Pearson Edexcel

Mark Scheme

Specimen Set 1

Pearson Edexcel GCSE In Computer Science (1CP2)
Paper 01: Principles of Computer Science

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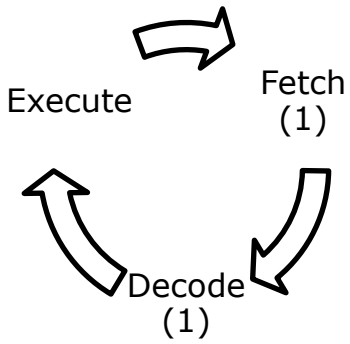
Paper 1 Mark Scheme

Question Number	Answer	Additional Guidance	Mark
1(a)	Any **two** from: • Copyright • Patents • Trademarks • Licensing • Non-disclosure agreement • Limit access to sensitive information • Awareness training for employees		**2**

Question Number	Answer	Additional Guidance	Mark
1(b)	B Algorithmic bias *A is not correct because AUPs are not an ethical issue associated with the use of artificial intelligence* *C is not correct because logic errors are not an ethical issue associated with the use of artificial intelligence* *D is not correct because unpatched software is not an ethical issue associated with the use of artificial intelligence*		**1**

Question Number	Answer	Additional Guidance	Mark
1(c)	Any **one** from: • Reduce use • Responsible Disposal (to prevent leaking chemicals) • Recycling • Reuse • Replace devices less frequently • Use power-saving options (such as black screen)		**1**

Question Number	Answer	Additional Guidance	Mark
1(d)	An explanation to include **two** from: It increases the risk to data / reduces cybersecurity (1) because the sender could be using social engineering techniques / the link could lead to a malicious website / could download malware (1)		**2**

Question Number	Answer	Additional Guidance	Mark
2(a)i			**2**

Question Number	Answer	Additional Guidance	Mark
2(a)ii	C Data bus *A is not correct because binary shift is not a hardware component.* *B is not correct because the control unit does not carry instructions from memory to the CPU* *D is not correct because registers do not carry instructions from memory to the CPU*		**1**

Question Number	Answer	Additional Guidance	Mark
2(a)iii	Arithmetic logic unit / ALU		**1**

Question Number	Answer	Additional Guidance	Mark
2(a)iv	More instructions can be carried out each second		**1**

Question Number	Answer	Additional Guidance	Mark
2(a)v	Address (bus)		**1**

Question Number	Answer	Additional Guidance	Mark
2(b)	Any **two** from: There is a magnetic/chemical coating on surface of the media (1) The magnetic state/polarity of the chemical can be changed (1) to represent a 0 or 1 (1)		**2**

Question Number	Answer	Additional Guidance	Mark
2(c)	Optical		**1**

Question Number	Answer	Additional Guidance	Mark
2(d)	Converting (human readable) code to binary/machine code		**1**

Question Number	Answer	Additional Guidance	Mark
2(e)	**Two** linked descriptions from: • A compiler carries out translation once prior to execution (1) whereas an interpreter carries out translation every time the program executes (1) • A compiler produces a stand-alone executable file (1) whereas an interpreter is required each time the code is run (1) • A compiler reports errors after translation is complete (1) whereas an interpreter reports errors as they occur (1)	Both items in the question must be addressed in each response	**4**

Question Number	Answer	Additional Guidance	Mark
2(f)	**Two** linked descriptions from: • Uses paging / allocates addresses/sections [of RAM] (1) to share memory between processes (1) • Extends main memory (1) by using part of secondary storage (1) (as virtual memory) • The memory of inactive processes (1) is stored in virtual memory and swapped back when the process becomes active (1) • Uses scheduling algorithm (1) to share processing time between competing processes (1)		**4**

Question Number	Answer	Additional Guidance	Mark
2(g)	A description to include **two** from: If set pressure levels / moisture levels are reached (1) a switch could be turned on/off / windscreen wipers could be turned on/off/ / (wiper) motor speed altered (1).		**2**

Question Number	Answer	Additional Guidance	Mark
3(a)	Breaking down a problem/solution/system/algorithm		**1**

Question Number	Answer	Additional Guidance	Mark
3(b)	The target item is not in the list / is at end of the list		**1**

Question Number	Answer	Additional Guidance	Mark
3(c)i	5		**1**

Question Number	Answer	Additional Guidance	Mark
3(c)ii	0		**1**

Question Number	Answer	Additional Guidance	Mark
3(c)iii	Variable	Accept words that describe a use of variable in this case, e.g. flag	**1**

Question Number	Answer	Additional Guidance	Mark
3(c)iv	1		**1**

Question Number	Answer	Additional Guidance	Mark
3(c)v	Looping over every item in a data structure		**1**

Question Number	Answer	Additional Guidance	Mark
3(d)	An explanation to include **two** from: • The subprogram may be used more than once in a program (1) so that writing, debugging, testing will save time (1) • The subprogram performs one specific/contained task (1) so it can be moved away from the main program code (1) • Subprograms for common tasks can be stored in libraries and reused in other programs (1) so that they don't have to be re-written (1)		**2**

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>3(e)</td><td>One mark for each correct column

<table>
<tr><th>A</th><th>B</th><th>C</th><th>(A AND B)</th><th>(NOT C)</th><th>(A AND B) OR (NOT C)</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr>
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Question Number	Answer	Additional Guidance	Mark
3(f)	An explanation to include **two** from: An integer is returned with `//` (1) because • `len(plants)` could be an odd number (1) • the value for position has to be an integer / not a decimal (1) e.g. If the length of the array is an odd number, normal division will return a real number (1) (which is not acceptable because) index values are integers (1)		**2**

Question Number	Answer	Additional Guidance	Mark
3(g)	Any **two** from: • Number of legs • Number of antennae • Length / width / size • Number of wings • Size of head • Shape of body • Number of eyes • Size of mouth • Habitat	Accept any appropriate feature. Award two marks from the same bullet point for the identification of two different features e.g. number of legs (1), legs jointed/unjointed (1)	**2**

Question Number	Answer	Additional Guidance	Mark
4(a)	C Multiplication *A is not correct because addition does not result from a single logical shift left* *B is not correct because division does not result from a single logical shift left* *D is not correct because subtraction does not result from a single logical shift left*		**1**

Question Number	Answer	Additional Guidance	Mark
4(b)	1 mark for each nibble 1101 1111		**2**

Question Number	Answer	Additional Guidance	Mark
4(c)	1 mark for each nibble 1110 0111		**2**

Question Number	Answer	Additional Guidance	Mark
4(d)	1 mark for each nibble 0010 1010		**2**

Question Number	Answer	Additional Guidance	Mark
4(e)i	The smallest single point of colour in an image / picture element / the smallest element of a bit-mapped image		**1**

Question Number	Answer	Additional Guidance	Mark
4(e)ii	A description to include **two** from: Increasing the number of bits used for each pixel (1) allows more colours to be represented in each pixel (1) OR increasing the number of bits allows more pixels to be used (1) providing a greater level of resolution (1) OR Decreasing the number of bits used for each pixel (1) allows fewer colours to be represented in each pixel (1) OR Decreasing the number of bits allows fewer pixels to be used (1) providing a reduced level of resolution (1)		**2**

Question Number	Answer	Additional Guidance	Mark
4(f)i	Amplitude		**1**

Question Number	Answer	Additional Guidance	Mark
4(f)ii	One mark for the benefit: • Increases the accuracy of the representation (1) One mark for a drawback from: • Increases the amount of storage required (1) • Increases the time it takes to download the audio file (1)	Do not accept increases the quality	**2**

Question Number	Indicative content
4(g)	• Compression reduces data used to represent the original sound • Both types require encoding and decoding • Lossy compression reduces the accuracy of the representation • (Lossless - Reverse) • Lossy compression increases the reduction in file size. • (Lossless - Reverse) • Lossy better for online transmission of sound, e.g. streaming technologies as it takes less time to download / can facilitate access by users with low-speed connections. • Lossy better for cases where limited storage available, e.g. embedded systems (toys/cards) • Lossless better for physical media (CDs), since it supports high quality audio. • Lossy audio removes data representing frequencies that humans cannot hear (or are masked) so they cannot tell the difference • Lossy compression can be variable so that different amounts of compression can be offered depending on a user's bandwidth.

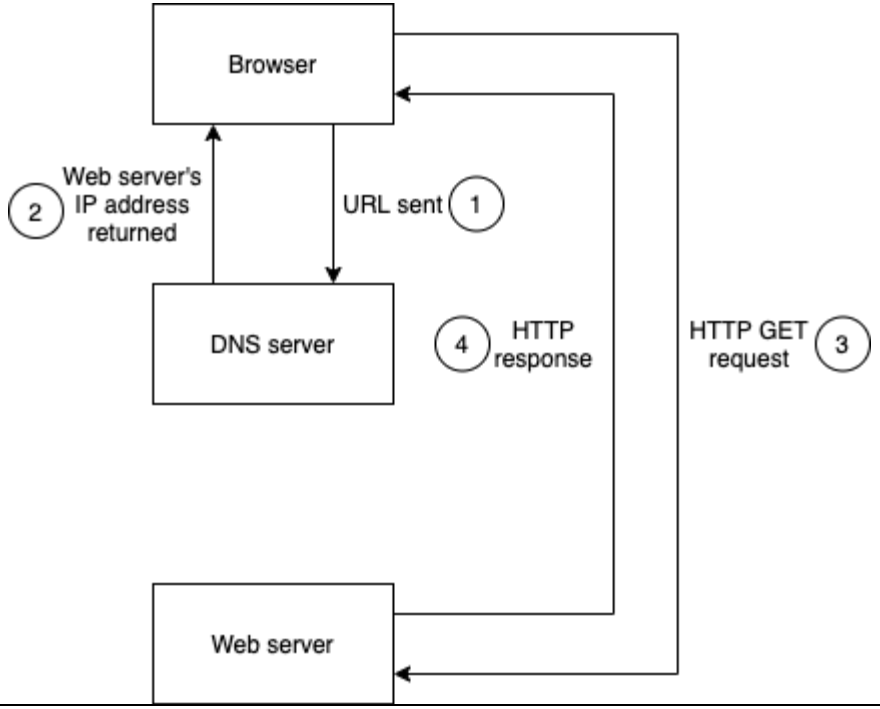
Level	Mark	Descriptor
	0	No rewardable content.
Level 1	1–2	Basic, independent points are made, showing elements of understanding of key concepts/principles of computer science. (AO1) The discussion will contain basic information with little linkage between points made or application to the context. (AO2)
Level 2	3–4	Demonstrates adequate understanding of key concepts/principles of computer science. (AO1) The discussion shows some linkages and lines of reasoning with some structure and application to the context. (AO2)
Level 3	5–6	Demonstrates comprehensive understanding of key concepts/principles of computer science to support the discussion being presented. (AO1) The discussion is well developed, with sustained lines of reasoning that are coherent and logically structured, and which clearly apply to the context. (AO2)

Question Number	Answer	Additional Guidance	Mark
5(a)	B Identifies devices on a network *A is not correct because unique IP addresses do not enable a firewall to protect devices* *C is not correct because unique IP addresses do not increase the speed of transmission* *D is not correct because unique IP addresses do not reduce the reliance on the transport layer*		**1**

Question Number	Answer	Additional Guidance	Mark
5(b)	If the main cable fails / is damaged (1) the whole network will fail (1) If more computers are connected (1) the transmission time is increased / increased chance of data collisions (1) Every computer receives all of the data on the network (1) causing a security risk (1)		**2**

Question Number	Answer	Additional Guidance	Mark
5(c)	An explanation to include **one** mark for a type of access and **one** mark for a linked reason, such as: • To recommend read only (1) because the student cannot accidentally change/delete the data / because the student cannot share the data (1) • No access (1) because the student cannot see any sensitive/irrelevant information (1)		**2**

Question Number	Answer	Additional Guidance	Mark
5(d)	Total number of bits: • 250 x 1024 x 1024 (1) • x 8 (1) 3600 as denominator (1) Award all marks for the correct answer (582,542bps) Example expression: (250 x 1024 x 1024 x 8) / 3600	Ignore conversion to Mbps etc. Award equivalent expressions.	**3**

Question Number	Answer	Additional Guidance	Mark
5(e)	A drawing to include **six** from: • Label showing IP address being returned to browser • Arrow from Browser to Web server • HTTP GET request labelled • Arrow from Web server to Browser • HTTP response labelled • Correct order shown  		**6**