

6 A computer with a Von Neumann architecture has a central processing unit (CPU).

(a) Complete the statements about the operation of the CPU.

Use the terms from the list. **Not** all terms will need to be used. You should only use each term once.

- accumulator arithmetic logic unit character set
- control unit current instruction register cipher decoding set
- instruction counter instruction set memory address register
- memory data register memory instruction register next instruction register
- program counter program register

The stores the address of the next instruction to be fetched. This address is then sent to the

This address is the location in RAM where the instruction can be found. The instruction is retrieved from RAM and immediately stored in the

The instruction is then sent to the where it is decoded by the The instruction is decoded using an

[6]

(b) Handling interrupts is one function of an operating system.

(i) An interrupt is sent to the CPU every time a key is pressed on the keyboard.

Give the name of this type of interrupt.

..... [1]

(ii) Give the name of the program that services the interrupt.

..... [1]

(iii) Give **one** other function of an operating system.

..... [1]

- 9 Each employee in a finance company has a computer and an electronic account.
- (a) Each computer has an operating system. One function of the operating system is to manage memory.

Describe the role of the operating system in managing memory.

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..... [3]

- (b) The finance company is concerned that a hacker may perform a brute-force attack to gain access to an employee’s account.

(i) Describe how the hacker would perform the brute-force attack.

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..... [2]

- (ii) Give **three** cyber security solutions that could be used to help prevent a brute-force attack from being successful.

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3 [3]

- (c) The company uses a digital currency to purchase a new car.

(i) State what is meant by a digital currency.

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..... [1]

- (ii) The digital currency uses a process that involves a digital ledger. The ledger has time stamped transactions that cannot be altered.

Give the name of this process.

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.

[4]

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

[1]

2 A programmer has designed a three-dimensional (3D) interactive computer game. They are going to develop a program for the game. The program needs to run efficiently, but it must also be developed as soon as possible.

- (a) Tick (✓) **one** box to identify whether the programmer should use a high-level language or a low-level language to develop the program.

Explain the reasons for your choice.

High-level language

☐

Low-level language

☐

Reasons for your choice

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..... [4]

- (b) If the programmer chooses a high-level language, they can use a compiler or an interpreter to translate the high-level language into a low-level language.

Describe the operation of a compiler and of an interpreter.

Compiler

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Interpreter

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