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Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

COMPUTER SCIENCE **9608/11**

Paper 1 Written Paper **May/June 2019**

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 International will not enter into discussions about these mark schemes.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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Question	Answer	Marks
1(a)	**1 mark** for each correct indication and explanation **3A.21.2H.1** Invalid H is not a valid hexadecimal digit **299.53.2.2** Invalid 299 is not in the correct range **192.2.1.0** Valid Consists of four numbers in the range 0–255 separated by full stops	**3**
1(b)	**1 mark** per bullet point to **max 3** • URL is parsed to obtain the Domain name • Domain name is sent to the nearest Domain Name Server (DNS) • DNS holds a list of Domain names and matching IP addresses • DNS name resolver searches its database for the Domain name • If DNS does not find the Domain name, the request is forwarded to a higher level DNS • If the Domain name is found, the IP address is returned • If the Domain name is not found, the request is passed to a higher level server • If the Domain name is finally not found, an error message is generated	**3**
1(c)	**1 mark** for each correct term Real-time On-demand	**2**
1(d)(i)	**1 mark** per bullet point to **max 1** • The data files are very large • It would take a long time to send the uncompressed file // Compressed files will download faster • A higher bandwidth would be needed to transmit the uncompressed file	**1**
1(d)(ii)	**1 mark** per bullet point to **max 1** • Data is lost • The decompressed file is not the same as the original	**1**
1(d)(iii)	**1 mark** per bullet point to **max 3** • Lossy creates a smaller file than lossless // lossy compresses further than lossless • The recording of the concert is a large file size and needs significant reduction in size • Lossy removes detail which can be lost without people noticing • By example e.g. reduction in sound quality will not be noticed	**3**

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Question	Answer	Marks
2(a)	**1 mark** for each correct term • Commercial Licence • Free Software Licence • Shareware Licence • Open Source Licence	**4**
2(b)(i)	**1 mark** per bullet point to **max 3** • Data redundancy // data is repeated in more than one file • Data dependency // changes to data means changes to programs accessing that data • Lack of data integrity // entries that should be the same can be different in different places • Lack of data privacy // all users have access to all data if a single flat file	**3**
2(b)(ii)	**1 mark** for each correct name, **1 mark** for each matching description, max **2** marks per level • External • The individual's view(s) of the database • Conceptual • Describes the data as seen by the applications making use of the DBMS • Describes the 'views' which users of the database might have • Physical / Internal • Describes how the data will be stored on the physical media • Logical • Describes how the relationships will be implemented in the logical structure of the database	**4**
2(c)(i)	1-to-many // 1 customer to/has many licences	**1**
2(c)(ii)	**1 mark** per bullet point • `CustomerID` is the Primary key in `CUSTOMER` table • Links to `CustomerID` as a Foreign key in `LICENCE` table	**2**

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Question	Answer	Marks

2(c)(iii)	**1 mark** per bullet point
	
	• Select with correct 5 fields
	• From `LICENCE`
	• Where `ExpiryDate <= '31/12/2019'` (any appropriate date type)
	• Group by `CustomerID`
	• Order by `Cost` (with or without ASC, but not DESC)
	
	`SELECT CustomerID, SoftwareID, LicenceType,`
	`  Cost, ExpiryDate`
	`FROM LICENCE`
	`WHERE ExpiryDate <= '31/12/2019'`
	`GROUP BY CustomerID ORDER BY Cost;`
		5

Question	Answer	Marks
3(a)(i)	**1 mark** for each advantage, **1 mark** for a valid expansion to **max 2 × 2** • Code is already tested • …so it is more robust/likely to work • Saves programming time • …code does not have to be written/re-written from scratch • The programmer can use e.g. mathematical functions • …that s/he may not know how to code • If there is an improvement in the library routine • …the program updates automatically	**4**
3(a)(ii)	**1 mark** per bullet point to **max 2** • A collection of self-contained (shared library) programs • …that are already compiled • Linked to the main program during execution • Library program code is separate from the .EXE file • Library file only loaded into memory when required at run time • A DLL file can be made available to several applications (at the same time) • If DLL routine is updated the program that uses it will run the update	**2**
3(b)(i)	**1 mark** per bullet point to **max 1** • Errors can be corrected as they occur • Can run a partially complete program when developing • The effect of any change made to the code can be seen immediately	**1**

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Question	Answer	Marks
3(b)(ii)	**1 mark** per bullet point to **max 3** • Produces an executable file • User does not have access to source code • It will (probably) be faster to run the executable • Code does not have to be compiled each time it is run • Does not need the compiler to be present at run-time	**3**

Question	Answer	Marks
4(a)	**1 mark** for naming a principle, **1 mark** for description to **max 3 × 2** • Product • Software engineers shall ensure that their products and related modifications meet the highest professional standards possible. • Judgement • Software engineers shall maintain integrity and independence in their professional judgement. • Management • Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance. • Profession • Software engineers shall advance the integrity and reputation of the profession consistent with the public interest. • Colleagues • Software engineers shall be fair to and supportive of their colleagues. • Self • Software engineers shall participate in life-long learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.	**6**
4(b)	**1 mark** per bullet point to **max 2 × 2** Data backup • A copy of data will have been made and stored elsewhere. • If the original is lost, the backup can be used to restore the data. Disk-mirroring • The data is stored on two disks simultaneously. • If the first disk drive fails, the data is accessed from the second disk.	**4**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)</td><td>1 mark for two correct ticks, 2 marks for three correct ticks
<table>
<tr><th>Task</th><th>First pass</th><th>Second pass</th></tr>
<tr><td>Creation of symbol table</td><td>✓</td><td></td></tr>
<tr><td>Expansion of macros</td><td>✓</td><td></td></tr>
<tr><td>Generation of object code</td><td></td><td>✓</td></tr>
<tr><td>Removal of comments</td><td>✓</td><td></td></tr>
</table></td><td>2</td></tr>
<tr><td>5(b)</td><td>1 mark per bullet point to max 2

• Data movement
• Input and output of data
• Arithmetic operations
• Jump instructions
• Compare instructions</td><td>2</td></tr>
<tr><td>5(c)</td><td>1 mark per bullet point

• Storing 0 in 300 (line 21)
• Loading 65 (line 28)
• Outputting A (line 29)
• Loading 0 (line 30), incrementing ACC (line 31) and storing in 300 (line 32)
• Incrementing IX (line 33)
• Loading 67 (line 24) and adding 33 (line (25)
• Outputting d (line 26)
• Loading 1 (line 30), incrementing ACC (line 31), storing in 300 (line 32) and incrementing IX (line 33)</td><td>8</td></tr>
</table>

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Instruction address	ACC	Memory address							IX	OUTPUT
		100	101	102	103	104	300	301		
		65	67	69	69	68		33	0	
20	0									
21							0			
22										
23										
28	65									
29										A
30	0									
31	1									
32							1			
33									1	
34										
35										
22										
24	67									
25	100									
26										d
27										
30	1									
31	2									
32							2			
33									2	
34										
36										

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Question	Answer	Marks
6(a)	**1 mark** per bullet point to **max 3** • The data from a single frame is split into two separate fields • One field has data for the odd numbered rows/lines and the other field has data for the even numbered rows/lines • Odd numbered line fields alternate with even numbered line fields • The viewer sees data from two frames simultaneously	**3**
6(b)	**1 mark** per bullet point to **max 1** • Produces what appears to be a higher refresh rate • Lower bandwidth needed // Halves the bandwidth requirements	**1**
6(c)	**1 mark** per bullet point to **max 2** • Identifies pixels that do not change between frames • Records only the differences between the frames	**2**
6(d)(i)	**1 mark** per bullet point to **max 3** • The amplitude of the wave is measured /sound wave is sampled • At set/regular time intervals • Each sample is stored as a binary number • Samples are stored in order in a file	**3**
6(d)(ii)	**1 mark** per bullet point to **max 1** for each Sample rate: • Increasing the sample rate means more samples per second hence more bits per second and larger file size • Decreasing the sample rate means fewer samples per second hence fewer bits per second and smaller file size Sample resolution: • A higher sampling resolution means more bits per sample and a larger file size • A lower sampling resolution means fewer bits per sample. a smaller file size	**2**

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