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CAMBRIDGE
International Education

# Cambridge International AS & A Level

**COMPUTER SCIENCE** **9618/11**

Paper 1 Theory Fundamentals **May/June 2026**

MARK SCHEME

Maximum Mark: 75

**Published**

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

This document consists of **17** printed pages.

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**[Turn over**

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**General marking principles**

All examiners must apply these marking principles when marking candidate responses.

| | |
|---|---|
| 1 | Examiners must award marks for each response in line with:<br><br>• the specific **content** defined in the mark scheme<br>• the specific **skills** defined in the mark scheme or in the level descriptions<br>• the **standard of response** required as exemplified by the standardisation scripts. |
| 2 | Examiners must award **whole marks** (not half marks, or other fractions). |
| 3 | Examiners must award marks **positively**. This means that:<br><br>• marks are not deducted for errors or omissions<br>• marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate<br>• the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous. |
| 4 | Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly. |
| 5 | Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen. |
| 6 | Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions in mind. |

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## Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

## Annotations

| Annotation | Meaning |
|---|---|
|  | Correct |
|  | Incorrect |
|  | To indicate where a key word/phrase/code is missing. |
|  | Not relevant or used to separate parts of an answer. |
|  | Indicates a part of the answer that is incorrect. |
| Highlighter | To draw attention to a particular aspect or to indicate where parts of an answer have been combined. |
|  | Too vague. |
|  | Repetition |
|  | No examples or not enough. |

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| | |
|---|---|
| BOD | Benefit of Doubt. |
| NAQ | Not Answered Question. |
| SEEN | Indicates that work or a page has been seen including blank answer spaces and blank pages. |
| FT | Follow through. |
| I | Ignore |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(a)(i)</td><td>1 mark for each correct value<br><br>
<table>
<tr><th>Character</th><th>Denary</th><th>Binary</th><th>Hexadecimal</th></tr>
<tr><td>⁘</td><td>489</td><td>0001 1110 1001</td><td>1E9</td></tr>
<tr><td>@</td><td>64</td><td>0100 0000</td><td>40</td></tr>
<tr><td>Ω</td><td>911</td><td>0011 1000 1111</td><td>38F</td></tr>
<tr><td>₩</td><td>5590</td><td>0001 0101 1101 0110</td><td>15D6</td></tr>
</table></td><td>4</td><td>Correct answers only</td></tr>
<tr><td>1(a)(ii)</td><td>1 mark for the identification<br><br>• ASCII<br><br>1 mark for each difference to max 2<br><br>• There are fewer bits per character // ASCII has 7/8 bits per character, UNICODE has many more<br>• Fewer different characters can be represented // ASCII only represents the Latin alphabet<br>• ASCII Cannot be expanded indefinitely</td><td>3</td><td>Accept extended ASCII, or any other valid character set.<br><br>English Language BOD</td></tr>
<tr><td>1(b)</td><td>107</td><td>1</td><td>Correct answer only</td></tr>
</table>

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1(c) | **1 mark** for correct working<br>• showing/working binary subtraction<br><br>**1 mark** for correct answer<br><br>• 0100 1101<br><br>**Method 1:** Change +30 to -30 and add<br><br>30 in binary: 0001 1110<br><br>Flip bits: 1110 0001<br>+0000 0001<br>Add the 1: **1110 0010**<br><br>Add –30: 0110 1011<br>1110 0010<br>(1) **0100 1101**<br><br>**Method 2:** Direct Subtraction<br><br>0110 1011<br>–0001 1110<br>0100 1101<br>11 1 Carries | **2** | No marks for converting to denary and back<br><br>Method 1:<br>Direct subtraction<br>Needs to show the carries for the working mark<br><br>Method 2:<br>Change +30 to –30 and add<br>Needs to show the conversion and the addition |
| 1(d) | **1 mark** each<br><br>• Binary is in powers of 2 whilst decimal is in powers of 10<br>• Any example of values e.g. Kibibyte is 1024 bytes whilst Kilobyte is 1000 bytes | **2** | Do not allow:<br>Decimal uses the digits 0,1,2,3,4,5,6,7,8,9 binary only uses the digits 0 and 1<br>The question asks about binary and denary **prefixes**<br><br>MP2: Binary is mebibyte, denary is megabyte is ok, binary is mebibyte, denary is kilobyte is not |

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9618/11 Mark Scheme 2026

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(a) | **1 mark** each to **max 2**<br><br>• To convert a high-level language to a low-level language/assembly/machine code<br>• Computers use machine code and programmers use high-level languages<br>• To allow the computer to process the coded statements | **2** | Accept human language for HLL in MP2<br><br>MP3: Read is NE |
| 2(b) | **1 mark** for each benefit and **1 mark** for an appropriate expansion to **max 4 (2 × 2)**<br><br>For example:<br><br>• Amend the code or debug in real time<br>• and see the changes immediately instead of having to recompile<br><br>• Stops as soon as an error is encountered<br>• so the position of the error can be easily seen<br><br>• Only one error is displayed at a time // no dependent errors generated<br>• individual errors are easier to identify/debug/fix<br><br>• Incomplete code can be tested/run<br>• so the program does not need to be complete to see if it works/see the output | **4** | |
| 2(c) | **1 mark** for a correct answer<br><br>Assembler | **1** | Correct answer only |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2(d)</td><td>1 mark for each correct licence<br><br>
<table>
<tr><th>Software licence</th><th>Description</th></tr>
<tr><td>Shareware</td><td>The software is released on a trial period. After the trial period ends, a fee may be required to continue using the software.</td></tr>
<tr><td>Commercial // proprietary</td><td>The software is purchased for a fee. There is no access to the source code.</td></tr>
<tr><td>Open source initiative // free software</td><td>The software is released with the source code. The software can be changed and distributed with the changes under the same licence restrictions.</td></tr>
</table>
</td><td>3</td><td>Do not accept copyleft for open source<br><br>Do not accept freeware for open source</td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>3(a)</td><td>1 mark for each correct row<br><br>
<table>
<tr><th>accumulator current data</th><th>set of instructions</th><th>new accumulator data</th></tr>
<tr><td>B11001010</td><td>ADD B00000010<br>INC ACC</td><td>B11001101</td></tr>
<tr><td>#100</td><td>LDM #200<br>ADD 200</td><td>#301</td></tr>
<tr><td>#103</td><td>LDD 103<br>DEC ACC<br>DEC ACC</td><td>#48</td></tr>
</table>
</td><td>3</td><td>Correct answers only</td></tr>
<tr><td>3(b)(i)</td><td>1 mark for AND<br>1 mark for #0 // &0 // B00000000<br><br>Answer: AND B00000000 // AND &0 // AND #0</td><td>2</td><td>Accept correct shift instructions<br><br>Bit manipulation so no load commands</td></tr>
<tr><td>3(b)(ii)</td><td>1 mark for the correct answer<br><br>0000 0110</td><td>1</td><td>Correct answer only</td></tr>
</table>

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 3(c) | **1 mark** for a correct name<br>**1 mark** for a matching description<br>**1 mark** for a reasonable example<br><br>• Indirect<br>• the operand stores the address where the data is found // the data is held in the address stored in the given address<br>• example: LDI 23 loads the data in the address stored in address 23<br><br>• Indexed<br>• the address is calculated by adding the operand to the contents of the index register<br>• example: LDX 20 adds 20 to the contents of the index register to calculate the address | **3** | Do not accept Immediate, relative, direct, absolute, symbolic. |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 4(a) | **1 mark** for each correct point<br><br>• CUSTOMER BORROW is a one-to-many relationship // 1:M<br>• TOY_INSTANCE to TOY is a many-to-one relationship // M:1<br>• Identifying the correct Primary Key and matching Foreign Key in **both** relationships<br>• Stating how the keys form the relationship | **4** | |
| 4(b) | **1 mark** for each correct point<br><br>• Selecting the contact name, customer ID and totalling the number of days - needs all 3<br>• Using an appropriate name<br>• Linking or joining the correct tables<br>• Grouping the results<br><br>Example 1:<br>`SELECT CUSTOMER.ContactFirstName, CUSTOMER.CustomerID,`<br>`SUM(NumberDays)` MP1<br>`AS TotalDays` MP2<br>`FROM BORROW, CUSTOMER`<br>`WHERE CUSTOMER.CustomerID = BORROW.CustomerID` MP3<br>`GROUP BY CUSTOMER.CustomerID;` MP4<br><br>Example 2:<br>`SELECT CUSTOMER.ContactFirstName, CUSTOMER.CustomerID,`<br>`SUM(NumberDays)` MP1<br>`AS TotalDays` MP2<br>`FROM BORROW, INNER JOIN CUSTOMER`<br>`ON CUSTOMER.CustomerID = BORROW.CustomerID` MP3<br>`GROUP BY CUSTOMER.CustomerID;` MP4 | **4** | `CustomerID` needs the table reference<br><br>Accept any correct method of joining the tables, but no mix and match between methods |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 4(c)(i) | **1 mark** for each correct statement<br><br>• Altering the correct table<br>• Adding an appropriately named field with an appropriate data type<br><br>`ALTER TABLE BORROW`<br>`ADD Returned BOOLEAN;` accept `VARCHAR/CHAR(3)/BOOL` | **2** | Award just 1 mark if statements are in the wrong order or if there are any additional statements<br><br>Accept any sensible field name |
| 4(c)(ii) | **1 mark** for each correct statement<br><br>• Updating the correct table<br>• Setting the additional field to the correct data data type must match **4(c)(i)**<br>• Where clause<br><br>Example:<br>`UPDATE BORROW`<br>`SET Returned = "Yes"`<br>`WHERE BorrowID = "A2226";` | **3** | Award a maximum of 2 marks if statements are in the wrong order or if there are any additional statements |
| 4(d)(i) | **1 mark** for each correct point to **max 4**<br><br>• Validation only ensures that data meets certain criteria<br>• Validation prevents the input of inappropriate data<br>• Verification makes sure that the data that is entered matches the original data / the data that was intended to be entered<br>• Verification prevents data being accidentally changed from the original<br>• Any example of validation/verification in practice e.g. entering a password twice | **4** | Accept a type of validation for MP1 BOD or a type of verification for MP3 BOD but not for both |
| 4(d)(ii) | **1 mark** for a correct answer<br><br>• The original data was incorrect<br>// the **same wrong** data was entered twice, and the wrong data was also valid<br>// by example | **1** | User error is TV |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 5(a) | **1 mark** for each point to **max 3**<br><br>• The image is made of pixels<br>• Each pixel has one colour<br>• Each colour has a **unique** binary code<br>• The **code for the colour** of each pixel is stored **in sequence** / order | **3** | |
| 5(b) | **1 mark** for each correct term<br><br>• drawing object<br>• property<br>• drawing list<br><br>A **drawing object** is an individual element of an image, for example: a line, a square.<br><br>A **property** is an attribute of one part of the image, for example: a line colour, the width of a line.<br><br>A **drawing list** is all of the elements that are included in the vector graphic. | **3** | |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 5(c) | No mark for the choice.<br>**1 mark** for each point for a matching justification to **max 3**<br><br>Bitmap image:<br>• The logo might include something like a photograph<br>• Bitmaps can be more detailed/precise/high quality<br>• which may be more attractive/appealing on documents<br>• Bitmaps can be edited more precisely<br>• in case changes need to be made to the logo in future<br><br>Vector graphic:<br>• A logo should be made of simple shapes which are calculated mathematically<br>• A vector graphic logo can be resized without pixelation<br>• so, it could be used on different documents without losing quality<br>• The file size is smaller than a bitmap image<br>• so, the logo will not use excessive file storage if used in many documents | **3** | Justification must match the candidate's choice. No mix and match.<br><br>Accept any sensible justification of their choice<br><br>Accept other examples such as tee shirts for documents in MP3 and MP8 |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6(a)</td><td>1 mark for each correct answer<br><br>Y = NOT (B OR NOT C)<br><br>Z = E NOR (NOT C XOR D)</td><td>2</td><td>Accept any recognized notation<br><br>Accept Y = B NOR NOT C</td></tr>
<tr><td>6(b)</td><td>1 mark for drawing a truth table with correct inputs<br>1 mark for the correct outputs in the NAND column<br><br>
<table>
<tr><th>Input 1</th><th>Input 2</th><th>NAND</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>
</td><td>2</td><td>Ignore extra columns for working</td></tr>
</table>

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 7(a) | **1 mark** for each point to **max 2**<br><br>• Data is not stored on the client computer // all data is stored on the server<br>• The client computer is reliant on access to server<br>• The client computer is heavily reliant on the network connection<br>• The client computer requires few local resources, for example, memory / processing power / storage<br>• The client computer performs **minimal functions** / processes | **2** | |
| 7(b)(i) | **1 mark** for each point to **max 5**<br><br>Bus:<br>• Both nodes are connected to a bus/cable<br>• Data is broadcast on the cable<br>• but is only accepted by the intended recipient<br><br>Ethernet:<br>• Uses the IP/MAC addresses of the two nodes<br>• Ethernet transmits data as frames<br>• Ethernet uses Carrier Sense Multi-Access / Collision Detection / CSMA/CD<br>• The transmitting node listens to see if the line is free **and** only submits data when the line is free<br>• The node waits a random time if a collision is detected **and** then tries to send again | **5** | Award a maximum of 4 marks if only Ethernet referenced |
| 7(b)(ii) | **1 mark** for each point to **max 2**<br><br>• Bus networks are inefficient with a large number of nodes<br>• because only one transmission can be on the line at once<br>• Bus networks are inefficient with large numbers of simultaneous data transmissions<br>• because of the need for nodes to wait for the line to be free<br>• Bus networks are not easily scalable<br>• If the bus/cable goes down the whole/part of the network is unusable<br>• Transmissions are broadcast to all nodes, so could be privacy/confidentiality/security issues | **2** | The answer spaces are numbered, so mark the first answer in each space |

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 7(c)(i) | **1 mark** for a complete answer<br><br>• It does not change **and** it is only visible/accessible within the network/LAN | **1** | The answer needs both static and private |
| 7(c)(ii) | **1 mark** for each point to **max 3**<br><br>For example:<br>• Subnetting splits a larger network into smaller/more manageable parts<br>• The network has increased efficiency – just faster is NE<br>• Congestion is reduced // fewer collisions happen<br>• Security is improved<br>• It can be more straightforward to isolate faults<br>• Easier to scale a network with subnets | **3** | Accept any sensible benefit. |

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