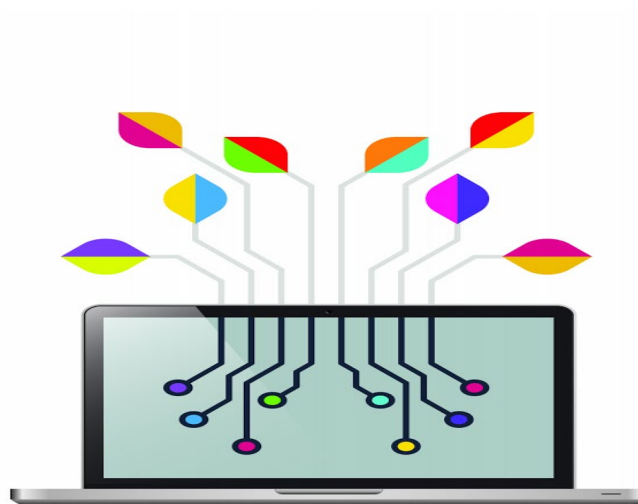Mark Scheme

January 2020

Pearson BTEC Level 3 - Computing

Unit 1: Principles of Computer Science (31768H)

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Unit 1: Principles of Computer Science

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- All marks on the mark scheme should be used appropriately.
- All marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if a candidate's response is not worthy of credit according to the mark scheme.
- Where some judgment is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt about applying the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed-out work should be marked UNLESS the candidate has replaced it with an alternative response.
- Phonetic spelling should be accepted.

Specific marking guidance

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 Nationals Unit 1 Mark Scheme

Question Number	Answer	Mark
1a	Any **two** from: • Leading zeros can be used (1) • Not used in calculation/ has no (numerical) value (1) • Can have letters as well as numbers (1) • Allows for string handling function (1) **Additional guidance** Allow examples of string handling function e.g. concatenation, slicing, length check for mark point 4	2

Question Number	Answer	Mark
1b	Location given as Bay 01 / Bay 1 / 01 / 1 (1) Shelf 01 / Shelf 1 / 01 / 1 (1) Section 08 / Section 8 / 08 / 8 (1)	3

Question Number	Answer	Mark
1c	An explanation such as: To validate user input / perform presence check (1) to ensure the item required input is not blank (1) Ensure that the length (of item required variable) is greater than 0 (1) will loop until data/item is entered (1) **Accept alternative wording**	2

Question Number	Answer	Mark
1d	An explanation of the purpose of index variable such as Controls the loop / sets the number of iterations (1) by incrementing the value (1) to ensure all items are scanned (1) To perform a (linear) search (1) by going through every element of the array (1) to identify the matching items (1) Acts as a pointer (1) to the matched item (1) to identify/ output corresponding location (1)	3

Question Number	Answer	Mark
1e	A description containing any three from: • Selects the parts of item location string (1) • Selects the first 2 characters for bay (1) • Selects characters 3 and 4 for shelf (1) • Selects the character **after character 4** for section (1) • Outputs the bay / shelf / section along with an appropriate heading (1)	3

Question Number	Answer	Mark
1f	A description of **three** from: • The search goes through all locations (1) • Prints location each time a match is found (1) • All/three locations will be printed (1) • The loop would runout of data / produce a range error (1) • Would output two correct locations and one location that does not exist (1) **Additional guidance** Award one mark against mark point 2 if examples of output are provided	3

Question Number	Answer	Mark
1g	Award **one** mark for identification and **one** mark for expansion up to a maximum of **four** marks. Allows the loop to break early (1) because it is a conditional loop (1) It is more efficient (1) because it does not have search the whole dataset (1) It will not output repeated items (1) because the loop ends when the item is found (1) A while loop would be able to cope with new bays/ items/ data being added (1) without updates to the program code (1)	4

Question Number	Answer	Mark
2a	Award **one** mark for identification and **one** mark for expansion. Uses service orientated processing (1) which makes it suitable for GUIs (1) Uses buttons/ mouse clicks/keyboard interactions (1) which could be controlled with a trigger function (1) Uses built in functions/libraries for interfaces (1) so you do not have to create from scratch (1)	2

Question Number	Answer	Mark
2b	A description to include **two** from: • On line one (1) • Change the parameters/values (1) • In the random function (1) **Additional guidance** Allow examples of actual numbers/code for mark point 2 & 3	2

Question Number	Answer	Mark
2c	Error 1 Line number: 4 (1) Correction: IF guess > target (1) Error 2 Line number: 6 (1) Correction: ELSEIF guess < target (1)	4

2d	Award 1 mark per correct shaded cell. Ignore all other entries.

line	start	counter	output
1	4		
2			4
3		1	
4	5		
5			5
3		3	
4	8		
5			8
3		5	
4	13		
5			13
6			
7			end

4

Question Number	Answer	Mark
2e		
		8

Level	Mark	Descriptor
Level 0	0	No rewardable material.
1	1-3	Structure of the flowchart uses some appropriate hierarchies/subdivision but clarity and/or readability is limited.

Variable/object/process names are inappropriate and/or inconsistent |

		Logical operations and sequence/structure of processes used with limited accuracy.
		There is limited use of accepted conventions
		A limited or highly inefficient solution.
2	4-6	Structure of the flowchart uses mostly appropriate hierarchies/subdivision to provide some clarity and readability.
		Variable/object/process names are mostly appropriate but there is some inconsistency
		Logical operations and sequences/structure of processes used with some accuracy.
		Accepted conventions have been applied but there are some inconsistencies.
		A solution that meets most of the requirements with some inefficiencies.
3	7-8	Structure of the flowchart uses appropriate and consistent hierarchies/subdivision providing clarity and readability.
		Variable/object/process names are appropriate and used consistently
		Logical operations and sequences/structures of processes are mostly accurate.
		Accepted conventions have been used consistently.
		A solution that meets the requirements with minor inaccuracies/inefficiencies.

Question Number	Answer	Mark
3a	An explanation such as: A total cannot be calculated (1) because the data is non numerical (1) An error would occur (1) because you are trying to perform a calculation on text (1)	
		2

Question Number	Answer	Mark
3b	A description to contain any **four** from: **Branches** Check total >= 50p (1) Check button pressed (1) Print ticket if total is enough (1) Reset total if ticket printed (1) Check value of coin inserted (1) Add the correct value of coin inserted to total (1) Any other valid examples of branches to control machine	4

Question number	Indicative content

3 (c)	EXAMPLE ONLY
	
	total_amount = 0
	REPEAT
	      Insert a coin
	      Identify value_of_coin
	      IF value_of_coin acceptable then
	            Add value_of_coin to total_amount
	      ELSE
	            reject coin
	      END IF
	UNTIL total_amount >= 50
	Button = false
	REPEAT
	      IF button_pressed then
	            button = true
	      END IF
	UNTIL button = true
	OUTPUT date
	OUTPUT total_amount
	issue ticket
	
	## Indicative content
	
	Loops for entering coins
	Checking value of coins
	Reject coins not of value
	Total coins and allow over payment
	Method of checking for button press/ loop/ wait for press
	Date and Time printed on ticket
	Method for resetting variables/ restarting code

	Mark scheme (award up to 8 marks)	
Level	Mark	Descriptor
Level 0	0	No rewardable material.
1	1-3	Structure of the algorithm uses some appropriate hierarchies/subdivision but clarity and/or readability is limited. Variable/object/process names are inappropriate and/or inconsistent Logical operations and sequence/structure of processes used with limited accuracy. There is limited use of accepted conventions A limited or highly inefficient solution.

| 2 | 4-6 | Structure of the algorithm uses mostly appropriate hierarchies/subdivision to provide some clarity and readability.

Variable/object/process names are mostly appropriate but there is some inconsistency

Logical operations and sequences/structure of processes used with some accuracy.

Accepted conventions have been applied but there are some inconsistencies.

A solution that meets most of the requirements with some inefficiencies. |
|---|---|---|
| 3 | 7-8 | Structure of the algorithm uses appropriate and consistent hierarchies/subdivision providing clarity and readability.

Variable/object/process names are appropriate and used consistently

Logical operations and sequences/structures of processes are mostly accurate.

Accepted conventions have been used consistently.

A solution that meets the requirements with minor inaccuracies/inefficiencies. |

Question number	Indicative content
3(d)	**Patterns** Price is 50p Only 2 ways to over pay £1 pound coin used OR 3 times 20p used Therefore change needed is 50p in coins any denomination Or a 10p coin Problems 10p coins always needed for change for 60p paid Need to monitor all coins Need to calculate change, using largest value coins If no 50p left need to use 20p and 10p If no 20p left need to use 10p coins If no 10p left cannot give change. Processes Calculate over payment Calculate coins needed Issue coins Message if no change available

	0	No rewardable material
1	1-4	Demonstrates isolated knowledge and understanding, there will be major gaps or omissions Breaks the situation down into component parts and a few of the points made will be relevant to the context in the question Limited analysis which contains generic assertions rather than interrelationships or linkages
2	5-7	Demonstrates some accurate knowledge and understanding, with few minor omissions/any gaps or omissions are minor Breaks the situation down into component parts and some of the points made will be relevant to the context in the question Displays a partially developed analysis which considers some interrelationships or linkages but not always sustained.
3	8-10	Demonstrates mostly accurate and thorough/detailed knowledge and understanding Breaks the situation down into component parts and most of the points made will be relevant to the context in the question Displays a well-developed and logical analysis which clearly considers interrelationships or linkages in a sustained manner

Question number	Indicative content
4 (a)	**Data required** name address type of car pick up point time of appointment length of appointment Licence details Date theory passed Instructor details

Level	0	No rewardable material
1	1-2	Demonstrates isolated knowledge and understanding, there will be major gaps or omissions Breaks the situation down into component parts and a few of the points made will be relevant to the context in the question Limited analysis which contains generic assertions rather than interrelationships or linkages
2	3-4	Demonstrates some accurate knowledge and understanding, with few minor omissions/any gaps or omissions are minor Breaks the situation down into component parts and some of the points made will be relevant to the context in the question Displays a partially developed analysis which considers some interrelationships or linkages but not always sustained.
3	5-6	Demonstrates mostly accurate and thorough/detailed knowledge and understanding Breaks the situation down into component parts and most of the points made will be relevant to the context in the question Displays a well-developed and logical analysis which clearly considers interrelationships or linkages in a sustained manner

Question number	Indicative content
4(b)	Needs to relate to the information booklet **Inputs** Instructor details Instructor working patterns Client details Pick up points Date of passing theory Appointment details Car details **Processes** Method of data collection Keeping data up to date Processing appointment lists, that give each instructor a daily list Match Clients to cars and instructors Calculating the number of appointments they can have in a day, including start & finish times. Avoiding double bookings Calculation of charge **Outputs** Detailed list for each instructor One list per day List has, client name, time of appointment, pick up point, and length of appointment. List of people whose theory test is about to expire

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

		Displays a well-developed and logical discussion which clearly considers a range of different aspects and considers how they interrelate, in a sustained way

Question number	Indicative content
4(c)	**Records** Customer records Instructor records Describes the record structure needed for the data Data types, fields, and validation Booking records **Lists and arrays** How data is extracted from the database the lists that are formed Data held in arrays Data sorted to provide sets for each instructor Lists are sorted to provide printed lists by date and instructor Evaluation may focus on: • The organisation using records, lists and arrays. • The storage of permanent and temporary data • Efficiency • Volume of data stored and effect on storage capacity • Redundancy of data • Extraction of data from different structures • Unique identifiers- ease of locating data

Level	Mark	
	0	No rewardable material
1	1-4	Technical vocabulary is used but is not used appropriately to support arguments in relation to the issues of the question. Few of the points made will be relevant to the context in the question. Limited evaluation which contains generic assertions leading to a conclusion (if present) that is superficial or unsupported
2	5-8	Accurate technical vocabulary is used to support arguments but not all are relevant to the issues of the question Some of the points made will be relevant to the context in the question, but the link will not always be clear. Displays a partially developed evaluation which considers some different competing points, although not always in detail, leading to a conclusion which is partially supported.
3	9-12	Fluent and accurate technical vocabulary is used to support arguments that are relevant to the issues of the question Most of the points made will be relevant to the context in the question, and there will be clear links

		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.

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