

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson BTEC Level 3
Nationals Extended
Certificate, Foundation
Diploma, Diploma,
Extended Diploma

Centre Number

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Learner Registration Number

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Friday 17 January 2020

Afternoon (Time: 2 hours)

Paper Reference **31768H**

Computing

Unit 1: Principles of Computer Science

You must have:

Information Booklet (enclosed)

Total Marks

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Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 90.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Answer ALL questions. Write your answers in the spaces provided.

Please refer to Section 1 of the Information Booklet in order to answer Question 1.

1 A supplies company stores goods in a warehouse.

The items are not stored in a specific order. Section 1 of the Information Booklet shows the storage bays in the warehouse.

Figure 1 shows some example data that the system will store.

(a) Give **two** reasons why a string data type could be used for the item code.

(2)

1

2

(b) Identify the location of item 478591.

(3)

Bay:

.....

Shelf:

.....

Section:

.....

A section of pseudocode to find an item and print its location is given in Figure 2.

(c) Explain the purpose of lines 2 to 4 of the code.

(2)

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(d) Explain the purpose of the index variable in the pseudocode given in **Figure 2**.

(3)

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(e) Lines 9, 10, 11 of the pseudocode output the item's location.

Describe how string handling functions are used to output the item's location.

(3)

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The company usually has more than one of each type of item in stock.

(f) The data in **Figure 1** is used to test the pseudocode in **Figure 2**.

Describe what would happen if **514832** was entered to locate an item.

(3)

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(g) It has been suggested that the FOR loop is replaced with a WHILE loop.

Explain **two** benefits of using a WHILE loop.

(4)

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(Total for Question 1 = 20 marks)

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QUESTION 2 BEGINS ON THE NEXT PAGE.



Please refer to Section 2 of the Information Booklet in order to answer Question 2.

2 A teacher has created a program of mathematical games for her students.

The main menu is shown in **Figure 3** in Section 2 of the Information Booklet.

(a) Explain **one** reason why event-driven programming is suitable for creating the main menu.

(2)

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Part of the pseudocode for the 'Guess the number' game is given in **Figure 4**.

(b) Describe how the teacher could change the range used to generate the number the students have to guess.

(2)

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The code for the 'Guess the number' game does not perform as expected.

(c) Identify **two** lines of the pseudocode that contain errors and write the correct pseudocode.

(4)

Line number

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Correct pseudocode

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Line number

Correct pseudocode

Part of the pseudocode for the 'Number pattern' game is given in **Figure 5**.

(d) The logic of the pseudocode is tested using a 'dry run'.

Complete the shaded cells in the trace table to show how the variables would change if the pseudocode was run as program code.

(4)

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



(e) The teacher has developed the rules for the 'Addition' game.

- The game has 10 questions.
- The score starts at zero.
- The score increases by one for each correct answer.
- Two numbers are generated and then added together.
- The addition question is displayed.
- The student enters their answer.
- A message is output to the student telling them if their answer is correct or incorrect.
- At the end of the game their final score is displayed.

Draw a flowchart that meets the requirements of the rules of the game.

(8)



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[Empty answer box for Question 2]

(Total for Question 2 = 20 marks)



Please refer to Section 3 of the Information Booklet in order to answer Question 3.

3 A ticket machine at a bus station prints out a ticket when payment has been made.

The rules for the machine are given in **Figure 6** in Section 3 of the Information Booklet.

(a) A programmer stores the values of the coins to be used in an array:

coins = [10p, 20p, 50p, £1]

Explain **one** problem that would occur when trying to generate a total if this array was used in the code for the machine.

(2)

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(b) Describe how branches could be used in the code for the machine so that it meets the rules.

(4)

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(c) Develop an algorithm to meet the rules for the ticket machine.
Use pseudocode for your algorithm.

(8)

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(d) The rules of the ticket machine need to be modified so that it gives change if more than 50p is inserted.

Analyse the patterns, problems and processes a programmer would need to consider to develop a solution.

(10)

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(Total for Question 3 = 24 marks)



(b) Discuss what a programmer would need to consider when developing a program that meets the requirements listed in **Figure 7**.

You should consider inputs, processes and outputs in your response.

(8)

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(c) The program uses data structures to store information and produce printed appointments lists for the driving instructors.

Evaluate the use of records, sets, lists and arrays to achieve this.

You should use examples appropriate to the scenario to support your evaluation.

(12)

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(Total for Question 4 = 26 marks)

TOTAL FOR PAPER = 90 MARKS





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