Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Centre Number ☐☐☐☐☐

Candidate Number ☐☐☐☐

Monday 11 May 2020

Morning (Time: 1 hour 40 minutes)

Paper Reference **1CP1/01**

Computer Science

Paper 1: Principles of Computer Science

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You are not allowed to use a calculator.

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

Pearson

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 A computer game designer is creating a new game.

(a) Colours in the game are represented in hexadecimal.

Convert the binary numbers in this table to hexadecimal.

(3)

	Hexadecimal
1101 1110	
1010 1111	
1100 0100	

(b) Convert the hexadecimal number 12 to binary and the result from binary to denary.

(2)

Binary

....

....

Denary

....

....

(c) State what is meant by the term 'image resolution'.

(1)

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(d) Computers use binary to represent colour.

Compare the use of 8 bits and 24 bits to represent colour.

(3)

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(e) The game uses black and white as well as colour images.

Explain the effects of using a run-length encoding (RLE) algorithm on the black and white images used in the game.

(3)

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(Total for Question 1 = 12 marks)

2 There are security concerns associated with cloud storage.

(a) State **one** way in which providers of cloud storage could prevent security breaches by their own employees.

(1)

(b) Identify **one** way in which cloud storage users can improve the security of their data.

(1)

☒ **A** Authentication

☒ **B** Compression

☒ **C** Decomposition

☒ **D** Virtualisation

(c) Explain why data on networks is encrypted.

(2)

(d) Describe how a Caesar cipher algorithm works.

(2)

(e) Explain why cloud storage companies often locate their servers in cold countries to protect the environment.

(3)

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(Total for Question 2 = 9 marks)

3 Gemma manages a network for an organisation.

(a) Two computers are assigned the same IP address.

Explain why Gemma must change the IP address of one of the computers.

(2)

(b) Identify the network topology that requires a server.

(1)

☒ **A** Bus

☒ **B** Mesh

☒ **C** Ring

☒ **D** Star

(c) The network transfers data at 3 Gbps.

Construct an expression to show how many bytes can be transmitted in 10 seconds.

You do not need to carry out the calculation.

(3)

(d) Identify the number of bits in a nibble.

(1)

☒ **A** 2

☒ **B** 4

☒ **C** 8

☒ **D** 16

(e) Identify the type of software used to compress files.

(1)

☒ **A** Backup

☒ **B** Utility

☒ **C** Security

☒ **D** Network

(f) Identify the email protocol.

(1)

☒ **A** FTP

☒ **B** HTTP

☒ **C** SMTP

☒ **D** TCP/IP

(g) State the role of an ISP.

(1)

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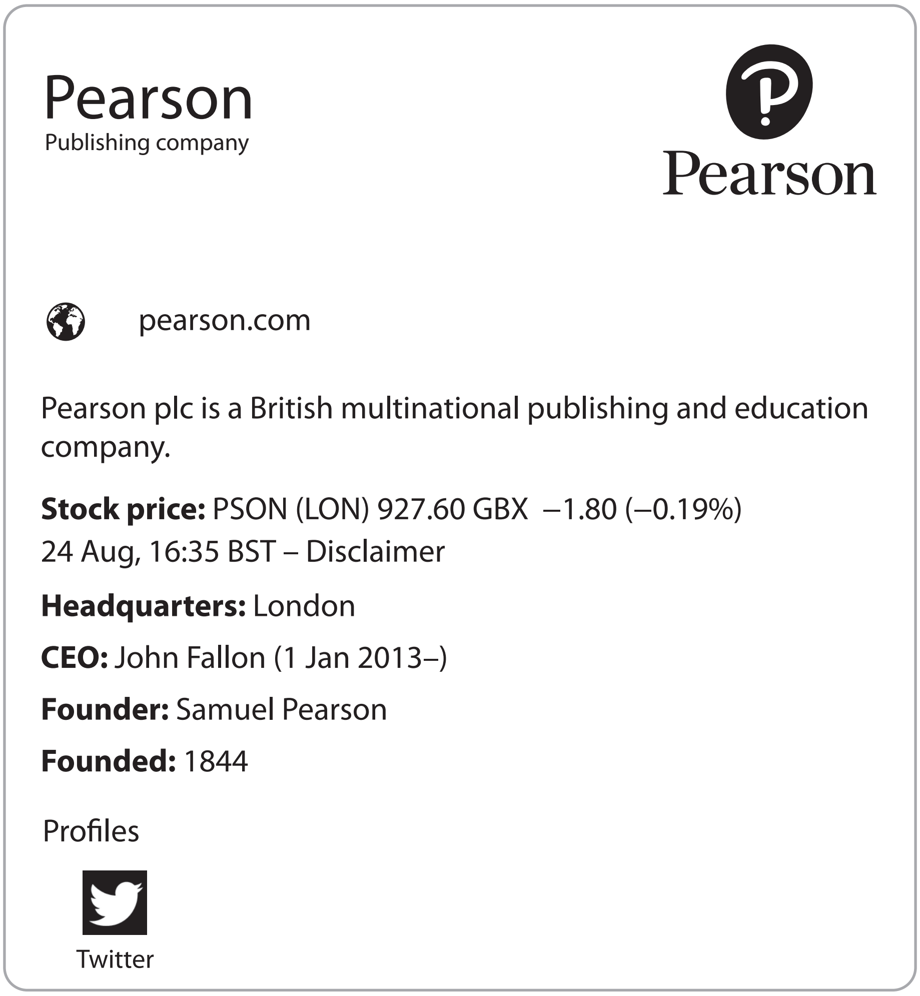
....

(h) A search engine selects information taken from the results of a search for 'Pearson'. The information is displayed here as a 'knowledge graph'.



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Headquarters: London

CEO: John Fallon (1 Jan 2013–)

Founder: Samuel Pearson

Founded: 1844

Profiles

Identify the property of the data that allows this information to be selected.

(1)

☒ **A** Formatted

☒ **B** Hyperlinked

☒ **C** Structured

☒ **D** Virtualised

(Total for Question 3 = 11 marks)

4 (a) When developing a computer system, requirements are investigated.

State **one** requirement that must be investigated.

(1)

....

(b) Complete this truth table.

(4)

A	**B**	**NOT (A OR B)**
1	1	
0		0
		1
1	0	

(c) Name the type of main memory used to store a computer's startup process.

(1)

....

(d) Give **two** examples of where software is used to simulate or model aspects of the real world.

(2)

1 ....

....

2 ....

....

(e) Explain why solid state storage is the best choice for a fitness tracker.

(2)

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(Total for Question 4 = 10 marks)

5 (a) Identify **one** component common to all computers.

(1)

☒ **A** Disk drive

☒ **B** Graphics card

☒ **C** Processor

☒ **D** Screen

(b) State **two** components of the CPU.

(2)

1 ....

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2 ....

....

(c) Describe how the CPU and main memory work together.

(4)

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(d) Compare the use of a compiler with the use of an interpreter to translate code.

(6)

(Total for Question 5 = 13 marks)

6 Joe plays online games using the world wide web.

(a) A sequence of processes is required to open a web page.

Describe this sequence of processes.

(4)

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(b) The web page uses a merge sort to display high scores.

Describe how a merge sort works.

(4)

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(c) A bubble sort is carried out on this list.

5	2	4	1	9	3	7

(i) State the number of comparisons that will be made on the first pass.

(1)

....

(ii) State the number of swaps that will be made on the first pass.

(1)

....

(iii) State the number of passes that will be made.

(1)

....

(iv) State the condition that will cause the algorithm to end.

(1)

....

(d) A sorted data set contains millions of items.

State why a binary search algorithm would be preferable to a linear search algorithm for use with this data set.

(1)

....

(Total for Question 6 = 13 marks)

7 A computer operates as a binary digital device.

(a) Explain why binary is used to represent computer data.

(2)

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....

(b) 8-bit two’s complement is used to represent the denary numbers -8 and -1.

Complete the table to show the binary addition on these two negative numbers.

(2)

-8								
-1								
Result								

(c) Explain why it is **not** possible to apply two’s complement to the 8-bit unsigned integer 1111 1101.

(2)

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....

(d) A musician wants to store hundreds of audio files to cloud storage.

She wants to compress the files before she stores them.

Compare using a lossless compression algorithm with using a lossy compression algorithm for this purpose.

(6)

Turn over ▶

(Total for Question 7 = 12 marks)

TOTAL FOR PAPER = 80 MARKS