OCR
Oxford Cambridge and RSA

GCSE (9–1) Computer Science
J276/01 Computer systems

Monday 14 May 2018 – Morning
Time allowed: 1 hour 30 minutes

Do not use:
• a calculator

First name	
Last name	
Centre number		Candidate number	

INSTRUCTIONS
• Use black ink.
• Complete the boxes above with your name, centre number and candidate number.
• Answer **all** the questions.
• Write your answer to each question in the space provided. If additional space is required, use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
• Do **not** write in the barcodes.

INFORMATION
• The total mark for this paper is **80**.
• The marks for each question are shown in brackets **[ ]**.
• Quality of written communication will be assessed in this paper in questions marked with an asterisk (*).
• This document consists of **12** pages.

No calculator can be used for this paper

OCR is an exempt Charity

Turn over
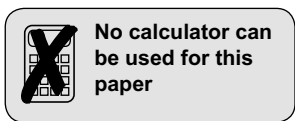
Answer **all** the questions.

1 William is creating a film for a school project using a digital video camera.

(a) The digital video camera has a secondary storage device.

(i) Explain why the digital video camera needs secondary storage.

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.... **[2]**

(ii) The digital video camera uses solid state storage.

Explain why solid state storage is the most appropriate type of storage for the digital video camera.

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.... **[4]**

(b) William transfers the videos to a computer for editing.

(i) The computer has 1GB of storage free.

Calculate the number of videos that could be stored on the computer if each video was 100MB in size.

Show your working.

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.... **[2]**

   (ii) A program needs to calculate the size of files in bytes. The program must:

   ○   Ask the user to input a file size in megabytes
   ○   calculate and output the number of bytes this represents in a user friendly format (e.g. `"There are 5242880 bytes in 5MB"`).

   Write an algorithm using pseudocode to calculate the number of bytes in a given number of megabytes.

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   .... **[6]**

 (c) William's computer has utility programs installed including automatic backup.

   (i) William can choose between a full or incremental backup.

   Identify the backup method William should use to backup the computer, justifying your choice.

   Method: ....

   Justification: ....

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   .... **[3]**

(ii) Give **one** additional utility program William could make use of and describe how he would use it.

Utility program: ....

Description of use: ....

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[3]

(d) William wants to upload his videos on the Internet and is considering releasing them under a Creative Commons license.

Explain how a Creative Commons license will impact the use of William's videos by other people.

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.... **[3]**

2 A house has computers in each room and a central router. Every room allows both Ethernet and WiFi connections to the router.

(a) Identify if the house network is a LAN (local area network) or a WAN (wide area network). Justify your choice.

Network type: ....

Justification: ....

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[3]

(b) The following table has descriptions of Ethernet and WiFi.

Tick (✓) **one** box in each row to identify if the description is more appropriate for Ethernet or WiFi.

Description	Ethernet	WiFi
A wired connection		
More likely to be affected by interference		
Data can be transmitted at a faster speed		
Wireless transmission		
Shorter transmission range before data is lost		

[5]

(c) (i) Describe the purpose of the router in the house's network.

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.... **[2]**

(ii) Identify **two** additional items of network hardware, apart from cables and a router, that may be used within the house network.

1 ....

2 ....

[2]

Turn over

(d) A user enters a uniform resource locator (URL) into a web browser on one of the computers in the house. A system is then used to find the IP address of the web server associated with the URL.

(i) Name the system which matches URLs to IP addresses on the web.

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.... **[1]**

(ii) The following statements describe what happens after the IP address has been found and returned to the user's computer.

There are **five** missing statements in the table.

Write the letter of the missing statements from the table in the correct place to complete the description.

1 The request is put into packets

2 ....

3 The packets are sent across the network

4 ....

5 ....

6 If they have not arrived:

7 A timeout is sent to request the packets are resent

8 If they have arrived:

9 ....

10 ....

Letter	Statement
A	The server checks if all the packets have arrived
B	The packets are put in order
C	The request is processed by the web server
D	The packets are received by the host server
E	Each packet is given the address and a number

[5]

(e) The house owner is concerned about potential threats to the network from being connected to the Internet.

(i) Describe **three** possible threats to the computers connected to the network and give **one** way each threat can be reduced or prevented.

Threat 1 ....

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Prevention ....

Threat 2 ....

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Prevention ....

Threat 3 ....

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Prevention ....

[9]

Turn over

3* A small island has 100 people living on it. The island has just been connected to the Internet, after previously having no Internet or mobile phone signal.

Discuss the impact on the island's inhabitants and businesses of getting access to the Internet.

In your answer you might consider the impact on:
- inhabitants
- businesses
- ethical issues
- privacy issues

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.... **[8]**

4 Alicia has designed a computer using Von Neumann architecture.

(a) Describe the purpose of **two** registers that are used by Von Neumann architecture.

1 ....

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2 ....

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[4]

(b) The CPU has a clock speed of 3.8 GHz.

Describe what is meant by a clock speed of 3.8 GHz.

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.... **[2]**

(c) Alicia says:
"My computer has a quad-core processor, so it will run twice as fast as a computer with a dual-core processor."

Explain why this statement is not always true.

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.... **[3]**

Turn over

(d) The computer will only have 2GB of RAM, but Alicia says that virtual memory can be used instead of adding more RAM.

(i) Explain how virtual memory can compensate for the lack of RAM in Alicia's computer.

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.... **[3]**

(ii) Explain why it would be beneficial for Alicia to get more RAM instead of relying on virtual memory.

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.... **[2]**

5 When connecting computers into a network, the use of appropriate protocols are important.

(a) Explain what is meant by a protocol.

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.... **[2]**

(b) For each of the scenarios below, identify the most appropriate protocol to be used and explain the function of the protocol.

(i) A user wants to transfer a file directly from his computer to his friend's computer.

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.... **[2]**

(ii) A customer wants to securely log into her bank's website to check her account balance.

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.... **[2]**

(c) Explain the difference between how the IMAP (Internet message access protocol) and SMTP (simple mail transfer protocol) protocols are used.

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.... **[2]**

END OF QUESTION PAPER

12

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

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OCR

Oxford Cambridge and RSA

GCSE (9–1) Computer Science

J276/02 Computational thinking, algorithms and programming

Thursday 17 May 2018 – Afternoon
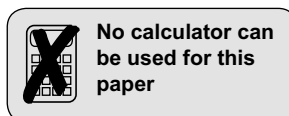### Time allowed: 1 hour 30 minutes

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INFORMATION
• The total mark for this paper is **80**.
• The marks for each question are shown in brackets **[ ]**.
• This document consists of **16** pages.

No calculator can be used for this paper

Turn over

Answer **all** the questions.

1   OCR High School uses a computer system to store data about students' conduct. The system records good conduct as a positive number and poor conduct as a negative number. A TRUE or FALSE value is also used to record whether or not a letter has been sent home about each incident.

An example of the data held in this system is shown below in Fig. 1:

StudentName	Detail	Points	LetterSent
Kirstie	Homework forgotten	−2	FALSE
Byron	Good effort in class	1	TRUE
Grahame	100% in a test	2	FALSE
Marian	Bullying	−3	TRUE

Fig. 1

(a) State the most appropriate data type used to store each of the following items of data.

- StudentName ....

- Points ....

- LetterSent ....

[3]

(b) The data shown above in Fig. 1 is stored in a database table called **Conduct**.

(i) Write an SQL statement to select the StudentName field for all records that have negative Points.

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.... **[3]**

(ii) State the wildcard that can be used in SQL to show all fields from a table.

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.... **[1]**

3

(c) A single record from this database table is read into a program that uses an array with the identifier `studentdata`. An example of this array is shown below:

```
studentdata = ["Kirstie", "Homework forgotten", "-2", "FALSE"]
```

The array is zero based, so `studentdata[0]` holds the value "Kirstie".

Write an algorithm that will identify whether the data in the `studentdata` array shows that a letter has been sent home or not for the student. The algorithm should then output either "sent" (if a letter has been sent) or "not sent" (if a letter has not been sent).

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.... **[4]**

2 A programmer has written an algorithm to output a series of numbers. The algorithm is shown below:

```
01  for k = 1 to 3

02      for p = 1 to 5

03          print (k + p)

04      next p

05  next k

06  m = 7

07  print m * m
```

(a) (i) Give the first three numbers that will be printed by this algorithm.

.... [1]

(ii) State how many times line 03 will be executed if the algorithm runs through once.

.... [1]

(b) Identify two basic programming constructs that have been used in this algorithm.

1 ....

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2 ....

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[2]

(c) (i) Describe what is meant by a variable.

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.... [2]

(ii) Identify two variables that have been used in the algorithm above.

1 ....

2 ....
[2]

3 The logic diagram below (Fig. 2) shows a system made up of two connected logic gates.
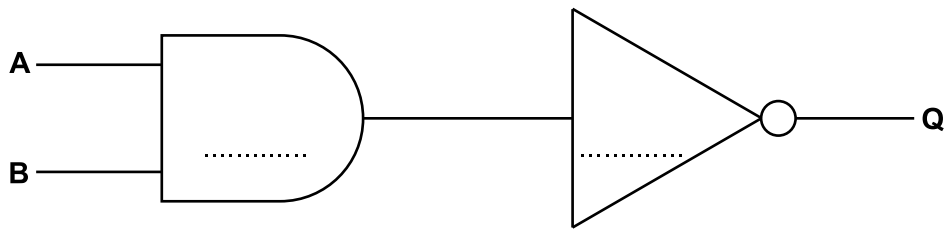

Fig. 2

(a) (i) Label the names of the two gates on the diagram above. **[2]**

(ii) Complete the truth table below to show the output from this logic system.

A	B	Q
0	0	
0	1	
1	0	
1	1	

[4]

(b) Draw the logic diagram represented by **Q = A ∨ ¬B**

[2]

4 A library gives each book a code made from the first three letters of the book title in upper case, followed by the last two digits of the year the book was published.

For example, "Poetry from the War", published in 2012 would be given the code `POE12`.

(a) (i) Complete the following pseudocode for a function definition that will take in the book title and year as parameters and return the book code.

```
01  function librarycode(title, ……………………………………………)

02      parta = title.subString(0, …………………………………………)

03      partb = year.subString(2, 2)

04      ………………………………………… parta.upper + partb

05  endfunction
```
[3]

(ii) Use pseudocode to write an algorithm that does the following :

- Inputs the title and year of a book from the user.
- Uses the librarycode function above to work out the book code.
- Permanently stores the new book code to the text file `bookcodes.txt`

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.... **[6]**

(b) Functions and procedures are both examples of sub programs.

(i) Describe **one** difference between a function and a procedure.

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.... **[2]**

(ii) Describe **two** benefits to a programmer of using sub programs.

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.... **[4]**

8

(c) The library sorts their books based on the book code.

(i) Show the steps that a merge sort would take to put the following list of book codes into ascending alphabetical order (from A to Z).

POE12 , BAC97 , FLY77 , JAV16 , TAL86 , AND18 , ZAR09 , HOP86

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.... **[4]**

(ii) Explain **one** advantage of a merge sort compared to a bubble sort.

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.... **[2]**

5 **(a)** **(i)** Convert the denary number **132** into an 8 bit binary number.

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.... **[2]**

(ii) Convert the binary number **10110101** to its hexadecimal equivalent.

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.... **[2]**

(iii) Show the effect of a binary shift right of two places on the binary number **00110100**.

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.... **[1]**

(iv) Describe a shift that can be used to double the value of the binary number **00100100**.

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.... **[2]**

(b) The table below (Fig. 3) shows the ASCII codes for a number of characters.

The lower case ASCII code for a character can be found by adding **0100000** to the upper case version.

Character	ASCII code
R	1 0 1 0 0 1 0
r	1 1 1 0 0 1 0
A	1 0 0 0 0 0 1
a	
E	1 0 0 0 1 0 1
e	

Fig. 3

(i) Complete the table above by filling in the missing ASCII codes. **[2]**

(ii) Compare the use of ASCII and Extended ASCII to represent characters.

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.... **[2]**

6 An infinite loop is where a section of a program repeats indefinitely.

(a) For each of the pseudocode algorithms shown below, tick the appropriate box to show whether they will loop infinitely or not.

Pseudocode	Will loop infinitely	Will <u>not</u> loop infinitely

`01 x = 0`
`02 while True`
`03     print x`
`04 endwhile`		

`01 x = 0`
`02 while x < 10`
`03     print x`
`04 endwhile`		

`01 x = 0`
`02 while x < 10`
`03     print x`
`04     x = x + 1`
`05 endwhile`		

`01 y = 5`
`02 for x = 1 to y`
`03     print x`
`04 next`		

[4]

(b) Using pseudocode, write an algorithm that will use a count-controlled loop to print out the numbers 1 to 10 in ascending order.

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.... **[3]**

7 Victoria is writing a program using a high level language to display the meaning of computer science acronyms that are entered. The code for her first attempt at this program is shown below.

```
01  a = input("Enter an acronym")

02  if a == "LAN" then

03      print("Local Area Network")

04  elseif a == "WAN" then

05      print("Wide Area Network")

06  ..........................................................................................

07  ..........................................................................................

08  endif
```

(a) (i) Complete the code above to print out an "unknown" message if any other acronym is entered by the user. **[2]**

(ii) Describe what is meant by a "high level language".

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.... **[2]**

(b) Victoria creates her program using an Integrated Development Environment (IDE).

Describe two tools or facilities that an IDE commonly provides.

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.... **[4]**

8 OCR town are holding an election with three candidates (A, B and C). An electronic voting booth will be used to allow people to vote.

Write an algorithm that:

- Allows voters to enter either A, B or C.
- Keeps track of how many times each candidate has been voted for.
- As soon as one person has finished voting, allows the next person to vote.
- At any point allows the official to type in "END", which will print out the number of votes for each candidate and the total number of votes overall.

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.... **[6]**

END OF QUESTION PAPER

14

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

15

OCR

Oxford Cambridge and RSA

Monday 13 May 2019 – Morning

GCSE (9–1) Computer Science

J276/01 Computer systems

Time allowed: 1 hour 30 minutes

Do not use:
• a calculator

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number ☐☐☐☐☐   Candidate number ☐☐☐☐

First name(s) _____

Last name _____

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OCR is an exempt Charity

Turn over

Answer **all** the questions.

1   Kerry wants to buy a new computer, but she does not understand what the different parts of a computer do.

(a) Kerry has heard of a CPU but does not know what it is.

(i)   The following sentences describe the purpose of a CPU.

Complete the sentences by filling in the missing words.

CPU stands for ....

It is the part of the computer that fetches and executes the ....

that are stored in ....

The CPU contains the Arithmetic .... Unit (ALU) and

the .... Unit (CU).

[5]

(ii) Kerry is looking at two computers; one has a single core processor and the other has a dual core processor.

Explain why having a dual core processor might improve the performance of the computer.

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.... **[2]**

(iii) One computer has 64 kilobytes of cache and the other has 512 kilobytes of cache.

Explain how the cache size can affect the performance of the CPU.

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.... **[2]**

(b) Both computers have RAM and ROM.

(i) The table has **five** statements describing RAM and/or ROM.

Tick (✓) **one or more** boxes in each row to identify if that statement describes RAM and/or ROM.

	RAM	ROM
Stores data		
The memory is volatile		
Data will not be lost when the computer is turned off		
Data is read-only, cannot be changed		
Stores currently running data and instructions		

[5]

(ii) Give **one** difference between RAM and flash memory.

....

.... **[1]**

Turn over

(c) Kerry has 5GB of files to transfer from her laptop at work to her new computer. She has been told to buy an external solid state device to do this.

(i) Give **one** example of a solid state device.

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.... **[1]**

(ii) Identify whether the device given in **part (c)(i)** is an example of primary or secondary memory.

....

.... **[1]**

(iii)* Kerry was originally going to use an optical storage device to transfer her files.

Discuss whether an optical or solid state device is the most appropriate media to transfer these files.

You may want to consider the following characteristics in your answer:
- portability
- robustness
- capacity
- cost **[8]**

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(iv) The filesizes of Kerry's files are usually displayed in megabytes (MB) or gigabytes (GB).

Calculate how many MB are in 5GB. Show your working.

....MB **[2]**

2 Xander's tablet computer comes with system software, including an operating system and utility system software.

(a) The operating system provides file management.

Identify **three** ways that Xander can make use of the file management facility.

1 ....

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2 ....

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3 ....

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[3]

(b) The utility system software provides compression software. Xander uses this to compress an image.

(i) Explain how the compression software will compress the image file.

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.... **[4]**

(ii) Give the name of **two** other types of utility system software.

1 ....

2 ....

[2]

(c) Xander also has a smart watch.

(i) Tick (✓) **one** box to show whether the smart watch or the laptop is an example of an embedded system.

	Is an example of an embedded system
Smart watch	
Laptop	

[1]

(ii) Justify your choice to **part (i)**.

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.... **[2]**

3 Hamish stores confidential documents on his laptop.

(a) Hamish needs his computer to be secure from unauthorised access when connected to a network.

(i) Describe the problems that can arise from unauthorised access to his laptop and confidential documents.

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.... **[3]**

(ii) Describe **two** ways Hamish can help prevent unauthorised access to his laptop.

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2 ....

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[4]

Turn over

(b) If unauthorised access does occur, Hamish would like to use encryption to add another layer of protection to his documents.

(i) Explain how encryption helps to protect Hamish's documents.

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.... **[2]**

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PLEASE DO NOT WRITE ON THIS PAGE

(ii) One encryption method is a Caesar cipher.

This Caesar cipher moves each letter of the alphabet **one** place to the right.

The following table shows the original letters in the first row, and the new letters in the second row.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A

For example, if the message read: HELLO

This would be stored as: IFMMP

The following pseudocode algorithm takes a string of uppercase letters as input and uses the Caesar cipher to encrypt them.

The functions used in the algorithm are described in the table:

Function	Description
ASC(*character*)	Returns the ASCII value for *character* e.g. ASC("A") returns 65
CHR(*ASCIIvalue*)	Returns the single character for *ASCIIvalue* e.g. CHR(65) returns "A"
subString(*Value, Number*)	Returns the *Number* of characters starting at position *Value* (where 0 is the first character)

Complete the pseudocode algorithm to perform a Caesar cipher.

```
01 message = input("Please enter your string")

02 newMessage = ""

03 messageLength = message.length

04 for count = 0 to ..........................................................................

05     ASCIIValue = ASC(message.subString(...............................,1))

06     ASCIIValue = ASCIIValue + ...............................

07     if ASCIIValue >90 then

08        ASCIIValue = ............................... − 26

09     endif

10     newMessage = ............................... + CHR(ASCIIValue)

11 next count
```

[5]

(iii) The algorithm needs adapting. An extra line (line 12) is needed to output the encrypted message.

Write line 12 to output the encrypted message in pseudocode or programming code.

....

.... **[1]**

4   An office has a LAN (Local Area Network). The office has four employees who each have a laptop. The office also has one server and one networked printer.

  (a)   The office is set up as a star network with a switch at the centre. All devices are connected to the network using cables.

   (i)   Draw the devices and connections in the office star network. All devices must be clearly labelled.

[3]

   (ii)   Describe the role of the switch in the office network.

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.... **[2]**

(b) The office introduces a WAP (Wireless Access Point) to allow network access to wireless devices.

The office manager has noticed that the performance of the network has recently decreased.

(i) Describe how introducing wireless access could have slowed down the network.

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.... **[2]**

(ii) Identify **two** other factors that can affect the performance of a network.

1 ....

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2 ....

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[2]

(c) Explain what is meant by a Virtual Network.

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.... **[2]**

Turn over

5 The IP address 192.149.119.226 is linked to the website with a URL of https://www.ocr.org.uk

(a) When https://www.ocr.org.uk is entered into a browser, the website homepage is loaded.

Describe the relationship between the website URL (https://www.ocr.org.uk), the IP address and the webserver.

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.... [5]

(b) Computers access the Internet using the TCP/IP model.

(i) The TCP/IP model uses layers including the application layer and transport layer.

Explain why the TCP/IP model uses layers.

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.... **[2]**

(ii) TCP/IP is one example of a protocol.

Give the name of **one** appropriate protocol for each task in the table.

Task	Protocol for this task
Sending an email from one mail server to another	
Transmitting a file from a client to a server	
Viewing a website using a web browser	
Downloading an email to your computer	

[4]

6 Fiona is a software engineer. She is creating a new version of a computer game she released three years ago.

Fiona is considering selling the game online and not making it available physically in shops.

(a) Describe the environmental impact of Fiona's decision.

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.... **[2]**

(b) Fiona releases her game under a proprietary licence.

Explain why a proprietary licence is a more appropriate choice than open source.

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.... **[2]**

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

OCR

Oxford Cambridge and RSA

Thursday 16 May 2019 – Afternoon

GCSE (9–1) Computer Science

J276/02 Computational thinking, algorithms and programming

Time allowed: 1 hour 30 minutes

Do not use:
• a calculator

INSTRUCTIONS
• Use black ink.
• Answer **all** the questions.
• Write your answer to each question in the space provided. If additional space is required, use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

INFORMATION
• The total mark for this paper is **80**.
• The marks for each question are shown in brackets **[ ]**.
• This document consists of **24** pages.

No calculator can be used for this paper

Answer **all** the questions.

1 **(a)** A radio station records an interview with a computer scientist using a computer and audio recording software.

(i) Explain how sampling is used to store audio recordings.

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.... **[2]**

A second interview with the computer scientist is recorded. Before this interview, the sampling frequency in the audio software is increased.

(ii) Define what is meant by the term **sampling frequency**.

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.... **[1]**

(iii) Tick (✓) **two** boxes to show the effects of increasing the sampling frequency.

Data type of returned value	Tick (✓) **two** boxes
The file size of the digital recording will be smaller.	
The file size of the digital recording will be larger.	
The quality of playback of the digital recording will be better.	
The quality of playback of the digital recording will be worse.	

[2]

(b) The radio station uses a digital camera to take a photograph of the computer scientist for their website. The photograph is stored as a bitmap image.

(i) Describe how bitmap images are represented in binary.

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.... **[3]**

(ii) Explain why computers represent data in binary form.

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.... **[2]**

The image is compressed using lossy compression before being uploaded to the radio station's web server. The image will be used on the radio station's website.

(iii) Describe **one** advantage and **one** disadvantage of using lossy compression on the image that will be used on the website.

Advantage ....

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Disadvantage ....

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.... **[4]**

5

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2 A programmer creates an algorithm using a flow chart.

(a) Complete the table to give the output when each of the following set of values are input into the algorithm as X and Y.

Input value of X	Input value of Y	Output
15	10	
6	5	
2	3	
12	2	

[4]

(b) Write this algorithm using pseudocode.

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.... **[6]**
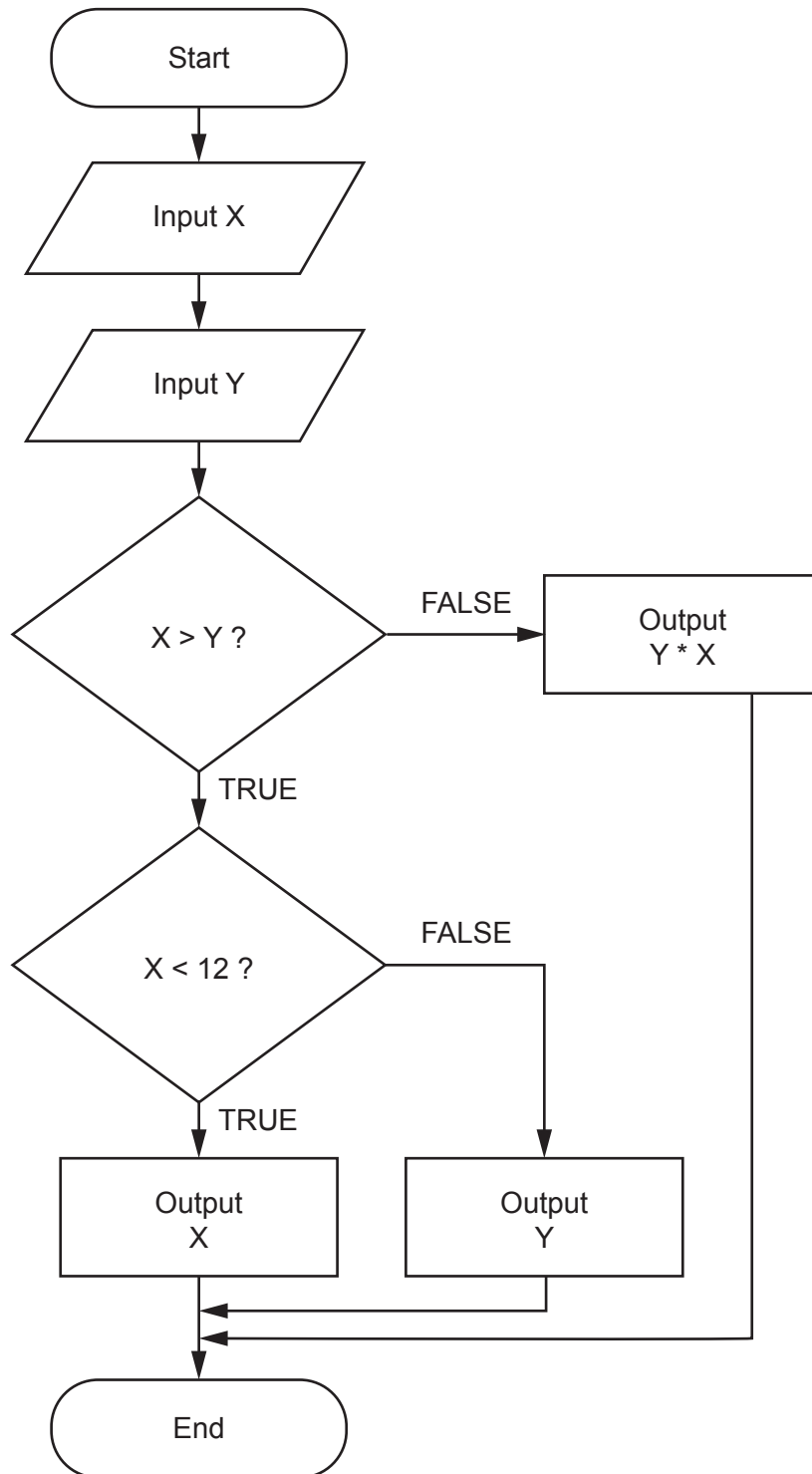
The algorithm is written in a high-level language. The high level code must be translated into machine code before a computer processor can execute it.

(c) Describe **two** methods of translating high level code into machine code.

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.... **[4]**

3 Louise writes a program to work out if a number entered by the user is odd or even. Her first attempt at this program is shown.

```
01 num = input("enter a number")

02 if num MOD 2 >= 0 then

03     print("even")

04 else

05     pritn("odd")

06 endif
```

(a) The program contains a logic error on line **02**.

(i) State what is meant by a logic error.

....

.... **[1]**

(ii) Give a corrected version of line **02** that fixes the logic error.

....

.... **[1]**

(b) The program contains a syntax error on line **05**.

(i) State what is meant by a syntax error.

....

.... **[1]**

(ii) Give a corrected version of line **05** that fixes the syntax error.

....

.... **[1]**

4 Elliott plays football for OCR FC. He wants to create a program to store the results of each football match they play and the names of the goal scorers. Elliott wants individual players from the team to be able to submit this information.

(a) **(i)** Define what is meant by **abstraction**.

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.... **[2]**

(ii) Give **one** example of how abstraction could be used when developing this program.

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.... **[1]**

(b) Describe **two** examples of defensive design that should be considered when developing this program.

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.... **[4]**

The number of goals scored in each football match is held in an array called `goals`. An example of this array is shown.

$$goals = [0, 1, 3, 0, 4, 5, 2, 0, 2, 1]$$

Elliott wants to count how many matches end with 0 goals.

(c) Complete the following pseudocode for an algorithm to count up how many matches with 0 goals are stored in the array and then print out this value.

```
01  nogoalscount = 0

02  for count = 0 to (goals.length-1)

03      if goals[…………………………] == 0 then

04          nogoalscount  ……………………………………………………………

05      endif

06  next count

07  print(………………………………………………)
```

[3]

5 (a) Convert the hexadecimal number **A3** to denary. Show your working.

....

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....

.... **[2]**

(b) Convert the binary number **1011011** to denary. Show your working.

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.... **[2]**

(c) The symbol ^ is used for exponentiation.

Give the result of `a^b` when `a = 3` and `b = 2`.

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....

.... **[1]**

(d) Add the following binary numbers.

$$1\ 0\ 1\ 1\ 0\ 1\ 1\ 0$$
$$+\qquad 1\ 0\ 0\ 1\ 1\ 1$$

[2]

(e) Complete the truth table for the following logic gate.

A	B	Q
0	0	0
0	1	1
	0	
1		

[4]

6 OCR Land is a theme park aimed at children and adults. Entrance tickets are sold online. An adult ticket to OCR Land costs £19.99, with a child ticket costing £8.99. A booking fee of £2.50 is added to all orders.

(a) A function, `ticketprice()`, takes the number of adult tickets and the number of child tickets as parameters. It calculates and returns the total price to be paid.

(i) Use pseudocode to create an algorithm for the function `ticketprice()`.

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.... **[6]**

(ii) Tick (✓) **one** box to identify the data type of the value returned from the function `ticketprice()`, justifying your choice.

Data type of returned value	Tick (✓) **one** box
Integer	
Real	
Boolean	
String	

Justification ....

....

....

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....

....

[2]

Turn over

(b) OCR Land regularly emails discount codes to customers. Each discount code includes a check digit as the last character.

   (i) Give **one** benefit of using a check digit for the discount code.

....

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.... **[1]**

(c) A list of valid discount codes is shown below.

       [NIC12B, LOR11S, STU12M, VIC08E, KEI99M, WES56O, DAN34S]

   (i) State **one** reason why a binary search would not be able to be used with this data.

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.... **[1]**

   (ii) Give the name of **one** searching algorithm that would be able to be used with this data.

....

.... **[1]**

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(d) OCR Land keeps track of the size of queues on its rides by storing them in an array with the identifier `queuesize`. It uses the following bubble sort algorithm to put these queue sizes into ascending numerical order.

```
01  swaps = True

02  while swaps

03      swaps = False

04      for p = 0 to queuesize.length-2

05          if queuesize[p] > queuesize[p+1] then

06              temp = queuesize[p]

07              queuesize[p] = queuesize[p+1]

08              queuesize[p+1] = temp

09              swaps = True

10          endif

11      next p

12  endwhile
```

(i) Explain the purpose of the Boolean variable `swaps` in this bubble sort algorithm.

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.... **[2]**

(ii) Explain the purpose of lines **06** to **08** in this bubble sort algorithm.

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.... **[2]**

(iii) Describe **one** way that the maintainability of this algorithm could be improved.

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.... **[2]**

(iv) Give the names of **two** other sorting algorithms that could be used instead of bubble sort.

1 ....

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2 ....

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[2]

(e) One ride in OCR Land has a minimum height of 140 cm to ride alone or 120 cm to ride with an adult.

Create an algorithm that:

- asks the user to input the height of the rider, in centimetres
- if needed, asks if they are riding with an adult
- outputs whether or not they are allowed to ride
- repeats this process until 8 people have been allowed to ride.

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.... **[8]**

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

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OCR
RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION

COMPUTING   **A451**

Computer Systems and Programming

Candidates answer on the question paper.	Tuesday 11 January 2011
OCR supplied materials: None	**Afternoon**
Other materials required: None	**Duration:** 1 hour 30 minutes

A451

Candidate forename		Candidate surname	

Centre number						Candidate number					

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **80**.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
- This document consists of **16** pages. Any blank pages are indicated.

1 Jo buys a notebook computer which has a 3MHz quad-core central processing unit (CPU).

(a) State the purpose of the CPU.

....

.... **[1]**

(b) Describe what is meant by

3MHz CPU

....

....

....

.... **[2]**

quad-core CPU

....

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.... **[2]**

2 A small business has three stand-alone computers, a printer and an internet connection in an office.

(a) State **two** advantages of connecting the computers to create a local area network.

1

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2

....

.... **[2]**

(b) Describe, using a diagram, how the computers can be connected to each other using a bus topology, stating what hardware will be needed.

....

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.... **[6]**

3 **(a)** Calculate the denary value of the 8-bit binary number 10010111.
You must show your working.

.... **[2]**

(b) Add the following two 8-bit binary numbers **and** explain the result.
You must show your working.

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

....

.... **[3]**

4 A desk-top computer's memory includes ROM and RAM.

Tick **one** box in each row to show whether each of the statements is true for ROM or RAM.

	ROM	RAM
Programs and data which are currently in use are loaded here.		
All the contents are lost when the power is turned off.		
It is used to boot up the computer when it is switched on.		

[3]

Turn over

5 Karen wants to use handheld computers to take customers' orders in her restaurant. She is thinking of using custom written, open source software.

(a) State what is meant by custom written software.

....

.... **[1]**

(b) State **two** reasons why Karen may decide to use custom written software.

1. ....

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2. ....

.... **[2]**

(c)* Discuss the implications of creating open source software for the restaurant.
The quality of written communication will be assessed in your answer to this question.

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.... **[6]**

6 A shopping centre uses several remote-controlled CCTV cameras for security. An operator uses a computer to watch, control and record the output of the cameras.

State an input, output and storage device which will be needed by the computer. For each, explain the reason why it is needed.

Input device

.... **[1]**

Reason

....

....

....

.... **[2]**

Output device:

.... **[1]**

Reason

....

....

....

.... **[2]**

Storage device:

.... **[1]**

Reason

....

....

....

.... **[2]**

7 A teacher uses a database to store the marks of pupils from all year 9 classes.

(a) PUPIL and CLASS are two entities used in this database.

Explain the term entity.

....

....

....

.... **[2]**

(b) The data for the first four pupils in the PUPIL table is shown below.

PupilNumber	Surname	FirstName	ClassCode
A01	Adams	Michelle	9DK
A02	Ali	Mohammed	9BH
A03	Ali	Shirelle	9DK
A04	Azor	Michelle	9FT

(i) State the primary key for the PUPIL table and explain your answer.

Primary Key .... **[1]**

Explanation

....

....

....

.... **[2]**

(ii) The database also contains a CLASS table. The primary key for the CLASS table is ClassCode.

Explain why ClassCode has also been included in the PUPIL table.

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.... **[3]**

8 A syntax error can occur when writing a program.

(a) State what is meant by a syntax error, giving an example.

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.... **[2]**

(b) Describe tools and facilities available in an integrated development environment (IDE) which can help the programmer to identify and correct syntax errors.

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.... **[4]**

9* Computer technology has changed the ways in which teenagers interact with each other. Explain how developments in software and hardware have enabled new methods of communication among teenagers.

The quality of written communication will be assessed in your answer to this question.

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.... **[6]**

10 (a) Explain how ASCII is used to represent text in a computer system.

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.... **[3]**

(b) State what is meant by the character set of a computer.

....

.... **[1]**

(c) Unicode is also used to represent text in a computer system.

Explain the difference between the character sets of Unicode and ASCII.

....

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....

.... **[2]**

PLEASE TURN OVER FOR THE NEXT QUESTION

11 Frances is writing a program which simulates a dice game played with three ordinary 6-sided dice.

(a) When the player rolls the three dice, the player is given points according to the algorithm expressed in the flow diagram below.

```
                        ┌──────────┐
                        │  BEGIN   │
                        └────┬─────┘
                             │
                             ▼
            YES         ╱ Are all three ╲        NO
       ┌────────────── ╲  dice equal?  ╱ ──────────────┐
       │                ╲             ╱                 │
       ▼                                                ▼
┌──────────────────┐                        YES  ╱ Are two of the ╲  NO
│ Score = total on │                    ┌─────── ╲  dice equal?   ╱ ───────┐
│ the 3 dice       │                    │         ╲              ╱          │
└────────┬─────────┘                    ▼                                   ▼
         │                 ┌─────────────────────────────┐        ┌──────────────┐
         │                 │ Score = sum on the 2 equal  │        │  Score = 0   │
         │                 │ dice                        │        └──────┬───────┘
         │                 └──────────────┬──────────────┘               │
         │                                ▼                              │
         │                 ┌─────────────────────────────┐              │
         │                 │ Score = Score – (the number  │              │
         │                 │ on the other dice)           │              │
         │                 └──────────────┬──────────────┘               │
         │                                │                              │
         │                                │  ◄───────────────────────────┘
         │                                │
         ▼                                ▼
        ┌──────────────────────────────────┐
        │             END                   │
        └──────────────────────────────────┘
```
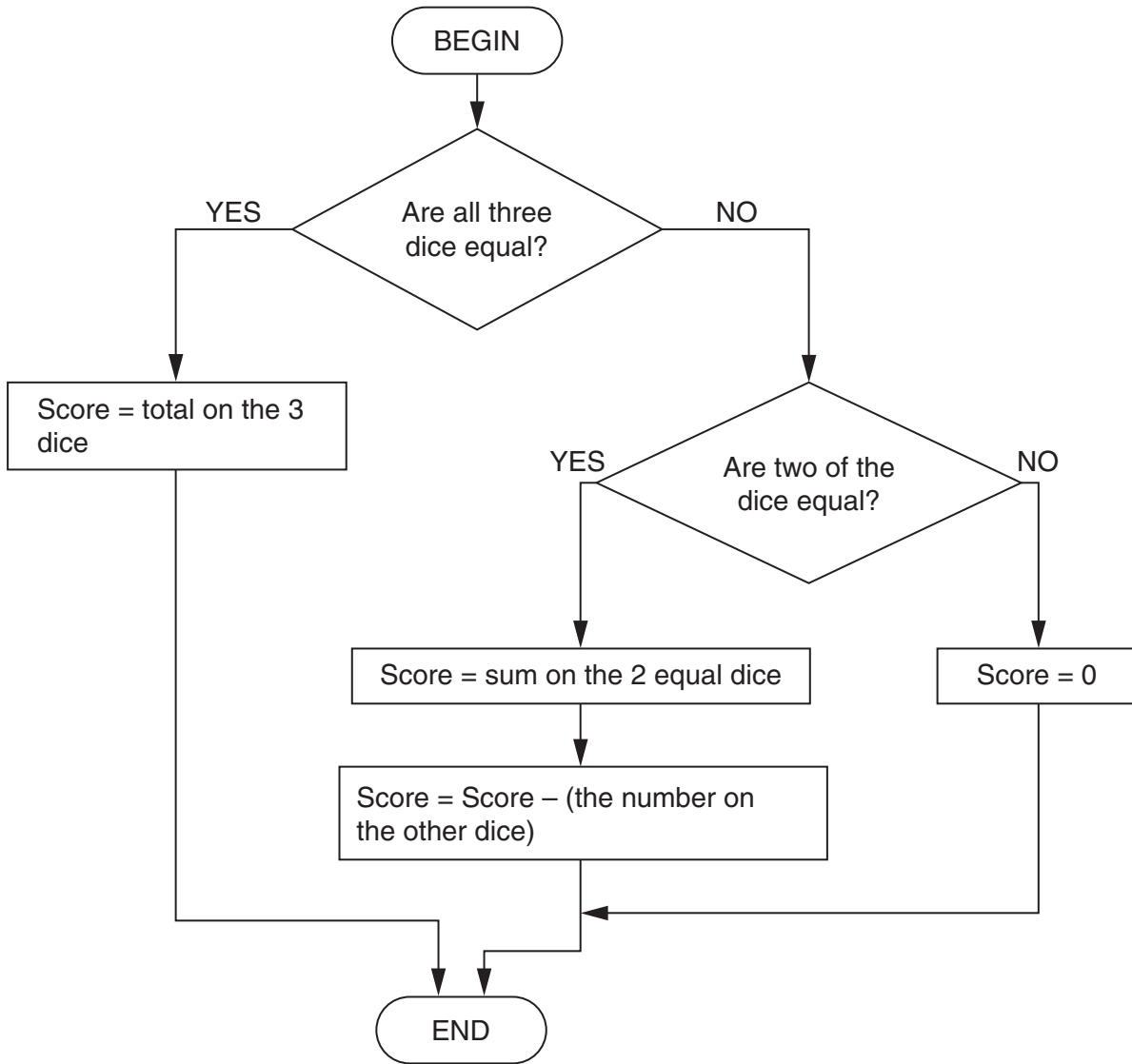
State the value of the score if the dice rolled are

3 4 5   Score : ....

4 4 4   Score : ....

5 5 6   Score : ....

[3]

(b) Some rolls of the dice result in a negative score.

State a set of three numbers which can be used to test whether the algorithm produces a negative score when it should, and state the expected output for your test data.

Set of test data: ....

Expected output: .... **[2]**

When the dice are rolled, the results are stored in an array called DiceResult.

For example, if the first dice shows a 5 then the value of DiceResult(1) becomes 5.

(c) Describe what is meant by an array.

....

....

....

.... **[2]**

(d) State the data type and size of the array DiceResult giving a reason for each.

Data type of DiceResult: ....

Reason: ....

....

Size of array DiceResult: ....

Reason: ....

.... **[4]**

PLEASE TURN OVER FOR THE LAST QUESTION

(e) The routine for rolling the dice is written as a sequence below.

```
BEGIN RollTheDice
    DiceResult(1) = Random Number between 1 and 6
    DiceResult(2) = Random Number between 1 and 6
    DiceResult(3) = Random Number between 1 and 6
END
```

Rewrite this routine so that it uses iteration.
You may use a diagram.

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.... **[4]**

[END]

15

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OCR
Oxford Cambridge and RSA

Wednesday 8 June 2016 – Morning

GCSE COMPUTING

A451/01   Computer Systems and Programming

Duration: 1 hour 30 minutes

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

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INFORMATION FOR CANDIDATES

* The number of marks is given in brackets **[ ]** at the end of each question or part question.
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* The Quality of Written Communication is assessed in questions marked with an asterisk (*****).
* This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 The character é is part of a computer's character set.

(a) Describe what is meant by a character set.

....

.... **[1]**

When sending text messages using a mobile phone, people can choose from hundreds of characters, called emoji, to insert in their message. An example of an emoji is 🙊.

The Unicode character code for the emoji 🙊 in hexadecimal is 1F64A.

(b) (i) Convert the hexadecimal number 1F64A to binary.
The first three hexadecimal digits have been done for you.

Hexadecimal:	1	F	6	4	A
Binary:	0001	1111	0110	....	....

[2]

(ii) Explain why mobile phones that can send emoji would use Unicode instead of ASCII as their character set.

....

....

....

.... **[2]**

2* Lauren is a Computing teacher. She is building a website for her Computing class where they can share ideas, send each other programs and discuss computing concepts. The students will have individual accounts that they can log into.

Discuss the ethical and legal issues Lauren will have to consider when setting up the website.

The quality of your written communication will be assessed in your answer.

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.... **[6]**

3 Charlotte runs a website which stores details about movies. The users can log onto the website and leave ratings for movies.

The websites uses a database with three tables:

- The table FILM contains the following fields; FilmID, Title, Year, Director, Category
- The table USER contains the following fields; UserID, FirstName, Surname, DateOfBirth
- The table RATING stores, amongst other fields, the rating a user has given a film (a score out of 5).

An extract of the data in the table RATING is shown in Fig. 1:

RatingID	FilmID	UserID	Rating
00214	16CM12	20_Elliot	4.5
00215	55HR8	Jade01	1
00216	12HR15	Sunil_99	1
00217	16SF8	Jade01	2

Fig. 1

(a) Explain why FilmID has been included in the RATING table.

....

....

....

....

....

.... **[3]**

(b) Explain why it is a good idea to separate the data from the applications that use the database.

....

....

....

.... **[2]**

(c) Give **one** example of a record that could be stored in the user table.

....

.... **[1]**

(d) (i) Charlotte uses a query to list films. The query uses the following criteria:

```
(Rating < 2) AND (UserID = "Jade01")
```

List the RatingID(s) of the rating(s) that will be selected from the extract shown.

....

.... **[1]**

(ii) Write the criteria for a query that will select all Films produced in the Year 2015 in the Category **"Comedy"**.

....

.... **[3]**

Turn over

4 Joseph is an author and programmer, and he needs to estimate how many pages his new book will have.

Each page has an average of 300 words. Each chapter starts with a chapter title page.
The number of pages is estimated by;
- dividing the number of words by 300
- ignoring the decimal part of the division
- adding the number of chapters to this total.

Joseph uses the algorithm below to estimate the number of pages, but his algorithm does not give the correct result.

```
01  INPUT numberOfWords
02  INPUT numberOfChapters
03  CONST wordsPerPage = 300
04  numberOfPages = RoundDown(numberOfWords / wordsPerPage)
05  numberOfPages = numberOfWords + numberOfChapters
06  OUTPUT numberOfPages
```

Joseph has used a `RoundDown` function to remove the decimal part of the division, e.g. `RoundDown(6.2)` would return 6, `RoundDown(7.8)` would return 7.

(a) State whether this algorithm uses selection, sequence or iteration.

.... **[1]**

(b) Line 03 defines a constant. Describe what is meant by a constant.

....

....

.... **[2]**

(c) There is an error in line `05` of the algorithm.

Write a corrected line of code to replace line `05`.

.... **[1]**

(d) Identify the most appropriate data type for the following variable `numberOfWords`. Give a reason for your choice.

Data type ....

Reason ....
                                                                                                                              [2]

(e) Joseph is changing his algorithm and needs to store the name and price of his book in new variables. State the most appropriate data type(s) for these variables.

Name ....

Price ....
                                                                                                                              [2]

Joseph is using an Integrated Development Environment (IDE) to produce the program.

(f) One tool in an IDE that Joseph uses is a translator.

Describe **two** additional tools in an IDE that Joseph could use to help him produce his program.

Tool 1 name: ....

Tool 1 description: ....

....

Tool 2 name: ....

Tool 2 description: ....

....
                                                                                                                              [4]

(g) Joseph's IDE allows him to use both a compiler and an interpreter.

Describe how Joseph could make use of a compiler and an interpreter when producing his program.

Compiler: ....

....

....

....

Interpreter: ....

....

....

....
                                                                                                                              [4]

5 Alex is producing images and sound effects for a website.
Part of a bitmap image is shown in Fig. 2:

W	W	R	R	R	B	B
W	W	R	Y	R	B	B
B	B	R	R	R	B	B
B	B	B	LG	B	DG	B
B	DG	DG	LG	DG	B	B
B	B	DG	LG	B	B	B
B	B	B	LG	B	B	B

Fig. 2

The letters represent a colour, as shown in Fig. 3:

Letter	Colour
W	White
B	Blue
R	Red
Y	Yellow
DG	Dark Green
LG	Light Green

Fig. 3

(a) Using the example in Fig. 2, explain how a bitmap image is stored on a computer.

....

....

....

....

....

.... **[3]**

(b) Explain how reducing the number of colours in an image can reduce its file size.

....

....

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.... **[2]**

(c) The final image file may contain metadata. Describe, using an example, what is meant by metadata.

....

....

....

.... **[2]**

(d) Alex needs to create an audio recording of himself playing his guitar.

   (i) Explain how sampling is used to make the recording.

   ....

   ....

   ....

   ....

   ....

   .... **[3]**

   (ii) State the effects of increasing the sample rate of the recording.

   ....

   ....

   ....

   .... **[2]**

6 Quinn's current computer specification is shown in Fig. 4.

> 1.5 GHz Dual Core Processor
> 1GB RAM
> 100GB Hard Drive
> 64KB Cache
> Touchscreen
> Integrated camera and speakers
> 2 × USB 3.0 ports
> 2 × USB 2.0 ports
> Blu-ray drive
> 2GB Graphics Card
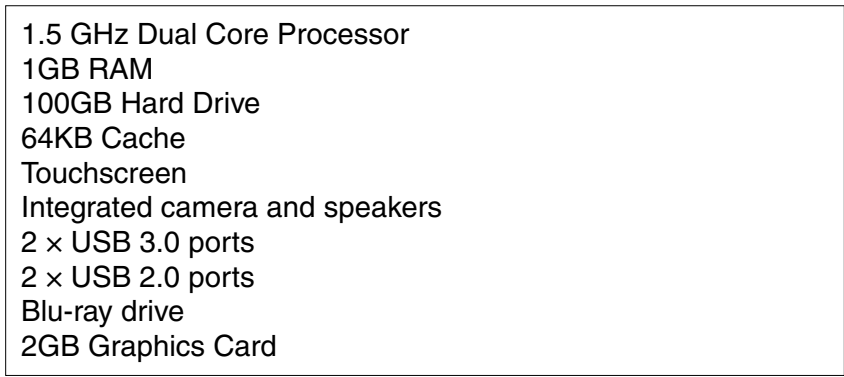
Fig. 4

(a) Describe the benefits of a dual core processor over a single core processor.

....

....

....

.... **[2]**

(b) Quinn is considering upgrading the RAM.

(i) Describe **two** differences between RAM and ROM.

Difference 1 ....

....

....

Difference 2 ....

....

....
[4]

(ii) Quinn has decided to upgrade the RAM on his computer. Explain why this would improve the computer's performance.

....

....

....

.... **[2]**

(iii)* After upgrading the RAM, Quinn could make further changes to improve his computer's performance.

Identify the changes and explain how these changes would improve performance.

The quality of your written communication will be assessed in your answer.

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.... [6]

Turn over

7 A company, OCR Supermarkets, has supermarket stores throughout the country. The computers for each store connect to the central office using a Wide Area Network (WAN).

(a) Identify **two** differences between a WAN and a LAN (Local Area Network).

Difference 1: ....

....

Difference 2: ....

....

....
[2]

(b) OCR Supermarkets use a client-server network to connect the checkout computers to the store's server.

Describe **two** benefits to OCR Supermarkets of using a client-server network instead of a peer-to-peer network.

Benefit 1: ....

....

....

Benefit 2: ....

....

....
[4]

The supermarket manager's computer can access the Internet and the World Wide Web.

(c) Explain the difference between the Internet and the World Wide Web.

....

....

....

.... **[2]**

8 **(a)** Convert the decimal number 191 into 8-bit binary.

.... **[1]**

(b) Perform the following binary addition

$$+\begin{array}{r} 01101011 \\ 01011011 \\ \hline \end{array}$$

[2]

9 A memory game is played where:
- three players (A, B and C) have to choose a number between 0 and 100
- if the number has already been chosen, a message is displayed that says `"taken"`
- if the number has not already been chosen, the player's letter is placed next to it
- the quantity of numbers that have not yet been chosen is displayed.

The winner is the player who has chosen the most unique numbers by the end of the game.

The numbers are stored in an array; `numbers()`. A number that has not yet been chosen is stored as an empty string `""`. The players are represented by `"A"`, `"B"` and `"C"`.

Fig. 5 shows an extract from the array:

Number:	0	1	2	3	4	...	...	99	100
Player:	A	C	B		A			B	

Fig. 5

You have been asked to program part of the game.

Write an algorithm for player A's turn, which;
- takes as an input the number that player A chooses
- if it has not already been chosen, stores an `"A"` in that array element
- if it has already been chosen, outputs `"taken"`
- counts and outputs the quantity of numbers left that have not been chosen. **[6]**

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END OF QUESTION PAPER

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OCR
Oxford Cambridge and RSA

Wednesday 7 June 2017 – Morning

GCSE COMPUTING

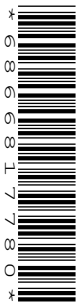### A451/01   Computer Systems and Programming

Duration: 1 hour 30 minutes

Candidate forename		Candidate surname	

Centre number					Candidate number				

INSTRUCTIONS TO CANDIDATES

*   Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
*   Use black ink. HB pencil may be used for graphs and diagrams only.
*   Answer **all** the questions.
*   Read each question carefully. Make sure you know what you have to do before starting your answer.
*   Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
*   Do **not** write in the barcodes.

INFORMATION FOR CANDIDATES

*   The number of marks is given in brackets **[ ]** at the end of each question or part question.
*   The total number of marks for this paper is **80**.
*   The Quality of Written Communication is assessed in questions marked with an asterisk (*).
*   This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 A satellite navigation system (Sat Nav) gives people instructions to reach their destination.

(a) A Sat Nav is an example of a computer system. Explain what is meant by a computer system.

....

....

....

.... **[2]**

(b) The Sat Nav has input and output devices.

(i) Explain why a computer system needs an input device.

....

.... **[1]**

(ii) Identify **one** input device that could be used in a Sat Nav to help disabled users and describe how it would be used.

Device ....

Use..

....

[2]

(c) The Sat Nav has an in-built, solid state, secondary storage device.

    (i) Explain why the Sat Nav needs a secondary storage device.

....

....

....

.... **[2]**

    (ii) The manufacturers of the Sat Nav chose to use a solid state storage device instead of a magnetic hard disk.

Describe **one** reason why a solid state storage device was chosen to be used in the Sat Nav.

....

....

....

.... **[2]**

(d) A Sat Nav has a CPU (Central Processing Unit).

    (i) State **one** task performed by the CPU.

....

.... **[1]**

    (ii) Explain why the data and instructions for the Sat Nav are stored using binary representation.

....

....

....

.... **[2]**

2 Shannon is creating a website using HTML.

(a) An HTML file will contain the text to be displayed on the webpage.

(i) Identify **one** further item that will be included in the HTML file.

.... **[1]**

(ii) Explain **one** benefit of HTML being a standard.

....

....

....

.... **[2]**

(b) In HTML, colours are represented by a series of 6 hexadecimal digits.

- The first 2 digits represent the amount of red in the colour
- The middle 2 digits represent the amount of green in the colour
- The last 2 digits represent the amount of blue in the colour

For example, FF0000 is red, 00FF00 is green, 0000FF is blue.

(i) The quantity of red, green and blue in a shade of purple are given in the table below. Convert each of the decimal numbers into its hexadecimal equivalent.

	Red	**Green**	**Blue**
Decimal	111	58	156
Hexadecimal	6F	....	....

[2]

   (ii) State **one** reason why hexadecimal is used to represent the numbers instead of binary.

   ....

   .... **[1]**

(c) Shannon is uploading a large number of images and videos to her website. She compresses the files before uploading them.

   Explain why Shannon compresses the files before uploading them.

   ....

   ....

   ....

   ....

   .... **[2]**

(d) Shannon has a URL (uniform resource locator) for her website.

   Explain how a domain name server is used to connect a user to the URL they have entered into a web browser.

   ....

   ....

   ....

   ....

   ....

   ....

   .... **[3]**

Turn over

3 An algorithm is written that finds the mean average (i.e. the total of the numbers divided by how many numbers there are) of a set of 10 numbers stored in an array `NumberArray`.

```
const Quantity = 10
for Count = 0 to Quantity
    Total = Total + NumberArray(....................)
next Count
Mean = ........................................
output Mean
```

(a) Complete the algorithm by adding the missing pseudocode statements. **[2]**

(b) Define the term constant, giving an example from the algorithm.

Definition ....

....

....

....

Example...

[3]

(c) Identify the most appropriate data type for `Mean`. Justify your choice.

Data type ....

Justification ....

....

[2]

(d) The algorithm uses iteration.

(i) Describe what is meant by iteration.

....

....

....

.... **[2]**

(ii) Identify **two** forms of iteration that are **not** used in this algorithm.

1 ....

2 .... **[2]**

(e) The program is being extended to ask the user to enter numbers into the array. An algorithm is written to check that the input is valid.

```
do
    input Number
until Number >= 0 AND Number <= 100
```

State **one** item of borderline data and **one** item of invalid data that can be input to test the algorithm works correctly.

Borderline ....

Invalid ....

[2]

4 A secondary school uses a database to store all requests for IT maintenance.

(a) A database is defined as a persistent store of organised data.

Explain what is meant by 'a persistent store of organised data'.

....

....

....

.... **[2]**

(b) The database stores information about the teachers, the hardware devices that each teacher has and the requests that have been made for IT maintenance.

The database has a table called `REQUESTS`.

An extract of the data in the table `REQUESTS` is shown in Table 4.1:

RequestID	TeacherID	Date	Details	HardwareID
0001	VE1	12/04/2017	Laptop battery fault	LAP#121
0002	GC1	12/04/2017	Interactive whiteboard will not connect	INT#002
0003	SO3	13/04/2017	USB drive corrupted	MEM#033
0004	VE1	14/04/2017	Java update needed	LAP#121

Table 4.1

(i) Identify the most appropriate data type for the field `RequestID`, giving a reason for your choice.

Data type ....

Reason ....

....

[2]

(ii) State how many records are shown in Table 4.1.

.... **[1]**

(iii) Identify the most appropriate field to be the Primary Key, giving a reason for your choice.

Field ....

Reason ....

....

[2]

(c) Validation is one feature of a DBMS that can be used to create customised data handling applications.

(i) For each of the fields listed below, identify **one** validation rule that could be used. Each rule must be different.

TeacherID ....

....

Date...

....

[2]

(ii) Identify and describe **two** additional features of a DBMS that can be used to create customised data handling applications, giving an example of how each could be used in this database.

Feature 1 ....

Description ....

....

....

Example use ....

....

Feature 2 ....

Description ....

....

....

Example use ....

....

[6]

Turn over

5* Driverless cars are currently being tested on roads in the USA and may soon be tested on roads in the UK.

Discuss the ethical and legal issues that should be considered when creating automatic technology, such as driverless cars.

The quality of your written communication will be assessed in your answer to this question.

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.... **[6]**

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6 A small accountancy firm, OCR Accounts, currently uses stand-alone computers within the office.

OCR Accounts is considering implementing a network.

(a) One benefit of having a network over stand-alone computers is the ability to monitor devices and employees on the network.

Explain, using examples for OCR Accounts, **two** additional benefits of having a network over stand-alone computers.

1 ....

....

....

....

....

2 ....

....

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....

....

[6]

(b) OCR Accounts have a set of laptops that will form the network.

(i) Identify **one** hardware device that would be needed to connect the laptops to the Internet.

.... **[1]**

(ii) Identify **two** additional pieces of hardware that OCR Accounts could use to set up the network and describe what each piece of hardware would be used for within the network.

1 ....

....

....

2 ....

....

....

[4]

(c)* OCR Accounts are setting a number of network policies.

Describe the network policies that OCR Accounts could implement and explain the purpose of each of these policies within the network.

The quality of your written communication will be assessed in your answer to this question.

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.... [6]

Turn over

7 A computer game has a stored number. The game gives the user 10 attempts to guess what the number is. If the user has got it correct, the game congratulates them and it ends. If the user has guessed it incorrectly, the game tells the user if the number is higher or lower than their guess.

Write an algorithm, using iteration, which:
- stores a number for the user to guess
- asks the user to guess the number
- outputs "congratulations" if the guess is correct and ends the game
- outputs if the user needs to guess lower, or higher
- allows the user 10 attempts to guess the number **[6]**

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END OF QUESTION PAPER

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