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CANDIDATE NAME

CENTRE NUMBER

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3077422798

COMPUTER SCIENCE **0478/11**

Paper 1 Computer Systems **May/June 2026**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [ ].
- No marks will be awarded for using brand names of software packages or hardware.

This document has **16** pages. Any blank pages are indicated.

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1 Data storage can be measured in different units.

(a) Tick (✓) **one** box to show which is the largest unit of measurement for data storage.

A exbibyte (EiB) ☐

B gibibyte (GiB) ☐

C mebibyte (MiB) ☐

D tebibyte (TiB) ☐

[1]

(b) Calculate how many kibibytes (KiB) are equal to 3072 bytes.

..... [1]

working space

.....

.....

.....

(c) Data is converted to binary to be stored by a computer.

Tick (✓) **one** box to show the correct statement about why data is converted to binary for storing in a computer.

A Binary uses numbers and characters to store all the data. ☐

B Binary is one type of data that a computer can store. ☐

C Data is processed by logic gates that can only be set as binary numbers. ☐

D Only binary numbers can be input into a computer. ☐

[1]

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2 A smartphone has a quad-core 2.4 GHz processor.

(a) The processor performs the fetch-decode-execute (FDE) cycle.

(i) The first register used in the FDE cycle stores the location in random access memory (RAM) of the next instruction.

Identify the name of this register.

..... [1]

(ii) Describe the actions that take place in the decode stage of the FDE cycle.

.....

.....

.....

.....

.....

..... [3]

(iii) Give the name of **one** component that is used in the execute stage of the FDE cycle.

..... [1]

(b) Explain the advantages of the smartphone having a quad-core processor instead of a dual-core processor.

.....

.....

.....

..... [2]

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(c) The smartphone has built-in input and output devices.

(i) Identify **two** input devices that could be built into the smartphone.

1 .....

2 .....

[2]

(ii) Identify **two** output devices that could be built into the smartphone.

1 .....

2 .....

[2]

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3 Hexadecimal and binary are two examples of a number system.

(a) Give **one** other example of a number system.

..... [1]

(b) Convert the hexadecimal number 2A to an 8-bit binary number.

..... [1]

working space

.....

.....

.....

(c) Convert the hexadecimal number 101 to a 12-bit binary number.

..... [1]

working space

.....

.....

.....

(d) Convert the binary number 01110001 to a hexadecimal number.

..... [1]

working space

.....

.....

.....

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(e) Convert the binary number 001011011000 to a hexadecimal number.

..... [1]

working space

.....

.....

.....

(f) Add the binary numbers 10011101 and 11110000 using binary addition.

Give your answer in binary. Show all your working.

```
  1 0 0 1 1 1 0 1
+ 1 1 1 1 0 0 0 0
```

[4]

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4 An optical mouse is connected to a computer using a universal serial bus (USB) cable.

(a) State the purpose of the optical mouse.

.....

..... [1]

(b) The USB cable transmits data using the serial half-duplex data transmission method.

Describe how the serial half-duplex data transmission method transmits the data.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(c) One benefit of using the USB cable to connect the optical mouse to the computer is that bits of data are less likely to arrive out of order.

Give **two** other benefits of using the USB cable to connect the optical mouse to the computer.

1 .....

.....

2 .....

..... [2]

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(d) One function performed by the operating system is managing peripherals. A role of this function is to install the drivers needed for the optical mouse.

Complete the table with the missing functions and roles of an operating system.

function	role
providing an interface	....
....	It makes sure that two processes do **not** access the same memory location at the same time.
managing interrupts	....
....	It allows the user to set a username and password.

[4]

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5 An integrated development environment (IDE) has two types of translator: a compiler and an interpreter.

(a) Give the purpose of the compiler and the interpreter.

.....

..... [1]

(b) Identify **one** other type of translator.

..... [1]

(c) The table contains statements about compilers and interpreters.

letter	statement
A	An interpreter translates and executes the code one variable at a time.
B	A compiler displays an error report when it is unable to run the code due to syntax errors.
C	An interpreter stops translating as soon as it finds an error in the code.
D	A compiler translates the whole code at once and then it is executed.
E	A compiler produces a non-executable file.

Two of the statements in the table are **not** correct.

Give the letter of each incorrect statement.

Suggest a corrected statement for each.

letter of the incorrect statement 1 .....

corrected statement .....

.....

.....

letter of the incorrect statement 2 .....

corrected statement .....

.....

.....

[4]

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(d) A translator is one function of an IDE.

Identify **two** other functions of an IDE.

State the purpose of each function.

function 1 .....

purpose .....

.....

.....

function 2 .....

purpose .....

.....

.....

[4]

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6 Web pages need to be located and retrieved to be displayed on a device.

(a) Complete the paragraph about locating and retrieving web pages.

Use the terms from the list. Some of the terms in the list will **not** be used.

You should only use a term once.

certificate	database
domain name server (DNS)	encryption
hypertext markup language (HTML)	internet protocol (IP) address
low-level language	protocol
request	uniform resource locator (URL)
web browser	web server

The user types the URL into the address bar. The web browser sends the domain name from the URL to the ..... .

This searches for the matching ..... and sends this back to the ..... .

The web browser sends a ..... to the web server for the web page. The web server then sends the data for the web page back to the web browser. The web browser renders the ..... to display the web page.

[5]

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(b) The transmission of data between the web browser on a device and a web server can be secured using the secure socket layer (SSL) protocol.

Complete and annotate the diagram to show the process of sending the data using SSL.



[5]

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7 A child has a robot animal. The robot animal can perform actions like making a noise and walking around a room.

If the robot animal hears a clapping sound, it makes a noise.

If the robot animal is walking and it senses an object is less than 10 cm away, it will stop.

(a) Give **one** suitable sensor that the robot animal could use to identify a clapping sound.

..... [1]

(b) Give **two** suitable sensors that the robot animal could use to identify if an object is nearby.

1 .....

2 .....
[2]

(c) One characteristic of the robot animal that makes it a robot is that it has electrical components that include sensors, a microprocessor and actuators.

(i) Give **one** other characteristic of the robot animal that makes it a robot.

..... [1]

(ii) The sensor continuously sends digitised data to the microprocessor.

Describe how the microprocessor uses the data from the sensor to stop the robot animal when an object is less than 10 cm away.

.....

.....

.....

.....

.....

..... [3]

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(d) The robot animal uses artificial intelligence (AI).

Explain how the robot animal can use AI to learn where objects are in a room.

.....

.....

.....

.....

.....

.....

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..... [4]

8 A student opens a document on their computer and inputs text.

(a) Explain how the computer represents the text.

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.....

..... [3]

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(b) The student stores a video on their computer.

The video contains sound and images.

(i) Complete the table with the missing terms and descriptions about sound and images.

term	description
.....	the smallest unit of an image that is made up of one colour
sound sample	....
.....	the dimensions of an image
colour depth	....
.....	the number of samples that are recorded each second

[5]

(ii) The student wants to compress the video.

Give **two** methods of compression that the student could use to compress the video.

1 .....

2 .....

[2]

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