Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

COMPUTER SCIENCE **9608/32**

Paper 3 Written Paper **May/June 2017**

MARK SCHEME

Maximum Mark: 75

Published

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.

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Question	Answer	Marks
1(a)(i)	`DECLARE NewFriend : MyContactDetail`	**1**
1(a)(ii)	`NewFriend.HouseNumber ← 129`	**1**

1(b)	Declaration of `Name`, `Area`, `HouseNumber` 1
	Inclusion of three correct values for `Area` 1
	Inclusion of correct range for `HouseNumber` 1
	
	For example:
	
	`TYPE MyContactDetail`
	`  DECLARE Name : STRING`
	`  DECLARE Area : (uptown, downtown, midtown)` **1**
	`  DECLARE HouseNumber : 1..499` **1 & 1**
	`ENDTYPE`
		3

1(c)(i)	4402	**1**
1(c)(ii)	33	**1**
1(c)(iii)	3427	**1**
1(c)(iv)	`TRUE`	**1**
1(d)(i)	`IPointer ← @MyInt2`	**1**
1(d)(ii)	`MyInt1 ← 33`	**1**
1(d)(iii)	`IPointer^ ← MyInt2`	**1**

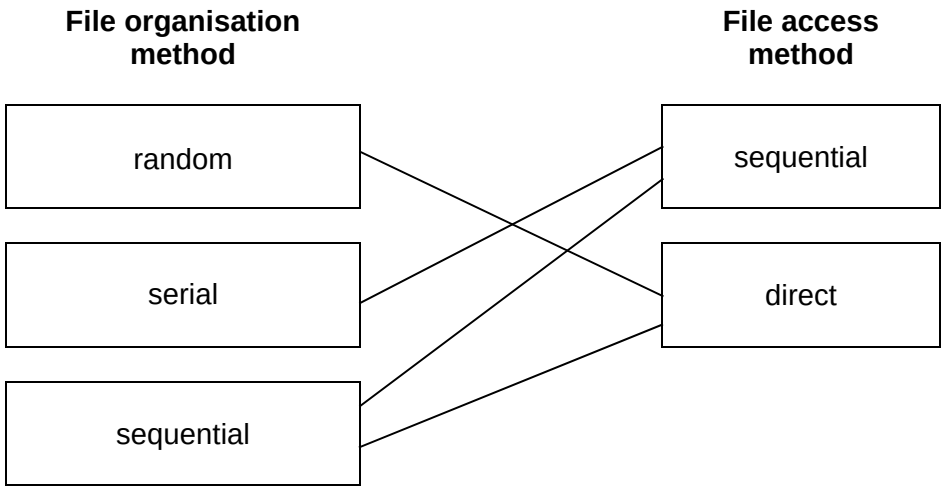
Question	Answer	Marks
2(a)(i)	Pharming	**1**
2(a)(ii)	Phishing	**1**
2(a)(iii)	A standalone/independent piece of malicious software 1 that can replicate/duplicate itself 1	**2**
2(b)	No up-to-date anti-virus (or equivalent) software (used) / Regular virus scans not performed No firewall Operating system not up-to-date/obsolete Attachments/suspicious links in emails clicked on Clicking on website with an out of date security certificate **max 2**	**2**
2(c)(i)	(Certificate) serial number 1 Certificate Authority (that issued certificate) 1 Valid date(s) // Date of expiry 1 Subject name (name of user/owner, computer, network device) 1 Subject public key 1 Version (Number) 1 Hashing algorithm (data or signature) 1 **max 3**	**3**
2(c)(ii)	CA uses hashing algorithm .. 1 To generate a message digest from the particular certificate 1 Message digest is encrypted with CA's private key 1	**3**
2(c)(iii)	Need to know that the certificate is genuine (and has not been altered) // Authenticate or verify it (came from the CA)	**1**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>3(a)</td><td>$S = (\overline{P} + (\overline{Q+R}))$. R
$\overline{P}$ 1
$(\overline{Q+R})$ 1
$(\overline{P} + (\overline{Q+R}))$ 1
. R (must be outside final brackets) 1

Or

$\overline{P}$ 1
$(\overline{Q+R})$ 1
$\overline{P} + (\overline{Q+R})$ 1
(…….). R 1</td><td>4</td></tr>
<tr><td>3(b)</td><td><table><tr><th>P</th><th>Q</th><th>R</th><th>Working space</th><th>S</th></tr><tr><td>0</td><td>0</td><td>0</td><td></td><td>0</td></tr><tr><td>0</td><td>0</td><td>1</td><td></td><td>1</td></tr><tr><td>0</td><td>1</td><td>0</td><td></td><td>0</td></tr><tr><td>0</td><td>1</td><td>1</td><td></td><td>1</td></tr><tr><td>1</td><td>0</td><td>0</td><td></td><td>0</td></tr><tr><td>1</td><td>0</td><td>1</td><td></td><td>0</td></tr><tr><td>1</td><td>1</td><td>0</td><td></td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td><td></td><td>0</td></tr></table>2 marks all correct, 1 mark seven correct, 0 marks six or fewer correct</td><td>2</td></tr>
<tr><td>3(c)(i)</td><td>PQ
<table><tr><td></td><td>00</td><td>01</td><td>11</td><td>10</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr></table>R</td><td>1</td></tr>
<tr><td>3(c)(ii)</td><td>PQ
<table><tr><td></td><td>00</td><td>01</td><td>11</td><td>10</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr></table>R</td><td>1</td></tr>
<tr><td>3(c)(iii)</td><td>$S = \overline{P}$. R</td><td>1</td></tr>
</table>

Question	Answer	Marks
3(d)	$S = (\overline{P} + (\overline{Q+R})) . R$ $S = (\overline{P} + (\overline{Q} . \overline{R})) . R$ // $\overline{P} . R + (\overline{Q+R}) . R$ 1 $S = (\overline{P} . R) + (\overline{Q} . \overline{R} . R)$ 1 $S = \overline{P} . R + \overline{Q} . 0$) $S = \overline{P} . R + 0$) 1 $S = \overline{P} . R$	**3**

Question	Answer	Marks
4(a)	 1 mark for random correct 1 mark for serial correct 2 marks for sequential correct (1 per correct line)	**4**
4(b)(i)	File A: Serial 1 Meter readings are submitted over time // added to the end of file 1 Stored chronologically 1	**3**
4(b)(ii)	File B: Sequential 1 Any two points from: Each customer has a unique account number 1 Sorted on Account number 1 High hit rate // Suitable for batch processing monthly statements 1	**3**
4(b)(iii)	File C: Random 1 Login without waiting // Random organisation allows fastest direct access to required record 1 Low hit rate // Suitable for access to individual records 1	**3**

Question	Answer	Marks
5(a)	Option 1 / Option 2 Application Layer / Application Layer **Transport** / **Transport (Layer)** 1 **Internet** / **Network (Layer)** 1 **Network Interface** / **(Data) Link (Layer)** 1	**3**
5(b)(i)	Peer-to-peer	**1**
5(b)(ii)	File sharing	**1**
5(b)(iii)	Any four points from the following: • Torrent descriptor file is made available • File to be shared is split into pieces • BitTorrent client software made available to other peers / users / computers Allowing them to work as seeds or leeches. A peer can act as a 'seed' – used to upload pieces of a file Peer downloading file can get pieces from different seeds simultaneously • Once a peer has a piece of the file it can become a seed for the parts downloaded Leeches download much more than they upload • Central server called a tracker keeps records of all the peers ('swarm') and the parts of the file they have Can pause and restart at any time.	**Max 4**
5(c)	Any two protocols from: HTTP/HTTPS … 1 Used for transfer of web pages from server to client 1 FTP … 1 Used for interactive file transfer 1 SMTP … 1 Used for sending email messages 1 POP3 … 1 Used for incoming email messages 1	**Max 4**

Question	Answer	Marks
6(a)(i)	Monitoring system	**1**
6(a)(ii)	There is no element of 'control' in the system // the system does not alter conditions in the building if sensors triggered	**1**
6(a)(iii)	Any two sensors from: Sound / acoustic Pressure Infra-red / motion /proximity Temperature / Thermal Light Smoke Tilt	**Max 2**

6(b)(i)	`01 ForEver ← FALSE //TRUE` 1
	`02 REPEAT`
	`03  FOR FloorCounter ← 1 TO NoOfFloors`
	`04  FOR SensorCounter ← 1 TO NumberOfSensors` 1
	`05  READ Sensor(SensorCounter)on Floor(FloorCounter)`
	`06  IF Sensor value outside range`
	`07  THEN`
	`08  OUTPUT "Problem on Floor ", FloorCounter`
	`09  ENDIF`
	`10  ENDFOR`
	`11  ENDFOR`
	`12  //`
	`13  // Delay loop`
	`14  // Delay loop`
	`15  //`
	`16 UNTIL ForEver/Forever = TRUE // NOT ForEver / ForEver = FALSE` **1**
		3

6(b)(ii)	`FOR Counter ← 1 TO 999999` (any "large" number) `ENDFOR`	**1**
6(b)(iii)	To allow time to elapse between readings	**1**
6(c)(i)	To identify which sensor caused the interrupt	**1**
6(c)(ii)	Display appropriate warning message 1 On the correct monitor 1	**2**