

**UNIT 2****MARK SCHEME****Guidance for examiners**

## Positive marking

It should be remembered that learners are writing under examination conditions and credit should be given for what the learner writes, rather than adopting the approach of penalising him/her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.

For questions that are objective or points-based the mark scheme should be applied precisely. Marks should be awarded as indicated and no further subdivision made.

For band marked questions mark schemes are in two parts.

Part 1 is advice on the indicative content that suggests the range of computer science concepts, theory, issues and arguments which may be included in the learner's answers. These can be used to assess the quality of the learner's response.

Part 2 is an assessment grid advising bands and associated marks that should be given to responses which demonstrate the qualities needed in AO1, AO2 and AO3. Where a response is not credit worthy or not attempted it is indicated on the grid as mark band zero.

## **Banded mark schemes**

Banded mark schemes are divided so that each band has a relevant descriptor. The descriptor for the band provides a description of the performance level for that band. Each band contains marks.

Examiners should first read and annotate a learner's answer to pick out the evidence that is being assessed in that question. Once the annotation is complete, the mark scheme can be applied.

This is done as a two stage process.

### **Stage 1 – Deciding on the band**

When deciding on a band, the answer should be viewed holistically. Beginning at the lowest band, examiners should look at the learner's answer and check whether it matches the descriptor for that band. Examiners should look at the descriptor for that band and see if it matches the qualities shown in the learner's answer. If the descriptor at the lowest band is satisfied, examiners should move up to the next band and repeat this process for each band until the descriptor matches the answer.

If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the learner's response should be used to decide on the mark within the band. For instance if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

### **Stage 2 – Deciding on the mark**

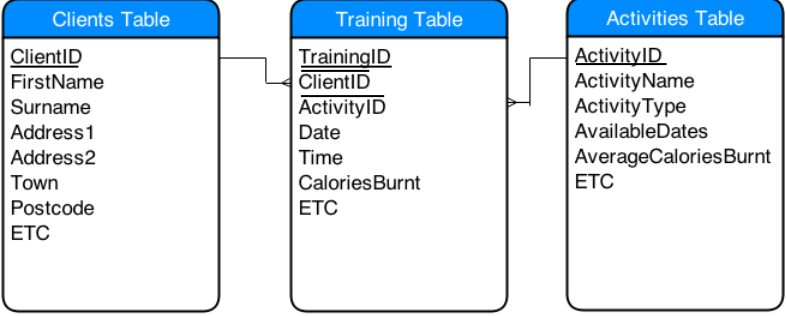
Once the band has been decided, examiners can then assign a mark. During standardising (marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

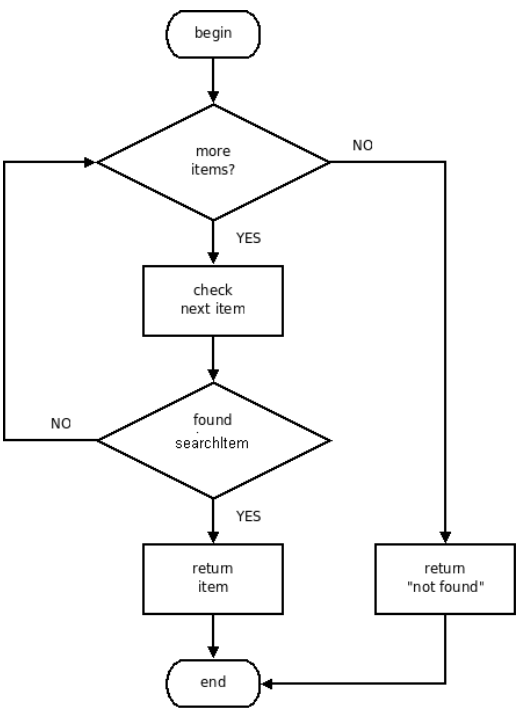
When marking, examiners can use these examples to decide whether a learner's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Indicative content is also provided for banded mark schemes. Indicative content is not exhaustive, and any other valid points must be credited. In order to reach the highest bands of the mark scheme a learner need not cover all of the points mentioned in the indicative content but must meet the requirements of the highest mark band. Where a response is not creditworthy, that is contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

## Section A

Q	Answer	Mark	AO1	AO2	AO3	Total																																																																	
1	<p>Candidate has designed suitable:</p> <ul style="list-style-type: none"> <li>• Fieldnames x 2</li> <li>• Data types x 2</li> <li>• Key Fields x 2</li> <li>• Field lengths x 2</li> <li>• Requirements for Validation (2 types) x 2               <ul style="list-style-type: none"> <li>○ Range, Format, Presence, Length . . .</li> </ul> </li> </ul> <p><b>Indicative content</b></p> <p>Non exhaustive example of Clients table:</p> <table border="1"> <thead> <tr> <th>Fieldname</th> <th>Keyfield</th> <th>Data Type</th> <th>Field Length</th> <th>Validation</th> </tr> </thead> <tbody> <tr> <td>ClientID</td> <td>Yes-indexed</td> <td>Integer</td> <td>7</td> <td>Presence</td> </tr> <tr> <td>Title</td> <td>-</td> <td>String</td> <td>10</td> <td>Lookup Mr, Mrs, Miss ...</td> </tr> <tr> <td>FirstName</td> <td>-</td> <td>String</td> <td>10</td> <td></td> </tr> <tr> <td>...</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> </tr> <tr> <td>Postcode</td> <td>-</td> <td>String</td> <td>9</td> <td>Format LL00 0LL</td> </tr> <tr> <td>DOB</td> <td>-</td> <td>Date</td> <td>2/2/4</td> <td>Range 1-31, 1-12 ...</td> </tr> </tbody> </table> <p>Etc . . .</p> <p>Non exhaustive example of Clients table:</p> <table border="1"> <thead> <tr> <th>Fieldname</th> <th>Keyfield</th> <th>Data Type</th> <th>Field Length</th> <th>Validation</th> </tr> </thead> <tbody> <tr> <td>ActivityID</td> <td>Yes-indexed</td> <td>Integer</td> <td>7</td> <td>Presence</td> </tr> <tr> <td>ActivityName</td> <td>-</td> <td>String</td> <td>10</td> <td>-</td> </tr> <tr> <td>ActivityType</td> <td>-</td> <td>String</td> <td>10</td> <td>Lookup Swimming, Weights ....</td> </tr> <tr> <td>AvailableDates</td> <td>-</td> <td>Date</td> <td>2/2/4</td> <td>Range 1-31, 1-12 ...</td> </tr> <tr> <td>AverageCaloriesBurned</td> <td>-</td> <td>Real</td> <td>3</td> <td>Type Check – data must be Real</td> </tr> </tbody> </table> <p>Etc . . .</p>	Fieldname	Keyfield	Data Type	Field Length	Validation	ClientID	Yes-indexed	Integer	7	Presence	Title	-	String	10	Lookup Mr, Mrs, Miss ...	FirstName	-	String	10		...	...	...	...	...	Postcode	-	String	9	Format LL00 0LL	DOB	-	Date	2/2/4	Range 1-31, 1-12 ...	Fieldname	Keyfield	Data Type	Field Length	Validation	ActivityID	Yes-indexed	Integer	7	Presence	ActivityName	-	String	10	-	ActivityType	-	String	10	Lookup Swimming, Weights ....	AvailableDates	-	Date	2/2/4	Range 1-31, 1-12 ...	AverageCaloriesBurned	-	Real	3	Type Check – data must be Real	2 2 2 2 2		2.1b		10
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Q	Answer	Mark	AO1	AO2	AO3	Total
2	 <p>One mark for each:</p> <ul style="list-style-type: none"> <li>• Correct relationship links</li> <li>• Foreign key from Clients table (ClientID)</li> <li>• Foreign key from Activities Table (ActivityID)</li> <li>• Clients Table completed with example data</li> <li>• Training Table completed with example data</li> <li>• Activities Table completed with example data</li> </ul>	<p>1 1 1 1 1 1</p>		<p>2.1b 2.1b 2.1b 2.1b 2.1b 2.1b</p>		6

Q	Answer	Mark	AO1	AO2	AO3	Total
3	<p>One mark for each:</p> <ul style="list-style-type: none"> <li>• Correct symbols</li> <li>• Correct decision (search match)</li> <li>• Correct use of a loop (more items)</li> <li>• Correct use of terminating condition (more items)</li> <li>• Correct operation (check next item)</li> <li>• Correct output (return item)</li> </ul> <p><b>Indicative content</b></p>  <pre> graph TD     Start([begin]) --&gt; MoreItems{more items?}     MoreItems -- NO --&gt; ReturnNotFound[return "not found"]     MoreItems -- YES --&gt; CheckNextItem[check next item]     CheckNextItem --&gt; FoundSearchItem{found searchitem?}     FoundSearchItem -- NO --&gt; MoreItems     FoundSearchItem -- YES --&gt; ReturnItem[return item]     ReturnNotFound --&gt; End([end])     ReturnItem --&gt; End   </pre> <p><b>Notes:</b> Flow chart will need to use standard conventions. As with programming code or pseudo-code there may be many ways to solve a given problem.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>		<p>2.1b</p> <p>2.1b</p> <p>2.1b</p> <p>2.1b</p> <p>2.1b</p> <p>2.1b</p>		6

Q	Answer	Mark	AO1	AO2	AO3	Total
4	<b>Indicative content:</b> <ul style="list-style-type: none"> <li>• Discussion of interface (CLI/GUI)</li> <li>• Data Structures (arrays/files)</li> <li>• File handling (serial/random)</li> <li>• Validation (range, format, presence, length)</li> <li>• Local or global variables used</li> <li>• Ability to handle data types (string/integer/boolean)</li> </ul>	6		2.1b		6

Band	A02.1b
	Max 6 marks
	<b>5 - 6 marks</b>
3	<p>The candidate has:</p> <ul style="list-style-type: none"> <li>• written an extended response that has a sustained line of reasoning which is coherent, relevant, and logically structured</li> <li>• shown clear understanding of the requirements of the question and a clear knowledge of the indicative content. Clear knowledge is defined as a response that provides five to six relevant detailed points on the selection and justification of the proposed method of solution for the three main requirements listed in the scenario</li> <li>• addressed the question appropriately with minimal repetition and no irrelevant material</li> <li>• has presented a balanced discussion and justified their answer with examples</li> <li>• used appropriate technical terminology referring to the indicative content confidently and accurately.</li> </ul>
	<b>3 - 4 marks</b>
2	<p>The candidate has:</p> <ul style="list-style-type: none"> <li>• written a response that has an adequate line of reasoning with elements of coherence, relevance, and logical structure</li> <li>• shown adequate understanding of the requirements of the question and a satisfactory knowledge of the topic of changeover as specified in the indicative content. Satisfactory knowledge is defined as a response that provides three to four points on the selection and justification of the proposed method of solution for the three main requirements listed in the scenario</li> <li>• has presented a discussion with limited examples</li> <li>• used appropriate technical terminology referring to the indicative content.</li> </ul>
	<b>1 – 2 marks</b>
1	<p>The candidate has:</p> <ul style="list-style-type: none"> <li>• written a response that that lacks sufficient reasoning and structure</li> <li>• produced a discussion which is not well developed</li> <li>• attempted to address the question but has demonstrated superficial knowledge of the topics specified in the indicative content. Superficial knowledge is defined as a response that provides one to two points on the selection and justification of the proposed method of solution for the three main requirements listed in the scenario</li> <li>• used limited technical terminology referring to the indicative content.</li> </ul>
0	<b>0 marks</b> Response not credit worthy or not attempted.

Q	Answer	Mark	AO1	AO2	AO3	Tot
5	<p><b>Indicative content</b></p> <p>Answer must make reference to the impact on the clients and staff:</p> <p>Direct “big bang” approach can be adopted - sudden change to new system</p> <ul style="list-style-type: none"> <li>○ Could be used where a failure would not be catastrophic</li> <li>○ Can be cheaper to implement</li> <li>○ New system is available immediately if required</li> <li>○ Can be the least disruptive if implemented well</li> <li>○ New system may not work as well until staff are fully used to using it</li> <li>○ If new system fails organisation have no system which could be costly or dangerous</li> </ul> <p>Parallel running - both systems running together for a time</p> <ul style="list-style-type: none"> <li>○ Safest option as if new system fails they still have existing system</li> <li>○ New system is available immediately if required</li> <li>○ The outputs from the old and new systems can be compared to check that the new system is running correctly</li> <li>○ Expensive as require temporary staff or overtime for current staff to operate both systems</li> <li>○ Could cause confusion for staff / customers having two systems</li> </ul> <p>Phased changeover - part-by-part (by functionality)</p> <ul style="list-style-type: none"> <li>○ Allows users to gradually get used to the new system</li> <li>○ Staff training can be done in stages</li> <li>○ All staff can focus on one area to resolve any problems</li> <li>○ Problems can be fixed quicker as more experts to resolve one functionality problem at a time</li> <li>○ Difficulties identified in one area can be resolved and managed in next area</li> <li>○ Might cause problems in the changeover period when they need to communicate with each other and have different systems</li> <li>○ Slower to get new system up and running compared to some other methods</li> <li>○ If a part of the new system fails, there is no back-up system, so data can be lost</li> </ul>	8		2.1b		8

	<p>Pilot changeover - part-by-part (by part of the organisation)</p> <ul style="list-style-type: none"> <li>○ All features of the new system can be fully trialled</li> <li>○ If something goes wrong with the new system, only a small part of the organisation is affected</li> <li>○ The staff who were part of the pilot scheme can help train other staff.</li> <li>○ All staff can focus on one area to resolve any problems</li> <li>○ Difficulties identified in one area can be resolved and managed in next area</li> <li>○ For the office / department doing the pilot, there is no back-up system if things go wrong</li> <li>○ Might cause problems in the changeover period when they need to communicate with each other and have different systems</li> <li>○ Slower to get new system up and running compared to some other methods</li> </ul>				
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Band	<p style="text-align: center;"><b>AO2.1b</b> <b>Max 8 marks</b></p>
<b>3</b>	<p style="text-align: center;"><b>7 - 8 marks</b></p> <p>The candidate has:</p> <ul style="list-style-type: none"> <li>• written an extended response that has a sustained line of reasoning which is coherent, relevant, and logically structured</li> <li>• shown clear understanding of the requirements of the question and a clear knowledge of the indicative content. Clear knowledge is defined as a response that provides seven to eight relevant detailed points on changeover methods, which relate to an extensive amount of the indicative content</li> <li>• addressed the question appropriately with minimal repetition and no irrelevant material</li> <li>• has presented a balanced discussion and justified their answer with examples related to the clients and staff</li> <li>• used appropriate technical terminology referring to the indicative content confidently and accurately.</li> </ul>
<b>2</b>	<p style="text-align: center;"><b>3 - 6 marks</b></p> <p>The candidate has:</p> <ul style="list-style-type: none"> <li>• written a response that has an adequate line of reasoning with elements of coherence, relevance, and logical structure</li> <li>• shown adequate understanding of the requirements of the question and a satisfactory knowledge of the topic of changeover as specified in the indicative content. Satisfactory knowledge is defined as a response that provides three to six points on changeover methods as signalled in the indicative content.</li> <li>• has presented a discussion with limited examples</li> <li>• used appropriate technical terminology referring to the indicative content.</li> </ul>
<b>1</b>	<p style="text-align: center;"><b>1 - 2 marks</b></p> <p>The candidate has:</p> <ul style="list-style-type: none"> <li>• written a response that that lacks sufficient reasoning and structure</li> <li>• produced a discussion which is not well developed</li> <li>• attempted to address the question but has demonstrated superficial knowledge of the topics specified in the indicative content. Superficial knowledge is defined as a response that provides one to two points on changeover methods as signalled in the indicative content</li> <li>• used limited technical terminology referring to the indicative content.</li> </ul>
<b>0</b>	<p style="text-align: center;"><b>0 marks</b></p> <p>Response not credit worthy or not attempted.</p>



Q	Answer	Mark	AO1	AO2	AO3	Total
6	<p>Any valid/functional comparison based algorithm that returns outputs as stated in question:</p> <p><b>Example</b></p> <pre> 1   set i = 1 2   set Position = -1 3   set Found = false 4   repeat 5     if MyArray[i] = MyArray[i - 1] then 6       set Position = i 7       output "Position =", i 8       output "TRUE" 9       set Found = true 10    else 11      set i = i + 1 12    endif 13  until (Found = true OR i &gt; LEN(MyArray)) 14  if Found = false then 15    output "FALSE" </pre> <p>One mark for each:</p> <ul style="list-style-type: none"> <li>• initialise variables</li> <li>• use of a loop</li> <li>• comparison</li> <li>• uses a flag to track "found"</li> <li>• use of terminating condition</li> <li>• use of logical operator for multiple terminating conditions</li> <li>• if "found" statement</li> <li>• correct outputs</li> </ul> <p>Marks awarded for concepts demonstrated above. Other solutions incorporating above concepts that provide exactly the same result would be awarded the mark.</p> <p>N.B. Above algorithm searches for adjacent duplicates in a pre populated array as stated in the question.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>			<p>3.1b</p> <p>3.1b</p> <p>3.1b</p> <p>3.1b</p> <p>3.1b</p> <p>3.1b</p> <p>3.1b</p> <p>3.1b</p>	8

## Section B

Q	Answer	Mark	AO1	AO2	AO3	Total
1	<b>Indicative content:</b> <ul style="list-style-type: none"> <li>• Opening a data file</li> <li>• Reading contents</li> <li>• Comparing Activities to the list</li> <li>• Incrementing the contents of the activities array               <ul style="list-style-type: none"> <li>○ Alternatively candidate may be unable to implement array, multiple variables accepted</li> </ul> </li> </ul>	4			3.1b	4

Band	AO3.1b Max 4 marks
	<b>4 marks</b>
3	The candidate has: <ul style="list-style-type: none"> <li>• Implemented all the points required as stated in the indicative content</li> <li>• Used and fully exploited the programming facilities of the language</li> <li>• Demonstrated a sound understanding of the appropriate tools and techniques available to them</li> </ul>
	<b>2 - 3 marks</b>
2	The candidate has: <ul style="list-style-type: none"> <li>• Implemented the majority of the points required as stated in the indicative content. Majority is defined as a response that provides two or three items of the functionality signalled in the indicative content</li> <li>• Used and exploited the programming facilities of the language</li> <li>• Demonstrated an understanding of the tools and techniques available to them</li> </ul>
	<b>1 mark</b>
1	The candidate has: <ul style="list-style-type: none"> <li>• Implemented only one of the points required as stated in the indicative content</li> <li>• Used some of the programming facilities of the language</li> <li>• Demonstrated a limited understanding of the tools and techniques available to them</li> </ul>
	<b>0 marks</b>
0	Response not credit worthy or not attempted.

Q	Answer	Mark	AO1	AO2	AO3	Total
2	<p><b>Indicative content:</b></p> <ul style="list-style-type: none"> <li>• Input</li> </ul> <p>Validation methods of:</p> <ul style="list-style-type: none"> <li>○ Range check</li> <li>○ Format check</li> <li>○ Length check</li> <li>○ Presence check</li> </ul> <ul style="list-style-type: none"> <li>• Stores on disc in a text file called customerdetails.txt</li> <li>• Retrieves specified customer from disc</li> <li>• HCI fit for purpose (Textual or GUI)</li> </ul>	8			3.1b	8

Band	AO3.1b Max 8 marks
	<b>7-8 marks</b>
3	<p>The candidate has:</p> <ul style="list-style-type: none"> <li>• Created a new program including the majority of the functionality as required in the question and stated in the indicative content. The majority of the functionality is defined as a response that provides seven to eight items of the functionality signalled in the indicative content</li> <li>• Used and fully exploited the programming facilities of the language</li> <li>• Demonstrated a sound understanding of the appropriate tools and techniques available to them</li> <li>• Written code that is well structured</li> <li>• Provided evidence of a completed user interface which aids user interaction and is intuitive</li> </ul>
	<b>3-6 marks</b>
2	<p>The candidate has:</p> <ul style="list-style-type: none"> <li>• Created a new program including most of the functionality as required in the question and stated in the indicative content. Most of the functionality is defined as a response that provides three to six items of the functionality signalled in the indicative content</li> <li>• Made use of an appropriate range of the programming facilities of the language</li> <li>• Demonstrated an understanding of the tools and techniques available to them</li> <li>• Provided evidence of a completed user interface which aids user interaction</li> </ul>
	<b>1-2 marks</b>
1	<p>The candidate has:</p> <ul style="list-style-type: none"> <li>• Created a new program with a limited range of the functionality as stated in the indicative content or improved the prototype provided by adding a limited range of the new functionality as stated in the indicative content. A limited range of functionality is defined as a response that provides one to two items of the functionality signalled in the indicative content</li> <li>• Used a limited range of the programming facilities of the language</li> <li>• Demonstrated a limited understanding of the tools and techniques available to them</li> <li>• Provided evidence of a user interface</li> </ul>
	<b>0 marks</b>
0	Response not credit worthy or not attempted.

Q	Answer	Mark	AO1	AO2	AO3	Total
3	<p><b>Indicative content:</b></p> <ul style="list-style-type: none"> <li>○ Clear annotation of steps within the following routines: <ul style="list-style-type: none"> <li>○ Validation</li> <li>○ Storage of data to file</li> <li>○ Retrieving specified data from file</li> </ul> </li> <li>○ Use of self-documenting identifiers / explanation of variables</li> </ul>	4			3.1a	4

Band	AO3.1a Max 4 marks
	<b>4 marks</b>
3	<p>The candidate has:</p> <ul style="list-style-type: none"> <li>• Produced listings that are appropriately laid out and included sufficient annotation to demonstrate an understanding of <b>all</b> programming routines listed in the indicative content</li> <li>• Written code using self-documenting identifiers / explained variables</li> <li>• Used appropriate technical terminology referring to the indicative content confidently and accurately.</li> </ul>
	<b>2-3 marks</b>
2	<p><b>Three</b> marks can be awarded if the candidate has:</p> <ul style="list-style-type: none"> <li>• Produced listings that are appropriately laid out and included sufficient annotation to demonstrate an understanding of <b>all</b> programming routines listed in the indicative content</li> <li>• Not written code using self-documenting identifiers / not explained variables</li> <li>• Used appropriate technical terminology referring to the indicative content.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Produced listings that are appropriately laid out and included sufficient annotation to demonstrate an understanding of <b>two</b> of the programming routines listed in the indicative content</li> <li>• Written code using self-documenting identifiers / explained variables</li> <li>• Used appropriate technical terminology referring to the indicative content.</li> </ul> <p><b>Two</b> marks can be awarded if the candidate has:</p> <ul style="list-style-type: none"> <li>• Produced listings that are appropriately laid out and included sufficient annotation to demonstrate an understanding of <b>two</b> of the programming routines listed in the indicative content</li> <li>• Not written code using self-documenting identifiers / not explained variables</li> <li>• Used appropriate technical terminology referring to the indicative content.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Produced listings that are appropriately laid out and included sufficient annotation to demonstrate an understanding of <b>one</b> of the programming routines listed in the indicative content</li> <li>• Written code using self-documenting identifiers / explained variables</li> <li>• Used appropriate technical terminology referring to the indicative content.</li> </ul>
	<b>1 mark</b>
1	<p>The candidate has:</p> <ul style="list-style-type: none"> <li>• Produced listings that are appropriately laid out and include sufficient annotation to demonstrate an understanding of <b>one</b> programming routine listed in the indicative content</li> <li>• Used limited technical terminology referring to the indicative content.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Written code using self-documenting identifiers</li> <li>• Used limited technical terminology referring to the indicative content.</li> </ul>
	<b>0 marks</b>
0	Response not credit worthy or not attempted.