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**COMPUTER SCIENCE**

**2210/22**

Paper 2

**October/November 2017**

MARK SCHEME

Maximum Mark: 50

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**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.

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This document consists of **8** printed pages.

Question	Answer	Marks
1(a)(i)	<p>1 mark for appropriate variable name, 1 mark for appropriate data type, 1 mark for appropriate use.</p> <p>Many correct answers, they must be meaningful. These are examples only.</p> <ul style="list-style-type: none"> <li>- HireTotal, integer, running total of money taken (for the day)</li> <li>- HoursHired, real, running total of hours hired for the day</li> <li>- Returned, real, hour and fraction of hour when next returned</li> </ul>	<b>3</b>
1(a)(ii)	<p>1 mark for appropriate constant name, 1 mark for appropriate value.</p> <p>Many correct answers, they must be meaningful. These are examples only.</p> <ul style="list-style-type: none"> <li>- HourPrice, 20.00</li> <li>- HalfHourPrice 12.00</li> </ul>	<b>2</b>
1(b)	<p>1 mark for validation check, all checks must be different, 1 mark for the reason and 1 mark for the test data. The only inputs for task 1 can be length of hire, money taken, time of hire and time of return.</p> <p>There are many possible correct answers these are examples only.</p> <p>Validation check      – range check for time of hire Reason                    – cannot be hired before 10:00 returned after 17:00 Test data                – 12:00, 19:00 Validation check      – type check for money taken Reason                    – must be a numeric value Test data                – 20.00, bob</p>	<b>6</b>



Question	Answer	Marks
1(d)	<p>Maximum 4 marks in total for question part</p> <p>e.g.</p> <p><b>Explanation</b> (may include reference to program statements)</p> <ul style="list-style-type: none"> <li>– check all boats for...</li> <li>– ... return time &lt; current time // current booking slot available or return time &gt; current time// current booking slot not available</li> <li>– keep a running total of those available</li> <li>– display number of boats</li> </ul> <p><b>Example:</b></p> <pre>FOR BoatNumber ← 1 to 10    loop to check for all boats   IF ReturnTime(BoatNumber) &lt;= CurrentTime  check return time against current time     THEN BoatsAvailable ← BoatsAvailable + 1    keep a running total   ENDIF NEXT BoatNumber PRINT "Number of boats available ", BoatsAvailable    display number of boats</pre>	<b>4</b>

Question	Answer	Marks
2	<p>1 mark for each, there may be other solutions, award full marks for any working solution</p> <p>any <b>six</b> from:</p> <ul style="list-style-type: none"><li>initialise total (outside loop)</li><li>Input number of numbers (outside loop with validation)</li><li>Loop using input value</li><li>Input number (inside loop)</li><li>Update Total (inside loop)</li><li>Calculate average</li><li>Print average and total (outside loop)</li></ul> <p>Sample algorithm:</p> <pre>INPUT NumberCount Total ← 0 FOR Count ← 1 TO NumberCount   INPUT Number   Total ← Total + Number NEXT Average ← Total/NumberCount PRINT Total, Average</pre>	<b>6</b>

Question	Answer	Marks										
3	<p>1 mark for each correct line, max <b>3</b> marks.</p> <table border="0" style="width: 100%; text-align: center;"> <thead> <tr> <th data-bbox="719 268 987 304">Data Structure</th> <th data-bbox="1133 268 1547 304">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="719 323 987 403">Constant</td> <td data-bbox="1133 323 1547 403">A collection of related data.</td> </tr> <tr> <td data-bbox="719 480 987 560">Array</td> <td data-bbox="1133 480 1547 560">A value that can change whilst a program is running.</td> </tr> <tr> <td data-bbox="719 636 987 716">Table</td> <td data-bbox="1133 636 1547 716">A value that never changes whilst a program is running.</td> </tr> <tr> <td data-bbox="719 793 987 873">Variable</td> <td data-bbox="1133 793 1547 873">A series of elements of the same data type.</td> </tr> </tbody> </table>	Data Structure	Description	Constant	A collection of related data.	Array	A value that can change whilst a program is running.	Table	A value that never changes whilst a program is running.	Variable	A series of elements of the same data type.	<b>3</b>
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Question	Answer	Marks
4	<p>2 marks for identification, 1 mark for description, 1 mark for reason.</p> <p>Identification:</p> <pre> CASE ... ... OF ... OTHERWISE ... (ENDCASE) or ... OF ... (OTHERWISE) ... ENDCASE </pre> <p>Description:</p> <ul style="list-style-type: none"> <li>– a statement that allows for multiple selections // not any of the above</li> </ul> <p>Reason:</p> <ul style="list-style-type: none"> <li>– to simplify pseudocode/ make pseudocode more understandable etc.</li> </ul>	<b>4</b>

Question	Answer					Marks																																																																											
5(a)	<table border="1"> <thead> <tr> <th data-bbox="320 220 551 268">Accept</th> <th data-bbox="551 220 781 268">Reject</th> <th data-bbox="781 220 1012 268">Count</th> <th data-bbox="1012 220 1301 268">Sack</th> <th data-bbox="1301 220 1756 268">OUTPUT</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td></td> <td>1</td> <td>50.4</td> <td></td> </tr> <tr> <td>2</td> <td></td> <td>2</td> <td>50.3</td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>3</td> <td>49.1</td> <td></td> </tr> <tr> <td>3</td> <td></td> <td>4</td> <td>50.3</td> <td></td> </tr> <tr> <td>4</td> <td></td> <td>5</td> <td>50.0</td> <td></td> </tr> <tr> <td>5</td> <td></td> <td>6</td> <td>49.5</td> <td></td> </tr> <tr> <td>6</td> <td></td> <td>7</td> <td>50.2</td> <td></td> </tr> <tr> <td>7</td> <td></td> <td>8</td> <td>50.3</td> <td></td> </tr> <tr> <td>8</td> <td></td> <td>9</td> <td>50.5</td> <td></td> </tr> <tr> <td></td> <td>2</td> <td>10</td> <td>50.6</td> <td>8 2</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p data-bbox="320 1007 1756 1042">                     ← (1 mark) →← (1 mark) →← (1 mark) →← (1 mark) →← (1 mark) →                 </p>					Accept	Reject	Count	Sack	OUTPUT	0	0	0			1		1	50.4		2		2	50.3			1	3	49.1		3		4	50.3		4		5	50.0		5		6	49.5		6		7	50.2		7		8	50.3		8		9	50.5			2	10	50.6	8 2																5
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5(b)	<ul style="list-style-type: none"> <li>– change to <code>Is Count = 50?</code></li> <li>– remove <code>IS Sack &gt; 50.5?</code></li> </ul>					2																																																																											

Question	Answer	Marks																																			
6(a)	<p>– 1 mark for each field suitable name, 1 mark for appropriate data type and appropriate data sample</p> <p>The following are examples there are many different correct answers.</p> <ul style="list-style-type: none"> <li>– Engine Number, text, 21012</li> <li>– Class, text, P6</li> <li>– Service Date, date, 4/3/2017</li> </ul>	<b>6</b>																																			
6(b)	– Engine Number // Correct field number	<b>1</b>																																			
6(c)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Field:</td> <td style="width: 25%;">Engine Number</td> <td style="width: 25%;">Class</td> <td style="width: 25%;">Service Date</td> <td style="width: 10%;"></td> </tr> <tr> <td>Table:</td> <td>TRAIN</td> <td>TRAIN</td> <td>TRAIN</td> <td></td> </tr> <tr> <td>Sort:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Show:</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Criteria:</td> <td></td> <td>Like 'P*' // Like 'P?'</td> <td>&lt;10/11/2016</td> <td></td> </tr> <tr> <td>or:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">(1 mark)</td> <td style="text-align: center;">(1 mark)</td> <td style="text-align: center;">(1 mark)</td> <td></td> </tr> </table>	Field:	Engine Number	Class	Service Date		Table:	TRAIN	TRAIN	TRAIN		Sort:					Show:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Criteria:		Like 'P*' // Like 'P?'	<10/11/2016		or:						(1 mark)	(1 mark)	(1 mark)		<b>3</b>
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