Cambridge Assessment International Education

Cambridge International AS & A Level

COMPUTER SCIENCE **9608/11**

Paper 1 Written Paper **May/June 2020**

MARK SCHEME

Maximum Mark: 75

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level components, and some Cambridge O Level components.

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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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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(a)</td><td>1 mark for each correctly completed term.

Validation checks that the data entered is reasonable. One example is a presence check.
Verification checks that the data entered is the same as the original. One example is double entry.</td><td>4</td></tr>
<tr><td>1(b)</td><td>1 mark for each correct entry

<table>
<tr><th>Security measure</th><th>Description</th></tr>
<tr><td>Disk mirroring</td><td>Data are written on two or more disks simultaneously.</td></tr>
<tr><td>Encryption</td><td>Contents are scrambled so they cannot be understood without a decryption key</td></tr>
<tr><td>Backup</td><td>A copy of the data is taken and stored in another location</td></tr>
</table></td><td>3</td></tr>
</table>

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)</td><td>1 mark for first three rows, 1 mark for the touchscreen being both.

<table>
<tr><th>Device</th><th>Input</th><th>Output</th></tr>
<tr><td>LCD Monitor</td><td></td><td>✓</td></tr>
<tr><td>Microphone</td><td>✓</td><td></td></tr>
<tr><td>Keyboard</td><td>✓</td><td></td></tr>
<tr><td>Touchscreen</td><td>✓</td><td>✓</td></tr>
</table></td><td>2</td></tr>
</table>

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Question	Answer	Marks
2(b)(i)	**1 mark** for **1 correct** entry **2 marks** for **2 correct** entries **3 marks** for **3 correct** entries **4 marks** for **5 correct** entries 1 The object is designed using Computer Aided Design (CAD) software 2 **C** (The software splits the object into slices) 3 **E** (The data about the slices is sent to the printer) 4 The solid plastic is melted and transferred to the nozzle 5 **A** (A stepper motor moves the nozzle into position) 6 **D** (The nozzle extrudes the molten plastic) 7 The steps 5 to 6 repeat until the layer is complete 8 **B** (A fan cools the layer) 9 The steps 4 to 8 are repeated for each subsequent layer	**4**
2(b)(ii)	**1 mark** per bullet point. **Max 3** for RAM, **max 2** for ROM RAM • Stores currently running parts of the 3D printer software • Stores the data about the layers being printed // contents of buffer • Stores current progress of printing • Stores the data about the printer, e.g. Plastic levels, nozzle position ROM • Stores the operating software for the 3D printer // OS for the 3D printer • Stores the boot-up/start-up instructions for the 3D printer	**4**

Question	Answer	Marks
3(a)	**1 mark** per bullet point • Outputs 12 // the result of 10 + 2 • In the object with the name "`text 2`"	**2**
3(b)	**1 mark** per bullet point • Declares a function called `calculateValue` • ... which takes two values as parameters	**2**

Question	Answer	Marks
3(c)	**1 mark** per bullet point to **max 2** • Assigns the value 2 to the variable `$number1` • Outputs to the screen • the result of `$number1` to the power of 3	**2**

Question	Answer	Marks
4(a)	**1 mark** per bullet point • 2000 * 1000 * 24 = 48 000 000 bits • 48 000 000 / 8 / 1024 / 1024 • = 6 MB or 5.7 MB	**3**
4(b)	**1 mark** per bullet point to **max 2** • Only 1 bit needed to store the colour of each pixel ... • ... so number of pixels * bit depth is 2000 * 1000 * 1 (rather than 2000 * 1000 * 24) • ... so the calculation (in part 4(a)) results in smaller figure for file size	**2**
4(c)(i)	0110 0010	**1**
4(c)(ii)	**1 mark** for each correct line **Character** | **t** **ASCII denary value** | 116 **Hexadecimal value** | 74	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)</td><td>1 mark for each pair of correct answers (shaded)

<table>
<tr><th>A</th><th>B</th><th>C</th><th>Working space</th><th>X</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>1</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td></td><td>0</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td></td><td>1</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td></td><td>1</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></td><td>4</td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(b)</td><td>

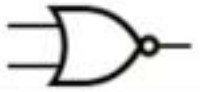
1 mark for name, **1 mark** for symbol, **1 mark** for truth table

- NAND



<table>
<tr><th colspan="2">Input</th><th rowspan="2">Output</th></tr>
<tr><th>A</th><th>B</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>

- NOR



<table>
<tr><th colspan="2">Input</th><th rowspan="2">Output</th></tr>
<tr><th>A</th><th>B</th></tr>
<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>
</table>

</td><td>3</td></tr>
</table>

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>6(a)(i)</td><td>

1 mark for each correct answer

A: The number 193

B: The data in memory location 193

C: The data in the memory location found by adding the contents of the IX to 193

</td><td>3</td></tr>
<tr><td>6(a)(ii)</td><td>

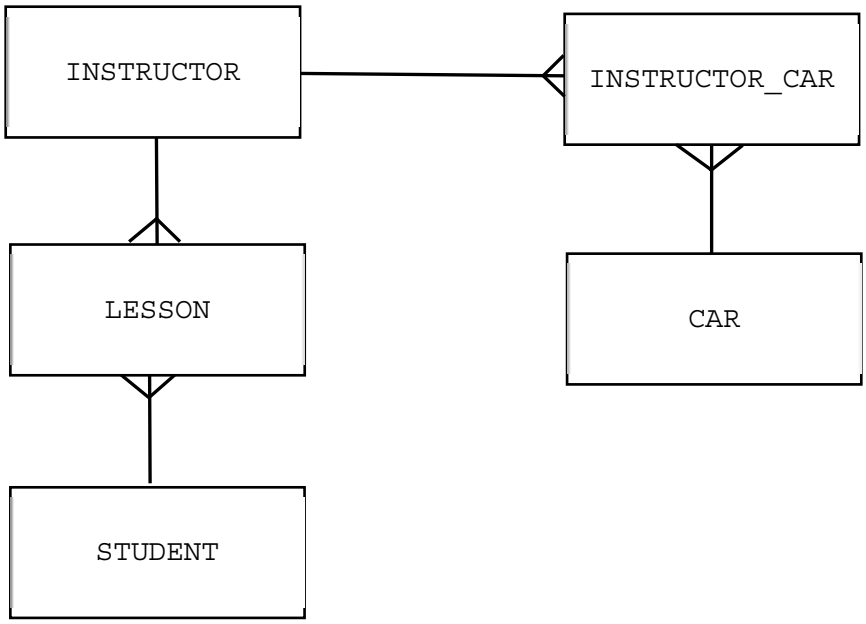
1 mark each correct answer

- Indirect
- Relative

</td><td>2</td></tr>
</table>

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Question	Answer	Marks
6(b)	**1 mark** for correctly naming register, **1 mark** for appropriate role • Program counter // PC • Stores the address of the next instruction to be fetched • Memory address register // MAR • Stores the address where data/instruction is to be read from or saved to • Memory data register // MDR • Stores data that is about to be written to memory // Stores data that has just been read from memory • Current instruction register // CIR • Stores the instruction that is currently being decoded/executed	**4**

Question	Answer	Marks
7(a)	**1 mark** per bullet point to **max 2** • Reduced data redundancy • Reduced data dependency • Improved data integrity • Improved data privacy • Program-data independence • Ability to create ad hoc queries	**2**
7(b)	**1 mark** for each correct link 	**4**

Question	Answer	Marks

7(c)	**1 mark** for each correctly completed statement
	
	• CREATE (line 1)
	• INTEGER (line 6)
	• PRIMARY KEY (line 7)
	
	`CREATE TABLE INSTRUCTOR(`
	`  InstructorID VARCHAR(5),`
	`  FirstName VARCHAR(15),`
	`  LastName VARCHAR(15),`
	`  DateOfBirth DATE,`
	`  Level INTEGER,`
	`  PRIMARY KEY (InstructorID)`
	`);`
		3

7(d)	**1 mark** per bullet point
	
	• Alter table student
	• Add an appropriate identifier with suitable data type
	
	`ALTER TABLE STUDENT`
	`ADD TelNum VARCHAR;`
		2

7(e)	**1 mark** per bullet point
	
	• Select lesson date and lesson time
	• From table LESSON
	• Where InstructorID = “Ins01”
	• And lesson date is greater than today’s date
	
	`SELECT LessonDate, LessonTime`
	`FROM LESSON`
	`WHERE InstructorID = "Ins01"`
	`AND LessonDate > #######;`
		4

Question	Answer	Marks
8(a)	**1 mark** per bullet point to **max 4** • Reads/writes data to/from RAM • … e.g. current data/instructions from a game so the CPU can access it • Allocates virtual memory • … when there is insufficient RAM to run a program/game • Allocates RAM to optimise performance • Paging • Segmentation	4

Question	Answer	Marks
8(b)	**1 mark** per bullet point to **max 2** • Software will have been built using a compiler // the software is pre-compiled • Software is an executable file // the game is already in machine code // the game is already set-up to run on the console • Source code is not provided so does not need compiling/interpreting	**2**
8(c)	**1 mark** for each similarity, **max 2** • Both devices regulate network traffic between two networks // connect two networks • Both receive packets from a network and both forward packets onto a network **1 mark** for a difference • A Router connects two networks using the same protocol, a Gateway can connect two networks using different protocols	**3**

Question	Answer	Marks
9(a)	**1 mark** for each correctly identified utility program **Description** / **Utility program** Reorganises files on a disk to improve efficiency / **Defragmentation software** Scans a hard disk to identify bad sectors / **Disk contents analysis / repair software** Prepares a hard disk for first use / **Disk formatter**	**3**
9(b)	**1 mark** for 3 correct answers **Action** / **Lossy** / **Lossless** Reducing the resolution of an image / ✓ / Using run-length encoding on a text file / / ✓ Reducing the sampling rate of a sound file / ✓ /	**1**