OCR
Oxford Cambridge and RSA

GCSE (9–1) Computer Science

J276/01 Computer systems

Monday 14 May 2018 – Morning

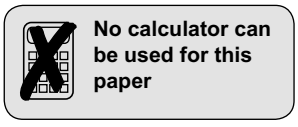
Time allowed: 1 hour 30 minutes

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.



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]

(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]

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.

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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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(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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(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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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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(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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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).