

# GCSE OCR Computer Science

## Practice Set A

## Paper 2

### Computational Thinking, Algorithms and Programming

Centre name				
Centre number				
Candidate number				

**Time allowed:**

- 1 hour 30 minutes

You **may not** use a calculator

Surname
Other names
Candidate signature

**Instructions to candidates**

- Write your name and other details in the spaces provided above.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information for candidates**

- There are 80 marks available on this paper.
- The marks available are given in brackets at the end of each question.

For examiner's use							
Q	Attempt N <sup>o</sup>			Q	Attempt N <sup>o</sup>		
1				6			
2				7			
3				8			
4				9			
5							
Total							

1. Khalid has written the following procedure, `printDetails`:

```
procedure printDetails (firstname, surname, age)
  print("My name is ", firstname, surname, " and I am ",
    age, " years old.")
  if age >= 17 then
    print("I am old enough to drive a car.")
  else
    print("I am not old enough to drive a car.")
endprocedure
```

- (a) How many parameters does the procedure `printDetails` have?

..... [1 mark]

- (b) State which one of the following the `printDetails` procedure uses:  
sequence, selection or iteration.

..... [1 mark]

- (c) What will be printed by the following call to the `printDetails` procedure?

```
printDetails("Steve", "Wozniak", 66)
```

.....  
.....  
..... [1 mark]

- (d) Khalid learns that he can use both functions and procedures in a program.

- (i) Define the term 'procedure'.

.....  
..... [1 mark]

- (ii) State the difference between a function and a procedure.

.....  
..... [1 mark]

2. Grace is designing a program to run an online multiple choice quiz. She has stored twenty questions in the file "r1\_Q.txt" and has written the following pseudocode so far:

```

01  quizfile = openRead ("r1_Q.txt")
02  quizScore = 0
03  for n = 1 to 20
04      nextQuestion = quizfile.readLine()
05      split nextQuestion into separate fields
        question, answer1, answer2, answer3, correctAnsNum
06      print(question, answer1, answer2, answer3)
07      userAnswer = input("Enter 1, 2 or 3:")

```

- (a) The algorithm uses iteration.

- (i) Define the term 'iteration'.

.....  
 .....  
 [1 mark]

- (ii) State the first line in which iteration begins in the pseudocode above.

.....  
 [1 mark]

- (b) Explain the purpose of lines 04-05 in the pseudocode above.

.....  
 .....  
 .....  
 .....  
 .....  
 .....  
 [3 marks]

Turn over ►

(c) Complete Grace’s pseudocode, adding in the following functionality:

- Check whether the answer is correct and give an appropriate response to the user.
- Add 1 to the quiz score if they give a correct answer.
- At the end of the quiz, display the total score and close the file.

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[5 marks]

**(d)** Grace expands her program so that the quiz now consists of multiple rounds, each scored out of 20. She uses the two-dimensional array 'Scores', shown below, to store the results for 6 different players over 10 rounds (e.g. the third player's score in the eighth round is stored as Scores[2, 7]).

		Round									
		0	1	2	3	4	5	6	7	8	9
Player	0	7	10	3	19	7	17	4	6	12	17
	1	8	1	20	20	18	8	14	1	15	9
	2	17	7	1	20	15	3	13	20	0	17
	3	17	0	15	15	20	15	9	7	12	8
	4	19	19	0	12	19	2	9	9	6	0
	5	11	5	15	9	9	12	13	15	2	18

[illegible]

**Turn over ►**

3. (a) Complete the following sentence:

1 GB is equal to ..... MB, and there are ..... bits in 1 byte.

[1 mark]

- (b) Convert the binary number 10011100 into denary.

.....  
.....

[1 mark]

- (c) Convert the hexadecimal number A4 into denary.  
You must show your working.

.....  
.....

[2 marks]

- (d) A computer stores data and instructions in binary form. Explain why computer systems use binary.

.....  
.....

[2 marks]

- (e) Add together the following two binary numbers:

$$\begin{array}{r} 1\ 0\ 1\ 1\ 1\ 0\ + \\ 1\ 1\ 1\ 0\ 0\ 0 \\ \hline \end{array}$$

[2 marks]

- (f) Perform a 1 place left shift on the binary number 00100101.

.....  
.....

[1 mark]

4. Isabelle has created a subroutine, `diceEven`, which takes the value of two integers from 1 to 6. It adds the two integers together and returns either 'Even' or 'Odd', depending on if the sum is even or odd. For example, `diceEven(2, 6)` would return 'Even'.

(a) Write an algorithm for the subroutine `diceEven`.

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[4 marks]

- (b) In a simple dice game, a player rolls two standard six-sided dice, and gains a point if the sum of the two scores is even.

Using the `diceEven` subroutine, write code to simulate a turn of this game, accepting the two dice rolls as user inputs.

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[2 marks]

Turn over ►

5. Gloria is planning to create a mobile application using a high-level programming language.

(a) Explain **two** reasons why Gloria might prefer to program her mobile application using a high-level programming language rather than a low-level one.

- 1 .....
- .....
- .....
- 2 .....
- .....
- .....

[4 marks]

(b) Complete the table below by ticking the box to show whether the statement refers to a feature of a compiler or an interpreter.

Feature	Compiler	Interpreter
Translates the whole program to produce an executable file		
Needed every time you want to run the program		
Halts the translation at the first line of error		
Runs the program at a slower speed		

[4 marks]

(c) Gloria decides to use an Integrated Development Environment (IDE) to write her application. Identify **two** features of an IDE that she might use, and explain how they will assist in the development of the program.

- 1 .....
- .....
- .....
- 2 .....
- .....
- .....

[4 marks]



6. Frankie is the manager of a day spa. He collects data about customers when they first book a session at the spa, which he stores in records. A sample of this data is given in the table, *Customers*, shown below:

UserID	F_Name	L_Name	Gender	Paid
001	Shaun	Whorton	M	Yes
002	Sam	King	M	No
003	Tanya	Khayer	F	Yes

- (a) Define the term 'record'.

.....  
[1 mark]

- (b) Explain why Frankie might want to store the data in this structure.

.....  
.....  
.....  
[2 marks]

- (c) Identify an appropriate data type that could be used to store whether or not the person had paid.

.....  
[1 mark]

- (d) State what would be returned if the following SQL command was executed on the data above.

`SELECT * FROM Customers WHERE Gender = "M" AND Paid = "No"`

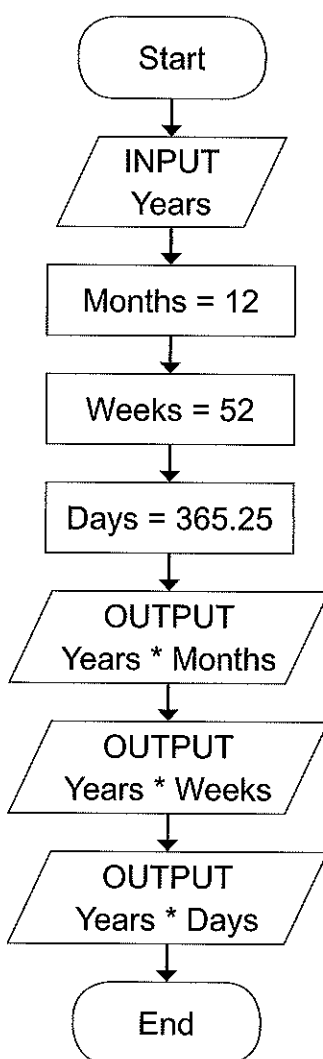
.....  
.....  
.....  
[1 mark]

Turn over ►

7. Kulraj has designed a program using a flow diagram, as shown:

Leave  
blank

**Figure 1**



- (a) Describe what the program has been designed to do.

.....

.....

.....

[1 mark]

- (b) Identify **one** variable and **one** constant in the program.

Variable .....

Constant ..... [2 marks]

- (c) Explain why you identified the variable given in part (b) as a variable.

.....  
..... [1 mark]

- (d) Describe **one** piece of test data that Kulraj could enter into his program to check that it is not accepting invalid data.

..... [1 mark]

Turn over ►

8. Jordan is writing code for a travel website, and needs to choose suitable searching and sorting algorithms to use. He uses the following as test data:

Jakarta      London      Cairo      Minsk      Amsterdam      Bangkok

- (a) Show the stages of a linear search to find the word "Amsterdam".

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[4 marks]

- (b) Show the stages of an insertion sort to put this list in alphabetical order.

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[4 marks]

- (c)** Jordan's code will use the numbers 0-6 to represent the seven continents. He has written the following subprogram:

```
function continent(number)
    if number == 0 then
        return "Africa"
    elseif number == 1 then
        return "Antarctica"
    elseif number == 2 then
        return "Asia"
    elseif number == 3 then
        return "Australia"
    elseif number == 4 then
        return "Europe"
    elseif number == 5 then
        return "North America"
    elseif number == 6 then
        return "South America"
    endif
endfunction
```

Jordan has been informed that his subprogram could be improved in several ways. Rewrite Jordan's subprogram with the following improvements:

- Use a one-dimensional array rather than multiple `elseif` statements to perform the same function as above.
- Validate that the argument used in the function is of the correct type and within the correct range, and return a message describing the error if this is not the case.

[5 marks]

**Turn over ►**

9. (a) Draw a labelled logic circuit diagram for the following Boolean statement:

$$P = (A \text{ AND } B) \text{ OR } C$$

[3 marks]

- (b) Complete the truth table for the logic statement  $P = (A \text{ AND } B) \text{ OR } C$ .  
The first and last rows have been done for you.

A	B	C	P
FALSE	FALSE	FALSE	FALSE
TRUE	TRUE	TRUE	TRUE

[6 marks]

**END OF QUESTIONS**

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