

Monday 16 May 2022 – Afternoon

GCSE (9–1) Computer Science

J277/01 Computer Systems

Time allowed: 1 hour 30 minutes

Do not use:
• a calculator



Please write clearly in black ink. Do not write in the barcodes.

Centre number

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Candidate number

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First name(s)

Last name

INSTRU

The 'How do I get 100% of the marks?' version



Answer all the questions.

1 Computers represent data in binary form.

(a) Tick (✓) one box in each row to identify the binary unit equivalent of each of the given file sizes.

File size	2 megabytes	2 petabytes	2 kilobytes	2 bytes	2 gigabytes
20				✓	
20		✓			
16					✓
4				✓	

(b) Cor

128 64 32 16 8 4 2 1

11011101

1

16 1
2 F
2 15

$$2 \times 16 = 32 + 15 = \underline{47}$$

(d) Cor

$$\begin{array}{r} 8421 \\ \times 8421 \\ \hline 10110000 \\ 110 \end{array}$$

BO

(e) Idei

16

(f) Per

.....
10001110
00010001

0001 0001



2 Complete the table by writing the missing definition or name of each of the common CPU components and registers.

CPU component or register	Definition
PROGRAM COUNTER	ion to be fetched from i-execute cycle.
RUNS THE F-E CYCLE	
MEMORY ADDRESS REGISTER	etched from or the I.
ARITHMETIC LOGIC UNIT	nd logical operations.

[4]



3 A library has a LAN (Local Area Network).

(a) The LAN allows access by both wired and wireless devices.

Users have reported that the network sometimes runs very slowly.

(i) Explain why the number of devices using the network at the same time can affect the performance of the network.

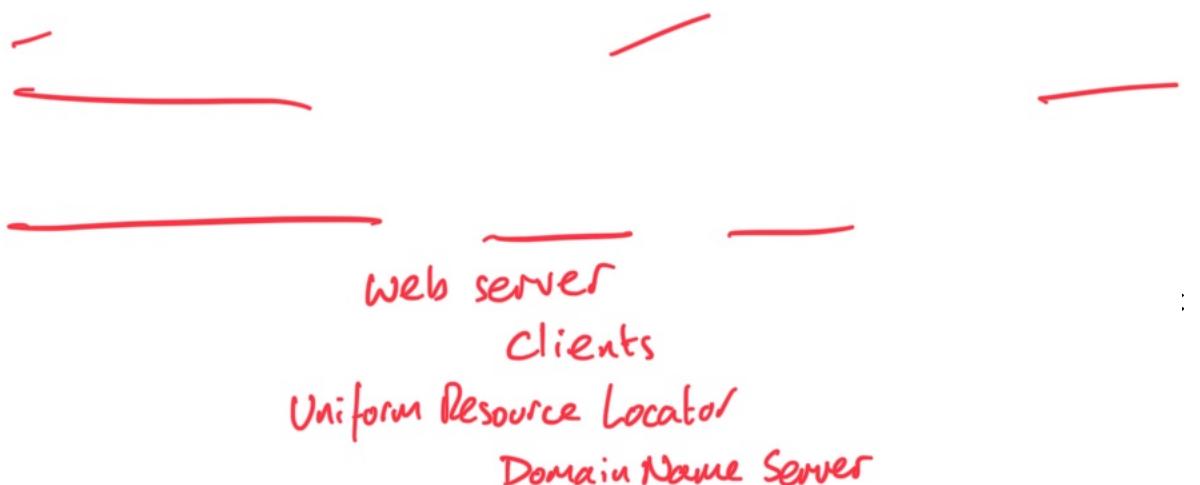
More devices means that bandwidth has to be split between them. As each device uses some of the bandwidth, more devices means each one gets a smaller share.

[3]

Interference from other electronic devices.

[1]

(b)



0 255
full stop

[7]



(c) The wired connection is an Ethernet connection. Ethernet is considered a standard.

Explain why Ethernet is a standard

Ethernet is used by most manufacturers to allow compatibility with other devices.

.....
.....
.....
.....
.....
.....

[2]

(d) TI

1d

1 Receive packets

.....
.....
.....
.....
.....
.....
.....
.....

[3]

2

Forward packets

3

Assign IP addresses to devices on the network

(e) TI

k.

G

1 To prevent data from being understood if it is intercepted.

2 To follow the Data Protection Act.

.....
.....
.....
.....
.....

[2]

(f) P

1c

SMTP

S

HTTPS

A

.....
.....
.....
.....
.....

[2]



4* Social networking websites use artificial intelligence (AI) to monitor posts from users.

Discuss the positive and negative uses of AI by social networking websites including:

- Legal issues
- Ethical issues
- Privacy issues



[8]



5 A software development company wants to protect their computer systems and data from unauthorised access.

(a) Identify two methods of physical security that the company could use to protect their computer systems.

CCTV

Locks on the door to prevent physical access

(b)

Passwords ✓

In order to access the data, the password would need to be entered correctly. The password could lock down a device if entered incorrectly 3 times.

Encrypt files.

This would mean that the contents of files would be scrambled. Therefore, if they were accessed, the data could not be understood.

[6]



(c) Tick (✓) one box on each row to identify the legislation that would cover each of the given events.

Event	The Data Protection Act (2018)	Computer Misuse Act (1990)	Copyright Designs and Patents Act (1988)
A company transmits personal data to another company without the individual's permission.	✓		
A school accidentally publishes their students' addresses on the school website.	✓		
The interface for a piece of software is replicated by a rival company.			✓
A user leaves a computer logged on and another person leaves them a message on their desktop.		✓	
A student guesses their teacher's password and accesses their computer account.		✓	

[5]



6 A student is creating a range of documents for a school project.

(a) The student records a podcast about computer science.

(i) Describe how an analogue sound wave is converted into digital form

The sound wave is sampled at regular time intervals. This sample is stored as a binary number.

[31]

(ii) T
h

will

[3]

(b) The st

(i) T

P

111

1c

7

.. [1]



(ii) Identify a second character set.

UNICODE

..... [1]

(c) The met:

Ident

- 1 ... HEIGHT
- 2 ... FILE TYPE
- 3 ... COLOUR DEPTH

[3]

(d) The

(i)

File size is reduced

Uploading the file to the email server would be quicker as the file size will be smaller.

[2]

(ii)

dent's

Because data would be removed permanently and so any text files would be very difficult to understand as they will have missing letters/ words.

[2]



7 A smart television allows the user to search the Internet and watch videos online.

(a) The smart television has both RAM and ROM.

(i) State the difference between RAM and ROM.

RAM is volatile, whilst ROM is non-volatile.

(ii) G

- 1 Application being run at present
- 2 Current programme being watched

(b) The smart television has both RAM and ROM.

(i) S

- .. To install software onto the TV which will need to be stored permanently when power is turned off and so they won't be lost.

(ii) Ic

cl

S

Magnetic storage.

J1

- .. The capacity of magnetic storage is high enough to record TV programmes, which will have large file sizes.
- .. Also the cost of magnetic storage is relatively low and so the TV would be cheaper to produce.

[4]

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).







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