



# Mark Scheme (Results)

Summer 2022

Pearson BTEC Nationals  
In Computing (31769H)  
Unit 2: Fundamentals of Computer Systems

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# Unit 2: Fundamentals of computer systems – Mark scheme

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## General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Marking grids should be applied positively. Learners must be rewarded for what they have shown they can do, rather than be penalised for omissions.
- Examiners should mark according to the marking grid, not according to their perception of where the grade boundaries may lie.
- All marks on the marking grid should be used appropriately.
- All the marks on the marking grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks, if the learner's response is not rewardable according to the marking grid.
- Where judgement is required, a marking grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the marking grid to a learner's response, a senior examiner should be consulted.

## Specific marking guidance

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The marking grids have been designed to assess learner work holistically. Rows in the grids identify the assessment focus/outcome being targeted. When using a marking grid, the 'best fit' approach should be used.

- Examiners should first make a holistic judgement on which band most closely matches the learner's response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer, in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band, depending on how they have evidenced each of the descriptor bullet points.

## BTEC Next Generation Mark Scheme

### Computing Unit 2 - June 2022

Question Number	Answer	Mark
1a	<p>Any <b>three</b> form:</p> <ul style="list-style-type: none"><li>• Queries/search features</li><li>• Report outputs</li><li>• Can create relationships</li><li>• Key fields / unique records / Reduced data redundancy</li><li>• Calculations/calculated fields</li><li>• Sorting / filtering</li><li>• Visualisation tools (e.g. graphs, dashboards)</li><li>• Centralised data / data accessible to <b>multiple</b> users</li><li>• Security features (e.g. encryption, user access permissions)</li><li>• Data validation / data type enforcement</li></ul> <p><b>Additional Guidance</b> Do not accept "easily accessible" without reference to centralised data/multiple users</p>	3
1b	<p>Award 2 marks for all 4 binary strings correct</p> <p>0100 0111 1001 0010</p> <p><b>Additional guidance</b> Award 1 mark for 3 out of 4 correct 4 = 0100 7 = 0111 9 = 1001 2 = 0010</p>	2

Question Number	Answer	Mark												
1c	<p>Award <b>one</b> mark each for quantity of individual items as an 8-bit binary number.</p> <p>and</p> <p>Award <b>one</b> mark for correct total as an 8-bit binary number.</p> <table border="1"> <thead> <tr> <th></th> <th>Qty</th> <th>Quantity (8-bit binary)</th> </tr> </thead> <tbody> <tr> <td><b>Item 1</b></td> <td>146</td> <td>10010010</td> </tr> <tr> <td><b>Item 2</b></td> <td>22</td> <td>00010110</td> </tr> <tr> <td colspan="2"><b>Total (8-bit binary)</b></td> <td>10101000</td> </tr> </tbody> </table> <p><b>Additional guidance</b> Award 1 mark follow through for total if binary number provided is correct based on <b>learner's</b> answers to items 1 and 2.</p>		Qty	Quantity (8-bit binary)	<b>Item 1</b>	146	10010010	<b>Item 2</b>	22	00010110	<b>Total (8-bit binary)</b>		10101000	3
	Qty	Quantity (8-bit binary)												
<b>Item 1</b>	146	10010010												
<b>Item 2</b>	22	00010110												
<b>Total (8-bit binary)</b>		10101000												

Question Number	Answer	Mark
1d	<p>An explanation such as:</p> <p>255 is the highest number it can store (1) which may be insufficient for a wholesaler (1) and would limit the size an order can be / may cause error ('overflow error') (1)</p> <p>Maximum value is 255 (1) which may be inappropriate for a qty/total (1) and would limit the amount of stock that can be ordered (1)</p> <p><b>Additional guidance</b> Allow – there is a limited number of values available (or similar)</p>	3

Question Number	Answer	Mark
1e	<p>An explanation such as:</p> <p>Simplex (1) the barcode scanner is an input device / it only transmits data back to the computer / data is only communicated in one direction (1)</p>	2

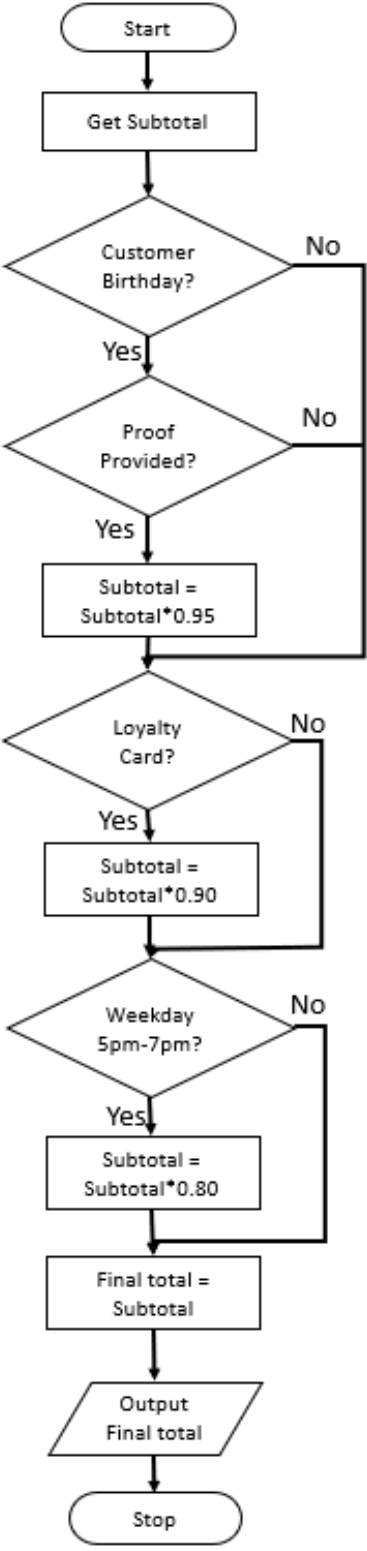
Question Number	Answer	Mark
1f	<p>Award <b>one</b> mark for the identification and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>four</b> marks.</p> <p>More accurate (1) as reduces potential user error (e.g. typos) (1)</p> <p>Faster data entry /more efficient (1) the scanner collects the whole code in one go (1)</p> <p>Greater convenience (1) as they are more portable / workers can be given mobile scanners to be able to move around the warehouse (1)</p> <p><b>Additional guidance</b> Accept reverse arguments e.g. typing is more likely to cause errors</p>	4

Question Number	Answer	Mark
1g	<p>A description to contain <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• An algorithm adds all digits (except check digit) (1)</li> <li>• Then uses a modulo operation (1)</li> <li>• to calculate if total is odd or even / to find if there is a remainder or not (1)</li> <li>• checks result against check digit (1)</li> <li>• if the <b>result</b> and the <b>check digit</b> don't match the code is incorrect (1)</li> </ul>	3

**Total for Question 1 = 20 Marks**

Question Number	Answer	Mark
2a	<p>Any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• Software Licence/purchase costs (1)</li> <li>• Installation cost (e.g. hiring network engineer) (1)</li> <li>• Network infrastructure/cabling (1)</li> <li>• Staff training (1)</li> <li>• Technical support / maintenance agreements (1)</li> <li>• Subscriptions (e.g. streaming entertainment services, internet service provider)</li> </ul>	3

Question Number	Answer	Mark
2b	<p>Award <b>one</b> mark for the identification and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>four</b> marks.</p> <p>Printer (1) to output bills /receipts/stock take (1)</p> <p>Screen / monitor (1) communicate orders to the kitchen (1)</p> <p>Speakers (1) playing music (for entertainment) (1)</p> <p><b>Additional guidance</b> Accept other examples/expansions that are appropriate for the scenario and identified output device (i.e. typical outputs that may occur in a restaurant)</p> <p>Uses/needs (expansion marks) can only be credited with an appropriately identified device</p>	4

Question Number	Answer	Mark
2c	 <pre> graph TD     Start([Start]) --&gt; GetSubtotal[Get Subtotal]     GetSubtotal --&gt; Birthday{Customer Birthday?}     Birthday -- No --&gt; LoyaltyCard{Loyalty Card?}     Birthday -- Yes --&gt; Proof{Proof Provided?}     Proof -- No --&gt; LoyaltyCard     Proof -- Yes --&gt; Subtotal95[Subtotal = Subtotal * 0.95]     Subtotal95 --&gt; LoyaltyCard     LoyaltyCard -- No --&gt; Weekday{Weekday 5pm-7pm?}     LoyaltyCard -- Yes --&gt; Subtotal90[Subtotal = Subtotal * 0.90]     Subtotal90 --&gt; Weekday     Weekday -- No --&gt; FinalTotal[Final total = Subtotal]     Weekday -- Yes --&gt; Subtotal80[Subtotal = Subtotal * 0.80]     Subtotal80 --&gt; FinalTotal     FinalTotal --&gt; Output[/Output Final total/]     Output --&gt; Stop([Stop]) </pre>	6

Level	Mark	Descriptor
Level 0	0	No rewardable material.
1	1-2	<p>Structure of the flowchart uses some appropriate hierarchies/subdivision but clarity and/or readability is limited.</p> <p>Variable/object/process names are inappropriate and/or inconsistent</p> <p>Logical operations and sequence/structure of processes used with limited accuracy.</p> <p>There is limited use of accepted conventions</p> <p>A limited or highly inefficient solution.</p>
2	3-4	<p>Structure of the flowchart uses mostly appropriate hierarchies/subdivision to provide some clarity and readability.</p> <p>Variable/object/process names are mostly appropriate but there is some inconsistency</p> <p>Logical operations and sequences/structure of processes used with some accuracy.</p> <p>Accepted conventions have been applied but there are some inconsistencies.</p> <p>A solution that meets most of the requirements with some inefficiencies.</p>
3	5-6	<p>Structure of the flowchart uses appropriate and consistent hierarchies/subdivision providing clarity and readability.</p> <p>Variable/object/process names are appropriate and used consistently</p> <p>Logical operations and sequences/structures of processes are mostly accurate.</p> <p>Accepted conventions have been used consistently.</p> <p>A solution that meets the requirements with minor inaccuracies/inefficiencies.</p>

Question Number	Answer	Mark
2d	<p>Award <b>one</b> mark for the identification and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>four</b> marks.</p> <p>Each array can be given a unique name (1) for example the table number (e.g. Table 1, Table 2) (1)</p> <p>The data only needs storing (in the program) temporarily (1) and can be deleted when the bill is paid (1)</p> <p>Arrays can be easily manipulated / mutable (1) so data can be added/removed to update the bill (1)</p> <p>Single data type only (1) so can store just the dish names/menu numbers (1)</p> <p>Can be iterated over(1) to ensure all elements are included in the final calculations (1)</p> <p>Can be dynamic/no fixed length (1) so can ensure all items ordered are stored (in the same data structure) (1)</p> <p><b>Additional guidance</b> Accept other examples/expansions that are appropriate for the scenario</p>	4

Question Number	Answer	Mark
2e	<p>An explanation such as:</p> <p>GUI is easy to use/ intuitive (1) so suitable for a range of different users (1) who will only use the system occasionally / who may not have used this system before (1)</p> <p><b>Additional guidance</b> Allow examples of different types of users for MKPT2</p>	3

**Total for Question 2 = 20 Marks**

Question Number	Answer	Mark
3a	<p>Award <b>one</b> mark for the identification and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>four</b> marks.</p> <p>Access rights (1) to restrict access to certain data /prevent (accidental or malicious) editing/deleting of data (1)</p> <p>Use a password for the <b>Wi-Fi</b> (1) which could change daily / to reduce the chances of people outside the library accessing the system (1)</p> <p>Disable USB ports (on the PCs) (1) to prevent users from installing/uploading software (1)</p> <p>Use a firewall (1) to reduce chances of hacker gaining access (via the web site) / to monitor incoming and outgoing traffic (1)</p> <p>Prevent access to some websites (1) to reduce chances of malware (1)</p> <p>Use antivirus (1) to check for/prevent threats (1)</p> <p>Ban/restrict some software (e.g. command prompt)(1) for standard/non-admin users (1)</p>	4

Question Number	Indicative content	Mark
3b	<p>An analysis of how the library computer system will make use of validation when processing data.</p> <p>Types of validation that may be covered:</p> <ul style="list-style-type: none"> <li>• Type checks</li> <li>• Range checks</li> <li>• Length checks</li> <li>• Format checks</li> <li>• Presence checks</li> </ul> <p>Application to the scenario may include:</p> <ul style="list-style-type: none"> <li>• Checking membership numbers are the correct number of digits and/or match the expected format</li> <li>• Checking 'data returned' (or similar) follow an appropriate data format</li> <li>• Ensuring the unique code for the book is the correct length and format</li> <li>• Number of items borrowed is within the acceptable range e.g. &gt;0 and &lt;=10</li> </ul>	6

	<ul style="list-style-type: none"> <li>• Ensuring all required fields are completed (presence check)</li> <li>• User details (when registering) for example: <ul style="list-style-type: none"> <li>○ Name is type checked (only text)</li> <li>○ Post code is format checked</li> </ul> </li> </ul>	
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	0	No rewardable material
1	1-2	<p>Demonstrates isolated knowledge and understanding, there will be major gaps or omissions</p> <p>Breaks the situation down into component parts and a few of the points made will be relevant to the context in the question</p> <p>Limited analysis which contains generic assertions rather than interrelationships or linkages</p>
2	3-4	<p>Demonstrates some accurate knowledge and understanding, with few minor omissions/any gaps or omissions are minor</p> <p>Breaks the situation down into component parts and some of the points made will be relevant to the context in the question</p> <p>Displays a partially developed analysis which considers some interrelationships or linkages but not always sustained.</p>
3	5-6	<p>Demonstrates mostly accurate and thorough/detailed knowledge and understanding</p> <p>Breaks the situation down into component parts and most of the points made will be relevant to the context in the question</p> <p>Displays a well-developed and logical analysis which clearly considers interrelationships or linkages in a sustained manner</p>

Question Number	Indicative content	Mark
3c	<p>A discussion of backup and recovery procedures that the library could use.</p> <p>Areas that could be covered:</p> <ul style="list-style-type: none"> <li>• Data storage and recovery systems that could be utilised (e.g. NAS, SAN, RAID and cloud storage)</li> <li>• Different backup media to be used (e.g. removable drives, magnetic tape)</li> <li>• Frequency of backup</li> <li>• Type of backup (e.g. incremental, full)</li> <li>• Location of backup</li> <li>• Responsibility for backup</li> <li>• Third party services vs in house</li> <li>• log file / mirror files for loans / returns data that is constantly changing through the day.</li> </ul> <p>The response should take in to account the given scenario. Learners could consider these areas in relation to the given scenario:</p> <ul style="list-style-type: none"> <li>• Loan information/data is changing constantly throughout the day</li> <li>• Member details changes less frequently</li> <li>• Sensitivity of information (member details) must be taken into account</li> <li>• Responsibility for backup and technical know how – the librarians may not have the technical skills to be in charge of the backup so an automated, third party service may be more appropriate.</li> </ul>	8

Level	Mark	
	0	No rewardable material
1	1-3	<p>Demonstrates isolated elements of knowledge and understanding, there will be major gaps or omissions</p> <p>Few of the points made will be relevant to the context in the question</p> <p>Limited discussion which contains generic assertions rather than considering different aspects and the relationship between them</p>
2	4-6	<p>Demonstrates some accurate knowledge and understanding, with only minor gaps or omissions</p> <p>Some of the points made will be relevant to the context in the question, but the link will not always be clear</p>

		Displays a partially developed discussion which considers some different aspects and some consideration of how they interrelate, but not always in a sustained way
3	7-8	<p>Demonstrates mostly accurate and detailed knowledge and understanding</p> <p>Most of the points made will be relevant to the context in the question, and there will be clear links</p> <p>Displays a well-developed and logical discussion which clearly considers a range of different aspects and considers how they interrelate, in a sustained way</p>

**Total for Question 3 = 18 Marks**

Question Number		Indicative content	Mark
4a		<p>A discussion of compression used by a digital streaming service.</p> <p>Areas that may be covered:</p> <ul style="list-style-type: none"> <li>• Image and sound quality</li> <li>• Load times</li> <li>• Compatibility</li> <li>• Consideration of target device</li> <li>• Data connection speeds available to customers</li> <li>• Target file sizes</li> <li>• Inclusion of subtitles/closed captions</li> <li>• Language options</li> </ul> <p>The response should take in to account the given scenario. Learners could consider these areas in relation to the given scenario:</p> <ul style="list-style-type: none"> <li>• Users may access using varied data connections types and speeds - Mobile data connections and wired connections</li> <li>• Varying screen sizes and maximum resolution of devices</li> <li>• Compatibility with different Operating systems/Platforms (Smart TVs – Bespoke OS/Linux, Android, Windows, iOS, Mac etc)</li> <li>• Some compression formats may not support multiple languages or subtitles</li> <li>• Customer satisfaction – quality vs performance</li> </ul>	10
Level	Mark		
	0	No rewardable material	
1	1-4	<p>Demonstrates isolated elements of knowledge and understanding, there will be major gaps or omissions</p> <p>Few of the points made will be relevant to the context in the question</p> <p>Limited discussion which contains generic assertions rather than considering different aspects and the relationship between them</p>	
2	5-7	<p>Demonstrates some accurate knowledge and understanding, with only minor gaps or omissions</p> <p>Some of the points made will be relevant to the context in the question, but the link will not always be clear</p>	

		Displays a partially developed discussion which considers some different aspects and some consideration of how they interrelate, but not always in a sustained way
3	8-10	<p>Demonstrates mostly accurate and detailed knowledge and understanding</p> <p>Most of the points made will be relevant to the context in the question, and there will be clear links</p> <p>Displays a well-developed and logical discussion which clearly considers a range of different aspects and considers how they interrelate, in a sustained way</p>

Question Number	Indicative content	Mark
4b	<p>An evaluation of the suitability of the two types of processors for use in the streaming device.</p> <p>Areas that may be covered:</p> <ul style="list-style-type: none"> <li>• Power requirements</li> <li>• Processing power: <ul style="list-style-type: none"> <li>○ Clock speed</li> <li>○ Number of cores</li> </ul> </li> <li>• Cooling considerations</li> <li>• Costs</li> </ul> <p>The response should take in to account the given scenario. Learners could consider these areas in relation to the given scenario</p> <ul style="list-style-type: none"> <li>• Mobile CPU will be smaller/integrated with a board (SoC) which will make the unit much smaller</li> <li>• Small device that plugs directly into the HDMI slot (like a google chrome cast) vs a larger box that will connect by HDMI cable</li> <li>• Desk top CPUs require cooling fans/which may cause issues in terms of noise</li> <li>• Mobile CPU will have less processing power which may result in lag when using the machine or more buffering when watching videos</li> <li>• Will not need secondary storage beyond storage of the system firmware so space saved from not requiring a HDD/SDD can be utilised to include a larger CPU and cooling, while still keeping overall profile of the device quite small.</li> <li>• Mobile CPUs have integrated GPUS where desktop processors tend to have external GPU units. As a result, using the desk top will require more components (which may</li> </ul>	12

	increase cost, and the size of the unit, however dedicated GPU unit would be able to process videos at a higher frame rate and provide better user experience	
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Level	Mark	
	0	No rewardable material
1	1-4	<p>Technical vocabulary is used but is not used appropriately to support arguments in relation to the issues of the question.</p> <p>Few of the points made will be relevant to the context in the question.</p> <p>Limited evaluation which contains generic assertions leading to a conclusion (if present) that is superficial or unsupported</p>
2	5-8	<p>Accurate technical vocabulary is used to support arguments but not all are relevant to the issues of the question</p> <p>Some of the points made will be relevant to the context in the question, but the link will not always be clear.</p> <p>Displays a partially developed evaluation which considers some different competing points, although not always in detail, leading to a conclusion which is partially supported.</p>
3	9-12	<p>Fluent and accurate technical vocabulary is used to support arguments that are relevant to the issues of the question</p> <p>Most of the points made will be relevant to the context in the question, and there will be clear links</p> <p>Displays a well-developed and logical evaluation which clearly considers different aspects and competing points in detail, leading to a conclusion that is fully supported.</p>

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Welsh Assembly Government

