Version 1.0

General Certificate of Secondary Education

Computer Science code

Code Computing fundamentals

Accredited Specimen Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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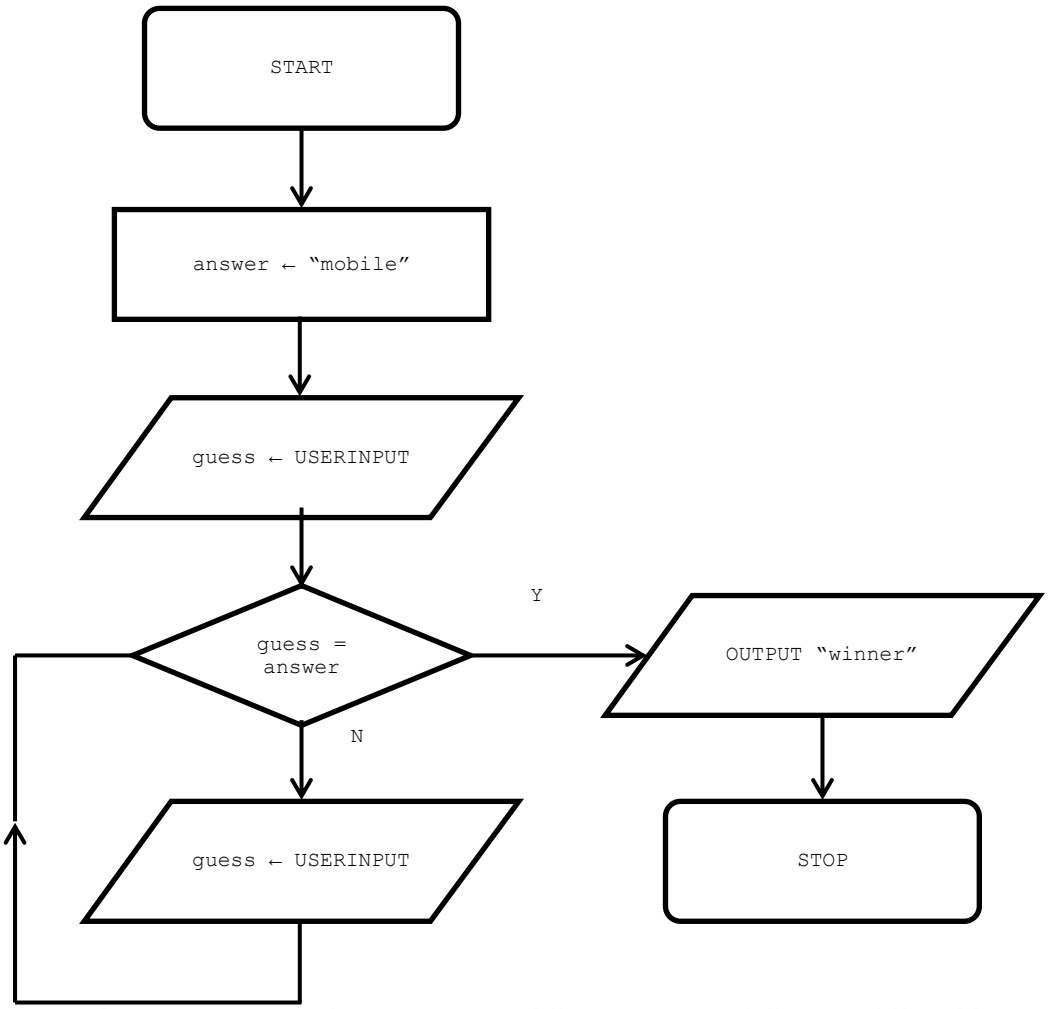
1	(a)		Signifies voltage/current/electricity on or off	(1 mark)
1	(b)		101 1011 (ignore leading zeros)	(1 mark)
1	(c)		One mark for correct answer: 167 One mark for working (award any correct method), eg: A -> 10 x 16 -> 160 160 + 7 -> 167 Or A7 -> 10 (first nibble) 7 (second nibble) -> 1010 0111 -> 1+2+4+32+128 -> 167	(1 mark) (1 mark)
1	(d)		Boolean Integer Character	(1 mark) (1 mark) (1 mark)
2	(a)	(i)	Output	(1 mark)
2	(a)	(ii)	Both	(1 mark)
2	(a)	(iii)	Input	(1 mark)
2	(a)	(iv)	Output	(1 mark)
2	(b)		Any suitable answer that is a hardware development. Examples include: More power efficient processors Smaller form memory Solid state memory Affordable touchscreens 1 mark for each correct answer. Max 3 marks	(3 marks)
3	(a)		Both are acceptable answers so marks **only** for justification. Accept any other suitable and correct justification. If answer A is given then marks only from: It has 4 cores that will allow it to process four instructions in parallel/at the same time. 1 mark for each underlined point. Max 3 marks. If answer B is given then marks only from: Processor B only has 1 core compared to 4 in B but this is only an advantage if the programs executing can be run in parallel. (or sentence with equivalent meaning). The clock speed of B is over twice that of A so every instruction can be processed faster. 1 mark for each underlined point. Max 3 marks	(3 marks)
3	(b)		A large amount of RAM enables more instructions/programs to be loaded from secondary storage into RAM so they can be executed by the processor. 1 mark for each underlined point. Max 2 marks.	(2 marks)

4	(a)	(i)	1 mark for either one of the following: Name Value	(1 mark)
4	(a)	(ii)	Array (allow array of …) Also allow string/string of characters	(1 mark)
4	(a)	(iii)	Boolean	(1 mark)
4	(b)		Any suitable answer. Eg: To make code easier to read. To allow for code reuse/sharing. To reduce programmer error. To improve code maintenance/easier to update code. Do **not** accept answers related to efficiency unless there is a suitable justification. 1 mark for each correct answer. Max 3 marks.	(3 marks)
5	(a)		Any suitable answer. Eg: One faulty device/connection means the network can fail. Connections are shared between all devices so not secure. Data has potentially to travel through many devices before reaching its destination so *slow*. 1 mark for each underlined disadvantage (max. 2), 1 mark for each underlined reason (max. 2).	(4 marks)
5	(b)	(i)	A	(1 mark)
5	(b)	(ii)	B	(1 mark)
5	(b)	(iii)	E	(1 mark)
5	(c)	(i)	Server	(1 mark)
5	(c)	(ii)	Both	(1 mark)
5	(c)	(iii)	Server	(1 mark)
6	(a)		An written error in a program that breaks the rules of the programming language. (Accept any equivalent answer but do not allow just an example if not backed up with an explanation.)	(1 mark)
6	(b)	(i)	5	(1 mark)
6	(b)	(ii)	The program attempts to access element 5 of the array arr which does not exist. (Accept any equivalent answer that refers to the array index going too high.)	(1 mark)

6	(c)	(i)	Accept any answer that is true for logical error detection but distinguishable from runtime or syntax errors such as: Because the program appears to run normally. **or** Because it is not obvious where the error has occurred.	(1 mark)
6	(c)	(ii)	4 (**1 mark**, correct answer only) tot ← tot + arr[i] (**1 mark**, accept any answer that makes it clear the previous value of `tot` is added to `arr[i]` and then stored in `tot`, e.g. `tot += arr[i]`.)	(2 marks)

7	(a)		**This question can be answered using either pseudocode or a flowchart.** Pseudocode answer as follows (permit any correct solution that differs from here but marks can only be awarded for the points labelled below): ***1 mark*** *for correct assignment of mobile to answer (allow mobile without speech marks)* `answer ← "mobile"` ***1 mark*** *for correct assignment of user input to guess* `guess ← USERINPUT` ***1 mark*** *for correctly declared WHILE loop* ***1 mark*** *for using a Boolean expression that checks that answer is not equal to guess (could also be "not (answer = guess)" or similar)* `WHILE answer ≠ guess` ***1 mark*** *for a statement that reassigns user input to guess within the WHILE loop.* `  guess ← USERINPUT` `ENDWHILE` ***1 mark*** *for outputting "winner" as long as it is declared outside of the loop (unless enclosed within correct IF statement)* `OUTPUT "winner"` *(See next page for flowchart answer.)*	(6 marks)

Flowchart answer as follows (again permit any correct solution that differs from here but marks can only be awarded for the points labelled below):



1 mark *for correct assignment of mobile to answer (allow mobile without speech marks) with correct symbol*
1 mark *for correct assignment of user input to guess with correct symbol*
1 mark *for a decision box that loops back into itself*
1 mark *for a correct Boolean expression in the decision box with correct Yes/No arrows*
1 mark *for correct assignment of user input to guess within 'loop' with correct symbol*
1 mark *outputting "winner" as long as in correct position with correct symbol*

7	(b)		Any two different, suitable improvements: Eg. Keep a high score. Allow another user to enter the value to be guessed. Allow another go. Display corrected guessed letters 1 mark for each correct answer. Max 2 marks.	(2 marks)
8	(a)		SupplierCode (**1 mark,** correct answer only) It is used as a foreign key in Product and so must be a primary key in Supplier. (**1 mark**, Do not accept answers that imply "unique value".)	(2 marks)
8	(b)		ComfyLoafers, 43, ST23 5XA ArmyBoot, 47, ST23 5XA 1 mark for ComfyLoafers and 43 1 mark for ArmyBoot and 47 1 mark for only the two correct results given 1 mark for correct postcode (allow mark if only one result provided but not if two different postcodes are given)	(4 marks)
8	(c)		`INSERT INTO Product` `VALUES (444AA, Slippers, 6.99, 32, 100)` 1 mark for INSERT INTO 1 mark for VALUES 1 mark for the five comma-separated values (permit use of quote marks)	(3 marks)
9			A series of instructions that solves a problem in a finite number of steps/that always ends. 1 mark for each underlined point. Max 2 marks	(2 marks)
10			Any suitable situations. Eg: When the data can be edited by users. When the data to be stored does not need the overhead of a relational database. Could save memory space if data is not large. 1 mark for each correct answer. Max 2 marks.	(2 marks)

11	(a)		Any suitable reasons. Eg: Saves them programming time. Allows more professional looking input fields. Allows access to advanced validation code. Allows more features than are available as standard. 1 mark for each correct answer. Max 2 marks	(2 marks)
11	(b)		Any suitable problems. Eg: Programmer relies on another company/organisation to update their code. May reduce the security of the site. External code may not be well documented. Limited by what the external source of code offers. 1 mark for each correct answer. Max 2 marks.	(2 marks)
12			ASCII is a 7-bit character set so can include at most 2^7/128 different characters. These 128 characters represent mainly just the Latin alphabet (accept English) and so this means that the characters of many other alphabets (accept languages) cannot be represented. 1 mark for each underlined point. Max 4 marks.	(4 marks)

<table>
<tr>
<td>13</td>
<td></td>
<td></td>
<td>Reward any technical reason or feature of a social networking site along with a justification of why it would be advantageous in this situation. Some examples are given in the section below.

<table>
<tr><td>No valid material</td><td>0</td></tr>
<tr><td>Lower mark range

There are a few simple or vague statements relating to benefits of social networking sites for mass communication.

Quality of written communication: The candidate has used a form and style of writing which has many deficiencies. Ideas are not often clearly expressed. Sentences and paragraphs are often not well-connected or at times bullet points may have been used. Specialist vocabulary has been used inappropriately or not at all. Much of the text is legible and some of the meaning is clear. There are many errors of spelling, punctuation and grammar but it should still be possible to understand much of the response.</td><td>1-2 marks</td></tr>
<tr><td>Mid mark range

There is evidence of some evaluation shown through the use of mostly correct technical explanation linked with advantages in the situation given. The answer covers a few of the ideas below or includes other correct answers.

Quality of written communication: The candidate has mostly used a form and style of writing appropriate to purpose and has expressed some complex ideas reasonably clearly and fluently. The candidate has usually used well linked sentences and paragraphs. Specialist vocabulary has been used on a number of occasions but not always appropriately. Text is legible and most of the meaning is clear. There are occasional errors of spelling, punctuation and grammar.</td><td>3-4 marks</td></tr>
</table>
</td>
<td>(6 marks)</td>
</tr>
</table>

			High mark range There is evidence of a clear evaluation shown by a correct explanation and three well justified advantages of the technical features of social networking sites. The answer covers most of the ideas below or includes other correct answers. Quality of written communication: The candidate has selected and used a form and style of writing appropriate to purpose and has expressed complex ideas clearly and fluently. Sentences and paragraphs follow on from one another clearly and coherently. Specialist vocabulary has been used appropriately throughout. Text is legible and the meaning is clear. There are few if any errors of spelling, punctuation and grammar.	5-6 marks	
			Quality of written communication skills The candidate's quality of written communication skills will be one of the factors influencing the actual mark an examiner will give within a level of response. The quality of written communication skills associated with each level is indicated above.		
			Technical reasons why social networking sites are used include: Data could be stored outside of country so (possibly) free from censorship. Allows other media to be shared along with text such as videos and photos to keep people more informed. Allows communication to many recipients simultaneously thus speeding up communication. Potential to allow anyone interested to see information and so potentially increasing the speed of the spread of information.		

14			The examples given in the final section below give some answers although the list is not exhaustive – any correct comparison should be awarded the relevant marks.	(8 marks)

No valid material	0
Lower mark range There are a few simple or vague statements relating to the ideas below. Comparison between models is not given or is false. Quality of written communication: The candidate has used a form and style of writing which has many deficiencies. Ideas are not often clearly expressed. Sentences and paragraphs are often not well-connected or at times bullet points may have been used. Specialist vocabulary has been used inappropriately or not at all. Much of the text is legible and some of the meaning is clear. There are many errors of spelling, punctuation and grammar but it should still be possible to understand much of the response.	1-2 marks
Mid mark range There is evidence of some evaluation shown through the use of mostly correct development models with an analysis of their advantages and disadvantages. The statements are supported by some relevant reasoning. The examples cover a few of the ideas below. Quality of written communication: The candidate has mostly used a form and style of writing appropriate to purpose and has expressed some complex ideas reasonably clearly and fluently. The candidate has usually used well linked sentences and paragraphs. Specialist vocabulary has been used on a number of occasions but not always appropriately. Text is legible and most of the meaning is clear. There are occasional errors of spelling, punctuation and grammar.	3-5 marks

			High mark range There is evidence of a clear evaluation shown through the use of correct development models that clearly analyses the advantages and disadvantages of both in a reasoned way. Quality of written communication: The candidate has selected and used a form and style of writing appropriate to purpose and has expressed complex ideas clearly and fluently. Sentences and paragraphs follow on from one another clearly and coherently. Specialist vocabulary has been used appropriately throughout. Text is legible and the meaning is clear. There are few if any errors of spelling, punctuation and grammar.	6-8 marks	
			Quality of written communication skills The candidate's quality of written communication skills will be one of the factors influencing the actual mark an examiner will give within a level of response. The quality of written communication skills associated with each level is indicated above.		
			Possible software development models include: Waterfall Model – Each phase clearly separated, inflexible, difficult to go back a step if needed. Spiral Model – More client consultation, ability to return and fix problems. Agile Development – Regular testing, faster development, difficult to develop large software using this method		