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Candidate surname

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Nationals Extended  
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Extended Diploma

Centre Number

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Learner Registration Number

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**Monday 3 June 2019**

Morning (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 the Information Booklet in order to answer Question 1.**

**1** Graham buys used mobile phones. He then sells the phones to make a profit. He would like a program to calculate how much he will pay (buying price) for a used mobile phone.

(a) Give **three** reasons why programmers use 'decomposition' when solving problems.

(3)

Reason 1

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Reason 2

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Reason 3

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Graham will use an event driven programming language to create the program code.

(b) Describe the purpose of a 'trigger function.'

(2)

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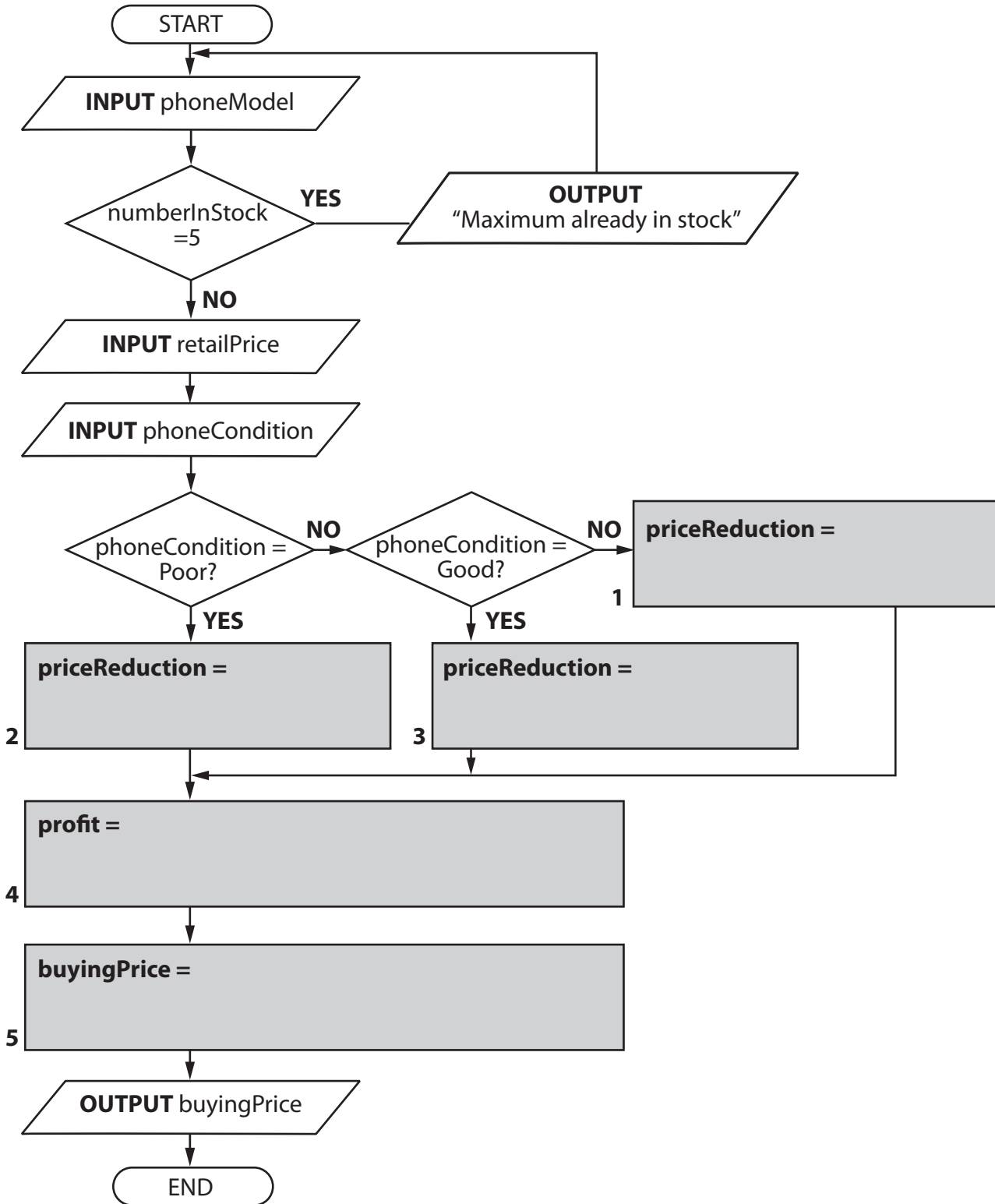


(c) Graham has started a flowchart to show the logic of the program.

The completed flowchart must meet the rules given in **Figure 1**.

Complete the statements in the shaded boxes numbered 1 to 5 to show the calculations the program will perform for each variable.

(5)



(d) The program will perform a validation check on the variable "phoneCondition".

The validation must:

- check that the data entered matches one of the three acceptable options (Poor, Good, Excellent)
- display the message "Accepted" when valid data is entered
- display the message "Error" if invalid data is entered.

Develop an algorithm for this validation check.

Write your answer using pseudocode.

(4)

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(e) Graham has created an algorithm to make sure the phone model is entered by the user.

This is written in pseudocode.

```
1 BEGIN
2 REPEAT
3     INPUT phoneModel
4     IF phoneModel = FALSE THEN
5         PRINT "you did not enter a phone model"
6     ENDIF
7 UNTIL phoneModel = NOT FALSE
8 ENDREPEAT
9 END
```

Explain why a **REPEAT** loop has been used instead of a **FOR** loop.

(3)

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(f) Graham already has a program that calculates the number of each phone in stock.

Give **three** reasons why Graham would use **Service-Oriented Processing** to retrieve the number of phones in stock when the code is calculating a buying price.

(3)

Reason 1

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Reason 2

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Reason 3

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**(Total for Question 1 = 20 marks)**

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

2 George is a teacher. He gives three different students a merit at the end of each day.

**Figure 2a** shows an algorithm that will form part of a larger program.

George uses the algorithm to input the names of the students who got a merit.

(a) The algorithm in **Figure 2a** makes use of concatenation to join data input to labels.

George inputs the first student into the algorithm.

First Name	Surname	Reason
Ruhail	Rauf	Behaviour

Give the output produced by the command on line 6.

(3)

(b) **Figure 2b** shows a different algorithm that has the same purpose as **Figure 2a**.

**Figure 2a** uses fewer lines of code and is more efficient than **Figure 2b**.

Describe how the structure of the algorithm in **Figure 2a** makes it more efficient.

(4)

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(c) George is going to give his students a test. Students can take the test more than once.

Students will get a certificate showing their most recent test score.

Here are sample test scores for one student.

Third Result	Second Result	First Result
19	18	37

Explain why storing these test scores as a **stack** would be the most appropriate.

(4)

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George stores the final test scores achieved by his students in a list. Here are sample test scores for 11 students.

18	19	23	23	35	38	42	42	55	62	68
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(d) Explain **two** reasons why George has used a **list** data structure rather than a set data structure.

(4)

Reason 1

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Reason 2

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(e) George will use a binary search to find the number 62 in the list.

State the **three** values that will be used as the **middle boundaries** during the binary search.

18	19	23	23	35	38	42	42	55	62	68
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You are advised to show your working.

(3)

Middle Boundary 1.....

Middle Boundary 2.....

Middle Boundary 3.....

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(b) The code in **Figure 3b** uses a variable called 'litresRequired' on line 27.

Analyse the problems that may be caused by using 'litresRequired' as a **global** variable.

(6)





Please refer to the Information Booklet in order to answer Question 4.

4 Callum owns a dog walking business. He offers group walks with up to four dogs each morning Monday to Friday. He would like a program to manage his bookings.

Figure 4a shows the rules that must be followed when making a booking.

Figure 4b shows sample data for different dogs.

(a) Callum wants the program to:

- make sure the data entered for 'Dog Behaviour' is reasonable
- support users when entering this data.

Describe how the program could achieve this.

(4)

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**(Total for Question 4 = 26 marks)**

**TOTAL FOR PAPER = 90 MARKS**



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