

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4341/01



S15-4341-01

COMPUTER SCIENCE

UNIT 1: Understanding Computer Science

A.M. WEDNESDAY, 3 June 2015

1 hour 30 minutes

For Examiner's use only	
Total	

4341
010001

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use pencil or gel pen. Do not use correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

If you run out of space, use the continuation pages at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

Quality of written communication will be assessed in question **13**.



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Answer **all** questions.

1. **Tick** (✓) the correct boxes below to show which **four** of the following items are usually found on the *Central Processing Unit (CPU)* of a personal computer. [4]

Hard disk drive	<input type="checkbox"/>
Controller	<input type="checkbox"/>
RAM	<input type="checkbox"/>
Internal memory	<input type="checkbox"/>
Arithmetic Logic Unit (ALU)	<input type="checkbox"/>
BIOS	<input type="checkbox"/>
Registers	<input type="checkbox"/>
ROM	<input type="checkbox"/>


2. (a) Complete the table below comparing the typical uses of **different** frequently used *backing storage*. [3]

The **first row** has been completed for you.

Backing storage	Typical use (Suitability)
Compact Disc	Storing and transferring music files or photographs
	Moving small files from work to home
External hard drive	
	Backing up a large commercial server



- (b) In the table below, put the different backing storage from **2(a)** in order of **access speeds**. Put the fastest first. [1]

Fastest  Slowest

Backing storage 1	Backing storage 2	Backing storage 3	Backing storage 4



3. A large comprehensive school has over 500 computers connected to their *Local Area Network (LAN)* with a connection to the Internet.

(a) Describe, **in detail**, **four disadvantages** for the school of having a network of computers compared to stand alone computers. [8]

Disadvantage 1

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Disadvantage 2

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Disadvantage 3

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Disadvantage 4

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(b) All staff and pupils have a unique *username* and a *password* to access the network.

State **three** rules that should apply to users' passwords to reduce the possibility of someone guessing a password. [3]

Rule 1

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Rule 2

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Rule 3

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(c) All pupil and staff files are stored on servers located in a secure server room.

(i) Describe the *user access levels* pupils should be given for their own files. [1]

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(ii) Describe the *user access levels* that should be given for files a teacher wants pupils to view, such as a homework task. [1]

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4. Below is an algorithm that uses *global* and *local* variables.

```

Algorithm FindTotal

Num1 is integer    {number input by user}
Num2 is integer    {number input by user}

    declare subprocedure AddTwoNum {procedure to find the total of two integers}

    Total is integer    {used to store the answer}

    start
        set Total = Num1 + Num2
        output "the total is", Total
    end

startmainprog

    output "type in first number"
    input Num1
    output "type in second number"
    input Num2
    call AddTwoNum

endmainprog

```

- (a) Write down an example of a *global variable* and a *local variable* from the algorithm above.

Global variable [1]

Local variable [1]

- (b) Explain the difference between global and local variables. [2]

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5. Computer programs require *translation* to execute.

(a) *Compilers* and *interpreters* translate high level programming languages into machine code. Describe the main differences between a compiler and an interpreter. [4]

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(b) State the main difference between an *assembler* and both a compiler and an interpreter. [1]

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6. Below is a representation of a black and white bitmap image consisting of **10 rows** and **8 columns** of pixels. The data for each pixel is stored as one bit with 0 representing white and 1 representing black.

The data about the pixels in each row is shown on the right hand side of each row.

Row 1								0000 0000
Row 2		1	1	1	1			
Row 3		1	0	0	0			0100 0000
Row 4		1	0	0	0			
Row 5		1	1	1				
Row 6		1	0	0	0			0100 0000
Row 7		1	0	0	0			0100 0000
Row 8		1	0	0	0			0100 0000
Row 9		1	0	0	0			0100 0000
Row 10								0000 0000

- (a) Write down the *data* for Rows 2, 4 and 5.

Row 2 [1]
Row 4 [1]
Row 5 [1]

- (b) State the number of bytes required to store the data for **one** row. [1]

.....

- (c) State the number of bytes required to store the data for the **whole picture**. [1]

.....

.....



(d) (i) A **different** image uses colour and each pixel can be one of 256 colours. State the number of bytes required to store the data for **one** pixel. [1]

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(ii) Calculate the number of bytes required to store the data for the **whole** picture on page 8 if it was a colour image with each pixel having 256 colours. You must show your workings. [2]

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7. (a) One facility of a *Software Development Environment* is to convert source code to machine code.

Name and briefly describe **four other** facilities commonly found in a Software Development Environment. [8]

Facility 1

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Facility 2

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Facility 3

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Facility 4

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(b) Give **two** examples of *private functions* or *subprograms* commonly stored in a programming library. [2]

Example 1

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Example 2

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8. (a) Complete the following *truth table*, for the logical **AND** operation, by writing **0** or **1** in the last column. *The first row has been completed for you.* [3]

A	B	A AND B
0	0	0
0	1	
1	0	
1	1	

- (b) Below are three 8-bit registers labelled **A**, **B** and **C**.

Carry out a logical **AND** operation on the bits in the registers **A** and **B** and write the result in register **C**. [2]

A

0	0	0	1	1	0	1
---	---	---	---	---	---	---

B

0	0	0	0	0	0	1
---	---	---	---	---	---	---

C

--	--	--	--	--	--	--

- (c) Describe the result produced in register **C** of performing a logical **AND** operation using the bit pattern in register **B** on any bit pattern in register **A**. [2]

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9. Identify and describe **four** roles of the operating system when managing the resources of a personal computer. [8]

Role 1

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Role 2

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Role 3

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Role 4

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10. Below is an algorithm.

```
Total is integer    {stores the total of the numbers input}
Mean is real        {stores the mean of the numbers input}
i is integer        {stores the loop control value}

startmainprog

    set Total = 0    {initialise variable}

    for i = 1 to 5

        set Total = Total + i

        output "Total is ", Total

    next i

    set Mean = Total / 5

    output "Mean is ", Mean

endmainprog
```

Write down **all** the outputs in the correct order produced by the algorithm.

[3]

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11. Computer programs sometimes contain errors.

Name **three different** types of error that could occur in a computer program. Give an example of **each** type of error. [6]

Error 1

Example

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Error 2

Example

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Error 3

Example

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12. (a) Convert the denary number **212** to a binary number with 8 bits. [2]

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(b) Convert the denary number **212** to hexadecimal. [2]

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(c) Convert the hexadecimal number **2F** to denary. [2]

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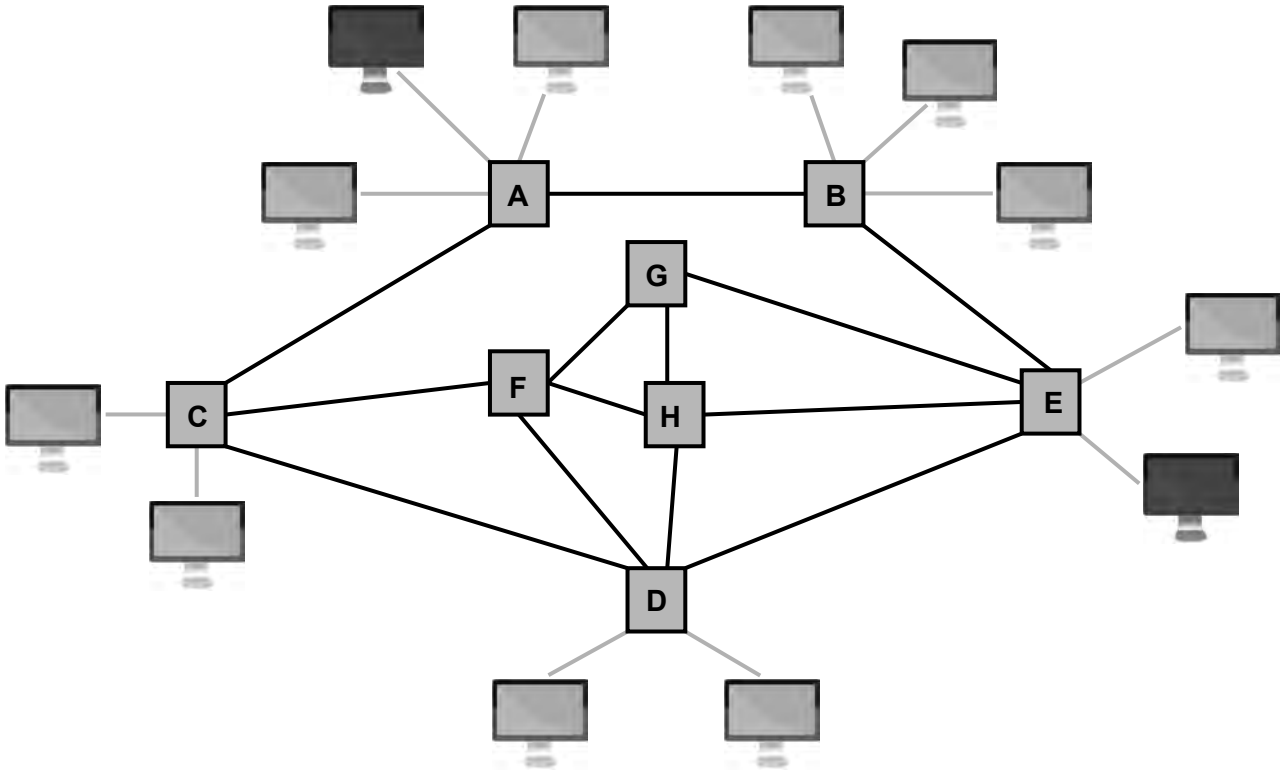
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TURN OVER FOR QUESTION 13



13. Below is a diagram of a *Wide Area Network (WAN)* such as the internet.

The nodes labelled **A** to **H** are managed by routers.



Data is transmitted on this WAN using *packet switching*.

Describe how data might be transmitted on this network, explaining:

- how *packet switching* and *routing* operates;
- the contents of a *packet*;
- the benefits of transmitting packets using routers.

[12]

Quality of written communication will be assessed in this question.

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Examiner
only

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