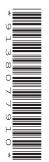
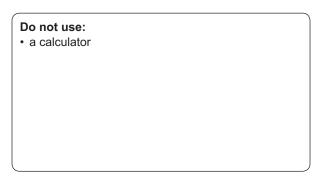


Monday 16 May 2022 – Afternoon GCSE (9–1) Computer Science

J277/01 Computer Systems

Time allowed: 1 hour 30 minutes







Please write clea	arly in	black	ink.	Do no	ot writ	e in the barcodes.		
Centre number						Candidate number		
First name(s)								
Last name								

INSTRUCTIONS

- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- · Answer all the questions.

INFORMATION

- The total mark for this paper is 80.
- The marks for each question are shown in brackets [].
- Quality of extended response will be assessed in questions marked with an asterisk (*).
- This document has 16 pages.

ADVICE

· Read each question carefully before you start your answer.

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
2000 bytes					
2000 terabytes					
16 bits					
4 nibbles					

[4]

(b)	Convert the denary number 221 into 8 bit binary. Show your working.	
(c)		
(d)	Convert the binary number 10110000 into hexadecimal.	
(e)	Identify how many unique values can be represented by 4 bits.	[1]
		[1]
(f)	Perform a binary shift of 3 places right on the binary number 10001110.	
		. [1]

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
	Stores the address of the next instruction to be fetched from memory. Increments during each fetch-execute cycle.
CU (Control Unit)	
	Stores the address of the data to be fetched from or the address where the data is to be stored.
	Performs mathematical calculations and logical operations.

[4]

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3

					4			
A lib	rary	has a LAN	l (Local Area N	letwork).				
a)	The	LAN allow	s access by b	oth wired	and wireless dev	vices.		
	Use	ers have re	ported that the	network :	sometimes runs v	very slowly.		
	(i)	-	rhy the number		es using the netw	ork at the san	ne time c	an affect the
								[3 _.
	(ii)	Identify o	ne other factor	r that can	affect the perforn	nance of the r	etwork.	
								[1
)	Cor				orary computers. websites using t		of terms.	Not all terms
	0	1	127	128	255	256	Colo	n
	Dor	nain Name	Server	Embed	ded systems	File serv	er	Full stop
	Нур	hen	Internet pro	tocol	MAC addres	s Roi	uter	
	Unit	form Reso	urce Locator	We	eb server	Clients		
	Αw	ebsite is h	osted on a				. The co	mputers that
	acc	ess the we	bsites are call	ed				
	The	user ente	rs the			into	a web bi	rowser. The
	web	browser s	sends a reques	st to the				for the
	mat	ching IP (I	nternet Protoc	ol) addres	s. If found the IP	address is re	turned. A	request is ther
	sen	t to this IP	address.					
	An	IPv4 addre	ss is made of	4 groups of	of digits. Each gr	oup can be be	etween th	ne denarv

values and The groups of digits are separated by a

......

[7]

(c)	The wired connection is an Ethernet connection. Ethernet is considered a standard.	
	Explain why Ethernet is a standard.	
		[2]
(d)	The network has several routers.	
	Identify three tasks carried out by a router.	
	1	
	2	
	3	
(e)	The library does not use encryption when data is transmitted through the network.	[3]
(c)	Give two reasons why the library should use encryption.	
	1	
	2	
	2	
		[2]
(f)	Protocols are used to transmit data through the network and over the internet.	
	Identify one protocol that can be used to perform each of the following tasks:	
	Send an email	
	Access a website securely	
		[2]

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 issuesEthical issues
Privacy issues

		го

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5

A software development company wants to protect their computer systems and data from

una	uthorised access.
(a)	Identify two methods of physical security that the company could use to protect their computer systems.
	1
	2
	[2]
(b)	Identify and describe two software-based security methods that the company can use to protect their computer systems and data.
	Method 1
	Description
	Method 2
	Description
	[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]

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A s	tuder	nt is creating a rang	ge of document	s for a school	l project.			
(a)	(a) The student records a podcast about computer science.							
	(i)	Describe how an	analogue soun	d wave is cor	nverted into dig	jital form.		
	(ii)	Tick (✓) one or n have on the soun		each row to ic	dentify the effe	ct(s) that each	change v	
		Chan	ige	File size increases	File size decreases	Accuracy increases	Accura decreas	
		Duration changes from 10 minutes to 20 minutes						
		Sample rate cha 44 kilohertz to 8						
		Bit depth change to 16 bits	es from 8 bits					
			-					
(b)	The	The computer sto	ores text using t	he ASCII cha	racter set.			
		Character	ASCII denar	у				
		D 4	77					
		M	77					
		N	78					
		N	78					

	(ii)	Identify a second character set.
(c)		student takes a photograph of their science experiment. The image file includes adata.
	lder	ntify three pieces of metadata that is often stored with an image.
	1	
	2	
	3	[3]
(d)	The	student compresses all their documents before emailing them to their teacher.
	(i)	Give two benefits of compressing the data before it is emailed.
		1
		2
		[2]
	(ii)	Explain why lossy compression may not be appropriate to compress all of the student's files.
		[2]

7

mart	television allows the user to search the Internet and watch videos online.				
The	smart television has both RAM and ROM.				
(i)	State the difference between RAM and ROM.				
	[1]				
(ii)	Give two examples of data that the smart television could store in RAM.				
	1				
	2 [2]				
The	smart television has secondary storage.				
	State, using an example, why the smart television needs secondary storage.				
()					
	[2]				
(ii)	Identify one appropriate type of secondary storage for the smart television. Justify your choice.				
	Secondary storage type				
	Justification				
	[4]				
	The (i) The (ii)				

END OF QUESTION PAPER

13 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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