

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Level

## **MARK SCHEME for the May/June 2015 series**

### **9608 COMPUTER SCIENCE**

**9608/33**

Paper 3 (Written Paper), maximum raw mark 75

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

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1	(a) (i)	Wrong assignment operator (should be '=' not '=')	1															
	(ii)	0 is not a digit	1															
	(iii)	'B' is not a number	1															
	(b)	<pre> &lt;assignmentstatement&gt; ::=   &lt;variable&gt; := &lt;variable&gt;&lt;operator&gt;&lt;number&gt; &lt;variable&gt; ::= &lt;letter&gt;&lt;number&gt; &lt;number&gt; ::= &lt;digit&gt;  &lt;digit&gt;&lt;number&gt; &lt;letter&gt; ::= A B C &lt;digit&gt; ::= 1 2 3 4 5 &lt;operator&gt; ::= + - * / </pre>	1 + 1 1 1 + 1 1															
	(c) (i)	Use of <u>software</u> ... (idea of using) to implement a <u>hardware</u> set-up (idea of implementing / simulating / emulating)	1 1															
	(ii)	e.g. no need to acquire client hardware for testing / reduces set-up time for test system / common development system for all developers	1															
	(iii)	e.g. software emulation runs slower than real hardware / not possible to emulate some hardware	1															
			<b>Total: 13</b>															
2	(a)	<table border="0"> <thead> <tr> <th>Description</th> <th>Type of LAN</th> <th></th> </tr> </thead> <tbody> <tr> <td>any packet the listening computer receives may be part of a message for that computer</td> <td>bus with terminators at each end</td> <td>1</td> </tr> <tr> <td>connection provided through an access point</td> <td>star</td> <td>1</td> </tr> <tr> <td>a process for handling collisions has to be implemented</td> <td>wireless</td> <td>1</td> </tr> <tr> <td>listening computer only receives packets that are addressed to this computer</td> <td></td> <td>1</td> </tr> </tbody> </table> <p>1 mark for correct arrow(s) from each description</p>	Description	Type of LAN		any packet the listening computer receives may be part of a message for that computer	bus with terminators at each end	1	connection provided through an access point	star	1	a process for handling collisions has to be implemented	wireless	1	listening computer only receives packets that are addressed to this computer		1	
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listening computer only receives packets that are addressed to this computer		1																
	(b) (i)	<b>Server:</b> central computer stores files that are to be downloaded	1 1															

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	(ii) <b>Command:</b> user can send action/instruction (or by example, e.g. change directory) that are carried out on server	1 1
	(iii) <b>Anonymous:</b> allows user to access files user does not need to identify themselves to server	1 1
		<b>Total: 10</b>
3	(a) A Phishing B Virus C a standalone piece of software which can reproduce itself automatically D sending unsolicited emails to a distribution list	1 1 1 1
	(b) e.g. phishing <b>problem:</b> identity fraud / misuse of financial data <b>solution:</b> ignore email / don't respond to email e.g. virus <b>problem:</b> computer may stop working // lost files <b>solution:</b> running anti-virus software	1 1 <b>or</b> 1 1
	(c) <b>cipher text:</b> encrypted text which is not understandable <b>private key:</b> key only known to owner that can be used to encrypt message to confirm author of message // can be used by owner to decrypt a message thereby ensuring only owner can read message	1 1
	(d) <ul style="list-style-type: none"> <li>• Manager encrypts email</li> <li>• using public key of colleague</li> <li>• colleague decrypts email</li> <li>• using his/her private key</li> </ul>	1 1 1 1
		<b>Total: 12</b>
4	(a) (i) HomeAddress.ThisHouseNo ← 34	1
	(ii) DECLARE ThisHouseNo: 1..10  DECLARE ThisTown: [Brightown, Arunde, Shoram]	1 1
	(b) (i) TYPE WeatherStation DECLARE StationID : STRING DECLARE Latitude : REAL DECLARE Temperature : <u>ARRAY[1..15]</u> OF INTEGER ENDTYPE	1 1 1 + 1 1
	(ii) StationID is hashed to produce home location If home location is free insert record Else use overflow method to find free location	1 1 1
		<b>Total: 11</b>

5 (a) (i)		<table border="1"> <thead> <tr> <th colspan="3">Circuit 1</th> </tr> <tr> <th>A</th> <th>B</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	Circuit 1			A	B	X	0	0	1	0	1	0	1	0	0	1	1	0	1
	Circuit 1																				
A	B	X																			
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(ii)		<table border="1"> <thead> <tr> <th colspan="3">Circuit 2</th> </tr> <tr> <th>A</th> <th>B</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	Circuit 2			A	B	X	0	0	1	0	1	0	1	0	0	1	1	0	1
Circuit 2																					
A	B	X																			
0	0	1																			
0	1	0																			
1	0	0																			
1	1	0																			
(b) (i)	circuit 1 $\overline{A+B}$ circuit 2 $\overline{A \cdot B}$		1 1																		
(ii)	$\overline{A+B} \equiv \overline{A \cdot B}$		1																		
(c)	$\overline{\overline{(A \cdot B) + B}}$ mark as : $\overline{(A \cdot B)}$ $+ B$ bar over whole expression		1 1 1																		
(d)	$\overline{\overline{(A \cdot B) + B}}$ $= \overline{\overline{(A \cdot B)} \cdot \overline{B}}$ $= \overline{(A \cdot B) \cdot \overline{B}}$ $= \overline{A \cdot (B \cdot \overline{B})}$ $= \overline{A \cdot 0}$ $= 0$ allow f.t. from (c)		1 1 1 1 1 max 3																		
			<b>Total: 11</b>																		

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<b>6 (a)</b>	Control system	1
<b>(b)</b>	Any three different items – max 6 marks heater / water pump / blinds pump ... for altering temperature / watering / light level actuator for... fan for distributing air / water pump / blinds motor analogue to digital converter / digital to analogue convertor ... converts analogue signal from sensor to digital value for processing / converts digital signal to analogue signal for controlling actuator microprocessor ... executes control software warning device (speaker/buzzer/light)... to give warning if conditions out of range / hardware malfunction	1 1 1 1 1 1 1 1 1 1 max 6
<b>(c) (i)</b>	output of system (alter temperature / light level / soil moisture) affects input from sensors continuous	3
<b>(ii)</b>	min / max / ideal / mean / extreme temperature // sampling rate // tolerance interval	1
<b>(iii)</b>	reading from sensor is compared with parameter appropriate action is taken (by example)	2
<b>(d) (i)</b>	reading available for processing reading value is 4	1 1
<b>(ii)</b>	AND #B00000100 // AND #04 // AND #4 1 mark for AND, 1 mark for address mode, 1 mark for mask, 1 mark for indication of numbering system	max 3
		<b>Total: 18</b>