Cambridge Assessment International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/21**

Paper 2 **May/June 2021**

MARK SCHEME

Maximum Mark: 50

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

PUBLISHED

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.

© UCLES 2021

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

Please note the following further points:

The words in **bold** in the mark scheme are important text that needs to be present, or some notion of it needs to be present. It does not have to be the exact word, but something close to the meaning.

If a word is underlined, this **exact** word must be present.

A single forward slash means this is an alternative word. A double forward slash means that this is an alternative mark point.

Ellipsis (…) on the end of one-mark point and the start of the next means that the candidate **cannot** get the second mark point without being awarded the first one. If a MP has ellipsis at the beginning, but there is no ellipsis on the MP before it, then this is just a follow-on sentence and **can** be awarded **without** the previous mark point.

© UCLES 2021

Question	Answer	Marks
	Section A	
1(a)(i)	Many correct answers. They must be meaningful and related to **Task 1.** The names are examples only. **One** mark per mark point • Constant MaxCandidates • Value 4 • Use The value of the maximum number of candidates for the election	**3**
1(a)(ii)	Many correct answers. They must be meaningful and related to **Task 1.** The names are examples only. **One** mark per mark point • Variable `NumberCandidates` • Use Storing the number of candidates in the election (for a tutor group) • Array `CandidateNames` • Use Storing the names of the candidates for the election	**4**
1(b)	**One** mark per mark point **(Max 4)** MP1 Change the value of the MaxCandidates constant/variable to 8 MP2 Change the input message to state the maximum number of candidates is 8 … MP3 …how your program changed the input message MP4 Change the loop limit to up to 8 … MP5 …how your program changed the loop limit MP6 Change the validation to allow input up to 8 … MP7 …how your program changed its validation check MP8 Change the array size(s) to ensure sufficient capacity to store up to 8 names … MP9 …how your program changed the array sizes MP10 Change the counters to ensure votes can be counted for up to 8 candidates … MP11 …how your program changed its counters	**4**

© UCLES 2021

Question	Answer	Marks

1(c)	Any **five** from:
	MP1 Input with message to enter unique voter number
	MP2 Validation of (unique) voter number entered e.g. length check/type check/range check
	MP3 Attempt to check if voter number input is in list of possible voters
	MP4 Attempt to check if they have already voted
	MP5 If voter has already voted, message to warn them they can't vote
	MP6 Attempt at preventing them from voting
	MP7 Store voter number in a suitable data structure
	
	Example answer
	`OUTPUT "Please enter your unique voter number"`
	`INPUT UniqueVoterNumber`
	`FoundFlag ← False`
	`AllNumbersChecked ← False`
	`Counter ← 0`
	`WHILE FoundFlag = False AND AllNumbersChecked = False`
	`  IF StudentNumbers[Counter] = ""`
	`    THEN`
	`      AllNumbersChecked = True`
	`      StudentNumbers[Counter] ← UniqueVoterNumber`
	`    ELSE`
	`      IF UniqueVoterNumber = StudentNumbers[Counter]`
	`        THEN`
	`          FoundFlag = True`
	`          PRINT "Sorry, you have already voted"`
	`        ELSE`
	`          Counter = Counter + 1`
	`      ENDIF`
	`  ENDIF`
	`ENDWHILE`
	`IF FoundFlag = False`
	`  THEN`
	`    OUTPUT "Please enter the code of your chosen candidate"`
	`    INPUT Vote`
	`ENDIF`
		5

© UCLES 2021

Question	Answer	Marks
1(d)	Explanation of how the program does the following: Any **four** from: MP1 Find out how many votes in total (for all candidates) were cast in the election. MP2 For each candidate MP3 … calculate the percentage of votes MP4 … excluding abstentions. MP5 Display the name of each candidate, the number of votes and the percentage of votes they received with appropriate messages. MP6 Display the number of votes cast and the number of abstentions with appropriate message.	**4**

© UCLES 2021

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td colspan="3">Section B</td></tr>
<tr><td>2</td><td>One mark per correct column
<table>
<tr><th>Statement</th><th>Validation</th><th>Verification</th><th>Both</th></tr>
<tr><td>Entering the data twice to check if both entries are the same.</td><td></td><td>✓</td><td></td></tr>
<tr><td>Automatically checking that only numeric data has been entered.</td><td>✓</td><td></td><td></td></tr>
<tr><td>Checking data entered into a computer system before it is stored or processed.</td><td></td><td></td><td>✓</td></tr>
<tr><td>Visually checking that no errors have been introduced during data entry.</td><td></td><td>✓</td><td></td></tr>
</table></td><td>3</td></tr>
</table>

Question	Answer	Marks

3	**One** mark per bullet point
	`37`
	• Data type name — Integer
	• Data type description — (Any) **whole number**
	
	`Cambridge2021`
	• Data type name — String
	• Data type description — A group of characters/text
	
	`47.86`
	• Data type name — Real
	• Data type description — (Any real) number that could be a whole number or a fraction
		6

Question	Answer	Marks
4(a)	**One** mark per mark point **(Max 3)** MP1 Marks input are **stored in the array** `Score[]` MP2 Marks are checked against a range of boundaries // allow example MP3 … and a **matching grade** is assigned to each mark that has been input MP4 … then **stored in the array** `Grade[]`… MP5 … at the same index as the mark input MP6 The algorithm finishes after 30 marks have been input // allows 30 scores to be entered	**3**

4(b)	**One** mark per mark point **(Max 3)**
	MP1 Correct loop, including counter if not a FOR loop
	MP2 Correct output of `Score[]`
	MP3 Correct output of `Grade[]`
	MP4 Suitable messages/text in output for both arrays
	
	Example answers
	`Count ← 0`
	`REPEAT`
	`  PRINT "Student: ", Count, " Mark: ", Score[Count], " Grade: ",Grade[Count]`
	`  Count ← Count + 1`
	`UNTIL Count = 30`
	
	`Count ← 0`
	`WHILE Count < 30 DO`
	`  PRINT "Student: ", Count, " Mark: ", Score[Count], " Grade: ",Grade[Count]`
	`  Count ← Count + 1`
	`ENDWHILE`
	
	`FOR Count ← 0 TO 29`
	`  PRINT "Student: ", Count, " Mark: ", Score[Count], " Grade: ", Grade[Count]`
	`NEXT`
		3

Question	Answer	Marks
4(c)	Any **three** correct statements **(Max 3)** e.g. MP1 Add an input facility to allow teachers to enter the class size MP2 Add a variable to store the input class size MP3 Use the class size variable as the terminating condition for the loop MP4 Make sure the arrays are sufficiently large to accommodate the largest possible class size	**3**

Question	Answer	Marks
5(a)	**One** mark for each correct column **(Max 4)**	**4**

`Value`	`Diff1`	`Diff2`	**OUTPUT**
50	50	0	Accept: Extreme
75	25	25	Accept: Normal
99	1	49	Accept: Normal
28			Reject: Abnormal
82	18	32	Accept: Normal
150			Reject: Abnormal
–1			

© UCLES 2021

Question	Answer	Marks
5(b)	**One** mark per bullet point **(Max 2)** • To output the type of test data • … by performing a range check //… by checking if numbers are within the range 50 and 100 (inclusive) (or not).	**2**

Question	Answer	Marks
6(a)	The data in the ID column/field is unique/not repeated in each row/record	**1**
6(b)	18	**1**
6(c)		**4**

Field:	ID	GenreName	Overdue		
Table:	GENRE	GENRE	GENRE		
Sort:			Descending		
Show:	☑	☑	☑	☐	☐
Criteria:			>0		
or:					

One mark for the correct fields present and correctly named
One mark for correct table name and show box in all columns
One mark for correct sorting
One mark for correct search criterion

© UCLES 2021