N13/5/COMSC/SP1/ENG/TZ0/XX/M

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MARKSCHEME

November 2013

COMPUTER SCIENCE

Standard Level

Paper 1

9 pages

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 **all** questions. Total 40 marks.
Maximum total = 70 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 that part of a question.

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

- Each statement worth one 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.
- If the candidate's answer has the same meaning or can be clearly interpreted as being the same as that in the markscheme then award the mark.
- Mark positively. Give candidates credit for what they have achieved and for what they have got correct, rather than penalizing 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. In this subject effective communication is more important than grammatical accuracy.
- 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 *Total: [30 marks]*

1. *Award up to **[2 marks max]**.*
User manual;
Installation instructions;
(Online) help/support;
Etc. ***[2 marks]***

2. *Award up to **[2 marks max]**.*
To speed up access to data stored on the disk;
It reorganizes blocks of data on a hard disk;
Which became separated as data is added/deleted;
To be next to each other; ***[2 marks]***

3. *Award up to **[2 marks max]**.*
Memory management;
Resource handling;
Program and data management;
Coordinating processing;
Communicating with peripherals;
Etc. ***[2 marks]***

4. *Award up to **[2 marks max]**.*
Text based;
Base of any other software for creation of web pages;
Cheap/free for schools; ***[2 marks]***

5. (a) *Award up to **[2 marks max]**.*
Hackers;
Will attempt to gain access rights;

OR

Viruses;
Could damage important data or hardware;
Etc. ***[2 marks]***

(b) *Award **[2 marks]** for each implication discussed, ×2 up to **[4 marks max]**.*

Example:
Lack of privacy;
Students could be prevented from visiting unsuitable sites (games, chat rooms, *etc.*);
Students could be prevented in copying/receiving/sending work from/to other students; ***[4 marks]***

6. (a) *Award **[1 mark]** for each representation up to **[2 marks max]**.*

The representation of $33_{(10)}$

0	**0**	**1**	**0**	**0**	**0**	**0**	**1**

The representation of $-33_{(10)}$

1	**1**	**0**	**1**	**1**	**1**	**1**	**1**

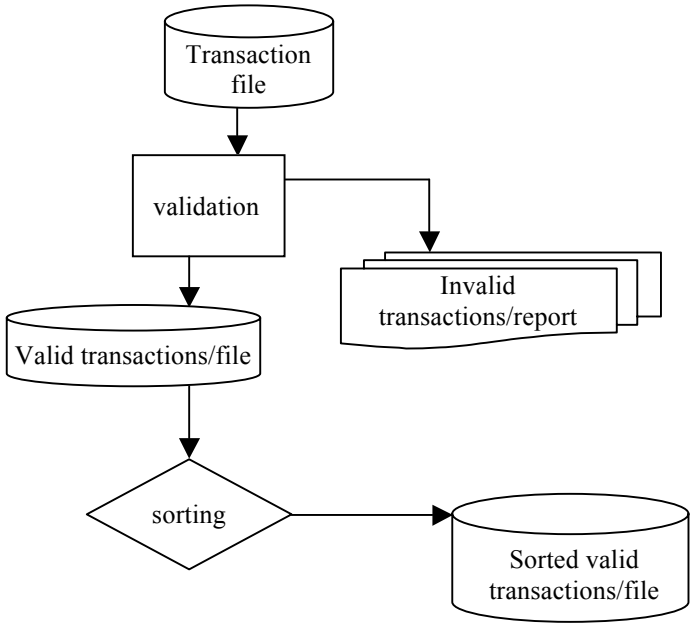
[2 marks]

(b) From $-2^7 \left(= -128\right)$;
to $2^7 - 1 \left(= 127\right)$; ***[2 marks]***

7. *Example answer*

ALU performs all logical and arithmetic operations and holds all temporary results. ***[1 mark]***

8. *Award **[1 mark]** for each labelled flowchart symbol up to **[5 marks max]**.*



[5 marks]

9. *Award **[1 mark]** for each output up to **[4 marks max]**.*

j	k	j>=1	s	output
4	2	true	–1	–2
3	4	true	1	4
2	6	true	–1	–6
1	8	false	1	8
0	10	false	–1	

[4 marks]

10. *Example answer:*

Debugging program is used to detect/diagnose;
And correct errors found by testing the code; ***[2 marks]***

SECTION B *Total: [40 marks]*

11. (a) *Award **[2 marks]** for any benefit outlined up to **[4 marks max]**.*
The design can be precisely drawn/inputted by a pen;
Held in a graphics file/stored within the memory;
Using the pen, changes can be easily made;
And the contents of the memory immediately updated; ***[4 marks]***

(b) Designer's computer connected to the Internet (broadband, fibre optic or other);
Secure link to company's server; ***[2 marks]***

(c) When large graphic files are compressed they occupy less memory space on the designer's and company's computer;
Transmission of smaller files is faster and cheaper; ***[2 marks]***

(d) The data files should be encrypted/secured because they may be intercepted/read;
And then misused by other designers or companies; ***[2 marks]***

Total: [10 marks]

12. (a) *Award up to **[2 marks max]**.*
Interview;
Observation;
Questionnaires;
Studying literature;
Etc. ***[2 marks]***

(b) Two or more prototypes allow the system's owners/management to choose;
Whichever is the best for the company / whichever they can afford; ***[2 marks]***

(c) *Award up to **[6 marks max]**.*
New jobs in a town in an area where previously the main industry had been coal mining, but employees will need training, new skills requested for using the new system;
The communication system in the area should be improved, in a major city it already exists;
Some employees might be redundant, they could either lose a job or be sent to work in some other departments/to another town;
Management and owners will also need training to use the system, some should move with their families to the new location;
Job conditions and requirements are changed so managers will spend a lot of time in (re)organizing work;
Owners may be happy because the increased efficiency and income;
Or unhappy because of decreased efficiency/income; ***[6 marks]***

Total: [10 marks]

13. (a) Batch processing; ***[1 mark]***

(b) (i) *Award up to **[1 mark max]**.*
Wireless link;
Cable; ***[1 mark]***

(ii) *Award up to **[1 mark max]**.*
Broadband connection;
Satellite link; ***[1 mark]***

(c) Analog form of temperature data measured by sensors;
Should be converted to digital form;
So it can be stored and processed by the computer; ***[3 marks]***

(d) *Award **[2 marks]** for a strategy explained, ×2 up to **[4 marks]**.*
All temperatures are stored in weather station;
And also on the central server;
So data can easily be recovered;
Two computer systems could be used;
The original and "mirrored" system;
So if one fails the other can be used; ***[4 marks]***

Total: [10 marks]

14. (a) *Example answer*

Local variables are declared within a block/method and can be used only within this block/method;
Local variables in method `check()` are: `p` and `k`; ***[2 marks]***

(b) `A`; ***[1 mark]***

(c) (i) Boolean; ***[1 mark]***

(ii) *Award up to **[4 marks max]** as follows.*
*Award **[1 mark]** for clearly showing that `Data` is actual parameter for `A`/values in array `A` are same as values in array `Data`;*
*Award **[1 mark]** for correctly filled column with heading **k**;*
*Award **[1 mark]** for correctly filled column with heading **k+1<A.length-1**;*
*Award **[1 mark]** for correctly filled column with heading **p**;*
*Award **[1 mark]** for the correct returned value;*

Example answer:

k	k+1<A.length-1 (k+1<5)	A[k]	A[k]<A[k+1]	p	return
-1	true			true	
0		14.3	false		
1		13.98	false		
2		11.6	false		
3		8.123	true		
4	false	9.2	false	false	false

[4 marks]

(d) It determines whether or not the array elements are sorted;
In descending order; ***[2 marks]***

Total: [10 marks]