Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

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

Time 1 hour 30 minutes

Paper reference **1CP2/01**

Computer Science

PAPER 1: Principles of Computer Science
Specimen Assessment Material for first teaching September 2020

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 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.*

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 ▶

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Pearson

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 ☒.

1 Computational thinking

(a) An algorithm is designed for a 'guess the roll of a dice' game. The player decides the number of sides on a single dice, between 6 and 12, and guesses the number rolled.

© PAL

(i) Name **two** inputs required by the algorithm.

(2)

1 .....

.....

2 .....

.....

(ii) The player of the game can have three guesses. The variable `roll` is set to 1 at the start of the game. One is added to `roll` after each guess.

Identify the statement with the correct relational operator used to check whether the player can have another guess.

(1)

☒ **A** `roll = 3`

☒ **B** `roll == 3`

☒ **C** `roll > 3`

☒ **D** `roll <= 3`

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(b) Complete the truth table for the logical expression NOT (A OR B).

(2)

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

(c) Define the term 'subprogram'.

(2)

.....

.....

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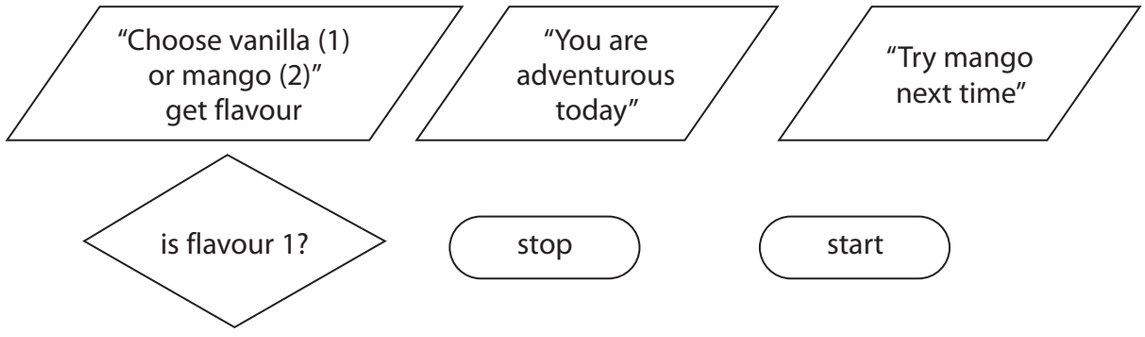
.....

(d) Here is a set of flowchart symbols for an algorithm about flavours.



Draw a flowchart to show the completed algorithm.

Use every symbol exactly once. Use as many arrows and labels as you require.
Do **not** add any additional symbols.

(4)

(e) State **three** types of error that can occur in programs.

(3)

1 .....

2 .....

3 .....

(f) Here is an algorithm.

```
1   today = ""
2
3   today = int (input ("Day of the week (1-7)"))
4
5   if ((today == 6) or (today == 7)):
6       print ("8am")
7   elif ((today >= 1) and (today <= 3)):
8       print ("7:30am")
9   else:
10      print ("7am")
```

Complete the table to show the output for the given input.

(3)

Input	Output
2	
7	
8	

(Total for Question 1 = 17 marks)

2 Issues and impacts

(a) State **two** ways that a user can increase the useful life of a smartphone rather than throwing it away.

(2)

1 .....

.....

2 .....

.....

(b) A backup of a server is made each night. Only the files changed that day are backed up.

Identify the name of this type of backup.

(1)

- ☒ **A** Fragmented
- ☒ **B** Full
- ☒ **C** Incremental
- ☒ **D** Lossy

(c) Data protection legislation sets out principles that organisations must follow.

Give **two** of these principles.

(2)

1 .....

.....

2 .....

.....

(d) Explain **one** way that a patent protects intellectual property (IP).

(2)

.....

.....

.....

.....

(e) Algorithmic bias could be caused by using inaccurate data to train a machine learning algorithm.

State **two other** ways that the data used to train an algorithm could cause algorithmic bias.

(2)

1 .....

.....

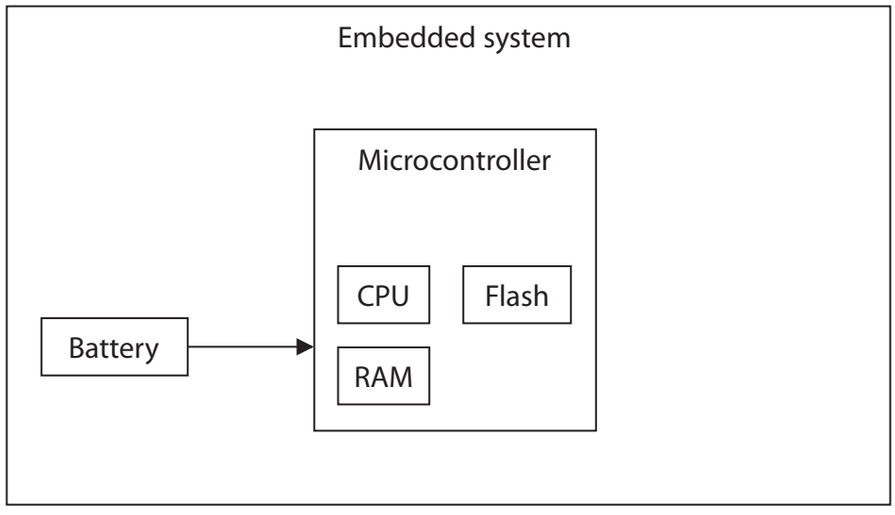
2 .....

.....

(Total for Question 2 = 9 marks)

3 Computers

(a) Complete the diagram of an embedded system by adding labelled boxes and arrows to show **one** sensor and **one** actuator that controls a motor.



(2)

(b) Explain the way a code review works.

(2)

.....

.....

.....

.....

(c) Identify which **one** of these is a hardware component of the CPU.

(1)

- ☒ **A** Clock
- ☒ **B** Control bus
- ☒ **C** Data bus
- ☒ **D** Register

(d) Here is an image of secondary storage. Three files (A, B, and C) are stored on it. Each file is made up of several blocks (1, 2, 3, 4, etc.).

		C1	C2	A2		A3		A1	C3	B1		B2	A4		

(i) Assume the secondary storage is a magnetic hard disk.

Complete the image to show the state after running a defragmentation utility.

(2)

(ii) Give **one** reason the performance of a solid-state drive is **not** affected by fragmentation.

(1)

.....

.....

(e) When using a compiler to translate source code to machine code, the translation only needs to be done once.

Give **three other** features of a compiler.

(3)

1 .....

.....

2 .....

.....

3 .....

.....

(f) The operating system manages peripherals.

Identify an additional piece of software that is required for the operating system to manage peripherals.

(1)

- ☒ **A** Analogue to digital converter
- ☒ **B** Assembler
- ☒ **C** Device driver
- ☒ **D** Disk defragmenter

(g) Describe **two** ways that a high-level language differs from a low-level language.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

(Total for Question 3 = 16 marks)

4 Networks

(a) Describe **one** difference between the POP3 and IMAP email protocols.

(2)

(b) The performance of a network depends on speed, range, latency, and bandwidth. Bandwidth in a wireless network is constant because the capacity of the network is not affected by any other environmental factors.

Explain **two** ways that the performance of a wireless network can be affected by its environment.

(4)

1

2

(c) A checksum works at the transport layer of TCP / IP.

Describe how a checksum is used to identify packets that have been corrupted during transmission.

(3)

(d) Discuss methods a movie streaming company could use to secure its network.

Your answer should consider:

- physical security
- access control
- firewalls.

(6)

(Total for Question 4 = 15 marks)

5 Data

(a) Describe **one** reason that lossless compression is preferred to lossy compression for transmitting word-processed documents over a network.

(2)

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.....

(b) In arithmetic, subtraction can be done by adding a negative number.

Calculate 18 – 8, using 8-bit binary and two's complement.

Convert the result back to denary.

Show all your working.

(4)

(c) Explain the reason why at least nine bits are needed to store 300 different binary patterns.

(2)

(d) Construct an expression to calculate the file size, in mebibytes, of a CD quality (44.1 KHz, bit depth of 16), two-channel stereo soundtrack that is 4 minutes long.

You do **not** need to carry out the calculation.

(4)

(e) Information about a bitmap image is described in two tables.

Complete the two tables and use the information, along with the image data, to show the image in the grid.

(6)

Image data:

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 1 0 1 0 1

0 1 0 1 0 1 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

Image descriptors

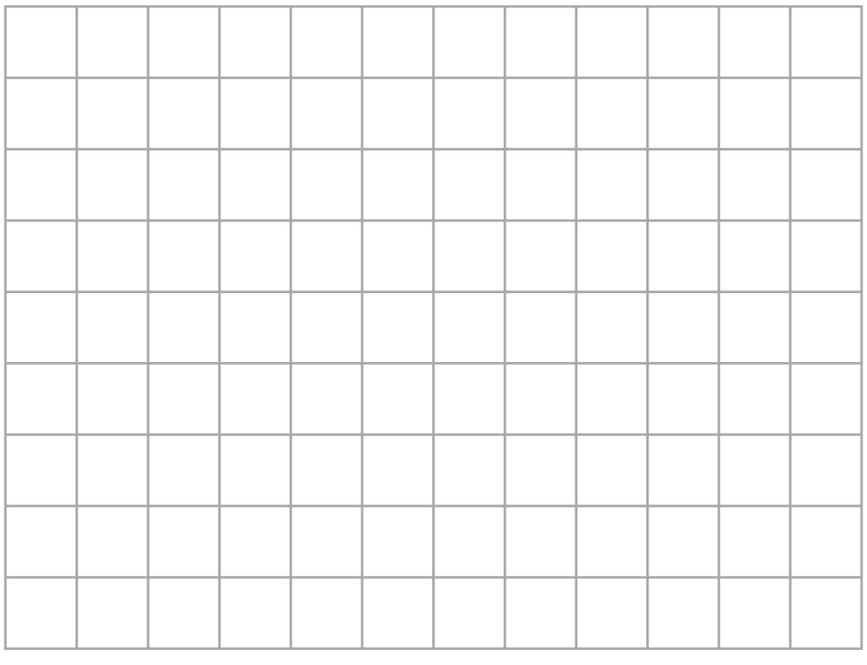
	Denary	Binary
Width		1000
Height		0101
Colour depth		0010

Colour table

	Denary	Binary
Black	0	
Red	1	
Green	2	
White	3	

Use B for black, R for red, G for green, and W for white.

You may not need all the squares in the grid.



(Total for Question 5 = 18 marks)

TOTAL FOR PAPER = 75 MARKS

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