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Cambridge International Advanced Level

MARK SCHEME for the May/June 2015 series

9608 COMPUTER SCIENCE

9608/31

Paper 3 (Written paper), maximum raw mark 75

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

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Page 3	Mark Scheme	Syllabus	Paper
	Cambridge International A Level – May/June 2015	9608	31

(c)	encryption: process of turning plain text into cipher text public key: key widely available that can be used to encrypt message that only owner of private key can decrypt // can be used to decrypt a message thereby confirming originator of message	1																		
		1																		
(d) (i)	digital signature	1																		
(ii)	- software is put through hashing algorithm - hash total is encrypted with private key (digital signature) - software + encrypted hash / digital signature are sent - receiver is in possession of sender's public key - the received hash total / digital signature is decrypted with public key (SH) - the receiver hashes received software (RH) - If SH matches RH then software is authentic and has not been altered	Any four points 1 mark each																		
		Total: 13																		
3 (a) (i)	enumerated	1																		
(ii)	record	1																		
(iii)	MyMonthOfBirth ← DateOfBirth.ThisMonth	1																		
(b) (i)	TYPE LocationRainfall DECLARE LocationName : STRING DECLARE LocationHeight : INTEGER DECLARE TotalMonthlyRainfall : <u>ARRAY[1..12]</u> OF REAL ENDTYPE	1																		
		1																		
		1																		
		1 + 1																		
(ii)	- no need to re-sort data every time new data is added - only a small file so searching will require little processing - new records can easily be appended	1 1 1 [max 2]																		
		Total: 10																		
4 (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>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> </tbody> </table>	Circuit 1			A	B	X	0	0	1	0	1	1	1	0	1	1	1	0	1
Circuit 1																				
A	B	X																		
0	0	1																		
0	1	1																		
1	0	1																		
1	1	0																		

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge International A Level – May/June 2015	9608	31

(ii)	<table border="1"> <tr> <th colspan="3">Circuit 2</th></tr> <tr> <th>A</th><th>B</th><th>X</th></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>	Circuit 2			A	B	X	0	0	1	0	1	1	1	0	1	1	1	0	1
Circuit 2																				
A	B	X																		
0	0	1																		
0	1	1																		
1	0	1																		
1	1	0																		
(b) (i)	- circuit 1: $\overline{A.B}$ - circuit 2: $\overline{A} + \overline{B}$	1 1																		
(ii)	$\overline{A.B} \equiv \overline{A} + \overline{B}$	1																		
(c)	$\overline{(A+B).B}$ Mark as follows: $\overline{(A+B)}$ $\overline{.B}$ bar over whole expression	1 1 1																		
(d)	$\overline{(A+B).B}$ $= \overline{(A+B) + \overline{B}}$ $= (A+B) + \overline{\overline{B}}$ $= A + (B + \overline{B})$ $= A + 1$ $= 1$ allow f.t. from (c)	1 1 1 1 1 [max 3]																		
		Total: 11																		
5 (a)	Monitoring system	1																		
(b)	- temperature sensor ... - transmits measured temperature - analogue to digital converter ... - converts analogue signal from sensor to digital value that can be stored - storage device // data logger... - for recording readings from sensor - transmission hardware ... - to transfer data from sensor to storage device - processor ... - to process incoming data	1 1 1 1 1 1 1 1 1 1 [max 6]																		

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge International A Level – May/June 2015	9608	31

(c) (i)	temperature reading in location 5 has been processed	1 1
(ii)	0100 0000 1111 1011 1 mark per byte	2
(d) (i)	AND #B00010000 // AND #&10 // AND #16 1 mark for AND, 1 mark for address mode, 1 mark for mask, 1 mark for indication of numbering system	1 + 1 + 1 + 1
(ii)	OR #B00000001 // OR #&01 // OR #1 1 mark for OR, 1 mark for mask	1 + 1
		Total: 17
6 (a)	Description email client downloads an email from an email server email is transferred from one email server to another email server email client sends email to email server browser sends a request for a web page to a web server Protocol used HTTP POP3 SMTP	1 mark for correct arrow from each description
(b)	peer-to-peer	1
(c) (i)	Tracker: central server that: stores details of other computers that have all / part of file to be downloaded // has data on those peers downloading and uploading file // shares IP addresses with other clients in swarm allowing them to connect	1 1
(ii)	Seed: peer computer that has 100% of file // is uploading downloaded content	1 1
(iii)	Swarm: all the connected peer computers that have all or part of the file to be downloaded / uploaded // share a torrent	1 1
		Total: 11