



# **MARKSCHEME**

**November 2008**

**COMPUTER SCIENCE**

**Standard Level**

**Paper 1**

*This markscheme is **confidential** and for the exclusive use of examiners in this examination session.*

*It is the property of the International Baccalaureate and must **not** be reproduced or distributed to any other person without the authorization of IB Cardiff.*

## 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:

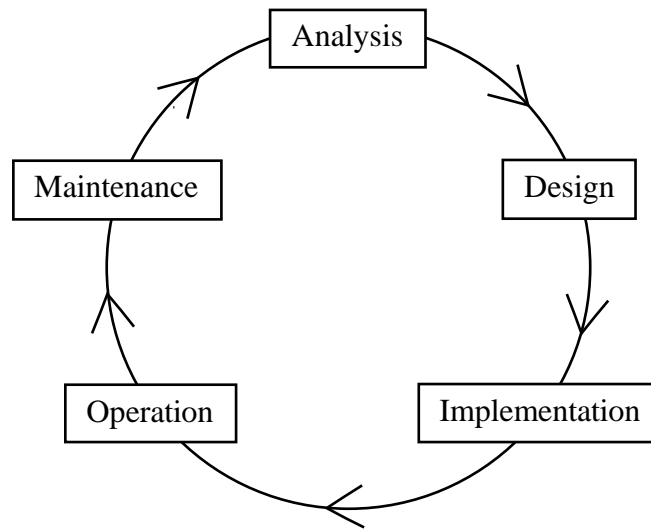
- Each statement worth one point has a separate line and the end is signified by means of a semi-colon (;)
- An alternative answer or wording is indicated in the markscheme by a “/”; either wording can be accepted.
- Words in ( ... ) in the markscheme are not necessary to gain the mark.
- The order of 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 markscheme 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. 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 [1 mark] for a circular diagram with an arrow showing the correct order.  
Award [1 mark] for including the names of at least 3 stages of the cycle (from analysis, design, implementation, operation, maintenance).  
Award [1 mark] for including a 4<sup>th</sup> stage. **[3 marks]**

Example:



2. Award [1 mark] for each correct characteristic up to [3 marks max].  
Use of large font (size);  
Clear font type;  
Use of graphics/animation;  
Use of a touch screen;  
Simple design/uncluttered screen/use of few words; **[3 marks]**

3. Award up to [2 marks max], for up to **two** different methods.  
An IDE/editor/compiler/interpreter could be used;  
Which would highlight/indicate the position of the error;  
*and/or*  
A dry run / trace could be carried out;  
Which would allow the user to find the error;  
*and/or*  
Use of print statements;  
To test the flow of the program / value of variables;  
*and/or*  
Allow use of exceptions;  
That will find run-time errors; **[4 marks]**

4. Award [2 marks] for all three correct answers.  
Award [1 mark] for: 3.3333..., 5.0/5, 10.0/10.  
Award [1 mark] for: 3.0, 5.0, 10.0.  
3, 5, 10. [2 marks]
5. For each part of the question, award [1 mark] for identifying data that would fit the required variable type (int or double), and [1 mark] for a good description of an appropriate set.
- Examples:*
- (a) Spectators;  
Attending a football ground for each match during the season; [2 marks]
- (b) Share prices;  
Over the course of 12 months for several different stocks; [2 marks]
6. Examples include a HTML/web page editor, an IDE/code editor, a database management system.
- Example:*  
An IDE;  
Allows a Java program to be created/edited; [2 marks]
7. Award [2 marks] for a correct answer. Award [1 mark] for either using 1000 instead of 1024 or only using 1024 once.  
 $6 \text{ GB} = 6 \times 1024 \times 1024 \text{ kB}$  [2 marks]
8. Volatile means that the contents of the memory (e.g. RAM);  
Will be lost when the power is switched off; [2 marks]
9. This is the allocation of memory;  
To the (different) programs that are currently in the computer's memory; [2 marks]
10. A hub transfers data to all of the node/machines to which it is attached;  
Whereas a router only transfers data to the node/machine for which it is intended; [2 marks]
11. (a) The software will look for all the sectors belonging to one file;  
And store them contiguously/next to each other; [2 marks]
- (b) File transfer rates will improve;  
Because all the sectors of a file are (now) stored together; [2 marks]

**SECTION B**

**Total: [40 marks]**

12. (a) Award [1 mark] for a correct answer (both parts are needed for the mark).  
**int** and **boolean**; [1 mark]
- (b) Award [1 mark] for each correct column (excluding the *x* column),  
 up to [3 marks max].

<b>x</b>	<b>x &gt; 0?</b>	<b>validate(x)</b>	<b>counter</b>	<b>list</b>
6	true	true	1	6
8	true	false		6
24	true	true	2	6, 24
-999	false			

*Note: allow entry of previous value(s) instead of the blank entries.* [3 marks]

- (c) Award up to [2 marks max].  
 -999 is an end-of-data marker/rogue value/sentinel;  
 Which terminates the loop/method/input of data;  
 Chosen because it would not be part of the (normal) data set; [2 marks]
- (d) The data type `int` needs to be in the signature/first line of the method;  
 The value `counter` (or equivalent) needs to be returned; [2 marks]
- (e) Award up to [2 marks max].  
 Defines the scope of the method;  
`validate()` method can only be called from within the class that it is part of;  
`validate()` method cannot be called from outside of the class that it is part of / it  
 is hidden from outside classes; [2 marks]

**Total: [10 marks]**

13. (a) On-line means that the user is connected via computer;  
To the server/site controlling the system; **[2 marks]**

(b) Award **[1 mark]** for identifying an interface/method, and **[1 mark]** for a good reason for its use, up to **[2 marks max]**.

*Examples:*

A touch sensitive screen;

Would be a good choice, as the user will be limited to selecting from the options presented;

Thereby reducing any possible errors/the time required to operate the system; **[2 marks]**

(c) The theatre records will be stored in one (central) file;

Thereby eliminating duplicate records;

*and*

Once a transaction is started (on a particular record);

No other terminal will be able to access that record until the transaction is completed; **[4 marks]**

(d) Award up to **[2 marks max]**.

Customers who are not computer literate;

Will (probably) not be able to use the system;

*or*

Customers will not be able to book for theatres;

That do not subscribe to this system; **[2 marks]**

**Total: [10 marks]**

14. (a) Batch processing; *[1 mark]*
- (b) The temperature data that is analogue;  
Will be converted into digital form;  
So that it can be processed by a computer; *[3 marks]*
- (c) *Award up to [2 marks max].*  
A microwave link;  
As line of sight would be likely;  
*or*  
A satellite link;  
No worries about distances; *[2 marks]*
- (d) *Award up to [2 marks max].*  
The data would be stored as two's complement;  
To allow for negative values;  
*or*  
8/16/24/32 bits will be enough;  
In order to cover the range of values; *[2 marks]*
- (e) (An array of) float/double/real numbers;  
Which would allow decimal values; *[2 marks]*

***Total: [10 marks]***



15. (a) Award [**1 mark**] for identifying the benefit that it provides, and [**1 mark**] for explaining why/how.

*Example:*

It allows fast retrieval of the price of the item;  
As the code provides the link to the item's record;

[2 marks]

- (b) Marks can be awarded if a clear example is given illustrating the points below.

The (original) bar code digits are summed;  
The modulo operator mod/% is used;  
To find the remainder when the summed digits are divided by the modulo's argument;  
This remainder becomes the check digit;

[4 marks]

- (c) The system is "mirrored";

So that the second system can take over;

*and*

The cash registers also store the transactions (for their machine);

So that all transactions are backed up;

[4 marks]

**Total: [10 marks]**

---