

# Knowledge Organiser

Unit 1 – The Computer

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## Summary

Computers require input hardware, processing hardware and output hardware. The hardware that defines a computer is the CPU and memory. Without these a computer could not function.

**CPU** - You can think of the CPU is being like the brain in a human. It is responsible for all of a computer's processing.

**Memory** - stores program operations and data while a program is being executed. There are several types of memory, including: registers, cache, RAM and virtual memory.

**Storage** - stores programs and files long term, even when they are not in use. Devices such as hard drives, USB memory sticks or SD cards are used to store files such as photos, music and software applications long term.

An **input device** is any piece of computer hardware used to provide data to a computer system. Examples include: keyboard, mouse, scanner, digital camera and webcam.

An **output device** is any piece of computer hardware used to communicate the results of data that has been processed.

Input	Output	Memory	Storage
Mouse	Printer	RAM	USB Stick
Keyboard	Speaker	ROM	DVD
Tracker Ball	Screen	Cache	SD Card

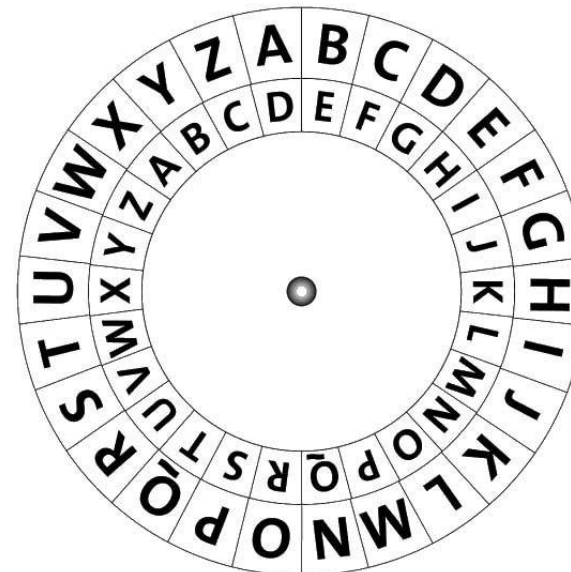
## **Storage Type:**

## **Examples:**

Solid State	Solid state hard drive, USB Stick, SD Cards.
Optical	CD, DVD, Blue Ray.
Magnetic	Hard Drive, Magnetic tape.

## Caesar Cipher

One of the earliest known ciphers is the Caesar cipher, used by the Roman Emperor Julius Caesar for his correspondence. The cipher was very simple - take each letter in the message and swap it for another letter an agreed number of positions up the alphabet. For example if the rule is 3 shifts, A becomes D, B becomes E and so on. It is trivial for a computer to crack this code, but for centuries it was quite good.



## Caesar Cipher

Assuming that the Cipher wheel on the left is already aligned. Using the outer wheel crack the code:

B U Z B I B K Q

E X C E L L E N T

What is the rule?

*3 Shifts*

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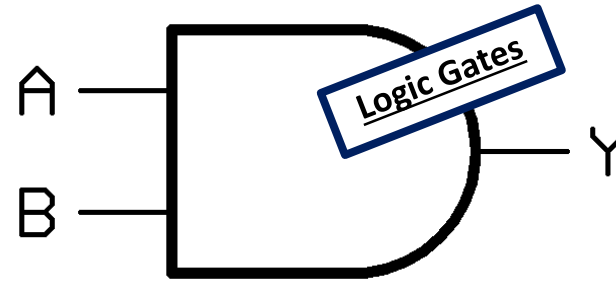
## Binary

Binary is a base-2 number system that is made up of only two numbers: 0 and 1. This number system is the basis for all binary code, which is used to write data such as the computer processor instructions used every day.

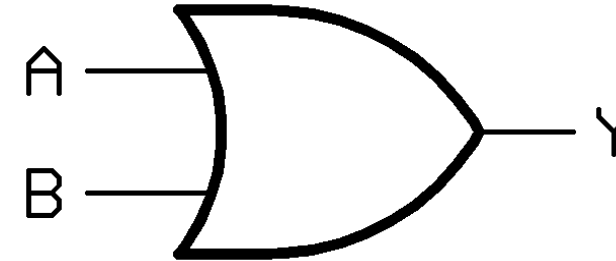
The 0s and 1s in binary represent OFF or ON, respectively. In a transistor, an "0" represents no flow of electricity, and "1" represents electricity being allowed to flow. In this way, numbers are represented physically inside the computing device, permitting calculation.

128	64	32	16	8	4	2	1	
0	1	0	1	1	0	0	1	89
0	0	0	1	1	1	0	0	28
0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	255
1	0	1	0	0	0	0	1	161
0	1	1	1	1	1	1	1	127

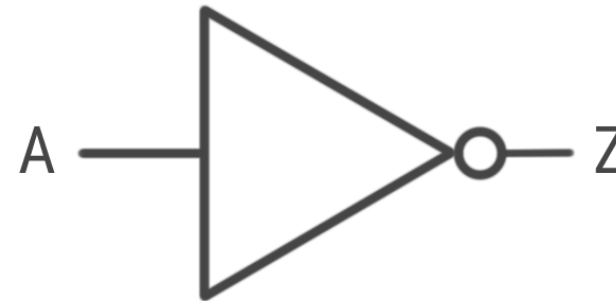
Exponent:	$2^7$	$2^6$	$2^5$	$2^4$	$2^3$	$2^2$	$2^1$	$2^0$
Value:	128	64	32	16	8	4	2	1



A	B	Y
1	0	0
0	1	0
1	1	1
0	0	0



A	B	Y
1	0	1
0	1	1
1	1	1
0	0	0



A	Z
1	0
0	1

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## Software

Software is a computer program (or programs) that provide the instructions for telling a computer what to do and how to do it. Different pieces of software can be categorised into two different types.

### System software

These are the files and programs that make up your computer's operating system.

### Application software

These are the everyday programs that you use such as Microsoft Office, graphics packages and web browsers

#### Examples:

Windows

Linux

Mac OS

iOS

Android

#### Examples:

Internet Explorer

Calculator

Microsoft Excel etc

Safari

Photoshop

