OCR
RECOGNISING ACHIEVEMENT

GCSE

Computing (Pilot)

General Certificate of Secondary Education

Unit **A451:** Computer systems and programming

Mark Scheme for January 2011

Oxford Cambridge and RSA Examinations

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OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
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Question			Expected Answer	Mark	Additional Guidance
1	(a)		• To carry out the processing on the computer/To (fetch and) execute instructions'	[1]	*"control" the computer is too vague*
	(b)		3MHz. Two from • 3MHz is the clock speed / how fast the processor is • Indicates how many instructions may be processed in each second • Indicates how many clock cycles per second	[2]	
			Quad core • The computer has 4 cores... • …which are independent processors within the CPU .. • ... working simultaneously / can perform multiple tasks	[2]	
2	(a)		Two from: • To share the printer • To share the internet connection • To share files • To communicate with each other eg by email	[2]	
	(b)		• Bus "line" shown • Terminators shown at each end of bus • 3 computers attached to bus • Printer attached to bus or to a computer • Internet connection connected to Router or to a computer • Network adapters are needed on each computer • Router needed to share the Internet connection • Cables needed to connect the different devices	[6]	Do not accept hub/switch unless there is a clear indication that there is a logical bus IN the hub/switch

<table>
<tr><th colspan="3">Question</th><th>Expected Answer</th><th>Mark</th><th>Additional Guidance</th></tr>
<tr><td>3</td><td>(a)</td><td></td><td>• 128 + 16 + 4 + 2 + 1
• 151</td><td>[2]</td><td>(accept valid alternative method)</td></tr>
<tr><td></td><td>(b)</td><td></td><td>1 0 0 1 0 1 1 1
1 1 0 1 1 0 0 0
0 1 1 0 1 1 1 1
1 1
Mark points for:
• First nibble correct with carries shown
• Second nibble correct
• There is an overflow...
• ... because the result > 255/cannot be represented in 8-bits</td><td>[3]</td><td>Accept 9 bit answers</td></tr>
<tr><td>4</td><td></td><td></td><td><table><tr><th></th><th>ROM</th><th>RAM</th></tr><tr><td>Programs and data which are currently in use are loaded here</td><td></td><td>✓</td></tr><tr><td>All the contents are lost when the power is turned off.</td><td></td><td>✓</td></tr><tr><td>It is used to boot up the computer when it is switched on.</td><td>✓</td><td></td></tr></table>1 mark per correct row</td><td>[3]</td><td></td></tr>
</table>

Question			Expected Answer	Mark	Additional Guidance
5	(a)		• Software created especially for a user/the restaurant	[1]	Do not accept "for a specific purpose" unless candidate indicates that there is a user who determines the purpose.
	(b)		Two from: • Appropriate software may not exist • Existing software may not do exactly what restaurant wants • Existing software may not be compatible with restaurant's hardware • Existing software may contain additional features (more complex and expensive)	[2]	
	(c)		High Level Response(5/6): A good discussion of open source software including reference to at least of 2 of ethical, financial or quality implications, discussing both merits and limitations; 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) clear understanding of open source software; at least 1 of ethical, financial or quality implications; mainly one-sided (for or against); 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 define open source software, but little or no attempt to discuss the implications, or discussion contains several factual errors; 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			Expected Answer	Mark	Additional Guidance
			Points to be made include: • Open source – licence-free, the restaurant will make the software and its source code available for others to use/improve. • Financial implications include: no need to pay for license, can reuse/adapt free open source software which is similar BUT loss of development costs/software will be available to competitors • Quality implications include: large community of open source developers can see and comment on code or can be consulted/ software has to conform to certain standards to be released under public licence BUT open source code is used as is, with no guarantees, • Ethical implications include: Open source encourages "open culture" values - free sharing, collaboration BUT restaurant is a business trying to make a profit.	**[6]**	
6			Input device: • Joystick • To control the CCTV cameras • … to zoom/tilt/pan • … as they allow precise movements (in 2 axis) • Keyboard • To type commands into the system… • … to perform complex control tasks • Key presses can be used to control the cameras Output device: • Monitor/Array of monitors • Show the output of cameras • Showing multiple cameras at a time		Allow follow through if a device has the correct use even if it is not identified as the correct type. (e.g. Joystick as output device) Reason has to relate has to relate to stem

Question			Expected Answer	Mark	Additional Guidance
			• Printer • To print hard copy images from the recordings • eg to be used as evidence Storage device • hard disk drive with large capacity • to record feed from all cameras… • … simultaneously • … allows direct access to any part of the recording • rewritable large optical drive/removable flash storage • to save recordings (eg for a given day) • for archiving purposes Other valid answers will be accepted. (1 mark for naming the device and up to 2 for explaining why needed)	**[9]**	
7	**(a)**		• A real world object • ... about which data is stored in a database • Corresponds to tables in the database	**[2]**	
	(b)		• Primary Key: PupilNumber • It is a <u>unique identifier</u> • Two pupils cannot have the same PupilNumber... • ... but they can have the same surname, firstname or ClassCode 1 for primary key + any other 2 bullet points	**[3]**	

Question			Expected Answer	Mark	Additional Guidance
	(c)		• ClassCode is used here as a foreign key • To link CLASS and PUPIL • Using the ClassCode, all the class details can be retrieved from the Class table • ... otherwise the class details will have to be rewritten everytime/to avoid data redundancy	[3]	Explanations must link the two entities. e.g. "To find out in which class a pupil is" or "to create lists of students by class" is too vague as it does not require the ClassCode in CLASS to be the same as in PUPIL.
8	(a)		• An error in the rules/grammar of the language • Any suitable example	[2]	"A spelling error" is acceptable as an example but not as a definition of syntax error. So e.g. "A spelling error such as ED IF instead END IF" is worth 1 mark only.
	(b)		• Error messages/translator diagnostics • Produced when translating/by the compiler • ... or on the fly while writing code • Attempts to tell you what the error is • And indicate where the error is/line numbers/underlines • Editor... • ... allows you to enter the corrected code	[4]	Translator includes compiler/interpreter
9			High Level Response(5/6): A good understanding with detailed descriptions of the role of both software and hardware in social networking; 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 awareness shown of the impact of software and hardware in social networking, with good descriptions of one of these; There may be occasional errors in spelling, grammar and punctuation. Technical terms will be mainly correct.		

Question			Expected Answer	Mark	Additional Guidance
			Low level response (0/2): There may be some discussion of social networking but with little or no reference to developments in hardware or software; 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. Points may include: • Hardware: Computers faster & more capable of high speed Internet access – allows video and voice communication; large server farms and cheaper storage enables the infrastructure behind large social networking websites; convergence of computers with other digital technology (eg phones, television sets) allows continuity of networking over several formats. • Software: Open standards and increased use of server side software (eg php) allow social networking sites to operate across all platforms. Open protocols allow several clients to use the same services or allow software to be written to allow different services to sync with each other; coexist. Software increasingly easier to use and easily adopted by younger generation.	**[6]**	
10		**(a)**	• Each character is given a numeric code • Including symbols, digits, upper and lower case • This code is then stored in binary • Each character takes 1 byte • Text is stored as a series of bytes (1 per character) • Some codes are reserved for control characters (eg TAB, Carriage Return)	**[3]**	
		(b)	• All the characters which are recognised/can be represented by the computer system	**[1]**	

Question			Expected Answer	Mark	Additional Guidance
		(c)	• Unicode has a much larger character set • ... and can represent many more characters/characters from all alphabets • Because unicode uses 16 bits... • ... and ASCII uses fewer/7/8 bits	[2]	
11	(a)		• 0 • 12 • 4	[3]	
	(b)		Test data : 1 1 3/1 1 4/1 1 5/1 1 6/2 2 5/2 2 6 Expected output: -1 -2 -3 -4 -1 -2 Award one mark for correct test data, and one mark for the correct corresponding outcome.	[2]	Accept dice in different order
	(c)		Two from: • A data structure/collection of several variables • Under one name • Each individual variable is given an index • by which it is referred within the array	[2]	
	(d)		• Data type: Integer • Reason: A dice roll is always a whole number (between 1 and 6) • Size: 3 • one element is needed for each dice	[4]	Accept size of array in bits/bytes = 3 * size of an integer if this is clear in the response.

Question			Expected Answer	Mark	Additional Guidance

	(e)		Example
			`BEGIN RollTheDice`
			`  i = 1`
			`  WHILE i <= 3`
			`  DiceRoll(i) = Random No`
			`  END WHILE`
			`END`
			Award marks for:
			• Using a loop
			• i (or equivalent) initialised correctly
			• correct end condition for loop/loops the required number of times
			• Correct use of i (or equivalent) in DiceRoll(i)
				[4]	

			Total	**[80]**	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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Facsimile: 01223 552553