Mark Scheme (Results)

Summer 2022

Pearson BTEC Nationals
In Computing (31771H)
Unit 4: Software design and development project

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Unit 4: Software Design and Development
Project - marking grid

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 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 judgment 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

The marking grids have been designed to assess learner work holistically.
Rows within 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 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.

Assessment focus	Band 0	Band 1	Band 2	Band 3	Max. mark
Activity 1: Flowchart	**0**	**1-3**	**4-7**	**8-10**	**10**
	No rewardable material	Use of British Computer Society (BCS) symbols is limited or mostly inaccurate. Flowchart breaks down requirements into component parts that are not relevant or arbitrary. The flowchart shows limited coverage of inputs, outputs and processes using inconsistent or inappropriate naming conventions Links between component parts are incomplete or inappropriate with limited procedures for handling unexpected events	British Computer Society (BCS) symbols used throughout with some inaccuracies. Flowchart breaks down requirements into component parts that are relevant, but lack detail. The flowchart shows coverage of most inputs, outputs and processes using some naming conventions appropriate to the scenario consistently. Links between component parts are complete, but may be inefficient with accurate procedures for handling some unexpected events	British Computer Society (BCS) flowchart symbols used accurately throughout. Flowchart breaks down requirements into component parts that are detailed and relevant. The flowchart shows full coverage of inputs, outputs and processes using naming conventions appropriate to the scenario consistently. Links between component parts are complete and efficient with accurate and robust procedures for handling unexpected events	

Assessment focus	Sub Task	Band 0	Band 1	Band 2	Band 3	Max. mark
Activity 2: Producing pseudocode and testing		**0**	**1-3**	**4-7**	**8-10**	**10**
	Pseudo code	No rewardable material	Structure of Pseudocode shows some use of appropriate hierarchies and indentation but clarity and/or readability is limited. The sequence of processes is partially incomplete or incorrect which would result in incorrect outcomes. Pseudocode uses some inappropriate and/or inconsistent naming conventions. Pseudocode includes imprecise use of logical operations, which would lead to a solution that is inaccurate and/or incomplete.	Structure of pseudocode makes use of appropriate hierarchies and indentation to provide some clarity and readability but these are not always consistent. The sequence of processes is complete but the suggested solution is inefficient and/or may result in minor errors in outcomes. Pseudocode uses appropriate naming conventions but there may be some inconsistencies. Pseudocode includes precise use of most logical operations, which would lead to a complete solution with some inaccuracies.	Structure of pseudocode shows appropriate and consistent use of hierarchy and indentation, providing clarity and readability The sequence of processes is complete and efficient and would result in the correct outcome(s). Pseudocode uses appropriate and consistent naming conventions. Pseudocode includes precise use of logical operations, which would lead to a complete and accurate solution.	

Note: the Assessment Grid for activity 3 (Test Plan) is given after the activity 4 Program Assessment Grid, so that all testing activities are on one page.

Assessment focus	Band 0	Band 1	Band 2	Band 3	Band 4	Max. mark
Activity 4	**0**	**1-6**	**7 - 12**	**13-18**	**19 -24**	**24**
Program	No rewardable material	Limited use of accurate syntax and indentation appropriate for the chosen language. Organisation has structure that lacks logic and commenting is vague, making maintenance of the code by a third party difficult. Code is inefficient; uses limited appropriate and accurate programming conventions. Uses imprecise logical operations to create a program which may not function or compile and/or may have major errors that prevent the program from meeting the given criteria. Program outputs may contain inaccuracies and/or provide limited information so a novice user would experience difficulty in using the program. Program uses minimal validation and checking procedures resulting in a program with limited capacity to reduce errors or handle unexpected events**.**	Program uses mostly accurate syntax and indentation throughout, appropriate to the chosen language. Organisation has some logical structure and some of the commenting of the code is informative but not always clear, allowing it to be maintained by a third party with minor difficulties. Code is efficient in some places; uses mostly appropriate programming conventions, with minor inaccuracies. Uses logical operations with some precision to create a functional program that meets most of the given criteria with minimal errors. Program outputs are accurate and mostly informative so a novice user would experience minor difficulties in using the program. Program uses some accurate validation and checking procedures, resulting in a program that minimises the most common errors and handles some unexpected events.	Program uses mostly accurate syntax and indentation throughout, appropriate to the chosen language. Organisation has logical structure and commenting is informative, but not always clear, allowing for the code to be maintained by a third party. Code is efficient; uses appropriate and accurate programming conventions throughout. Uses logical operations with some precision to create a functional program that meets the given criteria with minimal errors. Program outputs are accurate and mostly informative allowing a novice user to use the program. Program uses accurate validation and checking procedures, resulting in a program that minimises errors and handles unexpected events**.**	Program uses accurate syntax and indentation throughout, appropriate to the chosen language. Organisation has logical structure and commenting is consistently clear and informative, allowing for the code to be easily maintained by a third party. Code is highly efficient and optimised; uses appropriate and accurate programming conventions throughout. Uses precise logical operations throughout to create a fully functional, error-free program that meets the given criteria. Program outputs are accurate and informative allowing a novice user to easily use the program. Program uses accurate validation and checking procedures throughout, resulting in a robust program that minimises errors and handles unexpected events.	

Assessment Focus	Sub Task	Band 0	Band 1	Band 2	Band 3	Max Mark
		0	**1-2**	**3-4**	**5-6**	**6**
Testing	**Test Plan** **Activity 3**	No rewardable material	Test plan is too narrow to confirm a working solution including limited normal, abnormal and/or extreme data. Expected results are generic or mostly inaccurate based on identified test data.	Test plan is adequate to confirm a working solution, including some normal, abnormal and extreme data. Expected results are and accurate based on identified test data, but may lack detail.	Test plan is thorough, including a range of normal, abnormal and extreme data. Expected results are specific and accurate based on identified test data.	
		0	**1-2**	**3-4**	**5-6**	**6**
	Testing **Activity 4**	No rewardable material	Testing shows evidence of a limited or linear development process, with minimal identification and resolution of errors. Comments show a limited understanding of errors that were found, and how they were fixed.	Testing shows evidence of an iterative development process that identifies and resolves some errors, but problems may persist. Comments show partial understanding of errors that were found, and how they were fixed.	Testing shows evidence of an iterative development process that identifies and resolves errors and improves efficiency. Comments show a clear and detailed understanding of errors that were found, and how they were fixed.	

Assessment focus	Band 0	Band 1	Band 2	Band 3	Band 4	Max. mark
Activity 5 Evaluation	**0**	**1-3**	**4-6**	**7-9**	**10- 12**	
	No rewardable material	Superficial understanding of relevant technical concepts with some inaccuracies. Limited or unsupported justification of changes made during the development process. Limited or unsupported justification of coding conventions selected. Limited links between aspects of the solution and the requirements of the scenario. Limited or unsupported judgments about the quality and performance of the program. Technical vocabulary is used but it is not used appropriately to support arguments.	Some accurate and relevant understanding of technical concepts. Some valid justification, which may lack support, of changes made during the development process. Some valid justification, which may lack support, of coding conventions selected. Some logical links between aspects of the solution and the requirements of the scenario but may lack clarity. Some valid judgments which may lack support about the quality and performance of the program. Mostly accurate technical vocabulary is used to support arguments.	Mostly accurate and detailed understanding of relevant technical concepts. A valid and mostly supported justification of changes made during the development process. A valid and mostly supported justification of coding conventions selected. Makes some logical coherent links between aspects of the solution and the requirements of the scenario. Makes valid and mostly supported judgments about the quality and performance of the program. Accurate technical vocabulary is used to support arguments.	Accurate and detailed understanding of relevant technical concepts throughout. A valid and fully supported justification of changes made during the development process. A valid and fully supported justification of coding conventions selected. Makes logical coherent links between aspects of the solution and the requirements of the scenario throughout. Makes valid and fully supported judgments about the quality and performance of the program. Fluent and accurate technical vocabulary is used to support arguments.	**12**

Total mark = 68

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Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE