INTERNATIONAL BACCALAURÉAT BACHILLERATO
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M04/750/S(1)M+

MARKSCHEME

May 2004

COMPUTER SCIENCE

Standard Level

Paper 1

12 pages

If you do not have a copy of the current Computer Science Guide, please request one from IBCA.

General Marking Instructions

After marking a sufficient number of scripts to become familiar with the markscheme and candidates' responses to all or the majority of questions, Assistant Examiners (AEs) will be contacted by their Team Leader (TL) by telephone. The purpose of this contact is to discuss the standard of marking, the interpretation of the markscheme and any difficulties with particular questions. It may be necessary to review your initial marking after contacting your TL. **DO NOT BEGIN THE FINAL MARKING OF YOUR SCRIPTS IN RED INK UNTIL YOU RECEIVE NOTIFICATION THAT THE MARKSCHEME IS FINALIZED.** *You will be informed by e-mail, fax or post of modifications to the markscheme and should receive these about one week after the date of the examination. If you have not received them within 10 days you should contact your Team Leader by telephone. Make an allowance for any difference in time zone before calling.* **AEs WHO DO NOT COMPLY WITH THESE INSTRUCTIONS MAY NOT BE INVITED TO MARK IN FUTURE SESSIONS.**

You should contact the TL whose name appears on your "Allocation of Schools listing" sheet.

Note:
Please use a personal courier service when sending sample materials to TLs unless postal services can be guaranteed. Record the costs on your examiner claim form.

General Marking Instructions

1. Follow the markscheme provided, do **not** use decimals or fractions and mark only in **RED**.

2. Where a mark is awarded, a tick (✓) should be placed in the text at the **precise point** where it becomes clear that the candidate deserves the mark.

3. Sometimes, careful consideration is required to decide whether or not to award a mark. Indeed, another examiner may have arrived at the opposite decision. In these cases write a brief annotation in the **left hand margin** to explain your decision. You are encouraged to write comments where it helps clarity, especially for moderation and re-marking.

4. Unexplained symbols or personal codes/notations on their own are unacceptable.

5. Record subtotals (where applicable) in the right-hand margin against the part of the answer to which they refer. Show a mark for each part question (a), (b), *etc.* Do **not** circle sub-totals. Circle the total mark for the question in the right-hand margin opposite the last line of the answer.

6. Where an answer to a part question is worth no marks, put a zero in the right-hand margin.

7. **Section A**: Add together the total for each question and write it in the Examiner Column on the cover sheet.
Section B: Record the mark awarded for each of the three questions answered in the Examiner Column on the cover sheet.
Total: Add up the marks awarded and enter this in the box marked TOTAL in the Examiner Column on the cover sheet.

8. After entering the marks on the cover sheet check your addition of all marks to ensure that you have not made an arithmetical error. Check also that you have transferred the marks correctly to the cover sheet. **We have script checking and a note of all clerical errors may be given in feedback to all examiners.**

9. Every page and every question must have an indication that you have marked it. Do this by **writing your initials** on each page where you have made no other mark.

10. If a candidate has attempted more than the prescribed number of questions, mark only the required number of answers in the order in which they are presented in the script and ignore any excess material, regardless of its quality. Make a comment to this effect in the left hand margin. **This is unless the candidate indicates, otherwise on the front cover.**

11. A candidate can be penalized if he/she clearly contradicts him/herself within an answer. Once again make a comment to this effect in the left hand margin.

Subject Details: Computer Science SL Paper 1 Markscheme

Mark Allocation

Section A: Candidates are required to answer ALL questions. Total 30 marks.
Section B: Candidates are required to answer any three questions (10 marks each). Total 30 marks.
Maximum total = 60 marks.

General

A markscheme often has more specific points worthy of a mark than the total allows. This is intentional. Do not award more than the maximum marks allowed for part of a question.

When deciding upon alternative answers by candidates to those given in the markscheme, consider the following points:

- Each marking point has a separate line and the end is signified by means of a semi-colon (;)
- An alternative answer or wording is indicated in the markscheme by a "/"; either wording can be accepted.
- Words in (…) in the markscheme are not necessary to gain the mark.
- The order of points does not have to be as written (unless stated otherwise).
- If the candidate's answer has the same "meaning" or can be clearly interpreted as being the same as that in the mark scheme then award the mark.
- Mark positively. Give candidates credit for what they have achieved, and for what they have got correct, rather than penalising them for what they have not achieved or what they have got wrong.
- Remember that many candidates are writing in a second language; be forgiving of minor linguistic slips. Effective communication is more important than grammatical niceties.
- Occasionally, a part of a question may require a calculation whose answer is required for subsequent parts. If an error is made in the first part then it should be penalized. However, if the incorrect answer is used correctly in subsequent parts then **follow**
- **through** marks should be awarded. Indicate this with **"FT"**.

SECTION A

1. *Award **[2 marks]** for ALU and **[2 marks]** for CU.*

ALU: perform arithmetic;
logic operations;
carries out arithmetic / holds results of operations;
log-in operations; ***[2 marks max]***

CU: controls the order of the operations performed by the CPU / controls the operation of the CPU;
holds instructions;
controls data flow;
controls operations; ***[2 marks max]***

2. *Award **[2 marks]** for a complete answer and **[1 mark]** for a partial one.*

protocol is the set of rules which must be followed by all devices involved in a communication event; ***[2 marks]***

3. *Award **[1 mark]** for definition and **[2 marks]** for outline.*

functional programs that improve performance / efficiency / usability; ***[1 mark]***
function of defragmentation is to ensure that sectors of a single file are contiguous across the disk; ***[2 marks]***

4. *Award **[2 marks]** for a complete answer, **[1 mark]** for a partial one e.g.*

the user clicks on a word or graphic that has been assigned to a hyperlink, and the web-browser then contacts the URL referred to by that hyperlink and downloads (if necessary) and displays the new page;
or
using browser history list, user can move back to recently visited sites; ***[2 marks]***

5. (a) 5 bits (16,8,4,2,1); ***[1 mark]***

(b) 01110 base 2 = 14 base 10; ***[1 mark]***

6. *Award **[2 marks]** for a complete answer, **[1 mark]** for a partial one.*

data security deals with protecting the data from unauthorized access, whilst data integrity deals with ensuring that the data is correct; ***[2 marks]***

7. *For **[2 marks]** answers need to address two key points.*

ease of understanding;
ease of adding or deleting a module;
more understandable code;
reduce errors by promoting reuse *etc.*;
working in teams possible;
easier to test and debug; ***[2 marks]***

8. *Award **[2 marks]** for method and **[2 marks]** for attempted recovery.*
append a check digit and recalculate *e.g.* parity bit, check sum, check bit *etc*.;
request re-send of the data packet;
automatic error correction methods; ***[4 marks]***

9. (a) online (interactive); ***[1 mark]***

(b) batch; ***[1 mark]***

10. *Award **[1 mark]** for each definition.*

client: workstation / terminal connected to a network;

server: computer (system) providing services / storage for whole network; ***[2 marks]***

Accept supervise / control network.

11. *Award **[2 marks]** for the correct answer, **[1 mark]** if method shown is correct but gives the wrong answer.*
$\frac{3 \times 2^{30}}{650 \times 2^{20}} = 4.726$, therefore 5; ***[2 marks]***

12. *If name not given accept in the correct position (i.e. string, real, Boolean).*
(a) CITY: string;
AVR: real;
AP: Boolean; ***[3 marks]***

SECTION B

13. (a) NASHAH; ***[1 mark]***

(b) *Award **[2 marks]** for the third column if all correct, **[1 mark]** if there is only one mistake in the third column.*

I	POS[I]	TEMP[POS[I]]
1	2	SMITH
2	4	DELL'AVA
3	2	DUPONT
4	6	NASHAH
5	1	DOI
6	5	SINGH

[4 marks]

(c) *Award **[1 mark]** for the names in order and **[1 mark]** for* `"ZZZ"` *listed in position* `[3]`.

```
NAMES
[1] DOI
[2] DUPONT
[3] ZZZ
[4] DELL'AVA
[5] SINGH
[6] NASHAH
```

[2 marks]

(d) to give a list of competitors in order; ***[1 mark]***

(e) *For example.*
if `TEMP` starts blank or with sentinel value then the contents of `TEMP` should be checked before writing a name;
if there is already a name then put the current name in the `TEMP[POS[I+1]]`; ***[2 marks]***

14. (a) (i) LAN; ***[1 mark]***
Accept a suitable type e.g. bus, star etc.

(ii) WAN; ***[1 mark]***

(b) modem;
communicate lines; ***[2 marks]***
*Do not accept hardware **within** the office e.g. server.*

(c) *Award **[2 marks]** for each security issue e.g.*

e-*mail*: viruses, sending sensitive information to anywhere *i.e.* should encrypt;
Internet: log-in access and passwords need to be set sensibly;
potential for hacking (but not really an issue for the employee); ***[4 marks max]***

(d) *Award **[1 mark]** for relevant way and **[1 mark]** for elaboration e.g.*
cost / expensive peripherals can be shared;
speed of communication;
common documents : increases integrity; ***[2 marks]***
Do not accept any reference to the Internet.

15. (a) determine the requirements of the new system *i.e.* requirements definition,
what logically does the software need to do?;
accept other reasonable alternatives; ***[1 mark]***

(b) *For **[2 marks]** answers need to address one advantage and one disadvantage.*

advantage: faster implementation, cheaper, no development time, can be customized *etc.*;

disadvantage: may not integrate well with other parts of system, may not be supported very well, could be expensive to maintain, may not allow upgrades or additional function to be added *etc.*; ***[2 marks]***

(c) browser that is compatible with package software requirements; ***[1 mark]***

(d) *Award **[2 marks]** for strategy and **[2 marks]** for explanation.*
full backup of system + application + data;
regularly;

e.g. backup to portable separate medium *e.g.* tape streaming regularly;
store tape in safe place during non-backup time

important: data valuable, protect data against hardware failure corruption, misuse by unauthorized access or accidental change. ***[4 marks]***

(e) *Award **[1 mark]** for an example and **[1 mark]** for an elaboration e.g.*
interactive sales to increase numbers of customers;
clips online to enhance interest; ***[2 marks]***

16. (a) analog *i.e.* measurement of the temperature quantity on a continuous scale; ***[1 mark]***

(b) analog to digital; ***[1 mark]***

(c) *Award **[1 mark]** for method and **[1 mark]** for elaboration of each.*
verification: data sent twice and two sets compared;
validation: check the number of readings (2 × 100 × days in the month)
or check range of readings reasonable; ***[4 marks]***
*Accept any reasonable method of validation. Award **[2 marks max]** if the answer confuses verification with validation but gives good method of elaboration.*

(d) every reading must be read;
so sequential is needed; ***[2 marks]***

(e) *Award **[1 mark]** for method and **[1 mark]** for justification.*
archive on tape because holds large amounts of data;
archive on CDs because durable;
accept other sensible suggestions with justification; ***[2 marks]***