OCR
RECOGNISING ACHIEVEMENT

GCSE

Computing

General Certificate of Secondary Education

Unit **A451:** Computer systems and programming

Mark Scheme for January 2012

Oxford Cambridge and RSA Examinations

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All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations

Used in the detailed Mark Scheme (to include abbreviations and subject-specific conventions).

Annotation	Meaning
^	Omission mark
BOD	Benefit of doubt
C	Subordinate clause/Consequential error
Cross	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	Tick
TV	Too vague
ZERO	Zero (big)

Question			Answer	Marks	Guidance
1	(a)		• A 1-page text document: **Kilobyte(s)** • A 10-min movie clip: **Megabyte(s)** • A person's surname: **Byte(s)**	3	Allow abbreviations
	(b)		• Multiply by 1024/1000 • 2048/2000 (GB)	2	
2	(a)		Eg • Allows more than one program to run (apparently) at the same time • ... by sharing processor time / resources between the programs • Enables the user to be more productive • ... Good example of a situation where multitasking is required (eg cut from browser and paste in word processor) (1 mark for valid point & 1 for expansion)	2	
	(b)		**e.g.:** • Providing a user interface • Providing a platform for applications • Memory management • File/disk management Peripheral management / providing a platform for hardware	2	
3	(a)	(i)	• A <u>name/symbol</u> which represents a value in a program • ... points to a memory location • ... and the value be changed (while the program is running)	2	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td></td><td>(ii)</td><td>ORIGIN
• Data type: String
• Reason: Consists of characters
Size
• Data type: Integer
• Reason: Consists of whole numbers</td><td>4</td><td>Accept equivalent data types (for string: text, char, alphanumeric etc, for integer: byte, long, int etc.. but not number)

Do not award a correct reason referring to a wrong data type e.g. Because you can’t have half sizes, it must be real.</td></tr>
<tr><td></td><td>(b)</td><td></td><td>• Dress A: 14
• Dress B: 10
• Dress C: 12</td><td>3</td><td></td></tr>
<tr><td>4</td><td>(a)</td><td></td><td><table><tr><th></th><th>TRUE</th><th>FALSE</th></tr><tr><td>The internet is the same as the World-Wide Web</td><td></td><td>✓</td></tr><tr><td>The internet is a Local Area Network</td><td></td><td>✓</td></tr><tr><td>The internet is a network between many networks</td><td>✓</td><td></td></tr></table>One mark per correct row</td><td>3</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance	
					Content	Levels of response
	(b)		Points to be made include: How DNS servers are used: • DNS servers have a database of IP addresses • Constantly updated by other DNS servers • When you request an address(URL), the DNS server looks up the URL and returns the IP address, or searches for the address from other DNS servers Advantages • People do not need to remember IP addresses • Easily upgradable (eg IPv4 toIPv6) without all web addresses needing to be the same • As long as you are connected to a DNS server you can have access to all the addresses	6		**High Level Response (5-6):** A detailed description of how DNS servers are used, and an explanation of the main advantages. 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):** A limited description of how DNS servers are used and either one advantage explained or two advantages identified. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. **Low Level Response (0-2):** There may be an attempt to describe how DNS servers are used but the description is incomplete and/or contains factual errors. An advantage may be identified. 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.

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>5</td><td>(a)</td><td></td><td>
<table>
<tr><th></th><th>Must be included</th><th>Need not be included</th></tr>
<tr><td>The names of the people in the picture</td><td></td><td>✓</td></tr>
<tr><td>The width of the picture in pixels</td><td>✓</td><td></td></tr>
<tr><td>The number of bits used for each pixel</td><td>✓</td><td></td></tr>
<tr><td>The number of people in the picture</td><td></td><td>✓</td></tr>
<tr><td>The colour of each pixel</td><td>✓</td><td></td></tr>
</table>
1 mark per correct row</td><td>5</td><td></td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>• The concentration of pixels</td><td>1</td><td>Not just the number of pixels or picture quality</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>• (The higher the resolution) more pixels are required for the picture...
• ... which will increase the size of the bitmap file.
(Accept lower resolution → fewer pixels, smaller size)</td><td>2</td><td></td></tr>
<tr><td>6</td><td>(a)</td><td>(i)</td><td>eg
• Existence check
• Male / Female (or similar) allowed
• And no other entry possible</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>eg
• Range check
• Must be a (real) number
• Must be positive</td><td>2</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
	(b)		• It is used as foreign key (in this table) • ... the primary key <u>of the DOG table</u> • to link the two tables • allows us to find the details of the Dog to which each job relates / do not need to re-enter dog details for each job	3	Not simply "to identify dog… but if they refer to the JOB table, i.e. "to identify the dog that a job refers to" then this is the same as the 4th bullet
	(c)		• 36, 37, 39 (correct answer only)	1	
	(d)		• There is a date • There is a title • Jobs are grouped/sorted appropriately (eg by dog, time or job type) • Each job includes the Dog **Name** • Each job includes the Dog ID • Each Job includes the Job type • Each job includes details	6	
7	(a)		The following are just examples. Give max 2 marks per technology either 1 mark for naming the technology and 1 for expansion, or 2 marks for explaining in detail without naming. For example: • Swipe card / Smart card technology / RFID cards • ... can allow pupils to register themselves • ... can allow pupils to be located • Electronic registers/ centralised attendance database • ... immediately updated • ... can send messages (eg via email / SMS to parents) to inform of absence • ... can produce up to date reports of absence	4	

Question			Answer	Marks	Guidance
			• Virtual learning environment... • ... homework set is recorded online • ... whether homework is completed is recorded on line • ... parents can be given access to this information		
	(b)	(i)	eg **:** • Available now / the school will not have to wait • Recommendations available / can see it working in other schools • Tried and tested / less likely to contain bugs (given how critical the application is) • Costs less than custom-written / as the school does not pay for the full cost of development. • More (third party) support / documentation	2	
		(ii)	eg **:** • May contain features which the school does not need • May not contain features which the school needs • May not be compatible with school's hardware • May not be compatible with school's processes • Developer not available to make adjustments necessary	2	

Question			Answer	Marks	Guidance	
	(c)		Points may include: • The school should take reasonable steps to ensure that only authorised people can access pupils' personal data • ... ensure school network is safe from hackers eg strong passwords/firewalls • ... expressly seek permission from the pupil to pass data to third parties (eg when providing references) • Any images in which students can be identified cannot be used without students'/parents' permission • ... to comply with child protection legislation accept answers about any relevant areas of legislation (eg data protection, freedom of information, child protection, copyright and licensing etc)	6		**High Level Response (5-6):** A detailed explanation of different measures the school will take to address legal issues, clearly identifying the issues. 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)** A limited explanation of some measures the school will take with some reference to legal issues. There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct. **Low Level Response (0-2):** They may be an attempt to state some measures or identify some legal issues. 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.

Question			Answer	Marks	Guidance
8	(a)		• Stores parts of the operating system currently used by the computer • Stores programs that are currently running • Stores data that are currently used by the computer	2	
	(b)	(i)	• A section of the hard disk is used... • ... to store items in RAM which are not being currently used	2	
		(ii)	• Used to allow more programs / data to be loaded when the RAM is insufficient	1	
		(iii)	• The computer will be able to multitask more programs • ... as there is more memory for programs/data to be loaded into. • Programs will run faster... • ... due to less use of virtual memory.	2	
9	(a)		• Coins(4) = 50 • Coins(10) = 0 (correct answers only)	2	
	(b)	(i)	• The program is written to do something other than what the programmer intended	1	
		(ii)	• It will only reset the first 9 elements / will not reset the 10^{th} element • After setting Coins(9) = 0, i will become10... • ... and the loop will stop • It should be UNTIL i > 10 / or other working correction	2	

Question			Answer	Marks	Guidance

	(c)		Example:
			`i = 1`
			`total = 0`
			`REPEAT`
			`  total = total + Coins(i)`
			`  i = i + 1`
			`UNTIL i>10 or Coins(i)=0`
			OR:
			`total = 0`
			`FOR i = 1 to 10`
			`  total = total + Coins(i)`
			`NEXT i`
			
			Award marks for:
			• Initialising the total
			• (Using a loop which) correctly starts from element 1
			• ... to element 10 / to the first 0 element
			• ... each element is correctly added to the total
			• ... the iterator i (or equivalent) is correctly updated in the loop.
				5	Note that the FOR loop meets the requirements of bullets 2,3 and 5.
					
					If a candidate makes a sequence of 10 assignments they can get maximum of 4 marks (for bullets 1,2,3,4).

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