

Pearson Edexcel style

Pearson Edexcel GCSE (9–1) Computer Science

Paper 1: Principles of Computer Science – Practice Paper

1CP2/01 · Practice paper

Time allowed: 1 hour 30 minutes

Candidate name	
Centre number	
Candidate number	

Materials

- Black ink or ball-point pen
- You do not need any other materials.
- You must not use a calculator.

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 must not use a calculator.
- For multiple-choice questions, mark your answer with a cross ☒. If you change your mind, put a line through the box ☒ and then mark your new answer with a cross ☒.

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.
- 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.

Original practice material written by Teach io in the style of Pearson Edexcel Pearson Edexcel GCSE (9–1) Computer Science (1CP2). It is not produced, approved or endorsed by Pearson Edexcel.

Answer ALL questions.

Write your answers in the spaces provided. Some questions must be answered with a cross in a box ☒.

1 This question is about computational thinking.

(a) Which flowchart symbol is used to represent an input or an output?

Tick (✓) one box.

A	Diamond	
B	Rectangle	
C	Parallelogram	
D	Rectangle with rounded ends	

(1)

(b) A program is written to analyse the scores from a quiz.

```
1 scores = [12, 18, 7, 25, 18, 30]
2 total = 0
3 above = 0
4 for index in range(len(scores)):
5     total = total + scores[index]
6     if scores[index] >= 18:
7         above = above + 1
8 print(total, above)
```

(i) State the output of the program when it is run.

(2)

(ii) Identify the data type of the variable total.

.....

(1)

(iii) Complete the trace table for the program. The first row and the first two columns have been completed for you.

index	scores[index]	total	above
0	12	12	0
1	18		
2	7		
3	25		
4	18		

index	scores[index]	total	above
5	30		

(4)

(c) A merge sort can be used to put a list into order.

(i) Give one advantage of a merge sort compared with a bubble sort.

.....

(1)

(ii) The list shows some data items.

29 4 17 11 35 8 22 15

Show the stages of a merge sort to put the list into ascending order.

.....

(3)

(d) Complete the truth table for the expression $P = (A \text{ AND } B) \text{ OR NOT } C$

A	B	C	P
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

(3)

(e) This program should display the average of the three numbers, 9.0, but it displays 19.0. Identify the error and give the corrected code.

```
# Calculate the average of three numbers
num1 = 6
num2 = 9
num3 = 12
average = num1 + num2 + num3 / 3
print(average)
```

(2)

(Total for Question 1 = 17 marks)

2 This question is about data.

(a) Convert the denary number 158 to 8-bit binary.

(1)

(b) Convert the hexadecimal number A9 to denary.

(1)

(c) Convert the denary number –83 to 8-bit two's complement binary.

(2)

(d) The 8-bit unsigned binary number 01001110 is shifted using a logical shift left by two places.

(i) Give the result of the shift.

(1)

(ii) Explain why the result is not four times the original value.

(1)

(e) Two 8-bit unsigned binary numbers are added together.

11001011 + 01011110

(i) Give the 8-bit result of the addition.

(2)

(ii) Explain why the 8-bit result is not correct.

(1)

(f) A song is recorded in stereo (two channels). The sample rate is 44 100 Hz and the bit depth is 16 bits. The song lasts 180 seconds.

Construct an expression to calculate the file size of the song in mebibytes (MiB). You do not need to do the calculation.

(2)

(g) A web designer reduces the colour depth of an image. Explain one effect this has on the image.

(2)

(h) A row of pixel colours is stored as:

RRRRRRYYBBBBBBBGG

Give the run-length encoded version of this data, using the format count followed by colour.

--

(2)

(i) Which of these is the smallest amount of data?

Tick (✓) one box.

A	2 MiB	
B	2000 KiB	
C	2 100 000 bytes	
D	16 000 000 bits	

(1)

(Total for Question 2 = 16 marks)

3 This question is about computers.

(a) Which type of memory is volatile?

Tick (✓) one box.

A	ROM	
B	RAM	
C	Flash memory	
D	Magnetic disk	

(1)

(b) Describe the role of the clock in the CPU and how the clock speed affects the performance of a computer.

.....

.....

.....

.....

(3)

(c) Explain why a computer uses virtual memory.

(2)

(d) Explain one reason why a programmer might choose to write part of a program in a low-level language.

(2)

(e) Describe how data is read from an optical disc.

(2)

(f) A small video-editing studio is buying new computers. The editors work with very large video files and often run several programs at once. The studio can choose computers with:

- a CPU with more cores or a higher clock speed
- more RAM
- a larger or faster secondary storage device.

Discuss how each of these hardware choices could affect the performance of the editors' computers.

Your answer should consider:

- the CPU
- memory
- storage.

(6)

(Total for Question 3 = 16 marks)

4 This question is about networks.

(a) Which protocol is used to transfer web pages securely between a web server and a browser?

Tick (✓) one box.

A	HTTP	
B	HTTPS	
C	FTP	
D	POP3	

(1)

(b) Give two differences between a local area network (LAN) and a wide area network (WAN).

(2)

(c) A backup file of 3 GiB is uploaded over a connection with an upload speed of 50 Mbps.

Construct an expression to calculate the time, in minutes, taken to upload the file. You do not need to do the calculation.

(2)

(d) Complete the table by giving the name of the protocol that carries out each task.

Task	Protocol
Transfers files between a client and a server	
Downloads emails from a server, then deletes them from the server	
Splits data into packets and checks that they all arrive	
Addresses packets and routes them across networks	

(2)

(e) Explain how a firewall helps to protect a network.

.....

.....

.....

(2)

(f) Staff at a dental surgery receive an email that appears to come from their bank.

Describe how a phishing attack works and how the staff can protect themselves from it.

.....

.....

.....

.....

.....

(4)

(g) State what is meant by a protocol.

.....

(1)

(Total for Question 4 = 14 marks)

5 This question is about issues and impact.

(a) Give two ways in which large data centres have a negative impact on the environment.

.....

.....

(2)

(b) A software company has written a new app. Explain one way the company can protect its intellectual property.

.....

.....

.....

(2)

(c) Explain what is meant by algorithmic bias.

.....

.....

.....

(2)

(d) A hospital plans to introduce an artificial intelligence (AI) system that studies patients' scans and suggests a diagnosis to doctors. The system will be trained using thousands of past patient scans.

Discuss the issues the hospital should consider before introducing the system.

Your answer should consider:

- ethical issues
- legal issues
- environmental issues.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(6)

(Total for Question 5 = 12 marks)

END OF QUESTIONS