OCR
Oxford Cambridge and RSA

Wednesday 7 June 2017 – Morning

GCSE COMPUTING

A451/01 Computer Systems and Programming

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Calculators are allowed in this exam

Duration: 1 hour 30 minutes

* A 4 5 1 0 1 *

* 6 8 6 9 6 8 T 7 8 0 *

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

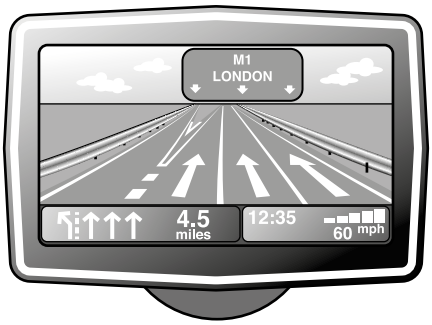
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting 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.

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..... **[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.

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..... **[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.

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

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

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

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

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

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..... **[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.

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..... **[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.

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..... **[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.

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..... **[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.

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..... **[3]**

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 .....

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.....

Example.....

[3]

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

Data type .....

Justification .....

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[2]

(d) The algorithm uses iteration.

(i) Describe what is meant by iteration.

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..... **[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'.

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..... **[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 .....

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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 .....

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Example use .....

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Feature 2 .....

Description .....

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Example use .....

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[6]

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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Turn to page 12 for Question 6

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 .....

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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 .....

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2 .....

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[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]**

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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