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GCSE (9-1)

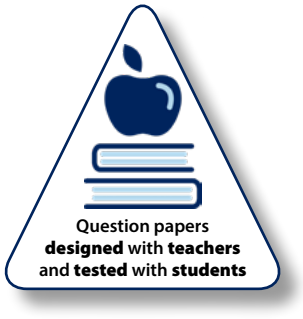
Candidate Style Answers

COMPUTER SCIENCE

J277
For first teaching in 2020

02 – Computational thinking, algorithms and programming

Version 2



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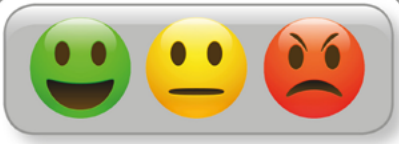

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Introduction

We have produced this resource on the sample question paper for J277/02 Computer Systems: https://www.ocr.org.uk/Images/552502-computational-thinking-algorithms-and-programming.pdf with help from students and teachers. The sample answers shown have been taken from original student work to keep their authenticity.

Please note this resource is provided for advice and guidance only and does not in any way constitute an indication of grade boundaries or endorsed answers. Whilst a senior examiner has provided a possible level for each Assessment Objective when marking these answers, in a live series the mark a response would get depends on the whole process of standardisation, which considers the big picture of the year's scripts. Therefore the level awarded here should be considered to be only an estimation of what would be awarded. How levels and marks correspond to grade boundaries depends on the Awarding process that happens after all/most of the scripts are marked and depends on a number of factors, including candidate performance across the board. Details of this process can be found here: https://ocr.org.uk/Images/142042-marking-and-grading-assuring-ocr-s-accuracy.pdf

Question 1 (a)

1 (a) Complete the truth table in **Fig. 1** for the Boolean statement `P = NOT(A AND B)`.

A	B	P
0	0	1
0	1	.....
1	0	.....
1	1	0

Fig. 1

[2]

Exemplar 1 2 marks

A	B	P
0	0	1
0	1	1
1	0	1
1	1	0

Examiner commentary

The candidate has successfully identified both the outputs and therefore 2 marks given (1 for each).

Exemplar 2 1 mark

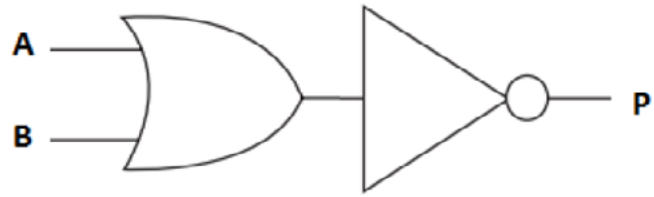
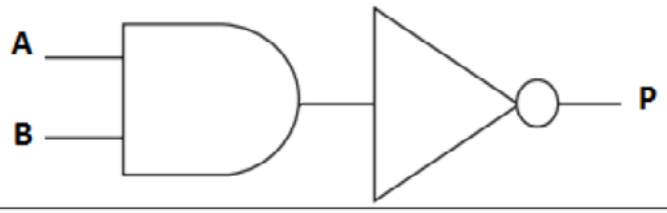
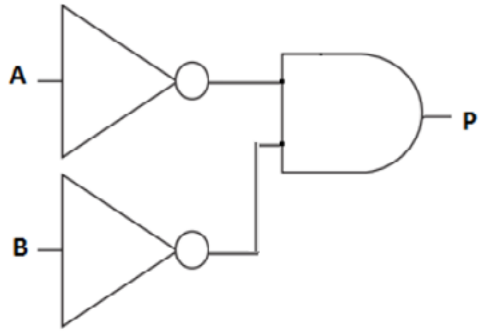
A	B	P
0	0	1
0	1	TRUE
1	0	FALSE
1	1	0

Examiner commentary

The candidate has successfully identified the output for line two of the truth table to gain 1 mark but they have incorrectly identified the output for line three of the truth table.

Question 1 (b)

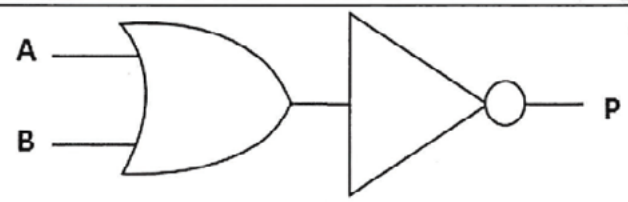
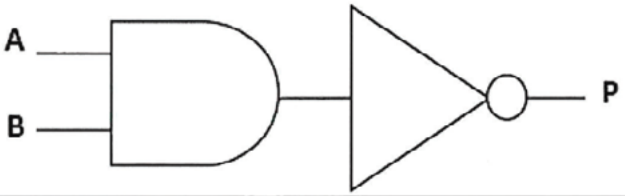
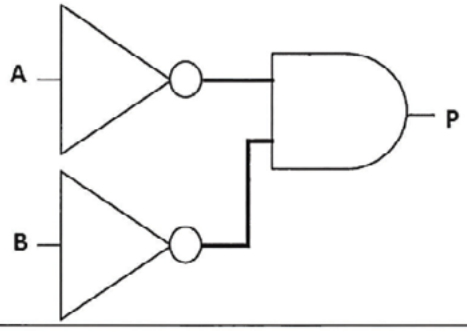
(b) Tick (✓) **one** box to identify the correct logic diagram for `P = NOT (A AND B)` .

`P = NOT (A AND B)`	Tick (✓) one box
	
	
	

[1]

Exemplar 1

1 mark

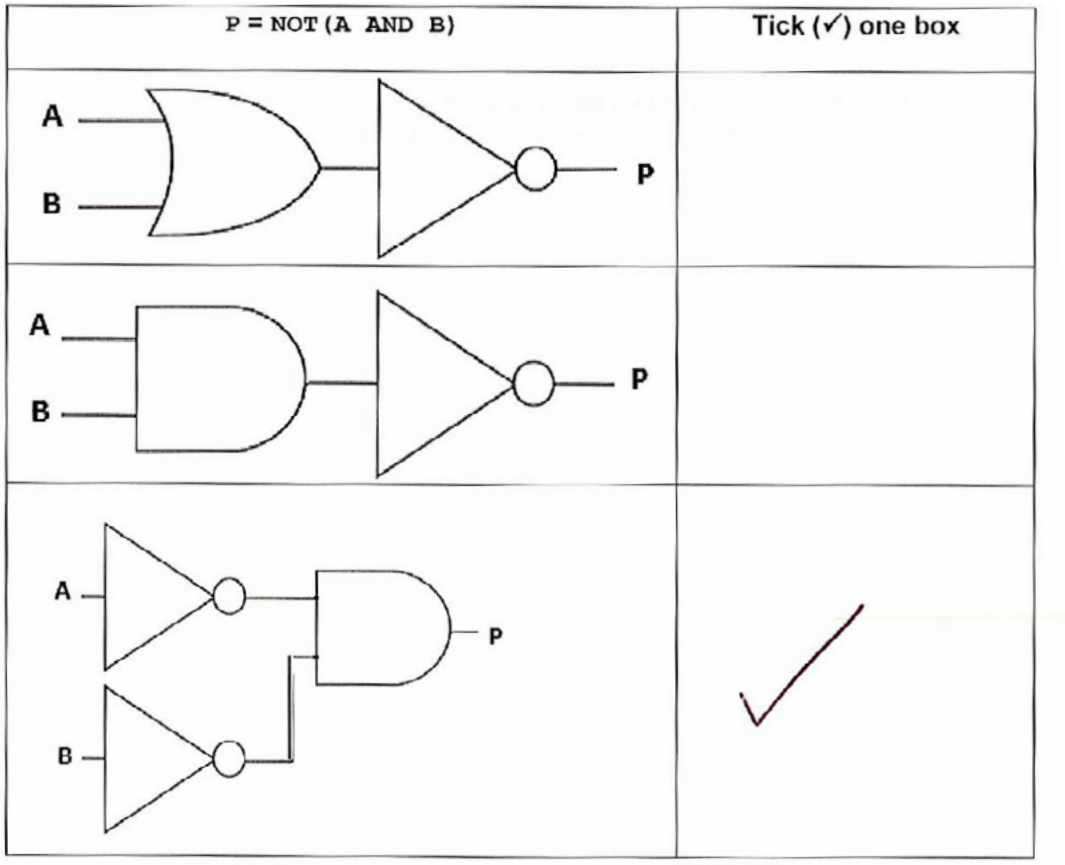
P = NOT (A AND B)	Tick (✓) one box
	
	✓
	

Examiner commentary

The candidate has correctly identified the logic diagram and so has been given the mark.

Exemplar 2

0 marks



Examiner commentary

This is (NOT A) AND (NOT B) which is not the same as NOT(A AND B). The candidate's choice is incorrect.

Question 2 (a)

2 A program needs to perform the following tasks:

- Input two numbers from the user
- Compare both numbers and output the largest number.

(a) Complete the pseudocode for this program.

```
num1 = input("enter first number")

num2 = input("enter second number")

..... num1 > ..... then

      .....

else

      .....

endif
```

[4]

Exemplar 1

4 marks

```
num1 = input("enter first number")

num2 = input("enter second number")

if ..... num1 > ..... num2 ..... then
      output("num1 is larger")

else
      output("num2 is larger")

endif
```

Examiner commentary

Full marks are given for this response. The first 2 marks are for 'if' and 'num2', the second 2 marks are for the output. The mark scheme allows equivalent pseudocode expressions and output is a suitable expression. Benefit of doubt is given that the candidate has crossed out the speech marks; if they had been left then the answer would not be able to be credited as a string would be output rather than the contents of the variable.

Exemplar 2

2 marks

```
num1 = input("enter first number")
num2 = input("enter second number")
if num1 > num2 then
    print("Number 1 is the largest number")
else
    print("Number 2 is the largest number")
endif
```

Examiner commentary

Two marks were given for this response; this was for the 'if' and 'num2'. Output marks were not given due to a string being printed rather than the larger of the numbers, using the variables num1 and num2. This therefore does not meet the requirements of the question.

Question 2 (b)

(b) A second program needs to perform the following tasks:

- Input a number from the user
- Double the number input and print the result
- Repeat bullets 1 and 2 until the user enters a number less than 0.

Write an algorithm for this program.

.....

.....

[5]

Exemplar 1

5 marks

```
input num1
While num1 >= 0
    num1 = input ("enter a number")
    num2 = num1 * 2
    print (num2)
End While
```

Examiner commentary

This response was given full marks:

Mark 1 was given for a while loop and mark 2 was given for ensuring that it repeats while a number entered is not less than 0. Mark 3 was given for the input of a number. Mark 4 was given for the calculation multiplying the number by 2, and mark 5 was given for outputting the result.

Exemplar 2

4 marks

```
num1 = input ("enter a number")
While num1 >= 0
    print (num1 * 2)
ENDWHILE
```

Examiner commentary

This response could not be given full marks as the input is outside of the loop. Mark 1 was given for a while loop, mark 2 for looping while the number is greater than or equal to 0. Even though the mathematical method of representing greater than or equal to is used this is accepted as it is pseudocode and does not need to be syntactically correct. The final 2 marks were given for outputting the number entered multiplied by 2.

Question 3

3 The database table `Results` stores the results for each student in each of their chosen subjects.

StudentName	Subject	Grade
Alistair	English	3
Jaxon	Art	5
Alex	Art	4
Anna	French	7
Ismaael	Art	9

Complete the SQL query to return all of the fields for the students who take Art.

```
SELECT .....
FROM .....
WHERE .....
```

[3]

Exemplar 1 — 3 marks

```
SELECT StudentName, Subject, Grade
FROM Results
WHERE Subject = "Art"
```

Examiner commentary

The candidate has gained full marks. They have separated the fields in the SELECT statement with commas, identified the correct table and correctly written the syntax for the WHERE clause criteria.

Exemplar 2 — 1 mark

```
SELECT StudentName, Subject & Grade
FROM Results
WHERE Subject = Art
```

Examiner commentary

Although the candidate has clearly understood the question, they will only receive 1 mark for this response. The mark for the SELECT statement cannot be given as they have incorrectly used the '&' sign where a comma was required. A mark can be given for results, however the final mark cannot be given as Art is not enclosed in speech marks.

Question 4 (a)

4 A program creates usernames for a school. The first design of the program is shown in the flowchart in **Fig. 2**.

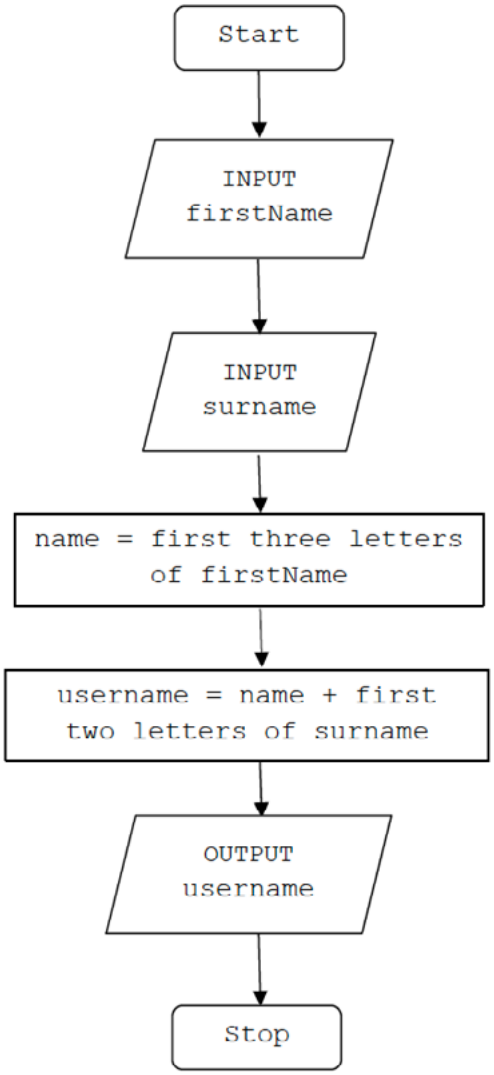


Fig. 2

For example, using the process in **Fig. 2**, Tom Ward's username would be TomWa.

(a) State, using the process in **Fig. 2**, the username for Rebecca Ellis.

..... **[1]**

Exemplar 1 1 mark

RebEl ..... [1]

Examiner commentary

The candidate has answered the question correctly by taking the first three characters from the first name and the first two characters from the surname. They have also used correct capitalisation as well although any case of character would be accepted.

Exemplar 2 1 mark

Rebel ..... [1]

Examiner commentary

The candidate has answered the question correctly by taking the first three characters from the first name and the first two characters from the surname. They have not used correct capitalisation however the mark scheme in this instance allows for any case.

Question 4 (b) (i)

(b) The program design is updated to create usernames as follows:

- If the person is a teacher, their username is the last 3 letters of their surname and then the first 2 letters of their first name.
- If the person is a student, their username is the first 3 letters of their first name and then the first 2 letters of their surname.

(i) What would be the username for a teacher called Fred Biscuit using the updated process?

..... **[1]**

Exemplar 1 — 1 mark

Examiner commentary

The candidate has understood that Fred Biscuit is male and therefore taken the last three letters of the surname and the first two of their first name and gained full marks. Once again they have used correct capitalisation although this is not necessary to gain the mark in this case.

Exemplar 2 — 0 marks

Examiner commentary

The candidate has carried out the concatenation correctly but misread the question and applied the female concatenation rules rather than the male rules, therefore 0 marks are given.

Question 4 (b) (ii)

(ii) Write an algorithm for the updated program design shown in question **4(b)(i)**.

.....

.....

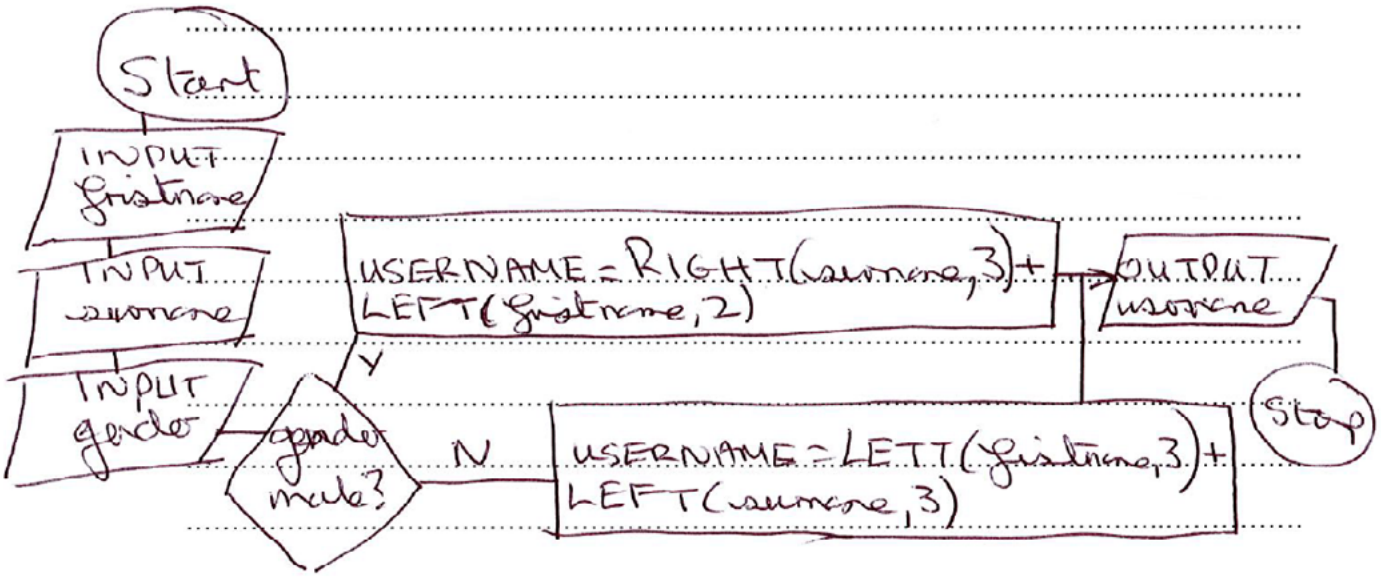
.....

.....

[6]

Exemplar 1

6 marks

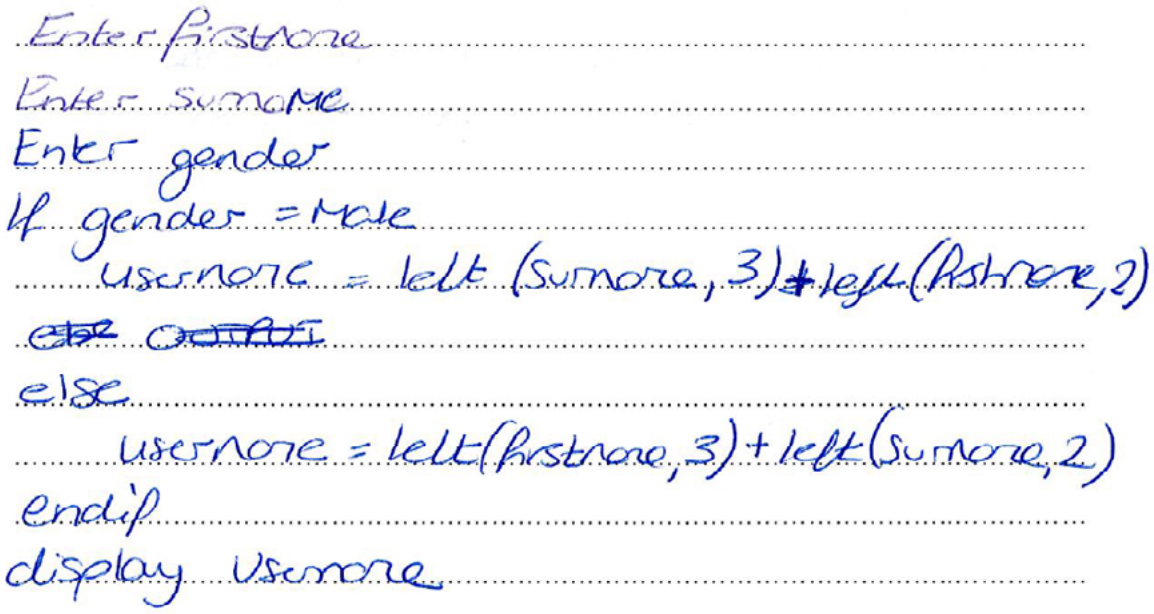


Examiner commentary

The candidate has gained full marks on this question. They have used a flowchart rather than pseudocode; however candidates are not to be penalised for doing this. They have gained the first mark by identifying all three inputs and the second mark for using a decision (diamond) to see if the gender is male. They have gained the third mark for correctly identifying they need to use RIGHT to get the last three letters of the surname. The fourth mark is achieved as this is combined with the first two letters of the surname using LEFT. The fifth mark is gained by using the previous method of calculating a username. The candidate gains the final mark as they have joined the flowchart back together to output the username.

Exemplar 2

5 marks



Examiner commentary

The candidate gains 5 out of 6 marks for this response. They have identified the three inputs and written these as plain English statements rather than pseudocode; this is acceptable in Section A. They have then gained the second mark by using selection to check if the user entered is male; this is given benefit of doubt as the comparison should really be of a string 'male', unless the variable male is defined somewhere (which it does not appear to be). However, the meaning is clear. The third mark point is not given as the candidate has used LEFT rather than RIGHT to get three characters from the surname, however the fourth mark can be and is achieved as they have concatenated this to the first two letters of the first name using LEFT. Mark point 4 is not a follow on mark therefore it can be given. The fifth mark is gained by using the same calculation as before for the female username. The candidate has written 'display username' at the end which is acceptable to signify outputting the username.

Question 5 (a)

5 A computer game is written in a high-level programming language.

(a) State why the computer needs to translate the code before it is executed.

..... **[1]**

Exemplar 1 — 1 mark

(a) State why the computer needs to translate the code before it is executed.

because a computer only understands binary instructions in binary **[1]**

Examiner commentary

The candidate has been given the mark as it refers to the computer only understanding instructions in binary. This satisfies mark point 2 as machine code is in binary form.

Exemplar 2 — 0 marks

the computer cannot understand high level code **[1]**

Examiner commentary

The candidate has not received the mark as it is too vague. The candidate needs to explain what type of language the processor can understand.

Question 5 (b)

(b) Either a compiler or an interpreter can translate the code.

Describe **two** differences between how a compiler and an interpreter would translate the code.

1 .....

.....

.....

.....

2 .....

.....

.....

.....

[4]

Exemplar 1

4 marks

1 A compiler puts all of the code together at once and this gives out an error if it found one. This just says it is ~~in~~ wrong and not where it is wrong.

2 An interpreter line for line translates the code and gives ~~out~~ messages out when something is incorrect.

Examiner commentary

The candidate has been given full marks. They have identified that a compiler translates all of the code at once whereas an interpreter translates one line at a time; this gains 2 marks for one comparison. The final 2 marks are for identifying that a compiler gives a list of the errors at the end and an interpreter will give out a message when a line is read and an error found. The interpreter explanation infers that when it finds an error it stops to show you it.

Exemplar 2

1 mark

1 an interpreter would intepeate each line (read) and identify any errors and a compiler turns highlevel code into binary

Examiner commentary

The candidate has been given 1 mark for identifying that an interpreter will check each line and identify for errors. As there is no comparison to a compiler in this respect, a second mark cannot be given. The candidate does mention a compiler, but this is too vague to be credited.

Question 6 (a)

6 A program uses a file to store a list of words that can be used in a game.

A sample of this data is shown in **Fig. 3**.

crime	bait	fright	victory	nibble	loose

Fig. 3

(a) Show the stages of a bubble sort when applied to data shown in **Fig. 3**.

.....

.....

[4]

Exemplar 1

4 marks

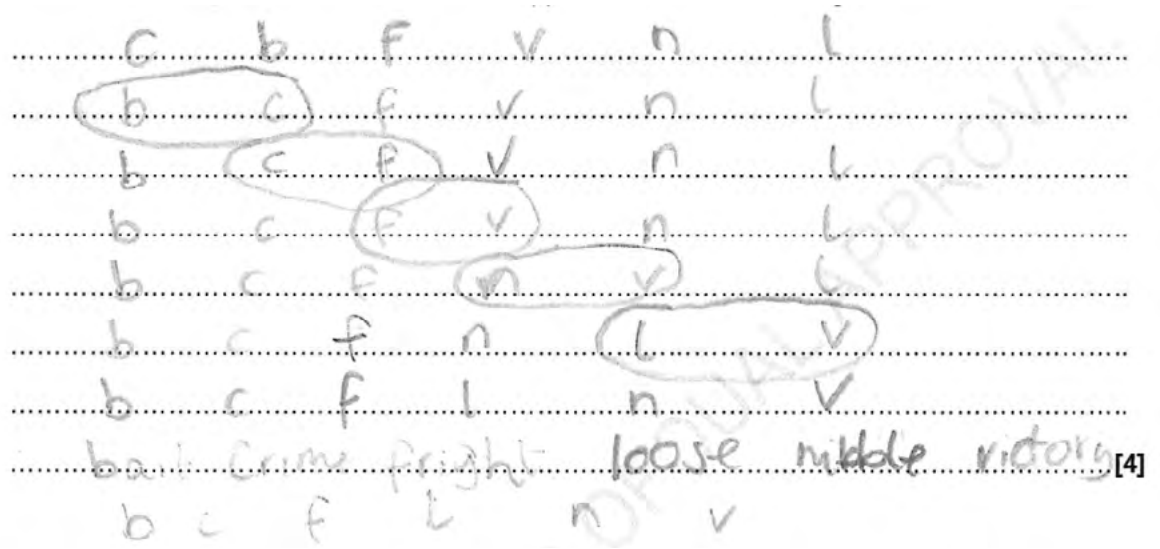
Crime, bait, Fright, Victory, nibble, loose
bait, Crime, Fright, victory, nibble, loose
bait, crime, Fright, Victory, nibble, loose
bait, Crime, Fright, nibble, Victory, loose
bait, Crime, Fright, nubble, loose, victory
bait, crime, Fright, nibble, loose, victory
bait, crime, Fright, nibble, loose, victory
bait, Crime, Fright, nibble, loose, Victory [4]
bait, crime, Fright, nibble, loose, victory
bait, crime, Fright, loose, nibble, victory

Examiner commentary

The candidate has gained full marks for this response. They have clearly demonstrated the stages of a bubble sort and shown which values they are comparing and swapping.

Exemplar 2

3 marks



[4]

Examiner commentary

The candidate has been given 3 marks out of 4 for this response. While they have not written the words out each time, it is clear where the swaps are being made throughout. This approach would not be advised, especially if there were two words beginning with the same letter as it could cause confusion. However, in this example it is still clearly shows the process and the swaps. All that is missing is the indication that 'loose' and 'nibble' have been swapped on the second pass through; the candidate arrives at the correct order but does not show what has happened to arrive at this result.

Question 6 (b)

(b) A second sample of data is shown in **Fig. 4**.

amber	house	kick	moose	orange	range	tent	wind	zebra

Fig. 4

Show the stages of a binary search to find the word `zebra` using the data shown in **Fig. 4**.

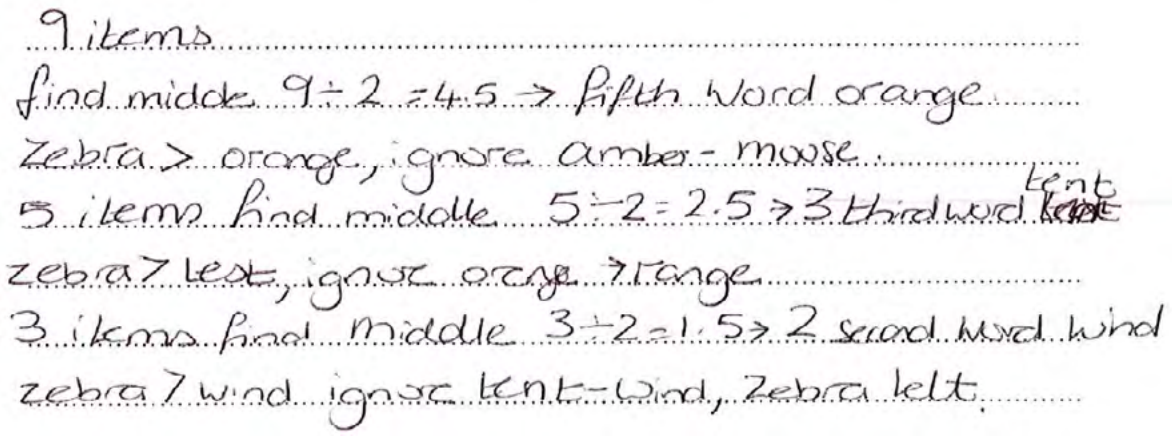
.....

.....

[4]

Exemplar 1

4 marks

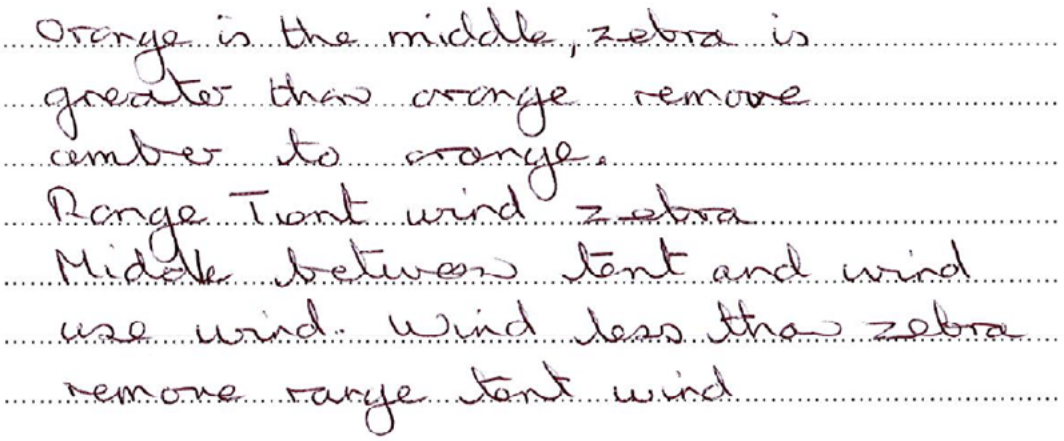


Examiner commentary

The candidate gains full marks for this answer. They gain the first mark as they have successfully found the middle value 'orange' and have then compared it to zebra (mark point 1). In their answer they have then identified that they discard the words to the left (ignore amber->moose) as these are alphabetically before zebra (mark point 2). They could at this point also have ignored orange to save an extra pass through the algorithm, however the mark scheme does allow for 2 more passes. With the remaining words, the middle is found and then compared to zebra and the words orange and range are discarded. The process is then written down again to discard the remaining words to leave zebra (mark points 3 and 4).

Exemplar 2

4 marks



Examiner commentary

The candidate gains full marks for this answer. They gain the first mark as they have successfully found the middle value 'orange' and have then compared it to zebra (mark point 1). In their answer they have then identified that they discard the words to the left (ignore amber->orange) as these are alphabetically before zebra (mark point 2). They then find the middle by splitting the words left in two and picking the one to the right (wind). A comparison is made between wind and zebra again (mark point 3) and the words to the left of wind and wind are removed to leave zebra (mark point 4). This last point is perhaps generous and candidates should be reminded to state the process or explain their actions in questions such as this.

Question 7 (a)

7 The area of a circle is calculated using the formula $\pi \times r^2$ where π is equal to 3.142 and r is the radius.

A program is written to allow a user to enter the radius of a circle as a whole number between 1 and 30, then calculate and output the area of the circle.

```
01  radius = 0
02  area = 0.0
03  radius = input("Enter radius")
04  if radius < 1 OR radius > 30 then
05  print("Sorry, that radius is invalid")
06  else
07  area = 3.142 * (radius ^ 2)
08  print (area)
09  endif
```

(a) Explain, using examples from the program, **two** ways to improve the maintainability of the program.

1 .....

.....

.....

.....

2 .....

.....

.....

.....

[4]

Exemplar 1 — 4 marks

1. add Comments, for example, the line of code have a Comment saying 'calculates the area'

2. Change some things to constants for example 3.142 could be pi pi defined as a constant

Examiner commentary

The candidate has received 4 marks for this response. They have correctly identified two ways to improve maintainability (comments and constants) and have also given two suitable examples for these.

Exemplar 2 — 2 marks

1. Indent the "print ("Sorry...")" ~~and~~, "area = 3.142r..." and "print (area)" lines within the If statement to make it easier to read.

2. Give sensible variable names e.g. 3.142 could be written as 'pi' so that the program is easier to read and it improves efficiency

Examiner commentary

The candidate has received 2 marks for this response. They have identified indentation as a method of maintainability with a suitable example (IF statement). The second explanation cannot be given marks as 'sensible variable names' is not on the mark scheme (as each variable named in the code given is eminently sensible already). The idea that pi should be used as a constant rather than a value would be good, but this is not what the candidate has written. Examiners are told not to read into candidates'

Question 7 (b)

(b) Identify **two** variables used in the program.

1 .....

2 .....

[2]

Exemplar 1 2 marks

1 Radius and area are the

2 two variables in the program

[2]

Examiner commentary

The candidate has successfully identified 2 variables within the program. They have also structured their answer into a sentence which is not required for the type of question, but does not adversely affect their marks in any way.

Exemplar 2 0 marks

1 int radius = 0

2 area = 3.14 2* (radius ^2)

Examiner commentary

The candidate doesn't gain any marks for this answer. While in the answer they have written variable names, they have shown lack of understanding of which part of their answer is the variable.

Question 7 (c) (i)

(c) (i) Identify **one** item in the program that could have been written as a constant.

..... **[1]**

Exemplar 1 1 mark

PI = 3.142

Examiner commentary

The candidate has identified that 3.142 could be written as a constant to gain the mark. They have also suggested a suitable variable name, which shows a good level of understanding of the algorithm, but there is no extra credit given for this.

Exemplar 2 1 mark

30

Examiner commentary

The candidate has identified a suitable value that could be stored as a constant and therefore the mark is given.

Question 7 (c) (ii)

(ii) Give **one** reason why you have identified this item as a constant.

..... **[1]**

Exemplar 1 1 mark

It does not change throughout the entire program

Examiner commentary

The candidate has gained the mark for the program as they have identified that the value in the previous part of the question does not need to change throughout the entire program as per marking point 1. This is perhaps generous but has been taken to show a higher level of understanding the answer below.

Exemplar 2 0 marks

It doesn't change

Examiner commentary

The candidate has not gained the mark for this answer as it slightly below the level of understanding required. A constant can be changed by the programmer, but it does not change during the running of the program.

Question 7 (d)

(d) Tick (✓) **one** box in each row to identify whether each programming construct has or has **not** been used in the program.

	Has been used	Has **not** been used
Sequence		
Selection		
Iteration		

[3]

Exemplar 1

3 marks

	Has been used	Has **not** been used
Sequence	✓	
Selection	✓	
Iteration		✓

Examiner commentary

The candidate has correctly identified, sequencing and selection having been used in this algorithm and that iteration has not. They have therefore been given 3 marks.

Exemplar 2

1 mark

	Has been used	Has **not** been used
Sequence		✓
Selection	✓	
Iteration	✓	

Examiner commentary

The candidate has gained 1 mark for identifying selection in the program. Sequence and iteration are incorrect answers.

Question 7 (e)

(e) An Integrated Development Environment (IDE) is used to write the program.

Identify **two** features of an IDE that might be used when writing the program.

1 .....

.....

2 .....

.....

[2]

Exemplar 1 2 marks

1 He could use an error list and automatic indention

Examiner commentary

The candidate has identified an error list, which infers that they are thinking about error diagnostics in an IDE, and also automatic indentation which is a feature of an editor, therefore 2 marks have been given. Although the mark scheme point is for error diagnostics the candidate has shown enough understanding to award this for error list.

Exemplar 2 2 marks

1 colour coding text

2 error checker

Examiner commentary

The candidate has gained 2 marks for this answer. They have gained a mark for error checker as this satisfies mark point 1 (error diagnostics) and have also been given a mark for colour coding text (as this is a valid feature of an editor).

Question 8 (a)

8 A teacher researches the length of time students spend playing computer games each day.

(a) Tick (✓) **one** box to identify the data type you would choose to store the data and explain why this is a suitable data type.

Data Type	Tick (✓) one box
String	
Integer	
Real	
Boolean	

Explanation: .....

.....

[2]

Exemplar 1

2 marks

Data Type	Tick (✓) one box
String	
Integer	
Real	✓
Boolean	

Explanation: as there are minutes and seconds and it may store this as a decimal

Examiner commentary

The candidate has correctly identified real as a data type for 1 mark and achieved the second mark for explaining that minutes and seconds might need to be stored and that this will be done as a decimal; this meets the second mark point as seconds may be important.

Exemplar 2

0 marks

Data Type	Tick (✓) one box
String	
Integer	
Real	
Boolean	✓

Explanation: Because the data will be too much or not too much and this is Boolean

Examiner commentary

The candidate has achieved 0 marks for this response. Boolean is unsuitable as a data type to store data about timings. As the explanation mark is dependent on the choice of data type and Boolean does not appear in the mark scheme, this is also not worthy of credit.

Question 8 (b) (i)

(b) The program should only allow values from **0** to **300** inclusive as valid inputs. If the data entered breaks this validation rule, an error message is displayed.

(i) Complete the following program to output "`Invalid input`" if the data does not meet the validation rule.

You must use **either:**

- OCR Exam Reference Language, **or**
- a high-level programming language that you have studied.

```
mins = input("Enter minutes played: ")
if mins < 0 ..... mins ..... then
      ..... ("Invalid input")
endif
```

[3]

Exemplar 1

3 marks

```
mins = input("Enter minutes played: ")
if mins < 0 ....or.... mins ....> 300.... then
      ....print.... ("Invalid input")
endif
```

Examiner commentary

The candidate has correctly identified all the required responses and has done this in a syntactically correct manner to gain all 3 marks.

Exemplar 2

1 mark

```
mins = input("Enter minutes played: ")
if mins < 0 ....and.... mins ....< 300.... then
      ....print.... ("Invalid input")
endif
```

Examiner commentary

The candidate has gained 1 mark for using 'print'. The other 2 marks are not given as they have used 'and' instead of 'or' and used the wrong mathematical operator.

Question 8 (b) (ii)

(ii) Complete the following test plan for the program in **8(b)(i)**.

Test data	Test type	Expected result
25	Normal	Value accepted
	Invalid	`Invalid input` message displayed
	Boundary	

[3]

Exemplar 1

3 marks

Test data	Test type	Expected result
25	Normal	Value accepted
600	Erroneous	`Invalid input` message displayed
300	Boundary	Value accepted

Examiner commentary

The candidate has gained full marks. They have correctly identified some erroneous test data as well as boundary data and come up with an appropriate expected result.

Exemplar 2

2 marks

Test data	Test type	Expected result
25	Normal	Value accepted
Hello	Erroneous	`Invalid input` message displayed
300	Boundary	Value accepted

Examiner commentary

The candidate has successfully gained the marks for the boundary data and expected result. They have not gained the mark for the erroneous test data as this data would not cause the result shown by the given program.

Question 8 (c)

(c) Data for one week (Monday to Friday) is stored in a 2D array with the identifier `minsPlayed`.

The following table shows part of this array, containing 4 students.

			Students			
			Stuart	**Wes**	**Victoria**	**Dan**
			0	**1**	**2**	**3**
Days of the week	**Mon**	**0**	60	30	45	0
	Tue	**1**	180	60	0	60
	Wed	**2**	200	30	0	20
	Thu	**3**	60	10	15	15
	Fri	**4**	100	35	30	45

The teacher wants to output the number of minutes Dan (column index 3) played computer games on Wednesday (row index 2). The following code is written:

```
print(minsPlayed[3,2])
```

Write program code to output the number of minutes that Stuart played computer games on Friday.

You must use **either:**

- OCR Exam Reference Language, **or**
- a high-level programming language that you have studied.

.....

..... **[1]**

Exemplar 1

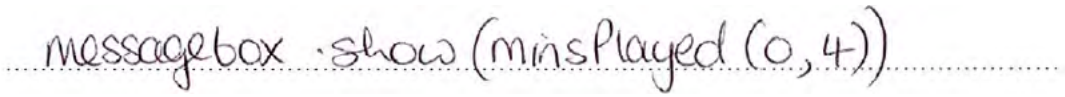
1 mark

Examiner commentary

The candidate has used syntax appropriately to output the information and the correct element is referenced from the array.

Exemplar 2

1 mark



Examiner commentary

The candidate has used syntax appropriately to output the information and the correct element is referenced from the array. Messagebox.show is a Visual Basic command and has been used appropriately here, with the correct index values.

Question 8 (d)

(d) The teacher writes a program to add up and print out the total number of minutes student 2 played computer games over 5 days (Monday to Friday).

```
total = 0
total = total + minsPlayed[2,0]
total = total + minsPlayed[2,1]
total = total + minsPlayed[2,2]
total = total + minsPlayed[2,3]
total = total + minsPlayed[2,4]
print(total)
```

Refine the program to be more efficient. Write the refined version of the algorithm.

You must use **either:**

- OCR Exam Reference Language, **or**
- a high-level programming language that you have studied.

.....

.....

[4]

Exemplar 1

3 marks

```
total = 0
For x = 0 To 4
    total = total + minsPlayed[2,0]
    rIndex = 0
    total = total + minsPlayed[2,(rIndex)]
    rIndex = rIndex + 1
Next
print(total)
```

[4]

Examiner commentary

The candidate has 3 marks for this response. They gained the first mark for initialising total and then outputting it at the end. They have completed mark point 2 and 3 by initialising a for loop and repeating five times. The final mark could not be given; though they have used an additional variable, the initialisation of it is inside the loop and therefore it resets to 0 each time. If rIndex=0 was outside the loop, the final mark could be given.

Exemplar 2

3 marks

```
dim total ac integer = 0
for i = 0 to 4
total = total + i
next next
messagebox show (total)
```

Examiner commentary

The candidate has correctly initialised total and then outputs it at the end using their chosen high-level language for the first mark. They have received the second mark for using a for loop and the third mark for repeating the loop 5 times starting at 0. The final mark was not given as they have not correctly referenced the minsPlayed array to add to the total.

Question 8 (e)

(e) The following program uses a condition-controlled loop.

```
x = 15
y = 0
while x > 0
    y = y + 1
    x = x - y
endwhile
print(y)
```

Complete the trace table to test this program.

x	y	output

[4]

Exemplar 1

4 marks

x	y	output
15	0	
14	1	
12	2	
9	3	
5	4	
0	5	5

Examiner commentary

The candidate has been given full marks for this response. They have identified the initial values as 15 and 0 for x and y respectively. They have then correctly identified the other values for x and y and then 5 being the output on its own.

Exemplar 2

3 marks

x	y	output
15	0	1
14	1	2
12	2	3
9	3	4
5	4	5
0	5	6
-6	6	6

Examiner commentary

The candidate has gained 3 marks for this response. They have correctly identified 15 and 0 for x and y respectively at the start. They have then correctly identified the other values for x and y for marking points 2 and 3. However, the final mark could not be given as there is more than one output.

Question 8 (f)

(f) A teacher writes an algorithm to store the name of the game a student plays each night (for example "OCR Zoo Simulator").

`variable.length` returns the number of characters in `variable`.
`variable.upper` returns the characters in `variable` in upper case.

```
valid = false
while(valid == false)
    gameName = input("Enter the game name")
    if (gameName.length > 0) AND (gameName.length < 20)
        gamesPlayed = gameName.upper
        valid = true
        print("Valid game name")
    else
        print("Game name is not valid")
    endif
endwhile
```

The algorithm needs testing to make sure the IF-ELSE statement works correctly.

Identify **two** different pieces of test data that can be used to test different outputs of the algorithm. Give the output from the program for each piece of test data.

Test data 1 .....

Expected output .....

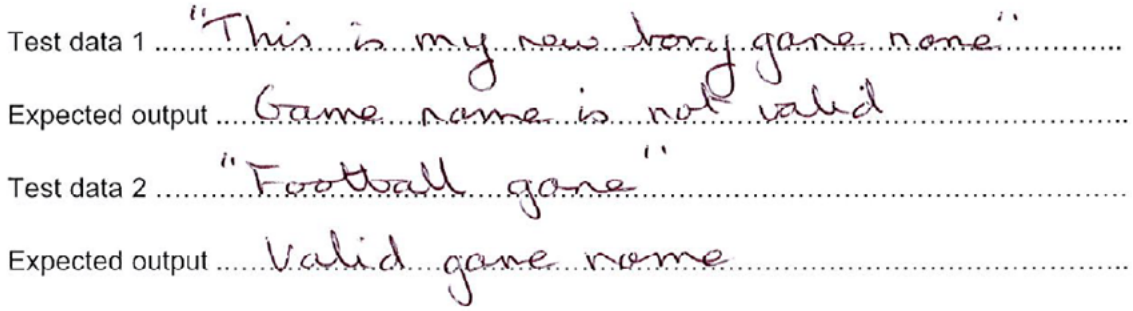
Test data 2 .....

Expected output .....

[4]

Exemplar 1

4 marks

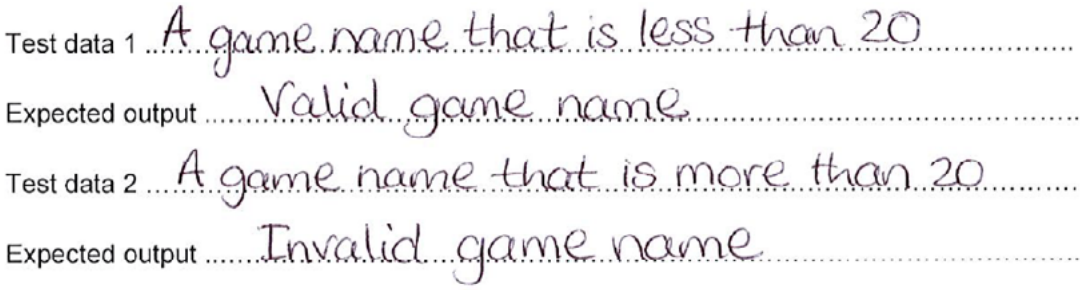


Examiner commentary

The candidate has correctly identified a name that would rejected and a name that would be accepted. In both cases, the expected output matches the test data and is correct.

Exemplar 2

0 marks



Examiner commentary

The candidate has not identified any test specific test data here; instead, they have simply described the sort of test data that could be used. More so, the expected output for the second set of test data is not as specified in the program.

Question 8 (g) (i)

(g) The teacher asks students how long they spend completing homework. Students answer in minutes and hours (for example 2 hours 15 minutes).

The teacher would like to create an algorithm that will display students' inputs in minutes only.

(i) Identify the input and output required from this algorithm.

Input .....

.....

Output .....

.....

[2]

Exemplar 1

2 marks

Input... Students time spent doing homework in hours and minutes.

Output... Students time spent in minutes

Examiner commentary

The candidate has correctly identified from the scenario that the student enters the number of hours and minutes spent on the homework. It then turns this into minutes ready for the output.

Exemplar 2

2 marks

Input ... number of hours & number of minutes

Output time = num of hours *60 + num of mins

Examiner commentary

The candidate has received 1 mark for correctly identifying the input. The output given is a (correct) calculation rather than an identification of an output but benefit of doubt has been given that the candidate knows that this is the number of minutes required.

Question 8 (g) (ii)

(ii) A program is created to convert hours and minutes into a total number of minutes.

The teacher wants to create a sub program to perform the calculation.

The program has been started but is not complete.

Complete the design for the program.

```
hours = input("Please enter number of hours played")

minutes = input("Please enter number of minutes played")

finalTotal = .....

print(finalTotal)


 function .....

          .....

          .....

          .....

          .....

 endfunction
```

[4]

Exemplar 1

3 marks

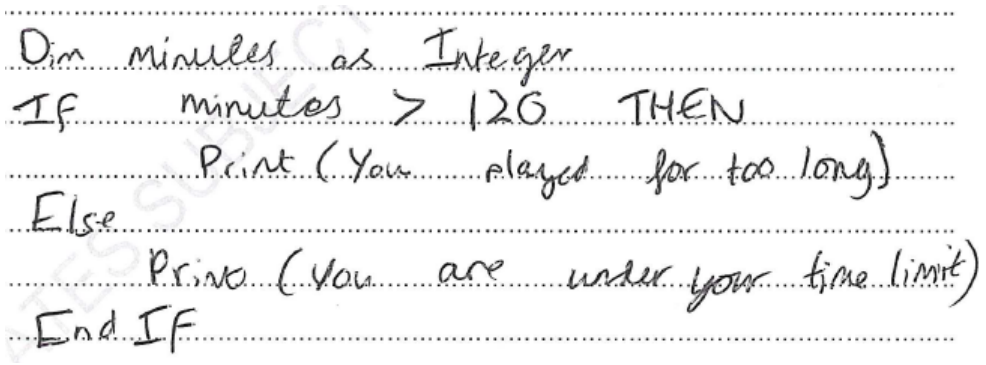
```
Dim played as integer = inputbox("How long have you play
If played >= 120 then
   messagebox.show("You played games for too long!")
else
   messagebox.show("You are under your time limit!")
End if
```

Examiner commentary

The candidate has gained 3 marks for this response. The first mark was gained for correctly taking the input from the user in their chosen language. The second mark was not given as the candidate has used the mathematical syntax for greater than or equal to (rather than simply greater than) which is incorrect. The final 2 marks were given for correctly outputting the messages.

Exemplar 2

1 mark



Examiner commentary

The candidate has gained a mark for correctly identifying that an IF statement is required and for the condition being correct. They have not gained a mark for the input as although the variable has been declared, there is no input from the user. They have also not been given the mark for the outputs as they have not used speech marks for the print messages and therefore these are both syntactically incorrect.

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