

[illegible]

Turn over for the next question

0	2
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A cake recipe uses 100 grams of flour and 50 grams of sugar for every egg used in the recipe.

Figure 3 shows the first line of an algorithm that will be used to calculate the amount of flour and sugar required based on the number of eggs being used. The number of eggs is entered by the user.

Figure 3

eggsUsed \leftarrow USERINPUT

0	2
---	---

1

Shade **one** lozenge to show which of the following lines of code correctly calculates the amount of flour needed in grams.

[1 mark]

A flourNeeded \leftarrow USERINPUT

☐

B flourNeeded \leftarrow eggsUsed * USERINPUT

☐

C flourNeeded \leftarrow eggsUsed * 100

☐

D flourNeeded \leftarrow eggsUsed * 50

☐

0	3
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Figure 4 shows a VB.Net program that calculates car park charges.

The user inputs their car registration (eg MA19 GHJ) and the length of the stay. The program then outputs the charge.

- Line numbers are included but are not part of the program.

Figure 4

```
1  Dim charge As Integer = 0
2  Console.Write("Enter your car registration: ")
3  Dim carReg As String = Console.ReadLine()
4  While carReg.Length() > 8
5      Dim displayMessage As String = " is not valid"
6      Console.WriteLine(displayMessage)
7      carReg = Console.ReadLine()
8  End While
9  Console.Write("Enter your stay in hours: ")
10 Dim hours As Integer = Console.ReadLine()
11 If hours < 2 Then
12     charge = 0
13 Else
14     charge = hours * 2
15 End If
16 Console.WriteLine(charge)
```

0	3
---	---

1

Rewrite **line 5** in **Figure 4** to **concatenate** the car registration with the string " is not valid", and store the result in the variable `displayMessage`.

Your answer must be written in VB.Net.

[1 mark]

0	3
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2

The charge for parking for two or more hours is changed to include an additional £2 fee.

Rewrite **line 14** in **Figure 4** to show this change.

Your answer must be written in VB.Net.

[1 mark]

0 | 4

Write a VB.Net program that calculates the value of a bonus payment for an employee based on how many items they have sold and the number of years they have been employed.

The program should:

- get the user to input the number of items sold
- get the user to input the number of years employed
- output the value of the bonus payment:
 - if the years of employment is less than or equal to 2 **and** the number of items sold is greater than 100, then the bonus will be the number of items sold multiplied by 2
 - if the years of employment is greater than 2, then the bonus will be the number of items sold multiplied by 10
 - otherwise, the bonus is 0

You **should** use meaningful variable name(s) and VB.Net syntax in your answer.

The answer grid below contains vertical lines to help you indent your code.

[7 marks]

[illegible]

[illegible]

0 5

Figure 3 shows a program written in VB.NET that calculates the area of a rectangle or the volume of a box from the user inputs.

Figure 3

```
Function calculate(width As Integer, length As Integer,
height As Integer) As Integer
    If height = -1 Then
        Return width * length
    Else
        Return width * length * height
    End If
End Function

Sub Main()
    Dim numOne, numTwo, numThree, answer As Integer
    Console.Write("Enter width: ")
    numOne = Console.ReadLine()
    Console.Write("Enter length: ")
    numTwo = Console.ReadLine()
    Console.Write("Enter height, -1 to ignore:")
    numThree = Console.ReadLine()

    answer = calculate(numOne, numTwo, numThree)

    If numThree = -1 Then
        Console.WriteLine($"Area {answer}")
    Else
        Console.WriteLine($"Volume {answer}")
    End If
End Sub
```

0 5 . 1

Complete the trace table using the program in **Figure 3**.

[3 marks]

numOne	numTwo	numThree	Final output
5	6	-1	
10	4	0	
3	5	10	

0	5	.	2
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Describe **one** way that the program in **Figure 3** could be made more robust.

[1 mark]

Turn over for the next question

[6 marks]

[illegible]

A group of people have a meal in a restaurant. Instead of one person paying for the whole meal, each person will pay for what they eat.

Write a VB.NET program that asks each person in the group how much they are paying towards the meal and works out when the bill is fully paid. Each person can pay a different amount.

The program should:

- get the user to enter the total amount of the bill
- get a person to enter how much they are paying towards the bill
- subtract the amount entered from the bill:
 - if the amount left to pay is more than 0, output how much is left to pay and repeat until the amount left to pay is 0 or less
 - if the amount left to pay is 0, then output the message `Bill paid`
 - if the amount left to pay is less than 0, then output the message `Tip is` and the difference between the amount left to pay and 0

You **should** use meaningful variable name(s) and VB.NET syntax in your answer.

The answer grid below contains vertical lines to help you indent your code.

[8 marks]

[illegible]

[illegible]

0	8
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Question **08** is about a dice game played against a computer.

The aim of the game is to get as close to a score of 21 as you can, without going over 21. If your score goes over 21 then you lose.

The player's score starts at 0.

For each turn:

- two dice (each numbered from 1 to 6) are rolled
- the total of the two dice rolls is added to the player's score
- the value of each dice and the player's new total score is output
- if the current score is less than 21, the player is asked if they would like to roll the dice again: if the player says yes, they get another turn; otherwise, the game ends.

At the end of the game, the program should work as follows:

- if the final score is 21, output a message to say the player has won
- if the final score is greater than 21, output a message to say the player has lost
- if the final score is less than 21, the program generates a random number between 15 and 21 inclusive:
 - if this random number is greater than the player's final score, output a message to say the player has lost
 - otherwise, output a message to say the player has won.

Figure 17 shows the output of a program that plays this dice game.

Figure 17

```
Roll 1: 1
Roll 2: 4
Current score: 5
Would you like to roll again? yes

Roll 1: 1
Roll 2: 6
Current score: 12
Would you like to roll again? yes

Roll 1: 1
Roll 2: 2
Current score: 15
Would you like to roll again? yes

Roll 1: 6
Roll 2: 1
Current score: 22
You lost!
```

Write a VB.NET program to simulate this game.

The first line has been written for you in the answer grid.

You **should** use meaningful variable name(s) and VB.NET syntax in your answer.

[11 marks]

[illegible]

[illegible]

0	9
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A programmer has written a VB.Net program that asks the user to input two integers and then output which of the two integers is the largest. Complete the program below by filling in the gaps using the items in **Figure 3**. You will not need to use all the items in **Figure 3**. Each item in **Figure 3** should only be used once.

[5 marks]**Figure 3**

Console.Write	num1	num2	output
Else	<	>	ElseIf
String	Double	Integer	

```
Dim num1 As Integer
```

```
Dim num2 As _____
```

```
Console.Write("Enter a number: ")
```

```
num1 = Console.ReadLine()
```

```
Console.Write("Enter another number: ")
```

```
num2 = Console.ReadLine()
```

```
If num1 > num2 Then
```

```
    Console.WriteLine("_____ is bigger.")
```

```
ElseIf num1 _____ num2 Then
```

```
    Console.WriteLine("_____ is bigger.")
```

```
_____
```

```
    Console.WriteLine("The numbers are equal.")
```

```
End If
```

Write a VB.Net program that allows a taxi company to calculate how much a taxi fare should be.

The program should:

- allow the user to enter the journey distance in kilometres (no validation is required)
- allow the user to enter the number of passengers (no validation is required)
- calculate the taxi fare by
 - charging £2 for every passenger regardless of the distance
 - charging a further £1.50 for every kilometre regardless of how many passengers there are
- output the final taxi fare.

You **should** use meaningful variable name(s), correct syntax and indentation in your answer.

The answer grid below contains vertical lines to help you indent your code accurately.

[7 marks]

[illegible]

[illegible]

1 | 1

A programmer has written the VB.Net program in **Figure 5** to add up the numbers between one and five.

Figure 5

```
Dim total As Integer = 0
Dim number As Integer = 0
For number = 1 To 5
    total = total + number
Next
Console.WriteLine(total)
```

The program needs to be changed so that it also multiplies all of the numbers between one and five.

Shade **one** lozenge next to the program that will do what the programmer wants.

[1 mark]

A	<pre>Dim total As Integer = 0 Dim product As Integer = 1 Dim number As Integer = 0 For number = 1 To 5 total = total + number product = total * number Next Console.WriteLine(total) Console.WriteLine(product)</pre>	<input type="radio"/>
B	<pre>Dim total As Integer = 0 Dim product As Integer = 1 Dim number As Integer = 0 For number = 1 To 5 total = total + number product = product * number Next Console.WriteLine(total) Console.WriteLine(product)</pre>	<input type="radio"/>
C	<pre>Dim total As Integer = 0 Dim product As Integer = 1 Dim number As Integer = 0 For number = 1 To 5 total = total + number product = product * total Next Console.WriteLine(total) Console.WriteLine(product)</pre>	<input type="radio"/>
D	<pre>Dim total As Integer = 0 Dim product As Integer = 1 Dim number As Integer = 0 For number = 1 To 5 total = total + number product = (total + product) * number Next Console.WriteLine(total) Console.WriteLine(product)</pre>	<input type="radio"/>

Write a VB.Net program that calculates an estimate of the braking distance in metres for a new model of go-kart that is travelling between 10 and 50 kilometres per hour (kph).

- keep asking the user to enter a speed for the go-kart until they enter a speed that is between 10 and 50 (inclusive)
- calculate the braking distance in metres by dividing the speed by 5
- ask the user if the ground is wet (expect the user to enter yes if it is)
- if the ground is wet, multiply the braking distance by 1.5
- output the final calculated braking distance.

The answer grid below contains vertical lines to help you indent your code accurately.

[illegible]

[illegible]

[illegible]

[illegible]

14

Figure 6 shows an algorithm, represented using pseudo-code.

Figure 6

```
days ← [10, 15, 4]
sales ← [20, 33, 12]
weeks ← [0, 0, 0]
FOR i ← 0 TO 2
    daysTotal ← days[i] + sales[i]
    weeks[i] ← daysTotal DIV 7
ENDFOR
weeksTotal ← weeks[0] + weeks[1] + weeks[2]
OUTPUT weeksTotal
```

The DIV operator is used for integer division.

Complete the trace table for the algorithm in Figure 6.

Part of the table has already been filled in.

You may not need to use all the rows in the table.

[6 marks]

i	daysTotal	weeks			weeksTotal
		[0]	[1]	[2]	
		0	0	0	

1	5
---	---

Figure 8 shows a VB.NET program.

Figure 8

```
Sub First(p1 As Integer, p2 As Integer, p3 As Integer)
    Dim v1 As Integer = p2 + p3
    Console.WriteLine(Second(v1, p1))
End Sub

Function Second(p1 As Integer, p2 As Integer) As Integer
    Dim v1 As Integer = p1 + p2
    If v1 > 12 Then
        v1 = v1 + Third(p1)
    End If
    Return v1
End Function

Function Third(p1 As Integer) As Integer
    If p1 > 3 Then
        Return 2
    Else
        Return 0
    End If
End Function
```

1	5
---	---

1

State what will be displayed by the `Console.WriteLine` statement when the subroutine `First` is called with the values 3, 4 and 4 for the parameters `p1`, `p2` and `p3`

[1 mark]

1	5
---	---

2

State what will be displayed by the `Console.WriteLine` statement when the subroutine `First` is called with the values 3, 4 and 8 for the parameters `p1`, `p2` and `p3`

[1 mark]

Using VB.NET, write a subroutine to help a museum review the number of visitors in a month.

The subroutine must:

- have the identifier `countDays`
- have the number of days a museum was open in the last month as a parameter
- get the user to enter the number of visitors to the museum for each of those days
- count how many of those days the museum had more than 200 visitors
- return the count.

You **should** use meaningful variable name(s) and VB.NET syntax in your answer.

The answer grid below contains vertical lines to help you indent your code.

[6 marks]

[illegible]

[illegible]