Cambridge Assessment International Education

Cambridge International AS & A Level

COMPUTER SCIENCE **9608/11**

Paper 1 Theory Fundamentals **May/June 2021**

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 May/June 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

© UCLES 2021

[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.

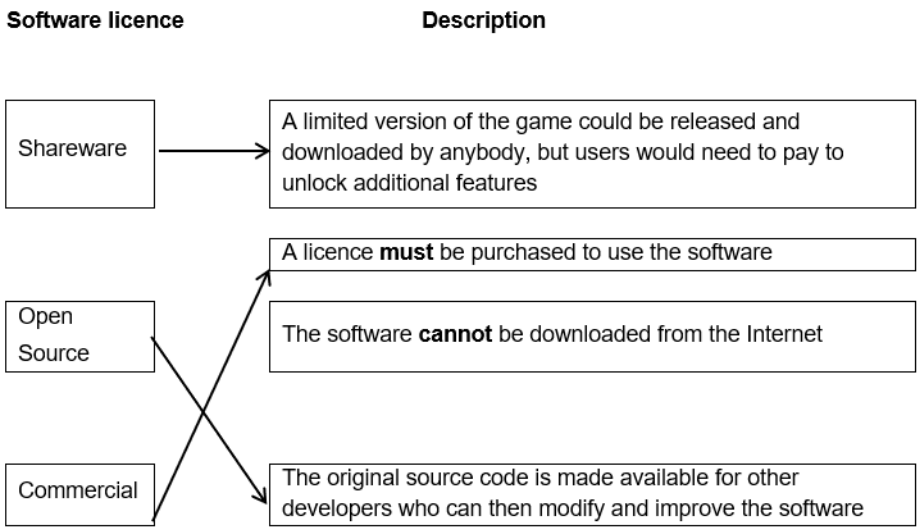
GENERIC MARKING PRINCIPLE 5:

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.

© UCLES 2021

Question	Answer	Marks
1	**1 mark** for each licence correctly identified 	**3**

Question	Answer	Marks
2(a)	**1 mark** per bullet point to **max 4** • The position/coordinate of the centre of the circle • Radius • Line width • Line colour • Line style • Fill colour	**4**
2(b)	**1 mark** per bullet point • A list that stores each separate object in the logo // a list that stores the command/description required to draw each object • Each shape has its own drawing list • Example related to logo, e.g. Three triangles, one square and one circle	**2**
2(c)	**1 mark** per drawback, **1 mark** for expansion (**max 2 each**) • A bitmap file is likely to take up more storage space • …because the colour of each pixel needs to be stored • A bitmap image cannot be enlarged // difficult to use in different types of document • …without the image pixelating • A bitmap would be more difficult to edit • …because each pixel would need to be edited separately	**4**

© UCLES 2021

Question	Answer	Marks
2(d)	**1 mark** per bullet point to **max 3** • Password • Biometrics • Access rights • Swipe cards • Physical access measures, e.g. security guards • Implement a firewall/proxy to monitor remote access requests • Two-step authentication	**3**

Question	Answer	Marks
3(a)	**1 mark** for each set of shaded rows	**3**

Instruction Address	ACC	Memory Address		
		200	201	202
		2	0	200
100	2			
101				
102				
103	1			
104		1		
105				
101				
102				
103	0			
104		0		
105				
101				
102				
106				

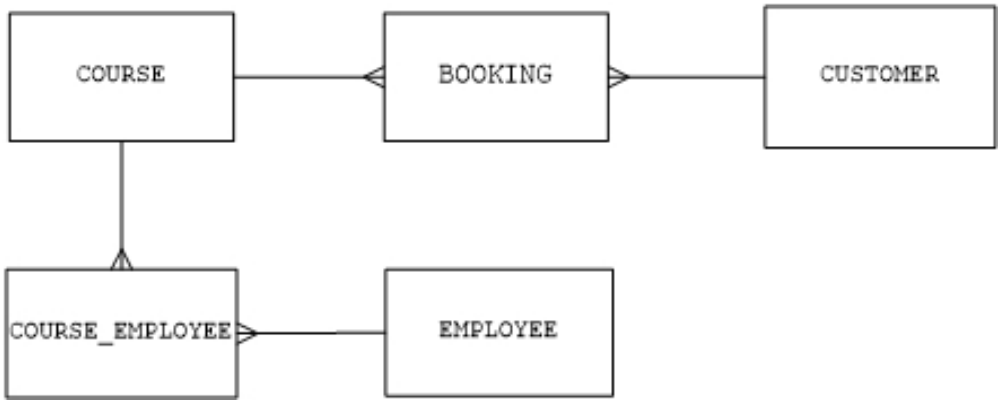
3(b)	LDI 202	**1**
3(c)(i)	1100 1001	**1**
3(c)(ii)	256	**1**

Question	Answer	Marks
3(d)	**1 mark** per bullet point to **max 3** e.g. • Zero • Carry • Overflow • Sign/negative • Compare results • Parity	**3**

Question	Answer	Marks
4(a)	**1 mark** per pair of outputs (shaded)	**4**

A	B	C	Working space	X
0	0	0		0
0	0	1		1
0	1	0		0
0	1	1		0
1	0	0		0
1	0	1		1
1	1	0		0
1	1	1		0

4(b)	1 mark for all three gates: OR XOR NOT	**1**

Question	Answer	Marks
5(a)	1 mark for each link: • 1 `CUSTOMER` to many `BOOKING` • 1 `COURSE` to many `BOOKING` • 1 `COURSE` to many `COURSE_EMPLOYEE` • 1 `EMPLOYEE` to many `COURSE_EMPLOYEE` 	**4**
5(b)	**1 mark** for description and **1 mark** for application to the given tables e.g. (2 marks) • each value stored in the `CustomerID` (FK) field in the `Booking` table must have a corresponding value (1) in the `CustomerID` (PK) field in the `Customer` table (1) e.g. (1 mark) • Each foreign key value must have a matching value in the primary key of the linked table (1)	**2**
5(c)	**1 mark** each (**max 3**) e.g. • Tables • Fields/attributes • Indexes • Users • Primary Key • Foreign Key • Relationships • Views	**3**

Question	Answer	Marks

5(d)	**1 mark** per syntactically correct bullet point:
	
	• Select correct fields
	• From correct table
	• Correct criteria for Role
	• Correct criteria for Language
	
	Example:
	`SELECT FirstName, LastName`
	`FROM EMPLOYEE`
	`WHERE Role = "Leader"`
	`AND (Language = "French" OR Language = "English");`
		4

Question	Answer	Marks
6(a)	`Good day`	**1**
6(b)	`12`	**1**

6(c)	**1 mark** for both answers
	
	`hour`
	`greeting`
		1

6(d)	**1 mark** for each pair of correct answers (shaded): **Statement** / **True** / **False** The program contains client-side and server-side code — ✓ The PHP code in the program will run on the client-side — ✓ Line `19` of the code outputs the message `"Good day"` — ✓ Line `18` of the code contains a conditional statement — ✓	**2**
6(e)	**1 mark** for each correctly completed term **Validation** can be performed both client-side and server-side. It is performed more rapidly by the **browser** because there is no delay in transmitting and receiving data, to and from the **server**. It is also performed server-side because the client's **browser** may not support **JavaScript**, so the data will still need checking to avoid errors.	**5**

Question	Answer	Marks
7(a)	**1 mark** per bullet point for each justification, to **max 2** **Either** Unethical • Marina knowingly produces a solution that is not as efficient as it could be • …and this does not enhance the reputation of the person/company • Reference to IEEE standards in context **Or** Ethical • Marina acts in the best interests of the employer to complete a working product on time • …that is more likely to be correct as the coding is simpler • Reference to IEEE standards in context	**2**
7(b)	**1 mark** per bullet point for each justification, to **max 2** **Either** Unethical • Doug has a management responsibility • …to be fair to his colleagues • …but is showing a lack of personal integrity by applying pressure • Reference to IEEE standards in context **Or** Ethical • Doug is trying to act in the best interests of his employer/client • …and may be asking employees to voluntarily offer to work additional hours • …he may be paying them extra • Reference to IEEE standards in context	**2**
7(c)	**1 mark** per bullet point for each justification, to **max 2** **Either** Unethical • Debbie may be breaking company policy discussing current projects // confidentiality • …and has a duty to act in the best interests of his company • …and should have raised her concerns internally • Reference to IEEE standards in context **Or** Ethical • Debbie may feel that in the public interest the problem should be discussed • …to ensure that a safety critical system is fully tested • …so as to prevent potential loss of life • Reference to IEEE standards in context	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>8(a)(i)</td><td>1 mark per correct row

<table>
<tr><th>Statement</th><th>Assembler</th><th>Interpreter</th><th>Compiler</th></tr>
<tr><td>Translates and executes each line of source code one line at a time</td><td></td><td>✓</td><td></td></tr>
<tr><td>Translates low-level source code into machine code</td><td>✓</td><td></td><td></td></tr>
<tr><td>Must be present in memory to execute the code</td><td></td><td>✓</td><td></td></tr>
<tr><td>Translates high-level source code into low-level code</td><td></td><td>✓</td><td>✓</td></tr>
</table></td><td>4</td></tr>
<tr><td>8(a)(ii)</td><td>1 Mark per bullet point to max 2

• The compiler is not required to run the program
• The program can be distributed without the source code
• A compiler produces code that executes faster than the equivalent for an interpreter</td><td>2</td></tr>
<tr><td>8(b)(i)</td><td>1 mark per bullet point to max 2

• To reduce the storage space required to store the file
• To reduce the time it would take to transmit the file
• Because they have to email it and have limited file sizes for sending/receiving</td><td>2</td></tr>
<tr><td>8(b)(ii)</td><td>1 mark per bullet point

• All of the original data needs to be retained/recoverable
• … because otherwise the file contents would not make sense</td><td>2</td></tr>
</table>

Question	Answer	Marks
9(a)	**1 mark** per difference • Private IP is only known within the LAN // Public IP is known outside of the LAN/ on Internet • Public is allocated by ISP // Private is allocated by the router • Public addresses are unique throughout the Internet, private addresses are unique only within the LAN • Private IP addresses are more secure than public IP addresses	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>9(b)</td><td>1 mark for each correct term

<table>
<tr><th>Description</th><th>Term</th></tr>
<tr><td>Receives data packets from a network and forwards them onto a similar network</td><td>Router</td></tr>
<tr><td>Manages access to a centralised resource</td><td>Server</td></tr>
<tr><td>Joins networks that use different sets of rules to transmit data</td><td>Gateway</td></tr>
<tr><td>Monitors and controls incoming and outgoing network traffic based on set criteria</td><td>Firewall</td></tr>
</table>
</td><td>4</td></tr>
</table>

© UCLES 2021