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

**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.
- Good luck with your examination.

*Turn over* ▶







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** Most programs are written using high-level languages.

(a) Identify **one** term used to describe a compiler.

**(1)**

☒ **A** Interpreter

☒ **B** Low-level language

☒ **C** Pseudocode

☒ **D** Translator

(b) State **two** types of utility software.

**(2)**

1 .....

2 .....

(c) Complete this sentence.

**(2)**

Instructions written in a high-level language must be converted to ..... , so that they can be executed by the ..... .

(d) Explain **one** reason why compiled code helps protect intellectual property.

**(2)**

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**(Total for Question 1 = 7 marks)**

**2** Computers carry out comparisons.

(a) Complete the truth table.

**(6)**

| X | Y | Z | Y AND Z | X OR (Y AND Z) |
|---|---|---|---|---|
| 0 | 1 | 0 | | 0 |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | |
| 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | |
| 0 | 0 | 1 | 0 | |
| 1 | 0 | 0 | | 1 |
| 1 | 0 | 1 | 0 | |

(b) State the name of the component of the CPU that performs comparisons.

**(1)**

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(c) Complete this model, which is used by all computers.

**(1)**

Input ..... Output

(d) State the function of cache memory.

**(1)**

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**(Total for Question 2 = 9 marks)**

**3** Algorithms are used in the design of computer programs.

(a) Describe what is meant by the term 'algorithm'.

**(2)**

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(b) Draw a straight line to match each use to the correct term.

**(3)**

| Use | Term |
| --- | --- |
| Making decisions | Abstraction |
| Removing unnecessary detail | Initialisation |
| Repeating code | Iteration |
| | Selection |
| | Sequence |

(c) Explain why it is important for computing technology to be inclusive.

**(2)**

(d) Explain **one** positive impact of computing technology on the environment.

**(2)**

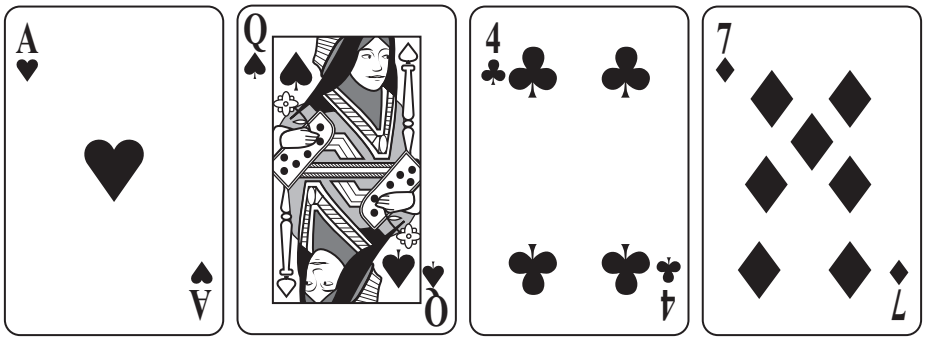
(e) Some open source software requires payment from users.

All open source software gives software developers certain freedoms.

Describe **one** freedom that open source software provides to developers.

**(2)**

(f) Here are four playing cards.



Describe how abstraction could be applied to playing cards when creating a card game to run on a computer.

**(2)**

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**(Total for Question 3 = 13 marks)**

**4** Computers store and manipulate data.

(a) State the number of colours that can be represented with 5 bits.

**(1)**

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(b) Convert the binary number 1010 1101 to hexadecimal.

**(1)**

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(c) Convert the hexadecimal number E3 to binary and the result from binary to denary.

**(2)**

**Binary**

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.....

**Denary**

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.....

(d) The ASCII code for the character 'H' is 72 in denary.

Derive the ASCII code for the character 'E' in 8-bit binary.

**(2)**

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(e) Compare the use of 8 bits and 24 bits to represent sound.

**(2)**

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(f) The addition of these 8-bit binary numbers is required.

0011 1010

1011 0011

(i) Complete the table to show the result of the addition.

**(2)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | |
| 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | + |
| | | | | | | | | |

(ii) The most significant bit (MSB) of the first binary number is changed.

Explain the effect of this change on the result of the addition.

**(2)**

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**(Total for Question 4 = 12 marks)**

**5** The principles of computer science are used in computer game design.

(a) State the reason why console games are provided on ROM rather than RAM.

**(1)**

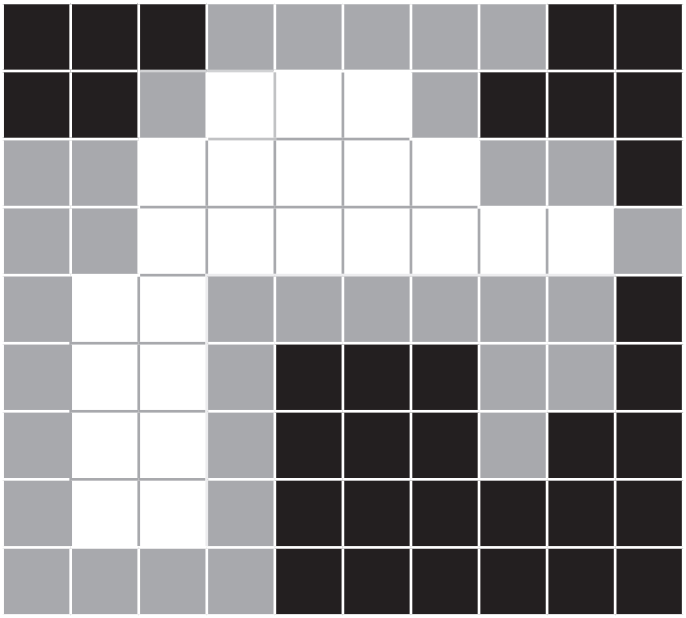
(b) Explain why a game console requires RAM.

**(2)**

(c) Describe how logic is used in computer games to produce more realistic simulations of the real world.

**(2)**

(d) Data representing this image must be compressed using run-length encoding (RLE).



Palette:

| | |
|---|---|
| | 000 |
| | 010 |
| | 111 |

(i) The first 3 bits are used for the colour and the next 4 bits are used for the run length of pixels.

Encoding starts from the top left pixel and is continuous between rows.

Convert the first two rows of pixels to binary data using RLE.

**(3)**

(ii) Construct an expression to show the maximum saving in bits that could be made by using an RLE algorithm to compress an image with this resolution.

**(4)**

**(Total for Question 5 = 12 marks)**

**6** A cloud storage provider installs new servers.

(a) The data on the servers is encrypted.

Identify **one** encryption technique.

**(1)**

- ☒ **A** Cipher
- ☒ **B** Firewall
- ☒ **C** Iteration
- ☒ **D** Protocol

(b) Describe how hardware and software work together to start a computer.

**(3)**

(c) Compare the storage media options available to a cloud storage provider.

**(6)**



**(Total for Question 6 = 10 marks)**

**7** A company moves its business online.

(a) Identify **one** way in which a WAN differs from a LAN.

**(1)**

- ☒ **A** LANs do not transmit data in packets
- ☒ **B** LANs use fibre optic cables
- ☒ **C** WANs are always connected via gateways
- ☒ **D** WANs are always wireless

(b) An employee accesses her work email using a smartphone and a laptop.

Explain why the IMAP protocol is more suitable for this than the POP3 protocol.

**(2)**

(c) Describe the role of the transmission control protocol (TCP).

**(4)**

(d) Describe the role of a server in a client-server network.

**(2)**

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(e) Draw lines to show how all these devices would be connected using a bus topology.

**(2)**

**(Total for Question 7 = 11 marks)**

**8** A company stores data about employees on networked computers.

Discuss the methods available to maintain network security and protect the data from cyberattacks.

**(6)**

**(Total for Question 8 = 6 marks)**

**TOTAL FOR PAPER = 80 MARKS**

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