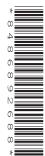




Cambridge IGCSE[™]

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COMPUTER SCIENCE

0478/12

Paper 1 Computer Systems

May/June 2024

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do not write on any bar codes.
- Calculators must **not** be used in this paper.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [].
- No marks will be awarded for using brand names of software packages or hardware.

This document has 12 pages. Any blank pages are indicated.



1 Data can be measured in bits.

(a)	Give the name of the data storage measurement that is equal to 8 bits.	F41
(b)	State how many bits there are in a kibibyte (KiB).	
(c)	Give the name of the data storage measurement that is equal to 1024 gibibytes (GiB).	
(d)	A 16-bit colour image has a resolution of 512 pixels wide by 512 pixels high. Calculate the file size of the image in kibibytes (KiB). Show all your working.	
	Answer KiB	[3]
Data	a can be transmitted from one device to another.	
(a)	Tick (✓) one box to show which of the terms is not a method for transmitting data.	
	A serial	
	B simplex	
	C parallel	
	D parity	
		[1]
(b)	Data is broken down into smaller units to be transmitted from one device to another.	
	Give the name of the unit that data is broken down into.	
		[1]

2

2

(ii)

3

(c) Data is often encrypted when it is transmitted from one device to another.

(i)	Explain how data is encrypted using symmetric encryption.	
	[4	<u>[</u>
(ii)	Give the purpose of encryption.	
	[1	1

3 Binary is a base 2 number system.

(a)	Give the name of the number system that is base 16.						
(b)		ee denary numbers are entered into a computer. The computer converts the numbers and					
	stor	es them as binary.					
	(i)	Give the binary number that would be stored for each of the denary numbers.					
		10					
		50					
		201[3]					
		Working space					
	/!! \						
	(ii)	Explain why the data is converted to binary by the computer.					
		[2]					
(c)	The	two binary integers 00110000 and 01100110 are added together.					
		the binary integers using binary addition and show your answer in binary. Show all your king.					
		হে					

4

5

(d) The denary integer –32 is stored as a two's complement integer. Calculate the two's complement integer that would be stored. Show all your working. A student uses both system software and application software on their computer. (a) Give one example of system software.[1] (b) Give two examples of application software. [2] (c) Describe the difference between system software and application software.



Instructions are processed by a control processing unit (CPLI) in a

Inst	ructions are process	sed by a central processin	g unit (CPU)) in a computer.				
(a)	Complete the paragraph about fetching an instruction into the CPU to be processed.							
	Use the terms from the list.							
	Some of the terms in the list will not be used. You should only use a term once.							
	address	arithmetic logic unit (ALI	J)	binary	control unit (CU)			
	current instruc	ction register (CIR)	data	denary	driver			
	fetch	interrupt	memory	address register	(MAR)			
	memory	data register (MDR)	rando	m access memo	ry (RAM)			
	read only	y memory (ROM)	secondar	y storage	signal			
	The program coun	ter contains the						
	of the next instruction to be processed; this is then sent to the							
	using the address bus. The address is the							
	sent to the							
	Once the address is received, the instruction stored at the location is							
	sent to the, using the							
bus. The instruction is t					en			
	sent to the			that is built int	o the			
					[7]			
(b)	The CPU uses an	instruction set to decode the	ne instructio	n.				
	State what is mean	nt by an instruction set.						
					[1]			

6



The table contains statements about error detection methods.

Complete the table by giving the correct error detection method for each statement.

7

error detection method	statement
	An odd or even process can be used.
	A value is calculated from the data, using an algorithm. This happens before and after the data is transmitted.
	A copy of the data is sent back to the sender by the receiver.
	Acknowledgement and timeout are used.
	A value is appended to data that has been calculated using the data. This value is checked on data entry.

		on data entry.	
			[5]
Α	comp	uter has both a media access control (MAC) address and an internet protocol (IP) add	ress.
(a	a) Tic	k (✓) one box to show which of the statements is correct about the MAC address.	
	Α	It is assigned by the manufacturer.	
	В	It is assigned by a router.	
	С	It can be static or dynamic.	
	D	It is made up of three different parts.	
			[1]
(k	o) An	IP address can have an IPv4 or IPv6 format.	
	(i)	Give an example of an IP address that has an IPv4 format.	
			[1]
	(ii)	Give two characteristics of the IPv6 format.	
		1	

[2]

8

- A company has a website that is suffering a distributed denial of service (DDoS) attack.
 - (a) Draw and annotate a diagram to show the process of the DDoS.

(b) Identify a solution that can be used to help prevent the DDoS attack being successful.

[5]

DO NOT WRITE IN THIS MARGIN

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* 0019654976409 *

A company uses both solid-state and optical secondary storage.

(a)	Explain why a computer needs secondary storage.
	[2]
(b)	Describe three differences between solid-state and optical storage.
	1
	2
	3

9

[6]

10 A garage uses an expert system to help diagnose any problems with cars that need repair.

(a) The expert system is an example of artificial intelligence (AI).

	Describe what is meant by AI.
	[2]
(b)	A car has a problem with its braking system, so it is brought into the garage.
	Explain how the expert system operates and how it is used to help diagnose the problem.
	I.E.

* 0019654976411 *

11

11 A company has a website. Users use the internet and the world wide web to access the website.

(a)	Describe the difference between the internet and the world wide web.	
		. [2]
(b)	The website has a uniform resource locator (URL). The URL has three different parts.	
	Identify the three different parts that are included in the URL.	
	1	
	2	
	3	
		[3]
(c)	One function of a web browser is to provide an address bar for a user to enter a URL.	
	Give three other functions of a web browser.	
	1	
	2	
	3	

[3]

12

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