Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

COMPUTER SCIENCE **9608/13**

Paper 1 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.

Cambridge will not enter into discussions about these mark schemes.

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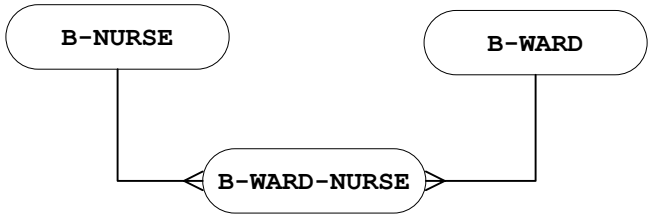
Question	Answer	Marks
1(a)	Many-to-one	**1**
1(b)(i)	A-NURSE(NurseID, FirstName, FamilyName, **WardName**)	**1**
1(b)(ii)	• The primary key WardName in the A-WARD table … 1 • … links to the foreign key WardName in the A-NURSE table. 1	**2**
1(c)(i)	Many-to-many relationship	**1**
1(c)(ii)	B-WARD-NURSE(WardName, NurseID) Both attributes (with no additions) 1 Joint primary key correctly underlined 1	**2**
1(c)(iii)	 Correct relationship between B-NURSE and B-WARD-NURSE 1 Correct relationship between B-WARD and B-WARD-NURSE 1	**2**
1(d)(i)	SELECT NurseID, FamilyName 1 FROM B-NURSE 1 WHERE Specialism = 'THEATRE'; 1	**3**
1(d)(ii)	UPDATE **B-NURSE** 1 SET **FamilyName = 'Chi'** 1 WHERE **NurseID = '076';** 1	**3**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)(i)</td><td>
<table>
<tr><td>1</td><td>A laser beam and a rotating mirror are used to draw an image of the page on the photosensitive drum.</td></tr>
<tr><td>2</td><td>C // The image is converted on the drum into an electrostatic charge.</td></tr>
<tr><td>3</td><td>Electrostatic charge attracts toner.</td></tr>
<tr><td>4</td><td>The charged paper is rolled against the drum.</td></tr>
<tr><td>5</td><td>D // The oppositely-charged paper picks up the toner particles from the drum. After picking up the toner, the paper is discharged to stop it clinging to the drum.</td></tr>
<tr><td>6</td><td>A // The paper passes through a fuser, which heats up the paper. The toner melts and forms a permanent image on the paper.</td></tr>
<tr><td>7</td><td>B // The electrical charge is removed from the drum and the excess toner is collected.</td></tr>
</table>
C in the correct place 1
DA, 1
AB 1</td><td>3</td></tr>
<tr><td>2(a)(ii)</td><td>Inkjet printer</td><td>1</td></tr>
<tr><td>2(b)</td><td>Hard disk drive // HDD 1
Solid state drive //SSD // flash memory 1
One from:
Hard disk
Inexpensive per unit of storage 1
Larger storage capacity than flash drive 1

Solid state storage
No moving parts / noise 1
Robust 1
Low latency // Fast read/write time 1</td><td>3</td></tr>
</table>

Question	Answer	Marks
3(a)	*Sampling rate* The number of samples taken per unit time // the number of times the amplitude is measured per unit time 1 Increasing the sampling rate will increase the accuracy / precision of the digitised sound // Increasing the sampling rate will result in smaller quantisation errors. 1	**2**
3(b)(i)	*Pixel* Smallest picture element which can be drawn 1 *Screen resolution* The number of pixels which can be viewed horizontally and vertically on the screen // or by example - A typical screen resolution is 1680 pixels × 1080 pixels. 1	**2**
3(b)(ii)	8	**1**
3(b)(iii)	*Working*: **Max two** from: • Number of pixels is 2048 × 512 1 • One pixel will be stored as one byte 1 • Number of kilobytes = (2048 × 512) / 1024 1 *Answer:* **One** mark: Number of kilobytes = 1024 KB 1	**3**
3(b)(iv)	**One** from: • Confirmation that the file is a BMP 1 • File size 1 • Location/offset of image data within the file 1 • Dimensions of the image in pixels // image resolution 1 • Colour depth (bits per pixel) 1 • Type of compression used, if any 1	**1**

Question	Answer	Marks
4(a)(i)	500	**1**
4(a)(ii)	496	**1**
4(a)(iii)	502	**1**
4(a)(iv)	86	**1**
4(b)	0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 1 1 0 0 1 1 0 0 0 0 1 Both correct op codes 1 Operand 0001 0001 1 Operand 0110 0001 1	**3**
4(c)	256	**1**
4(d)(i)	07 C2 07 1 C2 1	**2**
4(d)(ii)	LDI 63 LDI 1 63 1	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)(i)</td><td>• Count the number of one bits in the <u>first seven</u> bit positions 1
• Add a 0 or 1 to bit position 0, to make the count of one bits an <u>odd</u> number 1</td><td>2</td></tr>
<tr><td>5(a)(ii)</td><td>A = 1
B = 1</td><td>1</td></tr>
<tr><td>5(a)(iii)</td><td><u>Two</u> from:

• A parity bit is worked out for each <u>column</u> 1
• The computer checks the parity of each bit position in parity byte // the computer generates copy of the parity byte and <u>compares</u> 1
• If incorrect parity then there is an error in the data received // No parity error means no error in the data received 1
• The position of the incorrect bit can be determined 1</td><td>2</td></tr>
<tr><td>5(b)(i)</td><td>
<table>
<tr><th colspan="8">Bit position</th></tr>
<tr><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
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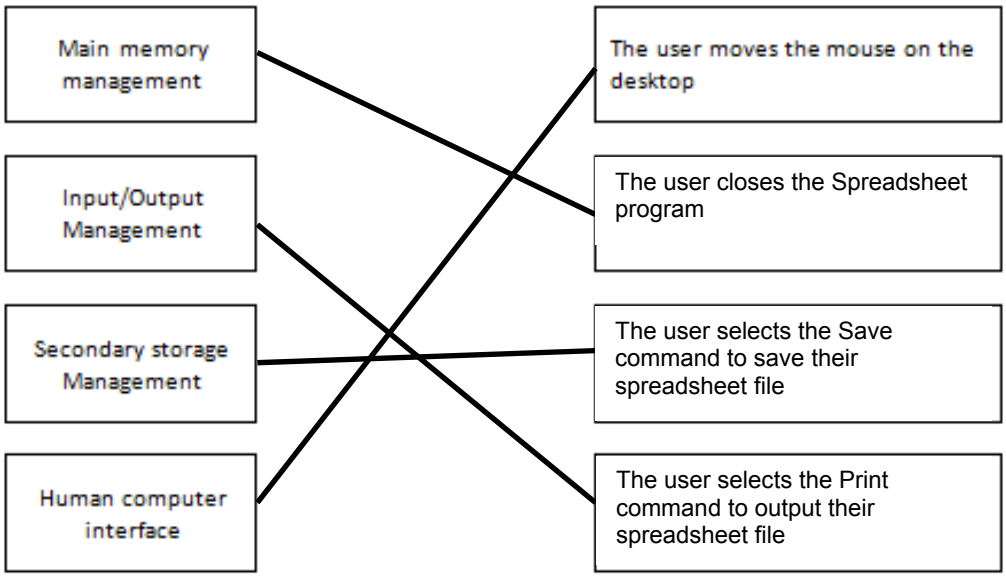
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td><td>2</td></tr>
<tr><td>5(b)(ii)</td><td><u>Three</u> from:

• Consider each row in sequence 1
• Identify any row with incorrect parity 1
• Repeat the process for each column in sequence 1
• Identify where a row and column with incorrect parity intersect 1</td><td>3</td></tr>
</table>

Question	Answer	Marks
6(a)	 **<u>One</u>** mark for each correct line from each left hand box **to max <u>three</u>** marks.	**3**
6(b)(i)	File compression software	**1**
6(b)(ii)	Backup software	**1**
6(b)(iii)	Disk repair software	**1**
6(b)(iv)	Anti-virus software	**1**

Question	Answer	Marks
7(a)	**Two** from: • The user's web browser is the client software 1 • The requested web page has program code / script embedded within it 1 • This code is interpreted by the web browser 1	**2**
7(b)	**Four** from: • The browser parses the URL to obtain the Domain Name 1 • The browser software passes the Domain Name to the nearest Domain Name Server (DNS) 1 • The DNS stores a list of Domain Names and matching IP addresses 1 • The DNS Name Resolver looks for the Domain Name in its database 1 • If found the corresponding IP address is returned to the originator 1 • If not found the request is forwarded to another higher level DNS 1 • The original DNS adds the returned IP address to its cache 1 • The original DNS returns the IP address to the originator 1 • The browser uses the IP address to request the required web page from the web server 1 • The web server retrieves the page and delivers it to the originator 1 • The browser software interprets the script and displays the web page 1	**Max 4**
7(c)(i)	Message1, Message2 1 x 1	**2**
7(c)(ii)	6 – 19	**1**
7(c)(iii)	11	**1**
7(c)(iv)	Checks that the product code has not be left blank // presence check on product code	**1**
7(c)(v)	**Two** checks from: **One** mark for check and **one** mark for description • Range check 1 Check the number entered is (say) between 1 and 100 1 • Format check 1 Checks the product code is a particular format // Checks the number has digit characters only // by example 1 • Length check 1 The number of items has exactly five characters 1 • Existence check 1 To ensure the product code has been assigned 1	**Max 4**