

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**  
**GCSE**

**A451/01**

**COMPUTING**

**Computer Systems and Programming**

**WEDNESDAY 7 JUNE 2017: Morning**

**DURATION: 1 hour 30 minutes**  
**plus your additional time allowance**

**MODIFIED ENLARGED**

<b>Candidate forename</b>		<b>Candidate surname</b>	
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<b>Centre number</b>						<b>Candidate number</b>				
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**Candidates answer on the Question Paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Calculators are allowed in this exam**

**READ INSTRUCTIONS OVERLEAF**



## **INSTRUCTIONS TO CANDIDATES**

**Write your name, centre number and candidate number in the boxes on the front page. 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).**

## **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 (\*).**

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**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.**

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**[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. [2]

	Red	Green	Blue
Decimal	111	58	156
Hexadecimal	6F		

- (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 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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  $\geq$  0 AND Number  $\leq$  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:

- (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]

**TABLE 4.1**

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

**(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]

**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. [6]**

[illegible]

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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** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**[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. [6]**

[illegible]

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- 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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[illegible]

[illegible]

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**END OF QUESTION PAPER**

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