Cambridge Assessment International Education

Cambridge International AS & A Level

COMPUTER SCIENCE **9608/11**

Paper 1 Written Paper **October/November 2020**

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.

Cambridge International is publishing the mark schemes for the October/November 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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[Turn over

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.

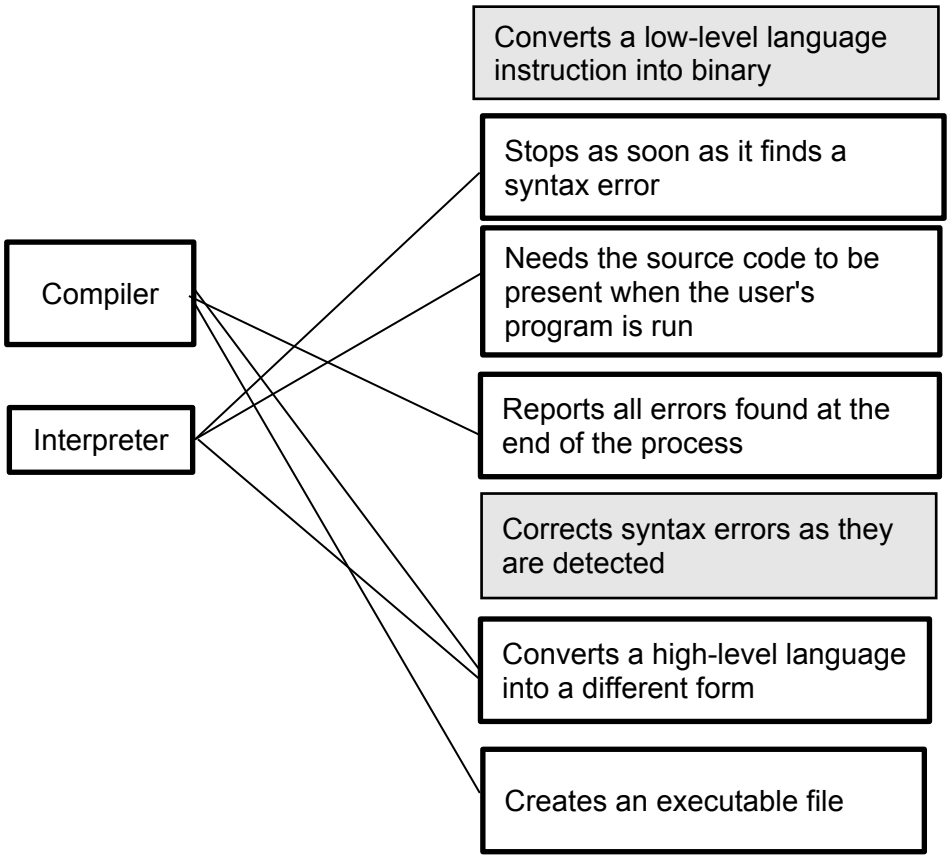
GENERIC MARKING PRINCIPLE 5:

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	**1 mark** for both compiler and interpreter linking to the sixth box (*Converts a high-level language program into a different form*) **1 mark** for the compiler having the other two correct links **1 mark** for the interpreter having the other two correct links **Language translator** **Statements**  	**3**

Question	Answer	Marks
2(a)	**1 mark** per bullet point to **max 4** **Max 3** if all generic, descriptions not related to benefits to the surgery **Max 3** for a list with no expansions • Linked tables can be set up • …the staff in the surgery can set up tables for the pets and their owners and link them by common attributes • To reduce / eliminate data redundancy • …the staff in the surgery usually only needs to enter data once // in the file system data is probably repeated unnecessarily in different files • Improved data integrity • … e.g. if they are searching for an owner's pets then all results for the owner should be returned • Privacy is improved • … e.g. different views can be given to different users in the surgery. E.g. the receptionists cannot see the pet's medical notes • Referential integrity can be enforced // Unwanted or accidental deletion of linked data is prevented • … e.g. the staff in the surgery cannot accidently delete an owner's record while there are pets belonging to that owner // Staff cannot enter an appointment for a pet that does not exist • Program-data dependence is overcome • …e.g. the staff in the surgery can add another attribute to the pet table without affecting the data already stored or the queries already written • More complex searches and queries can be executed … e.g. the staff in the surgery can set up a query to only return the names of pets who have not been seen for over a year	**4**
2(b)(i)	**1 mark** per bullet point to **max 1** • `OwnerFirstName, OwnerLastName` and `TelephoneNumber` are repeated for owners with more than one pet. • `OwnerFirstName, OwnerLastName` and `TelephoneNumber` are not dependent on the primary key of the `PET` table.	**1**

Question	Answer	Marks
2(b)(ii)	**1 mark** per bullet point • PET (PetID, PetName, PetBreed, PetDateOfBirth) • OWNER (OwnerID, OwnerFirstName, OwnerLastName, TelephoneNumber) • A linking table between PET and OWNER • Composite primary key made up of the primary keys of the other two tables and no extra attributes in the linking table, for example, PET_OWNER(PetID, OwnerID)	**4**
2(c)(i)	Structured Query Language // SQL	**1**
2(c)(ii)	**1 mark** per bullet point • ALTER TABLE APPOINTMENT • ADD PRIMARY KEY(AppointmentID); // ADD UNIQUE (AppointmentID);	**2**
2(c)(iii)	**1 mark** for each correct line • SELECT **Time**, **PetID** (FROM APPOINTMENT) • WHERE **StaffID = "JK1"** AND **Date = "02/02/2021"** • ORDER BY Time **DESC**;	**3**
2(d)(i)	**1 mark** for each bullet point to **max 2 × 2** • Double entry // The data from the form is entered twice (by two different people) • and **automatically** compared • Visual check // the data is compared (by two different people) after entry • ... to the paper form **manually**	**4**
2(d)(ii)	**1 mark** per validation to **max 2** For example: • Time can have range check to make sure it is within the opening hours of 09:00 and 16:50 • Date can have existence check to compare against list of dates they are open	**2**
2(e)(i)	**1 mark** for each correctly completed term The **client-server** model has one **server** that stores all the data for the surgery. The other computers are **clients**. When a user requests data, a request is sent to the **server**.	**4**

Question	Answer	Marks
2(e)(ii)	**1 mark** per correct method to **max 2** • Usernames and Passwords • Biometrics // fingerprint recognition // iris scanner • Two-step verification • Token authentication // use of dongle // swipe cards	**2**

Question	Answer	Marks
3(a)(i)	**1 mark** per bullet point to **max 2** Product: For example: • Ensure product is of a high standard • Ensure product meets requirements • Ensure the product is delivered within time • Ensure the product is delivered within budget • Ensure product development is well-documented • Ensure product is tested thoroughly // free of bugs	**2**
3(a)(ii)	**1 mark** per bullet point to **max 2** Colleagues: For example: • Need to be fair// do not show any prejudices • To be supportive of colleagues • Work together as a team • Listen to each other's ideas • Assist colleagues in professional development • Fully credit the work of other members of the team • Make colleagues aware of expected standard ways of working	**2**
3(b)	**1 mark** for naming licence, **1 mark** for description to **max 2** per licence • **Commercial** / proprietary... • ...Software is sold for a fee therefore giving the client the income • **Shareware**... • ...Free for a trial period / limited features, and then users must pay for it	**4**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(a)</td><td>1 mark for tick in correct position

<table>
<tr><th>Statement</th><th>Tick (✓)</th></tr>
<tr><td>Memory location 204 contains <code>400</code></td><td></td></tr>
<tr><td>Memory location 204 contains <code>41</code></td><td></td></tr>
<tr><td>Memory location 204 contains <code>231</code></td><td></td></tr>
<tr><td>Memory location 204 contains <code>29</code></td><td>✓</td></tr>
</table></td><td>1</td></tr>
<tr><td>4(b)</td><td>1 mark for tick in correct position

<table>
<tr><th>Statement</th><th>Tick (✓)</th></tr>
<tr><td>Memory location 120 contains <code>135</code></td><td></td></tr>
<tr><td>Memory location 120 contains <code>118</code></td><td>✓</td></tr>
<tr><td>Memory location 120 contains <code>0</code></td><td></td></tr>
<tr><td>Memory location 120 contains <code>16</code></td><td></td></tr>
</table></td><td>1</td></tr>
<tr><td>4(c)</td><td>1 mark for tick in correct position

<table>
<tr><th>Statement</th><th>Tick (✓)</th></tr>
<tr><td>Memory location 205 contains <code>607</code></td><td></td></tr>
<tr><td>Memory location 205 contains <code>601</code></td><td></td></tr>
<tr><td>Memory location 205 contains <code>603</code></td><td></td></tr>
<tr><td>Memory location 205 contains <code>606</code></td><td>✓</td></tr>
</table></td><td>1</td></tr>
<tr><td>4(d)</td><td>1 mark per correct mode

• Indexed
• Relative</td><td>2</td></tr>
</table>

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(e)</td><td>1 mark for correct ticks in pairs of rows (shaded)

<table>
<tr><th>Assembly language instruction</th><th>Arithmetic</th><th>Data movement</th><th>Jump instruction</th><th>Input and output of data</th></tr>
<tr><td>STO 120</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>JPE 200</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td>ADD 3</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>LDD 20</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>INC ACC</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>OUT</td><td></td><td></td><td></td><td>✓</td></tr>
</table></td><td>3</td></tr>
</table>

Question	Answer	Marks
5(a)(i)	1 mark for **real-time** **1 mark** per bullet point for justification to **max 2** • It is being watched **live** • It is not being downloaded to watch later // not already stored online	**3**
5(a)(ii)	**1 mark** per bullet point to **max 3** • Insufficient bandwidth // slow internet connection • … experiencing problems with buffering • Video is too high quality to stream in real-time • Congestion on the home network • Too much demand for the video from the supplier • Too many applications running on Oscar's computer • Oscar is trying to watch the video in High Definition, his friend is watching the video at a lower resolution	**3**
5(b)(i)	**1 mark** per bullet point to **max 2** • Each complete frame is transmitted/scanned each time • All the pixels in frame 1 will be transmitted • Then all the pixels in frame 2 will be transmitted	**2**

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Question	Answer	Marks
5(b)(ii)	**1 mark** per bullet point to **max 3** • If a pixel in frame 2 has the same colour value as the pixel **in the same position** in frame 1 then • …it is not necessary to send the pixel again • For example, the first row is / rows 1, 3, 5 and 6 on both frames are the same // only rows 2 and 4 change • … so does not need to be replicated // only rows 2 and 4 need to be resent	**3**
5(b)(iii)	Spatial redundancy	**1**
5(b)(iv)	Multimedia container format	**1**

Question	Answer	Marks
6(a)	1111 0000 1011	**1**
6(b)	240	**1**
6(c)	175	**1**
6(d)	853	**1**

Question	Answer	Marks
7	**1 mark** per bullet point to **max 4** • 98 kHz has a larger file size • …because it is recording more samples per second • …meaning more binary values being stored per second • ...will take more time to download • 98 kHz – Sound will be closer to the original • …because the samples will be closer together • …because of smaller quantization errors	**4**

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Question	Answer	Marks
8(a)	**1 mark** per bullet point to **max 4** • The router needs a public IP address so it can be identified on the Internet • The router needs a private IP address so it can be identified on the home network • The router has a public and a private IP address so that it can route data between the two networks (home and Internet) • The laptop needs a private IP address so it can be identified on the home network // so the router knows where to send data • The laptop does not have a public IP address because it does not connect directly to the Internet • ... this is more secure because it hides the laptop from the outside world • … all data from the Internet must be transmitted via the router	**4**
8(b)	**1 mark** per bullet point to **max 3** • The browser **parses** the Uniform Resource Locator (URL) to obtain the Domain Name • The domain name is looked-up in the locally cached list of corresponding IP addresses. If it is not found… • The domain name is sent to the closest Domain Name Server (DNS) • The DNS stores a table of Domain Names and corresponding IP addresses // searches its database of Domain Names and corresponding IP • If the DNS finds the Domain Name, it returns the IP address • If it cannot find the Domain Name, it sends the request to a higher DNS / upstream server • If the Domain Name is not found, an error is returned	**3**
8(c)	**1 mark** for any valid example e.g. 192.168.0.1	**1**