Paper reference 1CP2/01
Pearson Edexcel
Level 1/Level 2 GCSE (9-1)

Total Marks

COMPUTER SCIENCE
PAPER 1: PRINCIPLES OF COMPUTER SCIENCE

Time: 1 hour 30 minutes

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

Y67312A

Pearson

YOU MUST HAVE

Nil

YOU WILL BE GIVEN

A separate Data Book.

You do not need any other materials.

INSTRUCTIONS

- **Answer ALL questions.**
- **Answer the questions in the spaces provided in this Question Paper or in the Data Book – there may be more space than you need.**
- **You are not allowed to use a calculator.**

INFORMATION

- **The total mark for this paper is 75.**
- **The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.**

(continued on the next page)

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.**

ANSWER ALL QUESTIONS.
WRITE YOUR ANSWERS IN THE SPACES PROVIDED.

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 ☒.

Question 1 is on the next page

1. NETWORKS

(a) Devices are connected to networks.

(i) Give TWO reasons for connecting computers in a network.
(2 marks)

REASON 1 _____

_____

_____

_____

REASON 2 _____

_____

_____

_____

(continued on the next page)

Question 1 (a) continued

(ii) Describe ONE way a local area network (LAN) is different from a wide area network (WAN).
(2 marks)

(continued on the next page)

Question 1 (a) continued

(iii) A network has a speed of 17.08 megabits per second.

Identify the equivalent speed in bits per second.
(1 mark)

☐ A 17 080

☐ B 17 080 000

☐ C 17 080 000 000

☐ D 17 080 000 000 000

(continued on the next page)

Question 1 (a) continued

(iv) Define the term ‘latency’.
(1 mark)

(continued on the next page)

Question 1 continued

(b) Data is split up into packets for transmission over a network.

(i) Each device on a network has a unique identifier that is used when sending or receiving packets of data.

State the name of the unique identifier.
(1 mark)

(continued on the next page)

Question 1 (b) continued

(ii) Identify the item included between the header and the footer in a data packet.
(1 mark)

☐ A Data being sent

☐ B Destination address

☐ C Packet number

☐ D Public key

(continued on the next page)

Question 1 continued

(c) Describe how a firewall protects a local area network (LAN).
(2 marks)

(continued on the next page)

Question 1 continued

(d) State the name of an email protocol.
(1 mark)

_____

_____

(continued on the next page)

Question 1 continued

(e) Explain ONE disadvantage of using a star network topology.
(2 marks)

(Total for Question 1 = 13 marks)

2. COMPUTERS

(a) Some low – level programming languages use mnemonics.

(i) State the purpose of a mnemonic.
(1 mark)

(ii) State the type of low – level programming language that uses mnemonics.
(1 mark)

(continued on the next page)

Question 2 (a) continued

(iii) Mnemonics are one characteristic of some low – level languages. Describe ONE OTHER characteristic of a low – level language.
(2 marks)

(continued on the next page)

Question 2 (a) continued

(iv) State the name of the high – level programming language translator that executes a line of code immediately after translating it.
(1 mark)

_____

_____

(continued on the next page)

Question 2 continued

(b) State the TWO items held in RAM according to the von Neumann architecture.
(2 marks)

ITEM 1 _____

_____

ITEM 2 _____

_____

(continued on the next page)

Question 2 continued

(c) Data can be stored in different ways.

(i) Describe how data is stored on optical media.
(2 marks)

(continued on the next page)

Question 2 (c) continued

(ii) State the type of secondary storage that stores data as electric charges.
(1 mark)

_____

_____

(continued on the next page)

Question 2 continued

(d) An embedded computer system is part of a larger machine.

State TWO characteristics of embedded systems that make them different from general purpose computers.
(2 marks)

CHARACTERISTIC 1 _____

_____

_____

_____

CHARACTERISTIC 2 _____

_____

_____

_____

(continued on the next page)

Question 2 continued

(e) Identify TWO reasons for using data compression.
(2 marks)

☐ A Reduces data transfer times

☐ B Reduces disk fragmentation

☐ C Reduces required storage space

☐ D Reduces the chance of data being hacked

☐ E Reduces the need for error detection and correction

(continued on the next page)

Question 2 continued

(f) Robust software must be free from vulnerabilities before it is released to users. Programming bugs are one type of vulnerability.

State TWO OTHER types of vulnerability.
(2 marks)

VULNERABILITY 1 _____

_____

_____

_____

VULNERABILITY 2 _____

_____

_____

_____

(continued on the next page)

Question 2 continued

(g) Some users are given administrator privileges.

Explain ONE way an operating system allows an administrator to manage users.
(2 marks)

(Total for Question 2 = 18 marks)

3. DATA

(a) Computers manipulate binary patterns. Patterns can represent signed or unsigned integers.

(i) Convert the denary number 57 to 8 – bit binary.
(2 marks)

(continued on the next page)

Question 3 (a) continued

(ii) Convert the binary number 0010 1101 to hexadecimal. (2 marks)

(continued on the next page)

Question 3 (a) continued

(iii) Describe the process of converting a binary number to two's complement.
(2 marks)

(continued on the next page)

Question 3 (a) continued

(iv) Explain what has happened as a result of adding these two 8 – bit binary numbers. (2 marks)

	1	0	1	1	0	0	0	1	
	1	0	1	0	1	1	0	0	+
1	0	1	0	1	1	1	0	1	

(continued on the next page)

Question 3 continued

(b) After applying compression to a file, the original contents cannot be reconstructed fully.

State the type of compression used on the file.
(1 mark)

_____

_____

(continued on the next page)

Question 3 continued

(c) Data can be encoded using ASCII.

Describe ASCII.
(2 marks)

(continued on the next page)

Question 3 continued

(d) A pixel is the smallest element in a bitmap image.

(i) Two images are displayed on the same screen.
One image is
1280 × 720 pixels.
The second image is
1920 × 1080 pixels.
The second image has a higher resolution.

State ONE reason why the second image will be displayed in more detail.
(1 mark)

Question 3 (d) continued

(ii) A 10 – colour bitmap image uses 15 – bit colour depth. The image is 1028 pixels wide and 640 pixels high.

Complete the expression to show the minimum file size for the image in MiB.

You do not have to do the calculation.
(4 marks)

$$\frac{\square}{\square} \times \frac{\square}{\square} \times \frac{\square}{\square}$$

$$\frac{\square}{1024} \times \frac{\square}{\square} \times \frac{\square}{\square}$$

(Total for Question 3 = 16 marks)

4. ISSUES AND IMPACT

(a) Explain ONE reason why files should be backed up regularly. (2 marks)

(continued on the next page)

Question 4 continued

(b) Consent must be obtained before organisations can use personal data.

Give TWO pieces of information that organisations must tell people when requesting consent to use their personal data.
(2 marks)

INFORMATION 1 _____

_____

_____

_____

INFORMATION 2 _____

_____

_____

_____

(continued on the next page)

Question 4 continued

(c) Police forces use algorithms to help decide how many officers to deploy and where to send them.

Discuss how algorithmic bias can affect the decisions police forces make.

Your answer should consider:

- the cause of algorithmic bias
- the impact on individuals and communities of algorithmic bias
- the methods available to reduce the risk of algorithmic bias.

(6 marks)

Answer space continues on the next 4 pages

Question 4 (c) continued

(continued on the next page)

Question 4 (c) continued

(continued on the next page)

Question 4 (c) continued

(continued on the next page)

Question 4 (c) continued

(Total for Question 4 = 10 marks)

5. COMPUTATIONAL THINKING

(a) Look at the algorithm for Question 5 (a) in the separate Data Book.

It shows an algorithm that prints colours.

(i) State the type of data structure used to hold the ink colours.
(1 mark)

(ii) Give the contents of inkColours[2]
(1 mark)

(continued on the next page)

Question 5 (a) continued

(iii) State the name of the computational thinking technique used by the subprogram displayAll() to hide the logic of printing. (1 mark)

_____

_____

(continued on the next page)

Question 5 (a) continued

(iv) State the name of the computational thinking technique used when separating logic into different blocks, such as the subprogram and the main program.
(1 mark)

_____

_____

(continued on the next page)

Question 5 continued

(b) Look at the algorithm for Question 5 (b) in the separate Data Book.

This algorithm searches a sorted array of numbers for a target value. The target value may or may not be in the array.

The use of the **found** variable helps to make the algorithm efficient.

Describe how the use of the **passed** variable also helps to make the algorithm efficient.
(2 marks)

(continued on the next page)

Question 5 (b) continued

(continued on the next page)

Question 5 continued

(c) Look at the information and table for Question 5 (c) in the separate Data Book.

Laura owns a fruit shop.

This program checks the weight of boxes of strawberries from Laura's shop.

The inputs are 404, 393, 395, 405.

Complete the trace table showing the execution of the program with these inputs.

You may not need to fill in all the rows in the table.
(6 marks)

(continued on the next page)

Question 5 continued

(d) An algorithm is required that allows a user to enter two numbers. The algorithm then informs the user which number is greater, or whether the two numbers are equal. The algorithm is expressed in a flowchart.

Using the blank space for Question 5 (d) in the separate Data Book, draw a flowchart to show this algorithm.

There are some flowchart symbols on the next page.
(6 marks)

(continued on the next page)

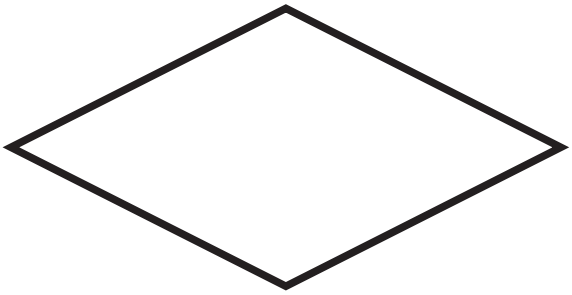
Question 5 (d) continued

Here are some flowchart symbols:

Terminator

Process

Decision



Input / Output

(Total for Question 5 = 18 marks)

TOTAL FOR PAPER = 75 MARKS

END OF PAPER