ICT – Internal Components of a Computer – Part 2

1 of 17 – Welcome

Welcome to this session on the internal components of a computer (part 2).

By the end of this session, you will:

* Know which individual devices are involved in processing digital data
* Understand how each device contributes to this process
* Know what cache memory is, and what job it performs

2 of 17 – Introduction to processing digital data

**What devices are involved when processing digital data?**

* Input devices
* RAM (random access memory)
* Central processing unit, which includes the arithmetic and logic unit, the registers, and the control unit
* Output devices

All of these parts link together in order to pass information back and forth, which allows a computer to process different types of data.

3 of 17 – Hard disk and storage

**Remember:** a hard disk is something built into your computer when it is made, and it is capable of storing huge amounts of data.

When a computer is processing digital data, the hard disk is where it looks for any stored information – such as programs, or applications. The hard disk can then load this information into the computer’s RAM, and from there the central processing unit is able to retrieve the instructions and run them properly through the computer – leading to your desired output.

So, the hard disk speaks to the RAM, which speaks to the CPU.

The hard disk stores documents as well as programs, and these can also be loaded into RAM to be opened (and then put back into the hard disk storage when they’re saved).

4 of 17 – CPU and GPU: what are they?

The CPU is the **central processing unit** of a computer and the GPU is the **graphical processing unit**.

The CPU is made up of three distinct parts – the ALU, the registers, and the CU – which work together to ensure instructions are completed. The GPU works alongside these other parts to process visual images, so they appear on your monitor at a good quality level.

These two units are particularly important when digital data is being processed because between the two of them, they run all of the **instructions** and process **calculations** that are pushed through a computer.

This means that the performance of these two separate units will actually affect the performance abilities of the whole computer.

5 of 17 – Computer clocks: what are they?

The internal elements of a computer – including the CPU and the GPU – all run and synchronise at a set speed and in a set order, to ensure the instructions are carried out correctly. This **speed and synchronisation** **is monitored by a clock** mechanism inside the computer. In fact, a microprocessor has **several clock cycles** which monitor instructions.

The speed of these clocks is commonly measured in **megahertz** (MHz) or **gigahertz** (GHz). The clock speed – which is the speed at which a computer is able to carry out instructions – generally indicates the effectiveness of your computer, as it determines how fast the machine can run.

The faster the clock speed then the faster the processing, and so the higher the performance – particularly when it comes to completing instructions on a second-by-second rate.

6 of 17 – Multi-processing cores: what are they?

Processing cores are designed to **understand and then complete program instructions** – the same sort of instructions that we’ve seen other parts of the computer work on already.

Many computers are built with **multiple processing cores**.

Each of these cores can run on their own, without any help or assistance needed from another core. This means that the **more cores a computer has, the faster it will be able to process machine code or instructions** – and so these instructions will be completed more quickly too!

This generally **helps a computer to run a little more smoothly**, as it is easier for it to process huge amounts of information without the speed of the machine slowing down too much.

7 of 17 – Question 1

The list below shows the steps involved in processing digital data, but in the wrong order. What should the correct order be?

1. Central processing unit
2. Hard disk
3. RAM

The correct order should be 2, 3 then 1, as shown below:

1. Hard disk
2. RAM
3. Central processing unit

8 of 17 – Question 2

The central processing unit is made up of three main components. What are they?

Choose all that apply:

1. Arithmetic and logic unit
2. Hard disk
3. Registers
4. Control unit
5. Processor cores

The correct answers are A, C and D, arithmetic and logic unit, registers and control unit.

9 of 17 – Question 3

How is the speed of a computer clock measured?

Choose all that apply:

1. Gigabytes
2. Gigahertz
3. Megabytes
4. Megahertz
5. Seconds

The correct answers are B and D, gigahertz and megahertz.

10 of 17 – Cache memory: what is it?

**Cache memory** – sometimes called **CPU memory** – is a type of memory or storage that a processor can access quickly.

This type of memory is often integrated into the CPU (central processing unit) of your computer, or it is sometimes integrated into your computer system using a chip which then connects (via a bus) to the CPU instead.

The main reason for using cache memory is its **speed**, as it works as a data buffer between fast and slow devices, allowing for a **higher level of overall productivity** from a computer system.

Faster and slower devices can work together better if cache memory is used. Typically, while the fast device works at a quickened pace to read or write from the cache memory, the slower device can work more effectively too by updating information as quickly as it can – so both devices can work at their full potential.

Cache memory can be used to **speed up access to your RAM** (random access memory), for example, which means that while the RAM is searching for the right responses to an instruction, the rest of the processor can still be working on another part of a job.

Remember, while all of this is going on inside your computer, you need to make sure that the right ventilation is in place to keep the system cool – either by using a fan or a heatsink. Your computer’s power supply unit is something else worth checking too, to make sure enough power is being produced for all of the components that are working.

11 of 17 – Data buses: what are they?

Data buses are **circuits** that link different parts of your computer together and ensure that individual components are all connected to the motherboard.

These data buses are sometimes referred to as an internal bus, memory bus, or a system bus. They can be **internal**, meaning they exist within your computer and transfer information between the different parts of your system, or they can be **external**.

When a data bus is external this means that rather than transferring information around inside your computer system, the external data bus is able to transfer information or data from **one computer system to another**.

Data buses work by transporting data from one part of your computer to another, and they can typically handle more than one chunk of data at a time.

The bigger the capacity – the more data that a bus can carry, that is – then the faster it allows information and instructions to travel between different components.

This increased capacity means that your computer is faster overall too, as a faster delivery of instructions will lead to a better performance from your system.

Not only do data buses do all of this work inside the computer, but there are different types of data bus available too, to allow for an even faster performance between certain internal components. So different devices are connected via a different type of bus.

12 of 17 – Question 4

What is cache memory?

1. A type of hard disk that can be added to your computer
2. A type of storage that a processor can access quickly
3. An external storage system that can be connected to your processor
4. A memory stick that improves the speed of your system

The correct answer is B, a type of storage that a processor can access quickly.

13 of 17 – Question 5

What **three** things can keep your computer in good working order?

Choose all that apply:

1. A heatsink
2. Increased memory
3. A fan
4. An updated graphics card
5. An IPS monitor
6. A strong power supply unit

The correct answers are A, C and F, a heatsink, a fan and a strong power supply unit.

14 of 17 – Question 6

Using the following choice of words; **motherboard**, **circuits**, **computer** **systems**, **types**, **internal** and **internal** **component**, fill in the blanks for the paragraph below:

Data buses are **blank** that carry information from one **blank** to another, and they make sure the components are connected to the **blank**. There are a number of different **blank** of bus available depending on the components that are being connected, and buses can also be **blank** or external. If they are external, instead of connecting two parts within a computer, an external data bus will connect two **blank** together, for a similar information transfer to take place.

The correct paragraph should read:

Data buses are **circuits** that carry information from one **internal component** to another, and they make sure the components are connected to the **motherboard**. There are a number of different **types** of bus available depending on the components that are being connected, and buses can also be **internal** or external. If they are external, instead of connecting two parts within a computer, an external data bus will connect two **computer systems** together, for a similar information transfer to take place.

15 of 17 – Question 7

Indicate whether the following statements are true or false.

Data buses that have bigger capacities can carry more data and speed up your computer’s performance.

True

False

The correct answer is: True

Cache memory is a good way of connecting two fast-working devices.

True

False

The correct answer is: False

Computers are often only built with one processing core.

True

False

The correct answer is: False

A hard disk is a storage system that is built into your computer and can store huge amounts of data.

True

False

The correct answer is: True

16 of 17 – End

Well done! You have now completed this session on the internal components of a computer (part 2).

In this session we have covered:

* Which individual devices are involved in processing digital data
* How each device contributes to this process
* What cache memory is, and what job it performs

If you have any questions about any of these topics, make a note and speak to your tutor for more help.