a set number of bits/bytes send the sum of preceding transmission
- check that sum of digits sent is the same as the sent sum

- odd or even parity check
- use one digit in transmission to maintain parity
- in case of even parity set to one or zero to ensure that an even number of bits for each byte is sent. In the case of odd the reverse