



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



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

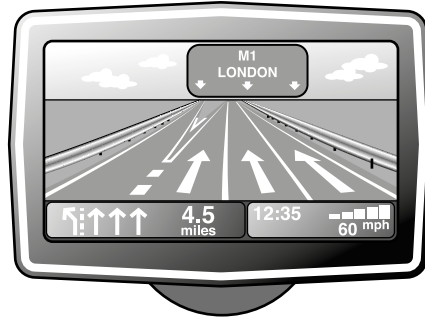
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting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

- 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]

11
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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

.....

.....

.....

.....

2

.....

.....

.....

.....

[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]

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