Cambridge Assessment International Education

# Cambridge O Level

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*5238662038*

**COMPUTER SCIENCE** **2210/12**

Paper 1 Computer Systems **May/June 2023**

**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 or correction fluid.
- 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 **12** pages. Any blank pages are indicated.

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**1** Output devices are used to output data from a computer.

Circle **three** devices that are output devices.

actuator digital versatile disk (DVD) keyboard

microphone mouse printer scanner

sensor solid-state drive (SSD) speaker

[3]

**2** Binary numbers can be converted to hexadecimal.

**(a)** Convert the **two** binary numbers to hexadecimal.

10010011 .....

00001101 .....

[4]

Working space

.....

.....

.....

.....

**(b)** A value is stored as a binary number in a register.

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

A logical right shift of **three** places is performed on the binary number.

**(i)** Complete the binary register to show its contents after this logical right shift.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

[1]

**(ii)** State **one** effect this logical shift has on the binary number.

.....

..... [1]

**(c)** Give **two** reasons why a programmer may use hexadecimal to represent binary numbers.

1 .....

.....

2 .....

.....
[2]

**(d)** Denary numbers can also be converted to hexadecimal.

Convert the denary number to hexadecimal.

301 ..... [2]

Working space

.....

.....

.....

.....

**3** When keys are pressed on a keyboard, the text is converted to binary to be processed by the computer.

**(a)** Describe how the text is converted to binary to be processed by the computer.

.....

.....

.....

.....

.....

..... [3]

**(b)** Text that is input into a computer can be stored in a text file.

A text file can be compressed using lossless compression.

**(i)** State what effect this has on the file size.

.....

..... [1]

**(ii)** Describe how lossless compression compresses the text file.

.....

.....

.....

.....

.....

.....

.....

..... [4]

**(iii)** Give **two** reasons why the text file may have been compressed.

1 .....

.....

2 .....

.....

[2]

**4** A student uses a mobile phone to take photographs for a school project.

The student needs to transmit the photographs to their computer. They could use serial data transmission or parallel data transmission to transmit the photographs.

**(a)** **(i)** Describe how the photographs would be transmitted using serial data transmission.

.....

.....

.....

..... [2]

**(ii)** Give **two** benefits of transmitting the photographs using serial data transmission.

1 .....

.....

2 .....

.....
[2]

**(iii)** State **one** benefit of the student using parallel data transmission instead of serial data transmission.

.....

..... [1]

**(b)** The photographs are also transmitted across a network to cloud storage. A device on the network forwards the data towards its correct destination.

**(i)** State the name of this device.

..... [1]

**(ii)** Describe what is meant by cloud storage.

.....

.....

.....

..... [2]

**(iii)** Give **one** disadvantage of storing the photographs in cloud storage instead of storing them locally.

.....

..... [1]

**5** A programmer writes a computer program using a high-level language.

**(a)** Tick (✓) **one** box to show which statement is correct about writing computer programs in a high-level language.

**A** Mnemonics are used to create instructions. ☐

**B** The computer program is harder to debug than a low-level language program. ☐

**C** The computer program is machine independent. ☐

**D** The hardware of the computer can be directly manipulated. ☐

[1]

**(b)** The programmer uses a compiler to translate the computer program.

**(i)** Describe how the compiler translates the computer program.

.....

.....

.....

.....

.....

..... [3]

**(ii)** Describe how the compiler reports errors.

.....

.....

.....

..... [2]

**(c)** The programmer uses an integrated development environment (IDE) to create the computer program.

One function of the IDE is that it has the built-in compiler.

Give **three** other common functions of an IDE.

1 .....

2 .....

3 .....

[3]

**6** **(a)** Complete the statements about cookies.

Use the terms from the list.

Some of the terms in the list will **not** be used. Some terms may be used more than once.

| | | |
|---|---|---|
| compression | executable | hypertext markup language (HTML) |
| hypertext transfer protocol (HTTP) | image | internet protocol (IP) address |
| persistent | session | sound |
| text | | |
| uniform resource locater (URL) | web browser | web server |

Cookies are small ..... files that are sent between a ..... and a ..... .

..... cookies are stored in memory and **not** in the user's secondary storage.

When the web browser is closed a ..... cookie is lost, whereas a ..... cookie is **not** lost.

[6]

**(b)** Give **three** functions of a cookie.

1 .....

2 .....

3 .....

[3]

**7** A distributed denial of service attack (DDoS) is a cyber security threat.

**(a)** Draw and annotate a diagram to represent the process of a DDoS.

[6]

**(b)** State **two** aims of carrying out a DDoS attack.

1 .....

.....

2 .....

.....

[2]

**(c)** Give **two** security solutions that can be used to help prevent a DDoS attack being successful.

1 .....

.....

2 .....

.....

[2]

**8** A computer is connected to a network and assigned an IPv4 address.

**(a)** Tick (✓) **one** box to show which device would assign the IPv4 address to the computer.

**A** Domain name server (DNS) ☐

**B** Network interface card (NIC) ☐

**C** Router ☐

**D** Web server ☐

[1]

**(b)** Describe the characteristics of an IPv4 address.

.....

.....

.....

.....

.....

.....

.....

..... [4]

**9** One component of an expert system is the inference engine.

**(a)** Identify the **three** other components in an expert system.

1 .....

2 .....

3 .....
[3]

**(b)** Describe the role of the inference engine in an expert system.

.....

.....

.....

..... [2]

**10** A user has both system software and application software installed on their computer.

**(a)** Describe the difference between system software and application software.

Give an example of each software in your answer.

.....

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.....

.....

.....

..... [4]

**(b)** State which component in the computer would store both types of software when the power is turned off.

..... [1]

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