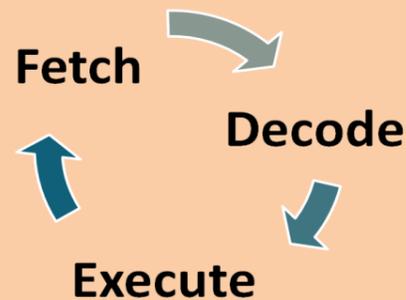


## Devices

Device	What is it?	Input, Output or Storage ?	What it is used for ?
	Monitor	Output	Displaying images and text
	Mouse	Input	Selecting items on a screen
	CD or DVD	Storage	Storing files e.g. movies
	USB Flash Memory Stick	Storage	Backing up or transferring data from one computer to another
	Keyboard	Input	Creating or editing a document
	Printer	Output	Print work
	Hard Disk Drive	Storage	Storing applications and files
	Speakers	Output	Hearing system sounds / noises / beeps
	Scanner	Input	Scanning important documents to store digitally
	Sim Card	Storage	Storing mobile phone contacts
	Webcam	Input	Using video calling over the Internet
	Headphones	Output	Listening to music

## Fetch – Decode – Execute cycle

1. Computer has a list of instructions in memory to carry out
2. CPU **Fetches** top instruction from the list
3. Instructions is passed to **Decoder** to interpret
4. **Decoder** passes on the instruction
5. Instruction is **Executed** or carried out
6. CPU **Fetches** top instruction from the list...



## What is Binary

Binary is a number system that only uses two digits: 1 and 0. All information that is processed by a computer is in the form of a sequence of 1s and 0s. Therefore, all data that we want a computer to process needs to be converted into binary.

The binary system is known as a 'base 2' system. This is because:

There are only two digits to select from (1 and 0)

When using the binary system, data is converted using the power of two.

NAME	EQUAL TO	SIZE IN BYTES
Bit	1 bit	1/8
Byte	8 bit	1
Kilobyte	1,000 byte	1,000
Megabyte	1,000 kilobyte	1,000,000
Gigabyte	1,000 megabyte	1,000,000, 000
Terabyte	1,000 gigabyte	1,000,000, 000, 0000

## Storage capacities

Device and capacity	Strengths	Weaknesses
<b>USB</b> 6-32GB or more	Easily portable, fast, high capacity storage, durable	Easy to lose. Slower than an internal hard disk
<b>INTERNAL HARD DRIVE</b> 1 TB or more	Large storage capacity	Internal hard disks are not portable. External hard disks are not very convenient to carry around and have moving parts so are breakable
<b>OPTICAL DRIVE</b> 4GB to 9GB or up to 50GB for rewritable Blu-ray	Large storage capacity, sound and picture quality excellent, cheap	Easily scratched, too large to fit in a pocket
<b>SD CARD</b> 8-64 GB, typically	Used in portable devices such as cameras	Easily lost. Not good for long term storage – may deteriorate after several years
<b>CLOUD STORAGE</b>	Useful for backup as it is secure, not likely to be lost. Data can be accessed from anywhere, or shared with others	Can be slower to access than data held on a local hard disk

## Key Terms

<b>Hardware</b>	Objects that you can touch, like a keyboard.
<b>Software</b>	You cannot 'touch' software. Software refers to the programs that run on a computer. Examples of software: Windows, MS Word, MS Excel, Kodu and Logo.
<b>Input Devices</b>	In computing, an <b>input device</b> is computer hardware which is used to enter data for processing. Examples of <b>input devices</b> include keyboard, mouse, image scanner, digital cameras and joysticks.
<b>Output Devices</b>	An <b>output device</b> is any hardware <b>device</b> used to send data from a computer to another <b>device</b> or user. Typical examples of <b>output devices</b> are monitors and projectors (video), headphones and speakers (audio), or printers and plotters.
<b>Storage Devices</b>	A piece of computer equipment on which information can be stored.
<b>Peripheral</b>	A <b>peripheral device</b> is defined as a computer <b>device</b> , such as a keyboard or printer, that is not part of the essential computer (i.e. the memory and microprocessor).
<b>Binary</b>	Binary is a number system that only uses two digits: 1 and 0.
<b>Operating System</b>	Manages the hardware and software in a computer (E.g. Windows 10).
<b>Systems Software</b>	Software that helps maintain the computer – such as anti-virus or compression ('Zip') software
<b>Applications Software</b>	Everyday programs such as Microsoft Office, web browsers and graphics packages.
<b>Optical media</b>	Refers to discs that are read by a laser. This includes CD-ROMs, DVD-ROMs.

## Devices

Decimal	Binary	Character	Decimal	Binary	Character	Decimal	Binary	Character
32	00100000	space	64	01000000	@	96	01100000	`
33	00100001	!	65	01000001	A	97	01100001	a
34	00100010	"	66	01000010	B	98	01100010	b
35	00100011	£	67	01000011	C	99	01100011	c
36	00100100	\$	68	01000100	D	100	01100100	d
37	00100101	%	69	01000101	E	101	01100101	e
38	00100110	&	70	01000110	F	102	01100110	f
39	00100111	'	71	01000111	G	103	01100111	g
40	00101000	(	72	01001000	H	104	01101000	h
41	00101001	)	73	01001001	I	105	01101001	i
42	00101010	*	74	01001010	J	106	01101010	j
43	00101011	+	75	01001011	K	107	01101011	k
44	00101100	,	76	01001100	L	108	01101100	l
45	00101101	-	77	01001101	M	109	01101101	m
46	00101110	.	78	01001110	N	110	01101110	n
47	00101111	/	79	01001111	O	111	01101111	o
48	00110000	0	80	01010000	P	112	01110000	p
49	00110001	1	81	01010001	Q	113	01110001	q
50	00110010	2	82	01010010	R	114	01110010	r
51	00110011	3	83	01010011	S	115	01110011	s
52	00110100	4	84	01010100	T	116	01110100	t
53	00110101	5	85	01010101	U	117	01110101	u
54	00110110	6	86	01010110	V	118	01110110	v
55	00110111	7	87	01010111	W	119	01110111	w
56	00111000	8	88	01011000	X	120	01111000	x
57	00111001	9	89	01011001	Y	121	01111001	y
58	00111010	:	90	01011010	Z	122	01111010	z
59	00111011	;	91	01011011	[	123	01111011	{
60	00111100	<	92	01011100	\	124	01111100	
61	00111101	=	93	01011101	]	125	01111101	}
62	00111110	>	94	01011110	^	126	01111110	~
63	00111111	?	95	01011111	_	127	01111111	del

## Binary can be used to represent characters

- 1) **Alphanumeric characters** are used to make **words** and strings. They include uppercase and lowercase **letters**, the **digits 0 – 9**, and symbols like ? + and £.
- 2) Computers are **unable** to process these characters directly as they only process binary code. So they need a way of **converting** these characters to binary code and vice versa. They can do this using **character sets**.
- 3) Character sets are also contain **special characters** which do certain commands (e.g. enter and delete).
- 4) Pressing a button on your **keyboard** sends a binary signal to the computer telling it which key you pressed. The computer then uses the character set to **translate** the binary code into a particular character.

You can work out the **size** of a text file using this formula  

$$\text{FILE SIZE (IN BITS)} = \text{NUMBER OF BITS PER CHARACTER} \times \text{NUMBER OF CHARACTERS}$$

Example - a text file that uses 8 bits per character and contains 200 characters will have a file size of  $8 \times 200 = 1600$  bits

## What is Binary

ASCII is the most commonly used character set in the English speaking world.

Each ASCII character is given a **7-bit** binary code - this means it can represent a total of 128 different characters including all the letters in the English alphabet, numbers, symbols and commands.

An **extra bit (0)** is added to the **start** of the binary code for each ASCII character. This means each ASCII character fits nicely into **1 byte**.

The codes for numbers, uppercase letters and lowercase letters are ordered (A comes before B comes before C ..... ) with symbols and commands scattered around.

Key Terms (Networks)	
Network	A group of <b>devices</b> connected together, either wirelessly or with a network cable.
Protocol	A set of rules.
Network cable	Used to connect different devices together. They are often made up of a number of wires.
Hub	Connects a number of computers together. Ports allow cables to be plugged in from each connected computer.
Server	A powerful computer which provides services to a network.
Router	Used to connect two separate networks together across the internet.
Wired	Wired networks send data along cables.
Wireless	Wireless networks send data through the air using radio waves.
3G /4G /5G	Wireless communications standards designed to provide different speeds for mobile devices, such as smartphones, tablets, and wireless hotspots.
Wi-Fi	A facility allowing computers, smartphones, or other devices to connect to the Internet or communicate with one another wirelessly within a particular area.
Bandwidth	Bandwidth is the amount of data that can be moved from one point to another in a given time.
Broadband	A high-capacity transmission technique using a wide range of frequencies, which enables a large number of messages to be communicated simultaneously.
Data capacity	How much <b>data</b> the storage type can hold, measured in <b>bits</b> .
Buffering	In streaming audio or video from the <b>Internet</b> , <b>buffering</b> refers to downloading a certain amount of data before starting to play the music or movie.

**What am I?**

Wired Versus Wireless	
Advantages of a wired network	Disadvantages of a wired network
Faster connection (little to no interference)	Cables can be a trip hazard and look unpleasant
Higher bandwidth	More expensive and time-consuming to add devices, as each device needs cables
Better security	Devices are in fixed positions (no portability)
Advantages of wireless network	Disadvantages of wireless network
No trailing/trips/hazards	Lower bandwidth
It is quick and cheap to connect to new devices	Wireless connections can be weakened by walls and ceilings
Allows portability	Less Secure

Network Protocols		
Layer	Protocols in this layer cover	Protocol Examples
1	Passing data (as electrical signals) over the physical network	<b>Ethernet</b>
2	Making connections between networks and directing data	<b>IP</b> (Internet Protocol)
3	Controlling data flow e.g. checking data is sent and delivered	<b>TCP</b> (Transmission Control Protocol)
4	Turing data into websites and other applications and vice versa	<b>HTTP / FTP / SMTP</b>

**Part of a website address**

URL

http://www.facebook.com

protocol
World Wide Web
domain name

Web Browsers / Search Engines / Websites		
<b>Browsers</b>	Google Chrome Internet Explorer Safari	
<b>Search engines</b>	Google Bing	
<b>Websites</b>	bbc.co.uk youtube.com	

Key Terms (Internet)	
Internet	The internet in a network of networks.
Internet Protocol	A set of rules governing the format of data sent over the Internet or other network.
IP Address	A unique string of numbers separated by full stops that identifies each computer using the Internet Protocol to communicate over a network.
VoIP	Voice Over Internet Protocol - the set of rules that makes it possible to use the Internet for telephone or videophone communication.
IoT	A network of <b>Internet</b> connected objects able to collect and exchange data.
Spam	Irrelevant or unsolicited messages sent over the Internet, typically to a large number of users, for the purposes of advertising, phishing, spreading malware, etc.
WWW (World Wide Web)	Part of the internet that contains websites, web pages, and the links between them.
Web Browser	A <b>browser</b> is a software application used to locate, retrieve and display content on the World Wide <b>Web</b> , including webpages, images, video and other files. E.g. Chrome / FireFox
Web Server	A web server is a computer that runs websites. The basic objective of the web server is to store, process and deliver web pages to the users.
Web Page	A hypertext document connected to the World Wide Web.
Search Engine	A type of website that allows you to look up information on the World Wide Web.
URL	Uniform Resource Locator ( <b>URL</b> ) is another name for a web address.
HTTPS	Stands for Hypertext Transfer Protocol Secure. This encrypts messages between a browser and the website so the messages cannot be understood by other devices.
HTTP	Stands for Hypertext Transfer Protocol. Messages are sent between a browser and a website in plain text and can be read and understood by other devices.
Domain Name	A <b>domain name</b> is a unique <b>name</b> that identifies a <b>website</b> .