ICT – Revision Session 2

1 of 20 – Welcome

Welcome to this session on revision (part 2).

By the end of this session you will:

* Know the main internal components of a computer system
* Understand what these components do
* Know how these components are used in mobile devices

2 of 20 – Introduction to internal components

**What are the internal components of a computer?**

When we talk about internal and external components, we are talking about two specific sets of devices that can be used to help your computer in a number of different ways.

The internal components of a computer system will be anything that is built into the computer system itself – something that belongs on the inside of the machine.

Meanwhile, external components, as their name suggests, are things that exist outside of the computer system, meaning they can be added or connected to the computer. Let’s see what you have remembered about these internal and external components.

3 of 20 – Question 1

Categorise the devices below, according to if they are an **internal** or an **external** component.

Graphics card

Webcam

Speakers

Optical drive

Mouse

Keyboard

Central processing unit

Motherboard

The correct answers are:

Graphics card, optical drive, central processing unit and motherboard are examples of **internal** components.

Webcam, speakers, mouse and keyboard are examples of **external** components.

4 of 20 – Internal components: motherboard

There are a number of internal components that are worth knowing about; the first (and most important) component inside a computer system is the motherboard.

A computer’s motherboard is the main printed circuit board inside the system – which means that this is the place where the computer’s other components are connected and monitored, to ensure that they are working properly.

It is the motherboard’s job to keep a computer system working, which is why so many other parts are connected to it, and have to report back to it, as they are carrying out instructions.

The motherboard works closely with another key internal component too, known as the central processing unit.

5 of 20 – Internal components: central processing unit

The central processing unit, or CPU, is made up of a number of smaller units – namely, the arithmetic and logic unit, the control unit, and the registers (remember registers provide small amounts of storage space for bytes).

The main job of the central processing unit as a whole is to run any instructions that are delivered by the computer’s software.

The central processing unit is given information either from a user or a program (this is the input), and then through running the necessary instructions the CPU is able to provide the user or program with the right result, by displaying something on the computer’s monitor, for example (this is the output).

The arithmetic and logic unit (which processes calculations and comparisons) and the control unit (which helps with timings and control signals) are very important parts of this process.

6 of 20 – Internal components: memory

Inside a computer system there can be two different types of memory, the first of which is called RAM (random access memory), and this is where data and programs are stored. RAM makes instructions and commands available for the central processing unit to call on, whenever a certain program is running.

RAM is available in different sizes and different types, namely dynamic RAM and static RAM.

Dynamic RAM is largely used in personal computers (PCs) and laptops and, because of the type of transistor used, it can only store information for these systems when a direct charge or power supply is provided, i.e. it only retains data while the machine is turned on.

Static RAM, which is mostly found in mobile phones, digital cameras, and other similar devices, works with a transistor that can retain information, meaning when the overall device is turned off the data is still retained. Static RAM is known to work a little faster than dynamic, too.

7 of 20 – Internal components: memory 2

The other type of memory that can be found inside a computer system is cache memory – it is worth noting though that this can be used alongside RAM (it is not a case of using one or the other) and cache memory has often been thought of as a way of improving a computer’s RAM, too.

Cache memory can be connected directly to the computer’s central processing unit, and it can also be accessed very quickly, making it a fast-acting alternative to other memory stores.

Because of the speed at which cache memory works, it is also typically used between fast and slow devices, as cache allows parts to work at their most effective speed, making for an improved user experience overall.

8 of 20 – Internal components: graphics card and sound

A graphics card is a small device that is inserted into your computer at the time that it is built. This internal component means that visual images can be made and pushed through the computer’s monitor, providing the displays that we see on our screens.

Graphics cards are typically in control of things like clarity, colour, definition, and the overall appearance of what is displayed on the monitor.

Alongside what can be seen on a computer system, we also have to consider what is heard. While speakers are considered an external component of a computer system, the ability for sound to come through the speakers in the first place is actually because of a certain type of hardware – installed as part of the motherboard – that pushes sound signals through the computer system and, eventually, through the speakers.

9 of 20 – Internal components: storage devices

A computer system comes complete with an internal storage device that is capable of holding huge amounts of data, such as programs, documents, and applications.

Typically, this main internal storage device will either be a hard disk drive (HDD) or a solid state drive (SSD). Both are capable of holding large amounts of data, but they work in slightly different ways.

While a hard disk drive both reads and writes data to moving disks, using a series of small magnetic dots, a solid state drive has no moving parts at all (which is why it is thought to be both quieter and quicker than the alternative HDD).

10 of 20 – Internal components: optical drive

The optical drive is something that many computer users will use on a day-to-day basis – this is the disk drive where users can insert CDs, DVDs, and similar devices.

The optical drive is an important internal tool when backing up data – it allows users to write their information to discs, for example – but it is also useful for introducing new software to the computer system, too.

When new software is installed, this is often done through inserting a disc into the optical drive in order for the program to be read and then introduced to the computer system.

The optical drive has, historically, been instrumental to this style of installation process. However, as the methods used for introducing new software are changing, i.e. software is often downloadable now, many laptops are being built without an optical drive at all.

11 of 20 – Internal components: CPU and GPU

The central processing unit (CPU) and the graphical processing unit (GPU) are often discussed together as they typically work together inside a computer system.

While the central processing unit pushes instructions through the machine – with the help of the different units that are enclosed inside it – the graphical processing unit works to process these instructions and translate them into the most appropriate visual images, to be displayed on a computer’s monitor.

The graphical processing unit – much like the individual graphics card mentioned earlier – also works to ensure that these displayed images and visuals are of the highest quality that they can be, making for an improved user experience as well.

12 of 20 – Internal components: computer clocks

Computer clocks – and indeed, clock cycles – are built into a computer system in order to monitor the synchronisation and speed of other components, namely the central processing unit and the graphical processing unit.

There are several clock cycles present inside any given computer system and, measured in either megahertz (MHz) or gigahertz (GHz), their overall speed is often a good indicator of how smooth-running a computer system is.

The faster the speed, the higher the processes (meaning, the faster instructions and commands are being carried out), which leads to a higher performance rate for the machine overall.

13 of 20 – Internal components: data buses

To keep these various internal components connected, a computer will also have a number of data buses that tie different parts of the system to each other and to the motherboard.

Data buses are circuits that are connected up inside the computer system, and they work by transferring data of varying sizes between different components. This means that data, including various commands and instructions, are pushed through the computer from one place to another, in order for the right components to complete the right task.

Data buses can be of different capacities – meaning that some can carry more or less data than others. It is worth noting then that the larger the capacity of the bus, the faster the workings of the computer overall (as information and data is being shared even faster).

14 of 20 – Fitting this into a mobile device

The average computer system is built in a way that makes it easy enough to hold these various internal parts; so you might be wondering how all of these parts can be squeezed into a mobile device, such as a mobile phone.

Well, all of the components are still there, they are just developed on a smaller scale. Companies have also found new ways to be economical with small spaces by developing things such as System on a Chip (SoC) technology.

This type of technology has allowed companies to put a number of different circuits on just one microchip, which needs less room inside a mobile device.

So the central processing unit and the graphical processing unit within a mobile device, for example, might be combined in order to take up less physical space, but they can both still perform the same jobs.

There are additional things to consider when introducing this hardware to a mobile device though, such as:

* Can the processor, or processors, handle this much hardware?
* How will this hardware impact the battery life of the device?

Given that the mobility of these devices is a key reason behind people using them, it is important that the size of the internal components does not negatively impact on the user experience of the device – and a decrease in battery life would certainly have a negative impact.

Concerns such as these are why there are so many releases of new mobile devices on a yearly basis, as the technology industry is continuously working towards updates and improvements.

15 of 20 – Question 2

What does the central processing unit consist of?

Choose all that apply:

1. Arithmetic and logic unit
2. Control unit
3. Graphical processing unit
4. Registers
5. Graphics card

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

16 of 20 – Question 3

Indicate whether the following statements are true or false.

RAM stands for Randomly Accessible Memory.

True

False

The correct answer is: False

The two types of RAM are dynamic RAM and static RAM.

True

False

The correct answer is: True

Dynamic RAM is often found in mobile phones and digital cameras.

True

False

The correct answer is: False

Computers can also use cache memory, which connects directly to the CPU.

True

False

The correct answer is: True

17 of 20 – Question 4

Using the following choice of words; **moving parts**, **solid state**, **hard disk**, **more reliable** and **physical** **movement**, fill in the blanks for the paragraph below:

The internal storage device used within a computer system will either be a **blank** drive (HDD) or a **blank** drive (SSD). While both of these systems can store huge amounts of data, they do work in notably different ways. A hard disk drive relies on the **blank** of disks to write and read data, using a number of magnetic dots. A solid state drive does not have any **blank** at all, which is why this system is thought to be quieter and faster. However, hard disk drives have often been thought of as the **blank** device.

The correct paragraph should read:

The internal storage device used within a computer system will either be a **hard disk** drive (HDD) or a **solid state** drive (SSD). While both of these systems can store huge amounts of data, they do work in notably different ways. A hard disk drive relies on the **physical movement** of disks to write and read data, using a number of magnetic dots. A solid state drive does not have any **moving parts** at all, which is why this system is thought to be quieter and faster. However, hard disk drives have often been thought of as the **more reliable** device.

18 of 20 – Question 5

What **two** things do companies have to consider when putting hardware into a mobile device?

1. The processor’s ability to handle the hardware
2. The physical size of the device
3. The battery life of the device
4. The appearance of the device
5. The space taken up by the processor

The correct answers are A and C, the processor’s ability to handle the hardware and the battery life of the device.

19 of 20 – End

Well done. You have completed this session on revision (part 2).

In this session we have covered:

* The main internal components of a computer system
* What these components do
* How these components are used in mobile systems

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