



Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

COMPUTER SCIENCE

0478/21

Paper 2

October/November 2018

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 October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **14** printed pages.

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.

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.

Question	Answer	Marks
Section A		
1(a)(i)	<p>1 mark for any meaningful array name related to Task 1 × 2 1 mark for correct data type AND use related to Task 1 × 2</p> <p>These are examples, many alternatives are valid.</p> <p>ItemCode ...string ...to store the item codes</p> <p>MenuItem ...string ...to store the menu items</p> <p>Price ...real ...to store the prices</p>	4

Question	Answer	Marks
1(a)(ii)	<p>1 mark for any meaningful variable name related to Task 2 × 2 1 mark for correct data type AND use related to Task 2 × 2, e.g.</p> <p>These are examples, many alternatives are valid.</p> <p>ItemCode ...string ...to allow items from menu to be input</p> <p>ItemCost ...real ...to hold price of current menu item</p> <p>TotalCost ...real ...to store current total price of the order</p> <p>Quantity ...integer ...to store the quantity of an item ordered</p>	4

Question	Answer	Marks
1(b)	<p>Any five from:</p> <ul style="list-style-type: none"> • Initialisation • Loop for entry order • Input of item code and quantity • Calculation of total price • Method of termination of loop e.g. use of flag • Generation of unique order code • Display Order... • ... display complete with unique order code, menu items, quantities, prices, total cost of order <p><i>Example algorithm</i></p> <pre> Total_Cost ← 0 Order_Complete ← FALSE Order_Item ← 0 Order_Number ← 0 Daily_Order_Counter ← 1 // The following would be repeated throughout the day REPEAT OUTPUT "Enter item code or X to finish" INPUT Item_Code[Order_Item] IF Item_Code[Order_Item] <> "X" THEN Menu_Count ← 0 Menu_Flag ← FALSE REPEAT IF Menu_Code[Menu_Count] = Item_Code[Order_Item] THEN Menu_Place[Order_Item] ← Menu_Count Menu_Flag ← TRUE Total_Cost ← Total_Cost + Menu_Price[Menu_Count] ELSE Menu_Count ← Menu_Count + 1 ENDIF UNTIL Menu_Flag ← TRUE OUTPUT "How many would you like? "</pre>	5

Question	Answer	Marks
1(b)	<pre> INPUT Item_Quantity[Order_Item] Order_Item ← Order_Item + 1 ELSE Order_Complete ← TRUE Order_Number ← Order_Number + 1 ENDIF UNTIL Order_Complete = TRUE OUTPUT "Order Number ", Order_Number Counter ← 0 WHILE Item_Code[Counter] <> "X" DO Menu_Count ← Menu_Place[Counter] OUTPUT Item_Code[Counter], " ", Menu_Item{Menu_Count}, " ", Price[Menu_Count], " ", Item_Quantity[Counter] Counter ← Counter + 1 ENDWHILE OUTPUT "Total cost of order = ", Total_Cost Daily_Order_Code[Daily_Order_Counter] ← Order_Number Daily_Total_Cost_of_Order[Daily_Order_Counter] ← Total_Cost </pre>	
1(c)	<p>Any four from:</p> <ul style="list-style-type: none"> • Explanation of using an input prompt and statement to enter the percent of the takings that are profit • Explanation of how the total takings are calculated • Explanation of how the percentage profits are calculated (from the input value) • Explanation of how the output is done // Explanation showing correct output statement with the daily takings, profit and percent value used in the calculation 	4

Question	Answer	Marks
1(d)	<p>1 mark for each correct test data item and related reason for Task 3 which requires a percentage to be input (Answers MUST relate to pre-release task) e.g.</p> <p>Test data: -10 Reason: To check that negative values of percentage are rejected (or can identify a loss)</p> <p>Test data: 7.5 Reason: To check that normal data is accepted</p> <p>Test data: 7Percent Reason: To check that incorrect data / data types are rejected</p>	3

Question	Answer	Marks														
Section B																
2	<p>1 mark for each correct line, maximum 5 marks</p> <table border="0" style="width: 100%;"><thead><tr><th style="text-align: center; width: 50%;">Term</th><th style="text-align: center; width: 50%;">Description</th></tr></thead><tbody><tr><td style="border: 1px solid black; padding: 5px; text-align: center;">Top-down design</td><td style="border: 1px solid black; padding: 5px; text-align: center;">Pre-written code to include in your own program to carry out a common task.</td></tr><tr><td style="border: 1px solid black; padding: 5px; text-align: center;">Structure diagram</td><td style="border: 1px solid black; padding: 5px; text-align: center;">Shows the steps representing an algorithm using various shapes of boxes.</td></tr><tr><td style="border: 1px solid black; padding: 5px; text-align: center;">Flowchart</td><td style="border: 1px solid black; padding: 5px; text-align: center;">Shows the hierarchy of the different components which make up a system.</td></tr><tr><td style="border: 1px solid black; padding: 5px; text-align: center;">Pseudocode</td><td style="border: 1px solid black; padding: 5px; text-align: center;">Shows the values of variables as you manually test your program.</td></tr><tr><td style="border: 1px solid black; padding: 5px; text-align: center;">Library routine</td><td style="border: 1px solid black; padding: 5px; text-align: center;">Breaks down a system into successively smaller pieces.</td></tr><tr><td style="border: 1px solid black; padding: 5px; text-align: center;">Trace table</td><td style="border: 1px solid black; padding: 5px; text-align: center;">Describes a program using a simplified high-level notation.</td></tr></tbody></table>	Term	Description	Top-down design	Pre-written code to include in your own program to carry out a common task.	Structure diagram	Shows the steps representing an algorithm using various shapes of boxes.	Flowchart	Shows the hierarchy of the different components which make up a system.	Pseudocode	Shows the values of variables as you manually test your program.	Library routine	Breaks down a system into successively smaller pieces.	Trace table	Describes a program using a simplified high-level notation.	5
Term	Description															
Top-down design	Pre-written code to include in your own program to carry out a common task.															
Structure diagram	Shows the steps representing an algorithm using various shapes of boxes.															
Flowchart	Shows the hierarchy of the different components which make up a system.															
Pseudocode	Shows the values of variables as you manually test your program.															
Library routine	Breaks down a system into successively smaller pieces.															
Trace table	Describes a program using a simplified high-level notation.															

Question	Answer	Marks
3	<p>1 mark for description 1 mark for example, e.g. To test if the value input falls between a given upper bound and a given lower bound ... If a month has to be input using an integer, it must be between 1 and 12 inclusive.</p> <p>1 mark for description 1 mark for example, e.g. To test if the data input is over/under a certain number of characters ... An international telephone number can be no longer than 15 digits.</p> <p>1 mark for description 1 mark for example, e.g. To test if the input is of the correct <u>data</u> type ... If the input is expecting integer(s) to be entered, it will not permit a string to be entered.</p>	6

Question	Answer	Marks
4(a)	<p>1 mark for each point:</p> <ul style="list-style-type: none"> • Expects 50 numbers to be input • Totals the numbers as they are entered / carries out a running total • Outputs the result after the numbers have all been entered 	3
4(b)	<p>1 mark for each point (max 3 marks):</p> <ul style="list-style-type: none"> • Correct initialisation of counter for REPEAT or WHILE loop ... • ... Correct loop statements and counter increment • ... Correct statements inside loop • ... Correct statements outside loop <p>e.g.</p> <pre>Total ← 0 Count ← 1 WHILE Count ≤ 50 DO INPUT Num Total ← Total + Num Count ← Count + 1 ENDWHILE OUTPUT Total</pre> <p>Accept alternative correct ranges e.g.</p> <pre>Count ← 0 WHILE Count < 50 DO</pre>	3

Question	Answer	Marks
4(b)	<pre>Total ← 0 Count ← 0 REPEAT INPUT Num Total ← Total + Num Count ← Count + 1 UNTIL Count = 50 OUTPUT Total</pre> <p>Accept alternative correct ranges e.g. Count ← 1 UNTIL Count > 50</p>	
4(c)	<p>1 mark for each correct point in description, e.g.</p> <ul style="list-style-type: none"> • Use a variable for the counter upper limit... • ... that is input by the user. <p>or</p> <ul style="list-style-type: none"> • loop using a condition control ... • ... until condition is met 	2

Question	Answer				Marks	
5(a)	Flag	TestNum	Num	OUTPUT	2	
	True	7	6			
			5			
			4			
			3			
			2			
			1	7		
	<----- 1 Mark ----->			<- 1 Mark - >		

Question	Answer	Marks																																								
5(b)	<table border="1" data-bbox="394 220 1276 874"> <thead> <tr> <th data-bbox="394 220 609 284">Flag</th> <th data-bbox="609 220 835 284">TestNum</th> <th data-bbox="835 220 1052 284">Num</th> <th data-bbox="1052 220 1276 284">OUTPUT</th> </tr> </thead> <tbody> <tr> <td data-bbox="394 284 609 352">True</td> <td data-bbox="609 284 835 352">6</td> <td data-bbox="835 284 1052 352">5</td> <td data-bbox="1052 284 1276 352"></td> </tr> <tr> <td data-bbox="394 352 609 421"></td> <td data-bbox="609 352 835 421"></td> <td data-bbox="835 352 1052 421">4</td> <td data-bbox="1052 352 1276 421"></td> </tr> <tr> <td data-bbox="394 421 609 489"></td> <td data-bbox="609 421 835 489"></td> <td data-bbox="835 421 1052 489">3</td> <td data-bbox="1052 421 1276 489"></td> </tr> <tr> <td data-bbox="394 489 609 558">False</td> <td data-bbox="609 489 835 558"></td> <td data-bbox="835 489 1052 558"></td> <td data-bbox="1052 489 1276 558"></td> </tr> <tr> <td data-bbox="394 558 609 627"></td> <td data-bbox="609 558 835 627"></td> <td data-bbox="835 558 1052 627"></td> <td data-bbox="1052 558 1276 627"></td> </tr> <tr> <td data-bbox="394 627 609 695"></td> <td data-bbox="609 627 835 695"></td> <td data-bbox="835 627 1052 695"></td> <td data-bbox="1052 627 1276 695"></td> </tr> <tr> <td data-bbox="394 695 609 764"></td> <td data-bbox="609 695 835 764"></td> <td data-bbox="835 695 1052 764"></td> <td data-bbox="1052 695 1276 764"></td> </tr> <tr> <td data-bbox="394 764 609 833"></td> <td data-bbox="609 764 835 833"></td> <td data-bbox="835 764 1052 833"></td> <td data-bbox="1052 764 1276 833"></td> </tr> <tr> <td colspan="4" data-bbox="394 833 1276 874"> <p style="text-align: center;"><----- 1 Mark -----><-----1 Mark -----></p> </td> </tr> </tbody> </table>	Flag	TestNum	Num	OUTPUT	True	6	5				4				3		False																				<p style="text-align: center;"><----- 1 Mark -----><-----1 Mark -----></p>				2
Flag	TestNum	Num	OUTPUT																																							
True	6	5																																								
		4																																								
		3																																								
False																																										
<p style="text-align: center;"><----- 1 Mark -----><-----1 Mark -----></p>																																										
5(c)	<p>1 mark for correct purpose e.g. Works out if the number entered is a prime number.</p>	[1]																																								

Question	Answer	Marks																																										
6(a)	<table border="1" data-bbox="481 215 1348 545"> <thead> <tr> <th>Field</th> <th>Data type</th> </tr> </thead> <tbody> <tr> <td>PCID</td> <td>Text</td> </tr> <tr> <td>ScreenSize</td> <td>Number</td> </tr> <tr> <td>Type</td> <td>Text</td> </tr> <tr> <td>Price</td> <td>Currency</td> </tr> </tbody> </table> <p data-bbox="347 582 810 646">2 marks for 4 correct data types 1 mark for 2 or 3 correct data types</p>	Field	Data type	PCID	Text	ScreenSize	Number	Type	Text	Price	Currency	2																																
Field	Data type																																											
PCID	Text																																											
ScreenSize	Number																																											
Type	Text																																											
Price	Currency																																											
6(b)	<p data-bbox="347 678 1034 813">1 mark correct Fields included 1 mark correct Table and Show on all fields used 1 mark for correct sort, must be descending on Price 1 mark for correct criteria for the fields</p> <table border="1" data-bbox="481 845 1527 1241"> <tbody> <tr> <td>Field:</td> <td>PCID</td> <td>ScreenSize</td> <td>RAM</td> <td>Type</td> <td>HDD(Gb)</td> <td>Price</td> </tr> <tr> <td>Table:</td> <td>PCSTOCK</td> <td>PCSTOCK</td> <td>PCSTOCK</td> <td>PCSTOCK</td> <td>PCSTOCK</td> <td>PCSTOCK</td> </tr> <tr> <td>Sort:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Descending</td> </tr> <tr> <td>Show:</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Criteria:</td> <td></td> <td></td> <td></td> <td>= "DT"</td> <td>>1000</td> <td></td> </tr> <tr> <td>or:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Field:	PCID	ScreenSize	RAM	Type	HDD(Gb)	Price	Table:	PCSTOCK	PCSTOCK	PCSTOCK	PCSTOCK	PCSTOCK	PCSTOCK	Sort:						Descending	Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Criteria:				= "DT"	>1000		or:							4
Field:	PCID	ScreenSize	RAM	Type	HDD(Gb)	Price																																						
Table:	PCSTOCK	PCSTOCK	PCSTOCK	PCSTOCK	PCSTOCK	PCSTOCK																																						
Sort:						Descending																																						
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																																						
Criteria:				= "DT"	>1000																																							
or:																																												