

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

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Morning

Paper Reference **31768H**

Computing

Unit 1: Principles of Computer Science

Information Booklet

Instructions

- You will need the information in this booklet to answer some questions.
- Read the information carefully.
- You must **not** write your answers in this booklet.
- Only your answers given on the question paper booklet will be marked.
- Do not return this Information Booklet with the question paper.

Turn over ►

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SECTION 1

The information in this section should be used to answer Question 1.

Figure 1 shows the rules the program will follow to calculate the buying price of a used mobile phone.

- The phone model is input.
- There should be no more than 5 phones of each model in stock.
 - If the number of phones in stock is 5 the program will print a message saying 'Maximum already in stock'.
 - If the number of phones in stock is fewer than 5, these rules are used to work out a buying price for a phone.
- The retail price of the phone, when new, is input.
- The condition of the phone is input. This can be 'Poor', 'Good' or 'Excellent'.
- A price reduction is then calculated. This will depend on the condition of the phone.

The price reduction is calculated by dividing the retail price by 100 and then multiplying this value by the reduction percentage.

Phone condition	Reduction percentage
Poor	65%
Good	45%
Excellent	25%

- 20% profit is calculated. The profit is calculated by subtracting the price reduction from the retail price. This value is then divided by 100 and then multiplied by 20.
- The buying price is calculated by subtracting the price reduction and the profit amount from the retail price.
- The program should then output the buying price.

Figure 1

SECTION 2

The information in this section should be used to answer Question 2.

Figure 2a shows an algorithm that George uses to enter the names of students who have achieved a merit. It is written in pseudocode.

```
1 BEGIN
2 FOR count 1 to 3:
3     INPUT firstname
4     INPUT surname
5     INPUT reason
6     OUTPUT("First name:"+(firstname)+"_Surname:"+(surname)+"_Reason:"+(reason[0:3]))
7 ENDFOR
8 END
```

Figure 2a

Figure 2b shows an alternative algorithm George could use. It is written in pseudocode.

```
1 BEGIN
2 DEFINE FUNCTION record
3     INPUT firstname
4     INPUT surname
5     INPUT reason
6     OUTPUT("First name:"+(firstname)+"_Surname:"+(surname)+"_Reason:"+(reason[0:3]))
7 ENDFUNCTION
8 CALL FUNCTION record
9 CALL FUNCTION record
10 CALL FUNCTION record
11 END
```

Figure 2b

Figure 2c shows some programming code that will perform a binary search. It is written in C#.

```
1      {
2          int low = 0, high = studentarray.Length - 1, middle = 0;
3
4          while (low <= high)
5          {
6              middle = low + (high - low)/2;
7
8              if (value == studentarray[middle])
9              {
10                 return middle;
11             }
12             else if (value < studentarray[middle])
13                 high = middle - 1;
14             else
15                 low = middle + 1;
16         }
```

Figure 2c

SECTION 3

The information in this section should be used to answer Question 3.

Figure 3a shows the rules the code follows to work out how many litres of paint are needed.

1. The customer surname must be input.
2. The number of walls that need to be painted is input.
3. The height and the width of each wall, in feet, are input.
4. The number of square feet is calculated for each wall by multiplying the height by the width.
5. The total number of square feet for all walls is added together.
6. One litre of paint will cover 100 square feet. The number of litres of paint is calculated by dividing the number of square feet by 100.
7. The number of litres should always be rounded **upwards** to the nearest whole number.
8. Paint is sold in the following sizes of tin:
 - 1 litre
 - 2 litres
 - 5 litres.

The program should calculate the number of each size of tin needed.

9. The following details are then output with suitable labels:
 - the total number of litres needed
 - the number of each size of tin needed (5 litres, 2 litres, 1 litre).

Figure 3a

Figure 3b shows the programming code that Madison has created.

It is written using Python.

```
1  #This section will allow the user to input their surname and the number of walls
2  customerSurname = input ("Enter customer surname")
3  while len (customerSurname) == 0:
4      customerSurname = input ("You must enter a surname to continue")
5  wallNumber = input("Enter the number of walls that needs painting")
6  wallNumber = int (wallNumber)
7
8  #This section of code will calculate the total number of square feet
9  squareFeet = 0
10 totalSquareFeet = 0
11 for i in range (1,wallNumber):
12     height = input ("Enter the height of the wall in feet")
13     height = int (height)
14     width = input("Enter the width of the wall in feet")
15     width = int (width)
16     squareFeet = (height)*(width)
17     totalSquareFeet = totalSquareFeet+squareFeet
18
19 #This section will calculate the total number of litres required
20 litresRequired = (totalSquareFeet//100)
21 if not totalSquareFeet%100 == 0:
22     litresRequired = litresRequired+1
23 print (litresRequired)
24
25 #This section will calculate the number of each paint tin required
26 def calculateTins():
27     global litresRequired
28     fiveLitres = 0
29     twoLitres = 0
30     oneLitre = 0
31     while litresRequired >5:
32         fiveLitres = fiveLitres+1
33         litresRequired = litresRequired-5
34     while litresRequired >2:
35         twoLitres = twoLitres+1
36         litresRequired = litresRequired-2
37     while litresRequired >0:
38         oneLitre = oneLitre+1
39         litresRequired = litresRequired-1
40
41 #This section will output information to the user
42 print("The total number of litres required is"+str(litresRequired))
43 print(str(fiveLitres)+"tins of 5 litre paint")
44 print(str(twoLitres)+"tins of 2 litre paint")
45 print(str(oneLitre)+"tins of 1 litre paint")
46
47 #This section will run the CalculateTins function
48 calculateTins()
```

GUIDANCE: The operator // means integer division that will only show the values before the decimal point.

Figure 3b

SECTION 4

The information in this section should be used to answer Question 4.

Figure 4a gives the rules that are followed when making a booking for the dogs Callum has to take for a walk.

The rules that are followed when making a booking are:

1. The dog name is entered
2. The day is entered
3. The code will count the number of dogs already booked on that day.
4. The following 'walk criteria' are checked:
 - Is the **number of dogs booked** less than 4
 - Is the **Vet Registered** "Yes"
 - Is the **Updated Vaccinations** "Yes"
 - Is the **Dog Behaviour** less than 4.
5. If all the 'walk criteria' are met, the dog name will be added to the bookings and a message saying "Booking successful" will be printed.
6. If not, a suitable message will be printed to inform the user of the reason why the booking cannot be made.

Figure 4a

Figure 4b shows some sample data about the dogs that attend a group walk.

ID	Dog Name	Breed	Gender	House Number	Road Name	Vet Registered	Updated Vaccinations	Dog Behaviour
	Winston	Pug	Female	16b	Toll Road	Yes	Yes	1
	Winston	Labrador Retriever	Male	26	King Road	Yes	Yes	2
	Lexi	Beagle	Female	18	Park Lane	No	No	2
	Blu	Border Collie	Male	19	Old Street	Yes	Yes	2
	Joel	Patterdale Terrier	Male	1a	Leake Street	Yes	Yes	3
	Daisy	German Shepherd	Female	157	Bond Street	Yes	Yes	4
	Rufus	Yorkshire Terrier	Male	289	Church Street	No	No	3
	Angus	Jack Russell	Male	12	Lord Road	Yes	Yes	2

Callum wants to create a unique identifier that cannot be repeated for each dog.

- 1 = Good
- 2 = Fair
- 3 = Satisfactory
- 4 = Aggressive

Figure 4b