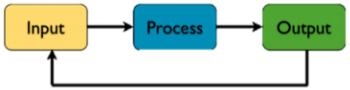
# Digital Design Y7

MODULE 3

Middle Years Programme

## What is a computer?

A computer is any device take takes an input, processes it and then outputs infor-




## CPU (Von Neumann)

The CPU has two main parts: **ALU** & **CU**

### Arithmetic and Logic Unit

The ALU carries out all of the arithmetic and logical operations including addition, subtraction and comparisons (for example, equal to, less than, greater than).

### Control Unit

The **Control Unit** uses electrical signals to direct the system to execute the instructions in stored programs.

## Fetch, Decode, Execute

The main function of the CPU is to run an endless fetch-execute cycle.


The speed of the **FDE** cycle is measured in cycles per second (**hertz**). This is known as the **clock speed.**

Processors are usually measured in **giga-hertz (GHz)**

**1GHz =** 1 billion instructions processed.

## Input Devices

An input device is a piece of hardware that can be used to enter data into a computer

## Output Devices

An output device is a piece of hardware that can be used to represent information in a variety of ways

## Components

Computer components are all the different internal parts of a computer system that help it to operate.
Each component has its own purpose and functions.

**Central Processing Unit**
The CPU is the brain of the computer. It does all the processing and calculating for the computer.


**Heat sink**
A heat sink is used to draw heat away from important components such as the CPU that can get quite hot. If a component gets too hot then it won't be able to perform its job as well.

**Motherboard**
The motherboard is what connects all the other components. It helps keep them secure and allows the components to communicate.

**Power Supply**
A power supply helps to convert electricity to a suitable voltage to power the computer safely.

**Hard Drive**
A Hard Drive is where all the computers long term data is stored i.e. data you want to keep for in the future, such as your own documents, music, films and games.

**Random Access Memory**
RAM is where temporary data is stored while the computer is currently being used. Once a computer is switched off this data is lost

**Network Interface Card**
A network interface card (NIC) enables a computer system to connect to a network. Some allow access wirelessly.

## Key Words

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| Input | Process | Output | CPU |
| Heat Sink | Motherboard | RAM | |
| Component | Hard Drive | FDE | |
| Power Supply | Clock Speed | | |

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|---|---|
| Abstraction | Removing unnecessary detail. Identifying what is important and leaving out the detail we do not need. |
| Debugging | Finding and fixing errors. Finding out what is wrong in an algorithm or program and fixing it. |
| Algorithm | Making steps and rules. A precise sequence of instructions, or set of rules, for performing a task. |
| Decomposition | Breaking down into parts. |
| Logic | Predicting and analyzing. Logic helps us to establish and check facts, and make predictions. |
| Programming | The process of writing computer programs. |
| Tinkering | Experimenting and playing. Changing things to see what happens. |
| Patterns | Spotting and using similarities. By spotting patterns we can make predictions, create rules and solve other problems. |