CAMBRIDGE
International Education

Cambridge International AS & A Level

COMPUTER SCIENCE **9618/22**

Paper 2 Fundamental Problem-solving and Programming Skills **October/November 2025**

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 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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 descriptions 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.

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.

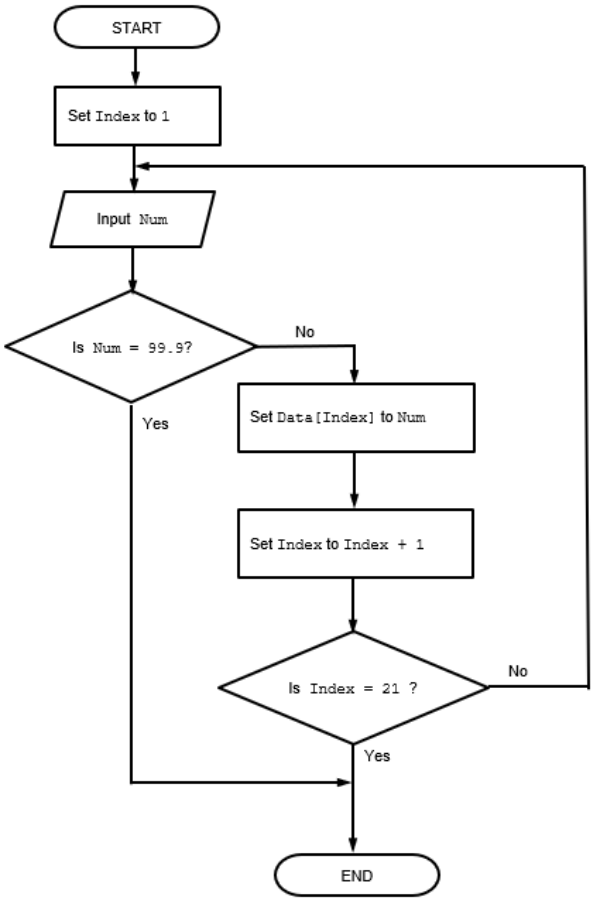
Annotations

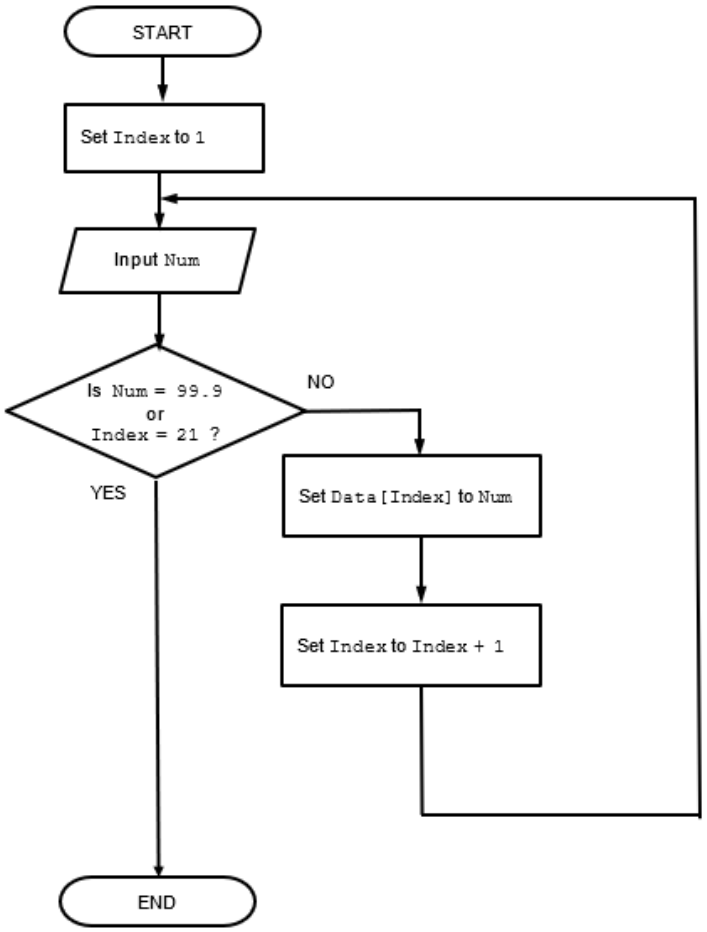
Annotation	Meaning
	Benefit of the doubt
	To indicate where a key word/phrase/code is missing
	Incorrect
	Follow through
	Indicate a point in an answer
Highlighted text	To draw attention to a particular aspect or to indicate where parts of an answer have been combined
	Ignore
	Not answered question
	No examples or not enough
	Not relevant or used to separate parts of an answer
Off-page comment	Allows comments to be entered at the bottom of the RM marking window and then displayed when the associated question item is navigated to.
	Repetition
	Indicates that work or a page has been seen including blank answer spaces and blank pages.
	Correct
	Too vague

Mark scheme abbreviations

/	separates alternative words / phrases within a marking point
//	separates alternative answers within a marking point
underline	actual word(s) given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be awarded
( )	the word / phrase in brackets is not required, but sets the context

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(a)</td><td>
<table>
<tr><th>Pseudocode example</th><th>Selection</th><th>Iteration</th><th>Subroutine</th></tr>
<tr><td><pre>IF Status = FALSE THEN
   FOR Count ← 1 TO 20
      CALL Reset(Count)
   NEXT Count
ENDIF</pre></td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td><pre>OTHERWISE : Status ← TRUE</pre></td><td>✓</td><td></td><td></td></tr>
<tr><td><pre>WHILE AllDone() = TRUE</pre></td><td></td><td>✓</td><td>✓</td></tr>
<tr><td><pre>30 : NextChar ← 'X'</pre></td><td>✓</td><td></td><td></td></tr>
</table>
One mark per row
</td><td>4</td></tr>
<tr><td>1(b)</td><td>
<table>
<tr><th>Variable</th><th>Example data value</th><th>Data type</th></tr>
<tr><td><pre>Result</pre></td><td><pre>5.42</pre></td><td>REAL</td></tr>
<tr><td><pre>MonthLetter</pre></td><td><pre>"JFMAMJJASOND"</pre></td><td>STRING</td></tr>
<tr><td><pre>Birthday</pre></td><td><pre>15/11/2009</pre></td><td>DATE</td></tr>
</table>
One mark per row
</td><td>3</td></tr>
<tr><td>1(c)</td><td>
<table>
<tr><th>Expression</th><th>Evaluates to</th></tr>
<tr><td><pre>INT(Result) + 1 > 6</pre></td><td>FALSE</td></tr>
<tr><td><pre>NUM_TO_STR(LENGTH(MonthLetter))</pre></td><td>"12"</td></tr>
<tr><td><pre>NUM_TO_STR(Result + "3.2")</pre></td><td>ERROR</td></tr>
<tr><td><pre>MID(MonthLetter, MONTH(Birthday) – 2, 1)</pre></td><td>"S"</td></tr>
</table>
One mark per row
</td><td>4</td></tr>
</table>

Question	Answer	Marks
2	 Mark as follows: **MP1** Initialisation of the array index **MP2** Input number **in a loop** **MP3** Test for termination value (99.9) **and** correct ending **MP4** Test for array full / maximum 20 iterations **and** correct ending **MP5** Assign number to `Data` array element **and** increment index	**5**

Question	Answer	Marks
2	Alternative solution:  	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>3(a)</td><td>Mark as follows:
<table>
<tr><td>MP1</td><td>1</td><td></td><td>open the file OldFile.txt in read (mode)</td></tr>
<tr><td>MP2</td><td>2</td><td></td><td>open the file NewFile.txt in write (mode)</td></tr>
<tr><td></td><td>3</td><td rowspan="3"></td><td>read a line from OldFile.txt and store in <code>LineX</code></td></tr>
<tr><td>MP3</td><td>4</td><td>read a line from OldFile.txt and store in <code>LineY</code></td></tr>
<tr><td></td><td>5</td><td>read a line from OldFile.txt and store in <code>LineZ</code></td></tr>
<tr><td>MP4</td><td>6</td><td></td><td>set <code>NewString</code> to
<code>LineX & '\' & LineY & '\' & LineZ</code></td></tr>
<tr><td>MP5</td><td>7</td><td></td><td>write <code>NewString</code> to NewFile.txt</td></tr>
<tr><td>MP6</td><td>8</td><td></td><td>repeat from step 3 until end of OldFile.txt</td></tr>
<tr><td></td><td>9</td><td></td><td>close both files</td></tr>
</table></td><td>6</td></tr>
<tr><td>3(b)</td><td>It does not appear in (any of) the data items
// it does not appear in the ID and Name</td><td>1</td></tr>
<tr><td>3(c)</td><td>MP1 Add a (single) new separator at the end of the third (original) item
MP2 Calculate the length of both new data items
MP3 Store / append the length (of the new each items)
MP4 as a fixed length / separated digit string // by example

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

Question	Answer	Marks

4(a)	Example solution:
	
	`DECLARE CheckTotal : ARRAY [0:35] OF BOOLEAN`
	`DECLARE Index : INTEGER`
	
	`FOR Index ← 0 TO 35`
	`  CheckTotal[Index] ← FALSE`
	`NEXT Index`
	
	Mark as follows:
	
	MP1 Declaration of `CheckTotal` array
	MP2 Declaration of a loop counter
	MP3 Loop – with correct syntax and number of iterations
	MP4 Assignment of array element to `FALSE`
		4

4(b)	`DECLARE EasyQ, HardQ : INTEGER`
	
	`FOR EasyQ ← 0 TO 15 STEP 3`
	MP1 MP2
	
	`  FOR HardQ ← 0 TO 20 STEP 5`
	MP3 MP4
	
	`  CheckTotal[HardQ + EasyQ] ← TRUE`
	MP5
	`  NEXT HardQ`
	
	`NEXT EasyQ`
	
	Mark as follows:
	One mark per gap (boldened)
		5

4(c)	**MP1** Check that the parameter value is in the range 0 to 35 **MP2** ... and if not, return `FALSE` **MP3** Use the **parameter** value as **the index to array** `CheckTotal` **MP4** Return the value from given index position	**4**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)</td><td>
<table>
<tr><th>Activity</th><th>Name of life cycle stage</th></tr>
<tr><td>a structure chart is produced</td><td>Design</td></tr>
<tr><td>a program is modified to allow it to run on new hardware</td><td>Maintenance</td></tr>
<tr><td>the programmer identifies the customer's requirements</td><td>Analysis</td></tr>
<tr><td>an Integrated Development Environment (IDE) provides context-sensitive help such as 'auto-complete'</td><td>Coding</td></tr>
</table>
One mark per row
</td><td>4</td></tr>
<tr><td>5(b)</td><td>Acceptance testing</td><td>1</td></tr>
</table>

Question	Answer	Marks

6	Example solution:
	
	`FUNCTION Compare(String1, String2 : STRING, __`
	`  CaseMatters : BOOLEAN, Position : CHAR) RETURNS BOOLEAN`
	`  DECLARE S1Length : INTEGER`
	
	`  S1Length ← LENGTH(String1)`
	`  IF LENGTH(String2) < S1Length THEN`
	`  RETURN FALSE // String2 is shorter than String1`
	`  ENDIF`
	
	`  IF CaseMatters = FALSE THEN`
	`  String1 ← TO_UPPER(String1)`
	`  String2 ← TO_UPPER(String2)`
	`  ENDIF`
	
	`  CASE Position`
	`  'e' : String2 ← RIGHT(String2, S1Length)`
	`  's' : String2 ← LEFT(String2, S1Length)`
	`  ENDCASE`
	
	`  IF String1 = String2 THEN`
	`  RETURN TRUE`
	`  ELSE`
	`  RETURN FALSE`
	`  ENDIF`
	
	`ENDFUNCTION`
	
	Mark as follows:
	
	MP1 Function heading **and** parameters **and** ending **and** return type
	MP2 Calculate length of `String1`
	MP3 **if** `String2` is shorter than `String1`, return `FALSE`
	MP4 Compare (modified) strings
	MP5 Test `CaseMatters` - if `FALSE` **and** convert two string(s) to same case
	MP6 Test for the value of 's'/'e' **and** form modified string(s) **in one** or both cases
	MP7 Return appropriate `BOOLEAN` value in all cases
		7

Question	Answer	Marks
7(a)	Example explanation: The arrow means that `Convert` **repeatedly** calls `Analyse` then `Update` and then `Sort` (in that order)10 **MP1** Reference to 'repetition'…' **MP2** Naming **all <u>four</u> modules** correctly **and** the sequence is stated or implied	**2**
7(b)	**MP1** `PROCEDURE Analyse (Count : INTEGER)` `FUNCTION Update (Key : STRING) RETURNS INTEGER` **MP2** **MP3** **MP4** `PROCEDURE Sort (BYREF P2 : BOOLEAN)` Mark as follows: One mark per underlined part	**4**

Question	Answer	Marks

8(a)	Example solution:
	
	`PROCEDURE CountLoans(ThisStudentID : STRING)`
	`  DECLARE Index, LCount, RCount : INTEGER`
	
	`  LCount ← 0`
	`  RCount ← 0`
	
	`  FOR Index ← 1 TO 7000`
	`  IF Loan[Index].StudentID = ThisStudentID THEN`
	`  IF Loan[Index].OnLoan = FALSE THEN`
	`  RCount ← RCount + 1`
	`  ELSE`
	`  LCount ← LCount + 1`
	`  ENDIF`
	`  ENDIF`
	`  NEXT Index`
	
	`  OUTPUT "Student has ", LCount, " books on loan"`
	`  OUTPUT "and has returned ", RCount, " books"`
	
	`ENDPROCEDURE`
	
	Mark as follows:
	MP1 Declaration of Index **and** two count variables
	MP2 Loop for 7000 iterations
	MP3 `Index` references an **indexed data** item with correct **.dot notation**
	MP4 Attempt to compare the `StudentID` field = **parameter in a loop**
	MP5 Test of the `OnLoan` field **and** correct logic for both outcomes
	MP6 Both count variables initialised **and** increment appropriate count **in a loop**
	MP7 Output includes both counts with a suitable message
		7

Question	Answer	Marks

8(b)	Example solution:
	
	`FUNCTION NewLoan(ThisStudentID, ThisBookID : STRING) RETURNS BOOLEAN`
	`  DECLARE Index : INTEGER`
	`  DECLARE IsStored : BOOLEAN`
	`  CONSTANT Blank = ""`
	
	`  Index ← 1`
	`  IsStored ← FALSE`
	
	`  WHILE Index <= 7000 AND NOT IsStored`
	`  IF Loan[Index].StudentID = Blank THEN`
	`  Loan[Index].StudentID ← ThisStudentID`
	`  Loan[Index].BookID ← ThisBookID`
	`  Loan[Index].OnLoan ← TRUE`
	`  IsStored ← TRUE`
	`  ENDIF`
	`  Index ← Index + 1`
	`  ENDWHILE`
	
	`  RETURN IsStored`
	`ENDFUNCTION`
	
	Mark as follows:
	
	MP1 Loop through 7000 elements in `Loan` array – correct loop structure
	MP2 or until the first unused element is found // Correct `RETURN` inside a `FOR` loop
	MP3 Correct use of the indexed dot notation
	MP4 Test if record is unused (`.StudentID = ""`) **in a loop**
	MP5 Two item assignment statements correct
	MP6 `Loan[Index].OnLoan` assigned TRUE
	MP7 Correct logic to return `BOOLEAN` in both cases (position found / no position available)
	
	Alternative solution: loop only (no 'found' mechanism)
	
	`  FOR Index ← 1 TO 7000`
	`  IF Loan[Index].StudentID = Blank THEN`
	`  Loan[Index].StudentID ← ThisStudentID`
	`  Loan[Index].BookID ← ThisBookID`
	`  Loan[Index].OnLoan ← TRUE`
	`  RETURN TRUE`
	`  ENDIF`
	`  NEXT`
	`  RETURN FALSE`
		7

Question	Answer	Marks
8(c)	**MP1** Save to/Open a **(text) file** **MP2** **Single line** – form a string with separator characters and write to the file // **Multiple lines** - write each data item to a separate line in the file	**2**
8(d)	Additional date(s) solution **MP1** Store the **return date** of each loan // the **start date <u>and</u>** the **loan period** **MP2** Algorithm will do a **calculation** involving the MP1 data item(s) OR The student email address solution **MP3** Store the student <u>email address</u> **MP4** In order **to send** the email // the student is alerted to return the book **Max 2**	**2**

