

0	1
---	---

.

2

State the value that is returned by the following subroutine call:

```
Authenticate('bob', 'abf32')
```

[1 mark]

0	1
---	---

.

3

Lines 7 and 8 in **Figure 3** could be replaced with a single line. Shade **one** lozenge to show which of the following corresponds to the correct new line.

[1 mark]

A IF user = us[z] OR pass = ps[z] THEN☐**B** IF user = us[z] AND pass = ps[z] THEN☐**C** IF NOT (user = us[z] AND pass = ps[z]) THEN☐

0	1
---	---

.

4

A programmer implements the subroutine shown in **Figure 3**. He replaces line 9 with

```
RETURN true
```

He also replaces line 14 with

```
RETURN false
```

Explain how the programmer has made the subroutine more efficient.

[2 marks]

0	2
---	---

The algorithms shown in **Figure 4** and **Figure 5** both have the same purpose.

The operator `LEFTSHIFT` performs a binary shift to the left by the number indicated.

For example, `6 LEFTSHIFT 1` will left shift the number 6 by one place, which has the effect of multiplying the number 6 by two giving a result of 12

Figure 4

```
result ← number LEFTSHIFT 2  
result ← result - number
```

Figure 5

```
result ← 0  
FOR x ← 1 TO 3  
    result ← result + number  
ENDFOR
```

0	2
---	---

1

Complete the trace table for the algorithm shown in **Figure 4** when the initial value of `number` is 4

You may not need to use all rows of the trace table.

[2 marks]

result

0 2 . 2

Complete the trace table for the algorithm shown in **Figure 5** when the initial value of number is 4

You may not need to use all rows of the trace table.

[2 marks]

x	result

0 2 . 3

The algorithms in **Figure 4** and **Figure 5** have the same purpose.

State this purpose.

[1 mark]

0 2 . 4

Explain why the algorithm shown in **Figure 4** can be considered to be a more efficient algorithm than the algorithm shown in **Figure 5**.

[1 mark]

Turn over for the next question

0 3

The two VB.Net programs in **Figure 5** output the value that is equivalent to adding together the integers between 1 and an integer entered by the user.

For example, if the user entered the integer 5, both programs would output 15

Figure 5

Program A
<pre> Console.Write("Enter a number: ") Dim num As Integer = Console.ReadLine() Dim total As Integer = 0 For i = 1 To num total = total + i Next Console.WriteLine(total) </pre>
Program B
<pre> Console.Write("Enter a number: ") Dim num1 As Integer num1 = Console.ReadLine() Dim num2 As Integer = num1 + 1 num2 = num1 * num2 num2 = num2 \ 2 Console.WriteLine(num2) </pre>

0 3 . 1

Shade **one** lozenge to indicate which of the statements is true about the programs in **Figure 5**.

[1 mark]

- A** Both programs are equally efficient.
- B** Program A is more efficient than Program B.
- C** Program B is more efficient than Program A.

☐☐☐**0 3 . 2**

Justify your answer for Question **04.1**.

[2 marks]
