GCSE

Computing

Unit **A451**: Computer systems and programming

General Certificate of Secondary Education

Mark Scheme for June 2014

These are the annotations, (including abbreviations), including those used in scoris, which are used when marking

Annotation	Meaning
BP	Blank Page – this annotation **must** be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
∧	Omission mark
BOD	Benefit of doubt
C	Subordinate clause/Consequential error
✖	Cross
E	Expansion of a point
FT	Follow through
NAQ	Not answered question
NBOD	Benefit of doubt not given
P	Point being made
REP	Repeat
/	Slash
✔	Tick
TV	Too vague
0	Zero (big)

Here are the subject specific instructions for this question paper

ADDITIONAL OBJECTS: You **must** annotate the additional objects for each script you mark. If no credit is to be awarded for the additional object, please use annotation as agreed at the SSU, likely to be 'seen' or the highlighting tool.

CROSSED OUT, RUBRIC ERROR (OPTIONAL QUESTIONS) AND MULTIPLE RESPONSES

Crossed-out Responses: Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

Multiple Choice Question Responses: When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate). This applies especially where candidates need to, for example, tick one box per row.
When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

Contradictory Responses: When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**): Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth **two or more marks**): If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response): Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

Question			Answer	Mark	Guidance
1	a		· Computers are <u>connected to each other</u> · Restricted to a small geographical area/site/other suitable example · <u>Dedicated</u> wired or WiFi connections	2	For the first bullet point candidates should be describing a network – just the idea that computers are connected to "something" is not enough. For the third bullet point, just "connected by cables" is not enough as there is no indication these are dedicated cables for the network.
	b		· One central hub/switch/router/server/connection point · All computers/devices connected to this central point	2	Accept diagram which shows the points in the mark scheme. Note that if the diagram is not annotated or described one mark can still be given for the second bullet point.
	c		· bus · ring	2	Accept other standard names of topologies that are not on the specification: - line, linear (only as an alternative for bus) - tree/hierarchical, mesh - hybrid - loop(only as an alternative to ring Do not accept serial or circle
2	a		· 1GB	1	Accept 1.024 The units are not necessary
	b		· Operating system · Other programs that are running / in current use · Data in current use	2	Accept examples for the second and third bullet points as long as it is clear that the programs/data are currently in use Accept instructions for programs
	c		· Using the hard disk/secondary storage · Used as RAM/to store the contents of RAM/main memory · Needed when there isn't enough physical memory	3	Note that these points may be worded differently. E.g. "items are taken from memory and stored on the hard disk until needed" achieves the first two bullet points.

Question			Answer	Mark	Guidance
3	a		Answer: 1 1 1 0 1 1 1 1 One mark per nibble	2	
	b		· There is an extra carry/bit · As number cannot fit into 8 bits · Result is greater than 255/11111111	2	
4	a		· Hypertext Markup Language	1	
	b		· Contains text/content to be displayed · ... and links to other resources / files / images etc... · ... and instructions about how they should be displayed / layout · In a standard format (that can be understood by web browsers)	2	
	c		· JPG files: images · MPEG files: videos	2	
5	a		Input device: · e.g. (touch screen, menu/next/prev page) buttons / keypad / touchpad / microphone Output device: · e.g. screen, speaker	2	Accept any devices relevant to an e-book reader. For input device accept a clear description of an inbuilt scrolling device such as a trackball, but do not accept "mouse". Also do not accept a clear indication of a software keyboard as this is a piece of software rather than a device. For output device, accept "monitor"
	b	i	· Solid state	1	

Question			Answer	Mark	Guidance
		ii	· Fast access... · ... less delays when turning the device on/ turning pages etc... · No moveable parts/robust · ... can be handled/manipulated/moved without damaging it · Small/light enough… · … to fit within a hand held device · low power · …to extend battery life of reader	2	No follow through from (i). Candidates need to identify a relevant characteristic of solid state storage for the first mark, and expand by explaining why this is an advantage in an e-book reader for the second mark. Note that portable/capacity are not acceptable answers here (as solid state storage is not particularly more portable/larger than other forms of storage for this application)
	c	i	eg · Cheap to produce · Easily portable / Fits in a magazine · Enough capacity for e-books · Can be read by other devices e.g. computers · Read only / can't write over	2	Note that portable/capacity are acceptable answers here (as they are relevant characteristics of a CD ROM) Do not accept "compact" (unless portability is clearly implied)
		ii	· optical	1	
	d	i	· Source code not made available/ Only compiled code is published · Licence restricts the copying/modifying/distribution of the software	2	The mention of a licence is not sufficient. Candidate should state that the licence restricts copying/modifying/distributing. "closed source" is not enough because it just gives an alternative term for "proprietary" without a description of what we mean by "closed"

Question			Answer	Mark	Guidance
		ii	eg · Stops competing companies copying their software (or hardware/ebooks) · ... and producing similar/better products. · Ensures compatibility (with the e-book reader)... · ... as they can ensure that no modifications have been made (mark points in pairs).	2	The first mark is for identifying a relevant advantage *to the manufacturer*, and the second for details expanding this point. Accept answers about preventing reverse engineering the company's product or piracy of the company's software or e-books (e.g. DRM) as referring to the first set of answers.
6	a		(see table below)	3	1 mark per row

Item of data	Date	Integer	Real	String
The amount paid			ü	
The customer's card number				ü
The date of the payment	ü			

			Answer	Marks	Guidance	
					Content	**Levels of response**
6	b		Points may include: · Need to be always available... · ... shops and customers want to process payments quickly, · ... if it goes down, there will be delays/customers lost etc... · Need to always process payments accurately · ... shops want to be confident that they will receive the payment · ... customers do not want to be overcharged · Need to be able to trust the security of the system · ... that fraudulent purchases cannot be made · ... that customers' personal details cannot be stolen/to prevent identity theft	6		High Level Response(5/6): A detailed description of the need for reliability with a number of fully justified points. There will be few if any errors in spelling, grammar and punctuation. Technical terms will be used appropriately and correctly. Medium Level Response (3/4); Some reasons why reliability is needed are explained, but some explanations may not be detailed. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. Low level response (1/2): One or more reasons why reliability is needed are identified, but there is little or no explanation. Information will be poorly expressed and there will be a limited, if any, use of technical terms. Errors of grammar, punctuation and spelling may be intrusive. 0 : Answer not worthy of credit

Question	Answer	Mark	Guidance
7	<table><tr><td>**A**</td><td>**b**</td><td>**NOT(a AND b)**</td></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td></tr></table> 1 mark for row two and three. For row 4, 1 mark for correctly identifying 1 1 as the inputs, and 1 mark for the correct output 0)	4	No follow through on row 4.
8	System information : · displays important data about the current state of the computer · e.g. temperature, free memory, network speed, % processor used Diagnosis: · attempts to detect/resolve items that are not working correctly · e.g. missing drivers, network connection	4	1 mark each for explaining "system information" and "diagnosis" + 1 mark for each example – accept relevant examples, but not examples related to virus/malware for diagnosis. Examples should be specific examples of the use of these utilities rather than general descriptions.

Question			Answer	Mark	Guidance
9	a	i	· 6 * 16 + 2 / 0110 0010 · 98	2	Accept working where candidates write the least significant bit first in their binary representation (i.e. 01000110) as long as this is clear (e.g. by showing the place values)
		ii	· 62 ÷ 16 = 3 r 14 / 62 = 0011 1110 · 3E	2	Accept working where candidates write the least significant bit first in their binary representation (i.e. 01111100) as long as this is clear (e.g. by showing the place values)
	b		· Binary produces long strings/ Hex is shorter · … Binary is difficult to work with/Hex easier to work with · Hex can be easily converted to/from binary / 1 hex digit per nibble · Hex is less susceptible to error	3	
10	a		· A value that does not change (while the program is running) · eg Noise	2	For the example do not accept the whole line of code; candidate should show that they know where the constant is. Note that "A constant is a variable which does not change" is a contradictory answer (because by definition variables change) and when candidates give a contradictory answer award no marks.
	b		· A location in memory to store / a value that may change (as the program is running) · eg Wins/ Losses/ Net/Goals	2	
	c		· Net = 5 which is less than Noise · Goals = 0	2	1 mark for the subtraction **and** result of the comparison 1 mark for correct result
			· Net = 15 which is greater than Noise · Runs Loop once {Goals = Goals + 1, Net = Net – Noise}... · . Goals = 1	3	1 mark for the subtraction and result of the comparison 1 mark for clearly indicating that the loop is executed once 1 mark for correct result Remember to enter a total mark out of 5 for both sections.

Question			Answer	Mark	Guidance
11	a		· A (persistent) organised store of data	1	Accept answers that imply that the data is organised – e.g. data stored in tables/records
	b		· data structure does not depend on the application / no data dependence · Multiple platforms/ applications · ... can operate on the same data · ... ensures no redundancy/inconsistency (between applications) · Different views of the same data · ... can easily be prepared for different users according to their need. · Any application can be changed if needed · ... without changing the data structure / reduces unproductive maintenance	3	Do not accept answers that refer to protecting the data from being accidentally deleted / different levels of PERMISSIONS for different users / data integrity But DO accept answers that refer to different users viewing different/user appropriate data (bullet 4)

Question			Answer	Mark	Guidance
	c		Queries eg · Select attendance for all students of a particular tutor group each week · ... so the tutor can see who has missed lessons · Select weekly attendance of a particular student for a term · So the school can see if his/her attendance is improving · (1 mark for a correct point + 1 mark for expansion) Validation rules eg · Range check / only allow a range of marks (e.g. Present, Absent, Late) · When teachers are calling the register and inputting the marks · Presence check on required fields(such as name, class etc.) · When a pupil is added to the register · (1 mark for a correct point + 1 mark for expansion)	4	Do not accept answers which explain what is meant by a query or validation rule. The question requires candidates to explain one example of **how** they can be used in this application, not what they are. Award one mark for a correct example and an expansion mark for detail/justification of this use. Remember to award a mark out of 4 for both parts of the question.

Question	Answer	Marks	Guidance	
			Content	**Levels of response**

12	Example:
	
	``
	Choice = ""
	
	REPEAT
	  INPUT Button
	  IF Button is between 0 and 9 THEN
	    Choice = Choice & Button
	    OUTPUT Choice
	  ELSE IF Button = CANCEL THEN
	    Choice = ""
	  END IF
	UNTIL Button = OK
	
	IF Choice is between 1 and 20 THEN
	  IF drink chosen available THEN
	    Dispense drink
	    OUTPUT "Collect your drink"
	  ELSE
	    OUTPUT "Drink not available"
	  END IF
	ELSE
	  OUTPUT "Invalid selection"
	END IF
	
	Wait
	OUTPUT "Ready"
	``
				High Level Response(5/6):
				A clear and complete algorithm with correct input, validation and reasonable output/outcome (accept minor errors).
				Algorithm presented in algorithm in code, pseudocode or as a flowchart with correct conventions used to make it clear (e.g. indentation, shapes of flow chart objects). Technical terms are used correctly and there are few, if any, errors in spelling.
				
				Medium Level Response (3/4):
				An algorithm that deals with input, validation and reasonable output/outcome but there may be some logical errors. Algorithm may be in code, pseudocode, flowchart, or very well structured English (e.g. clear bulleted steps) using some accepted conventions, although this may not be consistent. Technical terms are mainly correct and there may be occasional spelling errors.
				
				Low level response (1/2):
				A description of the Input, validation and output required, but some may be missing.
				Response may be in English or a poorly structured code/flowchart. Limited, if any, use of technical terms and errors of spelling may be intrusive.
				
				0: Response not worthy of credit

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