Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

COMPUTER SCIENCE **2210/21**

Paper 2 **May/June 2017**

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 will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

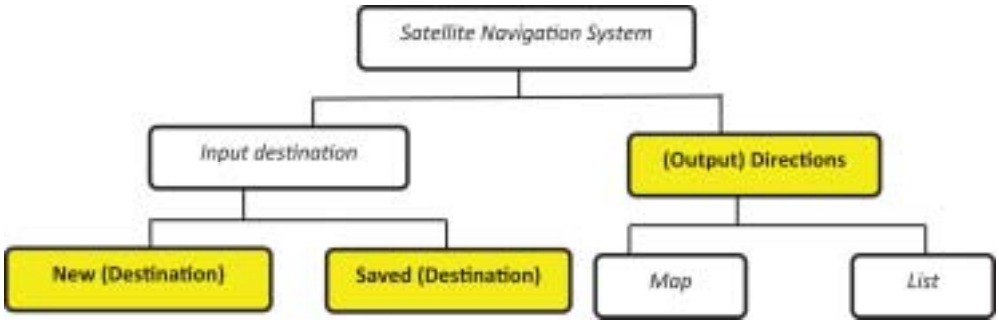
Question	Answer	Marks
1(a)(i)	1 mark for two meaningful names of constants (1) 1 mark for two relevant values related to Task 1 (1) Many correct answers, they must be meaningful. These are examples only. Coach_cost, 550 Ticket_cost, 30 Max_Students, 45 Free_Ticket, 10 (allow 9)	**2**
1(a)(ii)	1 mark for Any meaningful name AND purpose related to Task 2 Many correct answers, they must be meaningful. These are examples only. Students / ArrayStudents to store the students' names (1) paid / arrayPaid to record whether a student has paid or not (1) Max 2 marks	**2**

1(b)	Any **five** from:
	- Initialise values for both coach and ticket
	- Prompt for number of students taking part and input of number
	- Attempt at validation
	- Working validation for the entry for the number of students covering both ends of the range
	- Working out the number of free ticket(s)
	- Calculation of total cost of tickets including consideration of free tickets
	- Calculation of actual cost per student including coach
	- Output of cost to be charged with suitable annotation
	
	Example
	
	`Coach ← 550`
	`Ticket ← 30`
	`PRINT "Please enter the number of students taking part "`
	`INPUT NumberOfStudents`
	`WHILE NumberOfStudents <= 0 OR NumberOfStudent > 45`
	`  PRINT "Your number of students is out of range, please try again"`
	`  INPUT NumberOfStudents`
	`ENDWHILE`
	`FreeTickets ← NumberOfStudents DIV 10`
	`TotalCostTickets ← (NumberOfStudents – FreeTickets) * Ticket`
	`CostPerStudent ← (Coach + TotalCostTickets) / NumberOfStudents`
	`PRINT "The cost to be charged to each student is $", CostPerStudent`
		5

Question	Answer	Marks
1(c)(i)	1 mark for check and 1 mark for related description **Task 1** Many correct answers, they must relate to the pre-release task. These are examples only. Type/Character check to make sure only integers are entered for number of students Range/Limit check to make sure the number of students entered is not too large or small Presence check to make sure an entry has been made (for the number of students) **Task 2** Many correct answers, they must relate to the pre-release task. These are examples only. Type/Character check to make sure only letters are entered for names of students Length check to make sure the name entered is not too long Presence check to make sure an entry has been made (for a student name) Max 4 marks	**4**
1(c)(ii)	1 mark for appropriate test data and 1 mark for related reason **Task 1** Many correct answers, they must relate to the pre-release task and part (c)(i). These are examples only. *Test data:* –50 for number of students *Reason:* To check that negative values for number of students are rejected **Task 2** Many correct answers, they must relate to the pre-release task and part (c)(i). These are examples only. *Test data:* Smith@ for name *Reason:* To check that invalid characters are rejected in names Max 4 marks	**4**

Question	Answer	Marks
1(d)	Any **three** from: - Explanation of how the actual total costs are calculated – (cost of coach and cost of tickets) - Explanation of how the actual total income is calculated – (totalled money collected from students) - Explanation to show how the profit or loss is calculated – (total income – total expenditure) - Indicate whether a profit, break even, or loss has been made	**3**

Question	Answer	Marks
2	1 mark for each error identified and suggested correction (the corrected code must be written in full) *Line* 2 *Correct code* `Counter = 0` (1) *Line* 7 *Correct code* `Total = Total + Number` // `Number + Total` (1) *Line* 8 *Correct code* `Counter = Counter + 1` // `1 + Counter` (1) *Line* 10 *Correct code* `Average = Total / Counter` // `Average = Total / 50` (1)	**4**

Question	Answer	Marks
3	Must match question. 2 marks for three suitable sub system names 1 mark for two suitable sub system names 	**2**

Question	Answer	Marks
4	1 mark for each correct answer	**4**

Statements	Validation	Verification
To automatically check the accuracy of a bar code	✓	
To check if the data input is sensible	✓	
To check if the data input matches the data that has been supplied		✓
To automatically check that all required data fields have been completed	✓	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)</td><td>Any two from:
- Loop with 300 repetitions (starting at 1) / Loops from 1 to 300
- Values input/stored (in consecutive/different locations) in an array (at position I)
- Increases the loop counter/I value by 1 (and returns to the start of the loop)</td><td>2</td></tr>
<tr><td>5(b)</td><td>Any one from:
<pre>REPEAT (… UNTIL)
WHILE (… DO … ENDWHILE)</pre></td><td>1</td></tr>
<tr><td>5(c)</td><td>- Prompt and input number (1)
- Checking the input number is between 0 and 100 - both limits (1)
- Correct error message (1)

Many correct algorithms. This is an example only.

<pre>OUTPUT "Enter a number between 0 and 100 "
INPUT Number
IF Number < 0 OR Number > 100
  THEN
  OUTPUT "The number you have entered is outside the specified range"
ENDIF</pre></td><td>3</td></tr>
</table>

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>6</td><td>
<table>
<tr><th>HighF</th><th>HighC</th><th>TempF</th><th>OUTPUT</th></tr>
<tr><td>–100</td><td>–100</td><td></td><td></td></tr>
<tr><td></td><td></td><td>68</td><td></td></tr>
<tr><td>68</td><td>18</td><td>46</td><td></td></tr>
<tr><td>68</td><td>18</td><td>50</td><td></td></tr>
<tr><td>68</td><td>18</td><td>86</td><td></td></tr>
<tr><td>86</td><td>27</td><td>65</td><td></td></tr>
<tr><td>86</td><td>27</td><td>50</td><td></td></tr>
<tr><td>86</td><td>27</td><td>40</td><td></td></tr>
<tr><td>86</td><td>27</td><td>30</td><td></td></tr>
<tr><td>86</td><td>27</td><td>–1</td><td>The highest temperature is, 86 Fahrenheit, 27 Celsius.</td></tr>
</table>
(1 Mark) (1 Mark) (1 Mark) (2 Marks – see below)

The literal correct output is “The highest temperature is, 86 Fahrenheit, 27 Celsius.”
1 mark for values 86 and 27, 1 mark for correct output words, spacing and punctuation.</td><td>5</td></tr>
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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>7(a)</td><td>Any one from:
- It is the primary key/key field with unique data
- (Fixed length) text field with alphanumeric data</td><td>1</td></tr>
<tr><td>7(b)</td><td><table><tr><th>Field name</th><th>Data type</th></tr><tr><td>ScreenSize</td><td>Number</td></tr><tr><td>3D</td><td>Boolean</td></tr><tr><td>CurvedFlat</td><td>Text</td></tr><tr><td>Internet</td><td>Boolean</td></tr><tr><td>HDD</td><td>Boolean</td></tr><tr><td>Price</td><td>Currency</td></tr></table>1 mark for every two correct data types</td><td>3</td></tr>
<tr><td>7(c)</td><td><table><tr><td>Field:</td><td>TVID</td><td>ScreenSize</td><td>CurvedFlat</td><td>HDD</td><td>Price</td></tr><tr><td>Table:</td><td>TVSTOCK</td><td>TVSTOCK</td><td>TVSTOCK</td><td>TVSTOCK</td><td>TVSTOCK</td></tr><tr><td>Sort:</td><td></td><td></td><td></td><td></td><td>Ascending</td></tr><tr><td>Show:</td><td>☑</td><td>☑</td><td>☐</td><td>☐</td><td>☑</td></tr><tr><td>Criteria:</td><td></td><td></td><td>=“CV”</td><td>YES</td><td></td></tr><tr><td>or:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>(1 Mark)</td><td>(1 Mark)</td><td>(1 Mark)</td><td>(1 Mark)</td><td>(1 Mark)</td></tr></table></td><td>5</td></tr>
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