COMPUTER SYSTEMS

KNOWLEDGE ORGANISER:

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TOPIC TERMINOLOGY

COMPUTER	NETWORK
EMAIL	FILES
ACCOUNT	FOLDERS
LOGIN	ONENOTE
PASSWORD	DRIVES
PERIPHERALS	MOTHERBOARD
RAM/ROM	HARDDRIVE
DISK	HEATSINK FAN
COMPONENTS	MEMORY
STORAGE,	PROCESSOR
COMPUTE	DATA

FETCH, DECODE, EXECUTE.

CALL AND RESPONSE

I SAY...	YOU SAY...
A computer is...	Electronic device that can compute data
The smallest unit of data is...	1 or 0 (bit)
CPU stands for...	Central Processing Unit
Input Process Output Is the same as...	Fetch Decode Execute
The brain of the computer processes ...	All binary data 1s and 0s

SCHOOL COMPUTER SYSTEMS

Office

https://www.office.com/

USERNAME AND EMAIL ADDRESSES

USER NAME	PASSWORD	EMAIL ADDRESS
22KWebster	fulwood	22KWebster@fulwoodacademy.co.uk

DID YOU KNOW! An email address is made up from a 'username' and 'mail server name'

At symbol domain (company in UK)

22KWebster@fulwoodacademy.co.uk

NOTE: To log on to the PC you have to use your username & password to login, but for Microsoft software, it will ask for your email address as a username

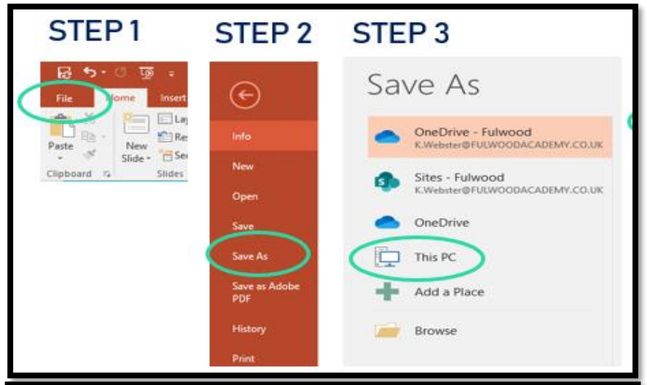
FILES AND FOLDERS

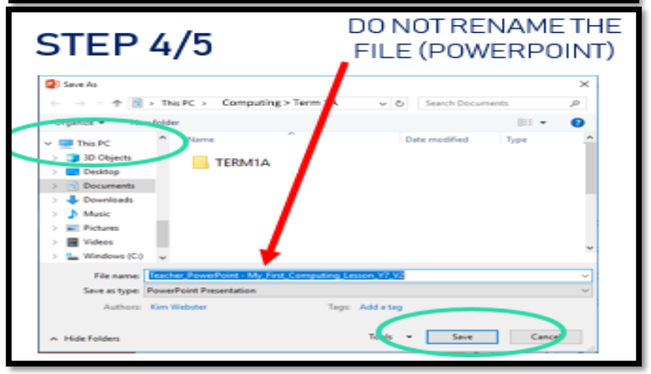
REMEMBER ME!!

- Computers can be used to store our work.
- They can save files and folders for us.
- We can create folders to save our working files.
- Working files are created by software used on a computer.

ACCESSING YOUR WORK

SAVING WORK INTO YOUR AREA





KEYBOARD SHORTCUTS

Ctrl+X	Cut
Ctrl+C	Copy
Ctrl+V	Paste
Ctrl+P	Print
Ctrl+N	New
Ctrl+O	Open
Ctrl+W	Close
Ctrl+F	Find
Ctrl+Z	Undo
Ctrl+Y	Redo
Ctrl+Alt+S	Split
Ctrl+Alt+V	Layout
Ctrl+Home	Home
Ctrl+End	End
Ctrl+S	Save

NEED SUPPORT

During Term Time – you can email for support

Head of Computing – k.webster@fulwoodacademy.co.uk

Teacher of Computing – k.dudley@fulwoodacademy.co.uk

IT Technician – a.syme@fulwoodacademy.co.uk

KWE>2022-23

COMPUTER SYSTEMS

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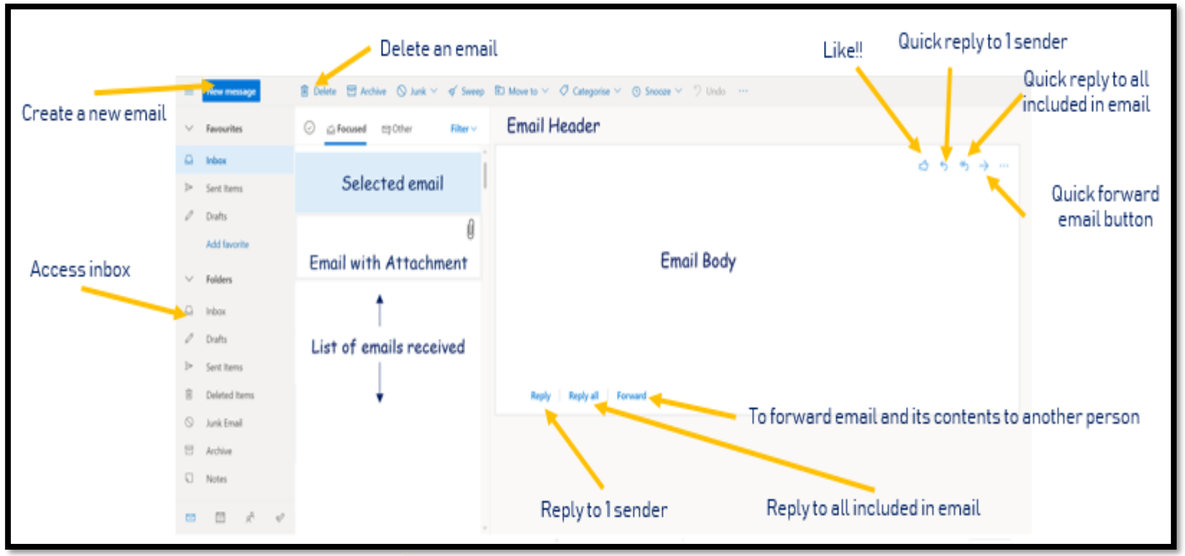
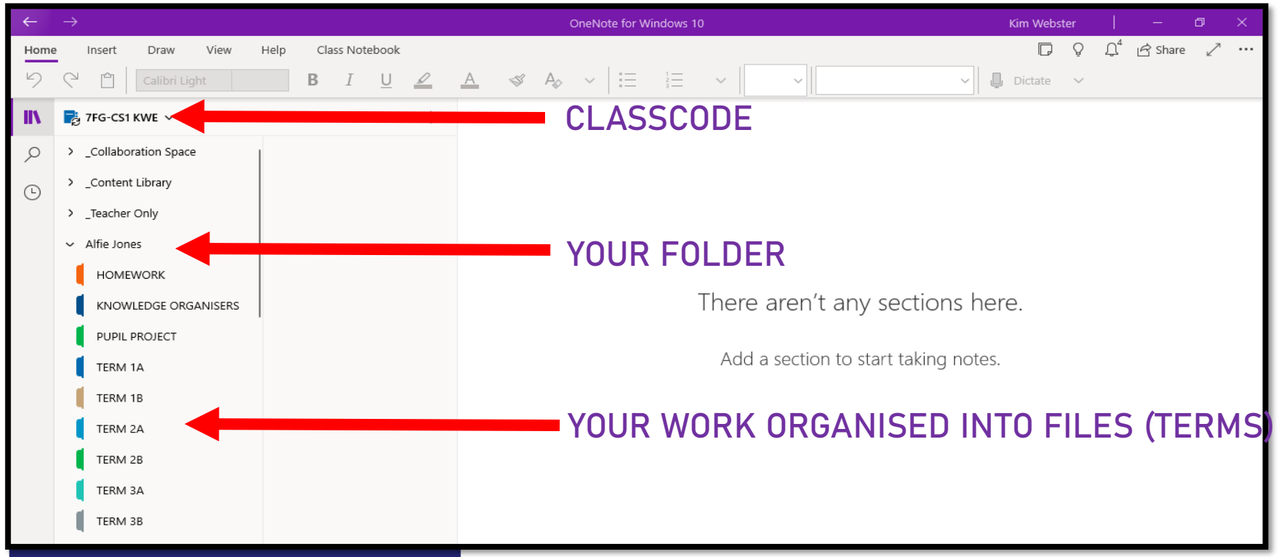
USING WEBMAIL



USING ONENOTE



EMAIL ETTEQUETTE

Dear (name of friend) Miss Webster. — FORMAL GREETING — FORMAL NAME

(Opening sentence – tell them why you are sending this email)
I am writing this email to request feedback on my presentation. — SUBJECT/OPENING

(Email body – anything else to add. Details about what you are asking/saying)
My presentation requires feedback before I send it out to all teachers. Would it be possible for yourself to provide this feedback. — BODY TEXT

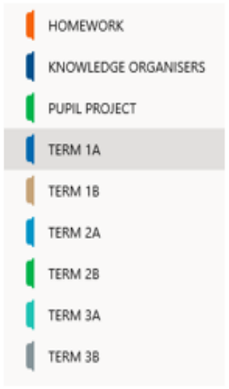
(Attachments – Tell them if there are any attachments attached to the email)
I have attached the presentation to this email. — ATTACHEMENTS

(Ending your Email – be formal, Regards, Best Wishes, Yours sincerely, yours faithfully)
Regards, — ENDING

(Your name)
Mr. K Dudley — SIGN OFF

PRINTING TO ONENOTE

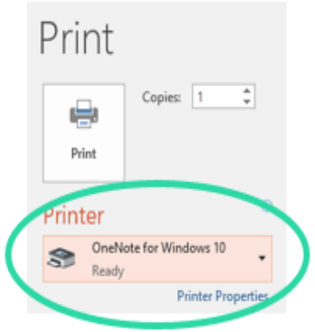
STEP 1: On desktop ONENOTE
Click your name to open the folders



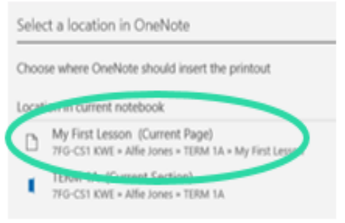
STEP 2: Click add page (bottom)

STEP 3: Give your new page a suitable name (My first Lesson)

STEP 4: Click 'file' 'print'



STEP : Choose the page you created, to print your work to.



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COMPUTER SYSTEMS

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PRINCIPLES OF COMPUTING

UNDER THE HOOD

Hard Disc Drive (HDD)

The HDD is a data storage device that uses magnetic storage to store and retrieve digital data using one or more rigid rapidly rotating platters coated with magnetic material

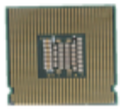
Power Supply Unit

The power supply unit provides the power so the Computer can work.

Audio Card

A sound card is an internal expansion card that provides input and output of audio signals to and from a computer under control of computer programs.

Central Processing Unit (CPU)



CPU is referred to as the 'Brain' of the computer, is the electronic circuitry within a computer that executes instructions that make up a computer program.

Heat Sink

The heat sync is used to absorb the heat from the CPU and the fan blows the heat from the machine.

Video Card

A video card is an expansion card which generates a feed of output images to a display device.

Random Access Memory (RAM)

Random-access memory is a form of computer memory that can be read and changed in any order, typically used to store working data and machine code.

Motherboard

The motherboard holds and allows communication between many of the crucial electronic components of a system, such as the central processing unit and memory, and provides connectors for other peripherals.

ARCHITECTURE

REMEMBER ME!!

Computer architecture refers to the structure and organisation of a computer system. It specifies the components that make up a computer system and describes how these are interconnected, how they interact with each other, and how they are managed. Different computing systems have different configurations. Standard characteristics in one computing system might not be present in another

CENTRAL PROCESSING UNIT

REMEMBER ME!!

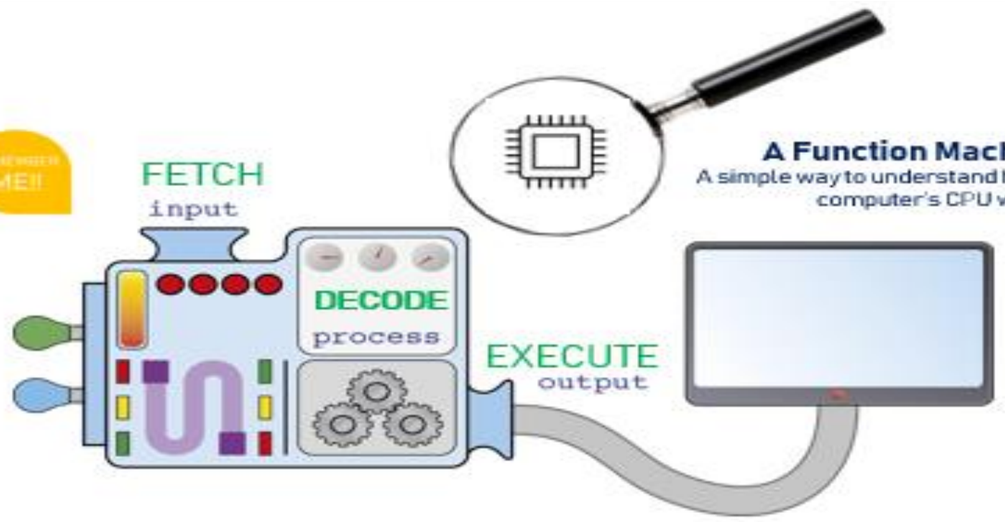
CPU Central Processing Unit

When a teacher asks you to do something, you listen (fetch), work out what you are being asked to do (decode) and then do it (execute). A CPU works in a similar way. It:

- fetches the instruction from memory.
- decodes the instruction to find out what processing to do.
- executes the instruction.

BBC Bitesize, 2020

REMEMBER ME!!



A Function Machine
A simple way to understand how a computer's CPU works

COMPUTER SYSTEMS

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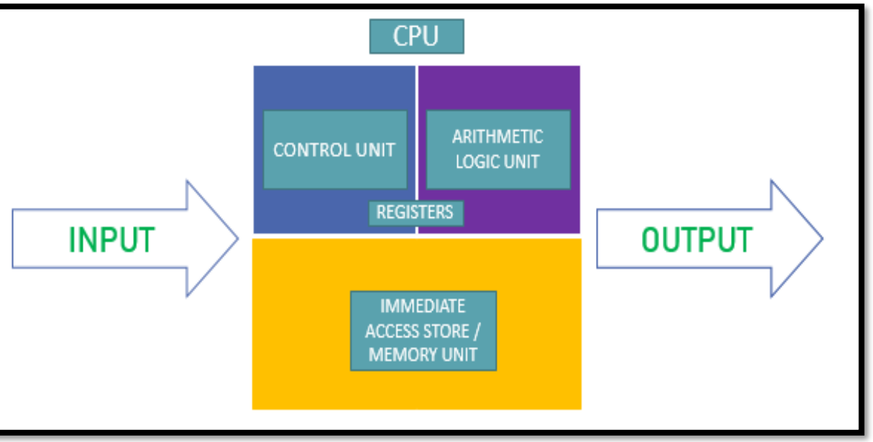
PROCESSOR'S BASIC COMPOSITION

REMEMBER ME!!

The CPU is made up of three main components, the **control unit**, the **immediate access store** and the **arithmetic and logic unit**.



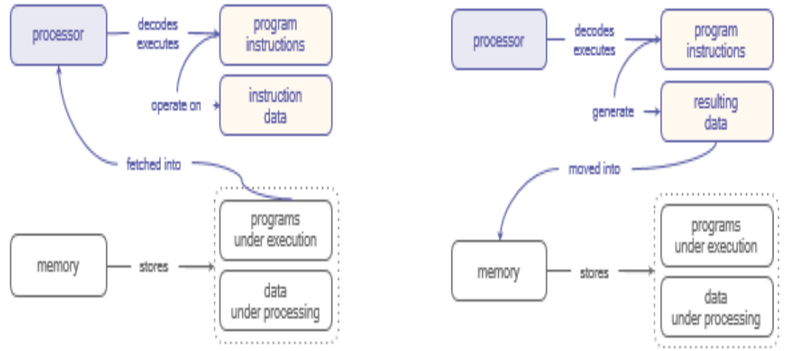
EXAMPLE OF THE ARCHITECTURE IN USE

The characters typed on a keyboard > this set of instruction for each characters is in the ROM inside the computer. The CPU / CU send a request for the RAM to FETCH the instructions from the ROM. When the instruction arrive, they are stored in the IMAS. The data needs to be DECODED – this is done by the ALU, it calculates the binary code which is temporarily stored inside IMAS. Once the binary is decoded, the IMAs sends the instruction to the other computer components, in this it's the video card – this component EXECUTES the instructions and displays the characters on the screen.

PROCESSOR AND OTHER COMPONENTS

REMEMBER ME!!

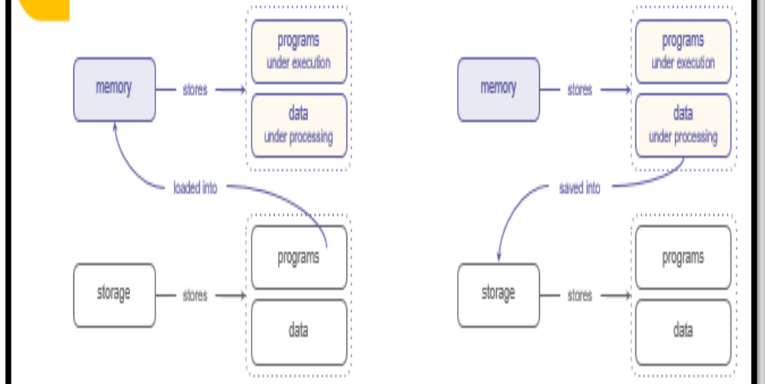
What does it do?



MEMORY AND OTHER COMPONENTS

REMEMBER ME!!

What does it do?



WHAT IS MEMORY

The main **memory** is the component that **stores** the programs and data **currently in use**.

Memory is **volatile**: its contents are lost when the power is off.

Terminology: The main memory is commonly referred to as **RAM** (random-access memory).

This is what the main memory looks like in desktops and laptops.

Sometimes, memory is integrated with other components, rather than being a separate component.

WHAT IS A PROCESSOR

The **processor** is the component that **executes** program instructions.

An instruction may:

- Perform arithmetic or logic operations on data
- Perform input/output of data
- Control program flow

Terminology: The processor is commonly referred to as the **CPU** (central processing unit).

This is what the processor looks like in desktops and laptops.

Sometimes, the processor is integrated with other components, rather than being a separate component.

COMPUTER SYSTEMS

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MEMORY TYPES

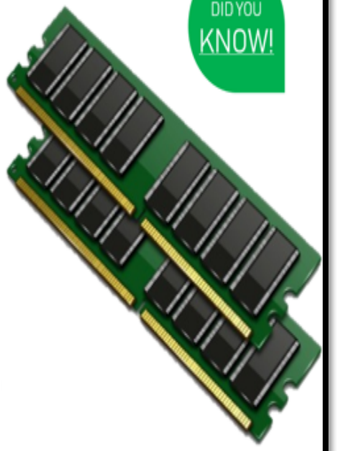
PRIMARY MAIN MEMORY

RAM stores data temporarily and it is known as the primary memory main memory.

When you are using a computer, RAM will store the programs data, that supports anything currently in use.

RAM is VOLATILE MEMORY – which means it looses its memory when the device is turned off.

The CPU accesses data FASTER using RAM than if it had to access the hard drive (storage).



DID YOU KNOW!

SECONDARY MAIN MEMORY

ROM stores data permanently and it is known as the secondary memory main memory. .

When using a computer a user cannot change the contents of ROM. Programs and other information on ROM are written by manufacturers when the chip is built.

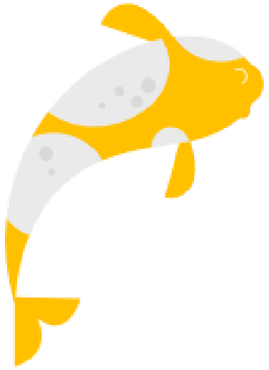
ROM is NON-VOLATILE – which means it has the capacity to store memory long term.

The CPU can *only read* from and cannot write data to ROM.

DID YOU KNOW!

VOLATILE MEMORY

Volatile memory loses its contents when unpowered.



NON-VOLATILE MEMORY

Non-volatile memory keeps its contents even when the computer is switched off.

REMEMBER ME!!

Primary Memory (Main Memory)

Primary memory holds only those data and instructions on which the computer is currently working. Basically... Primary Memory is split into two categories: RAM and ROM. So, if someone refers to Primary (Main) Memory, they are actually talking about RAM and/or ROM.

Characteristics of Main Memory

- Usually contains volatile memory (RAM) - Data is lost in case power is switched off.
- If it contained non-volatile memory it would be ROM.
- Both directly accessed by the CPU.
- It is the working memory of the computer.
- A computer cannot run without the primary memory.

SECONDARY MEMORY

The **device** that actually holds the data is known as the **storage medium** (**'media'** is the plural). The **device** that saves data onto the **storage medium**, or reads data from it, is known as the **storage device**. Sometimes the **storage medium** is removable from the **device**, e.g. a CD-ROM can be taken out of a CD **drive.**

Individually they are known as 'storage medium'

Collectively they are known as 'storage media'

REMEMBER ME!!

REMEMBER ME!!

COMPUTER SYSTEMS

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NETWORKS

Key vocabulary

Network	A group of interconnected computers/devices.
LAN	Local area network. A network of computers that covers a small area, eg a school or college.
WAN	Wide area network. A network that spans across a building, buildings or even countries, eg the internet.
Client-server	A relationship in which data or web application is hosted on a server and accessed by client computers.
Peer to peer	A relationship where all computers on the network share responsibility and there is no one central server.
WAP	A device that connects computers to a network using Wi-Fi.
Switch	A device for connecting computers and other network capable devices together to form a network.
NIC	**Network Interface Controller** -A circuit board that is installed in a computer so it can be connected to a network.
Transmission media	How data is carried from point A to point B physically, either by cable or wirelessly.
Ethernet	A set of protocols used in a wired local area network that describes how data is transmitted within it.
Wi-Fi	A method of connecting to the internet wirelessly using radio waves.
Bluetooth	Wireless technology used for transmitting data over short distances.
DNS	**Domain name server** - an internet service that translates IP addresses into website domain names. All websites have equivalent IP addresses.
Host	A server that stores files for other computers to access.
Cloud	A term often used to describe a location on the internet from which software applications are run and where data is stored.

NETWORK SECURITY

Key vocabulary

Encryption	Files that are encrypted have been altered using a secret code and are unreadable to unauthorised parties.
IP address	A unique address for each computer device on a network.
MAC address	Media access control - each unique piece of hardware on a network has a MAC address.
Standard	An agreed way of doing things.
Protocol	A set of rules for how messages are turned into data packets and sent across networks.

Layers

Layering means to break up the sending of messages into separate components and activities. Each component handles a different part of the communication. This can be referred to as the Transmission Control Protocol/Internet Protocol (TCP/IP) model.

Layering allows **standards** to be developed, but also to be adapted to new hardware and software over time. For example, different software packages (applications) may use the same transport, network and link layers but have their own application layer. The way the program encodes the message changes - the rest of communication method remains the same.

Common protocols

TCP/IP	**Transmission Control Protocol/Internet Protocol** - enables communication over the internet.
HTTP	**Hypertext Transfer Protocol** - governs communication between a webserver and a client.
HTTPS	HTTPS **(secure)** includes secure encryption to allow transactions to be made over the internet.
FTP	**File Transfer Protocol** - governs the transmission of files across a network and the internet.
POP	**Post Office Protocol** – governs the transmission of emails to devices. Once downloaded to the device is deleted from the server.
IMAP	**Internet Message Access Protocol** – governs the transmission of emails. Stored on server and accessed by devices.
SMTP	**Simple Mail Transfer Protocol** - governs the sending of email over a network to a mail server.
Layering	In networking, the concept of breaking up communication into separate components or activities.

Protecting networks

Form of attack	Prevention
Malware	Anti-Malware software.
Phishing	Training of user to detect scams as well as the filtering of emails.
Brute-force attacks	Use of different strong passwords. A limit on the number of incorrect attempts.
Denial of service attacks	Block IP addresses which send too many requests. Increase capacity.
Data interception and theft	Encryption of data.
SQL injection	Ensuring that all data input is sanitized. (Forcing data to be in the format you want it such as a date, text or integer.)

Key vocabulary

Malware	Software that is designed to cause harm or damage to a computer. This includes viruses that might damage files, adware that causes pop-ups, and spyware that collects and shares login details.
Social Engineering	Tricking people into giving sensitive data such as PINs or passwords.
Phishing	An attempt to gain personal information about someone by way of deception, eg sending an email pretending to be from their bank asking them for their bank details.
Brute-force attack	Attempting every combination of a password or encryption key until it is correct.
Denial of service attack	An attack designed to render online services inaccessible. One type of this attack involves many computers simultaneously flooding a target with network traffic.
Data interception	Where data is intercepted during transmission. This is done using software called a packet sniffer, which examines data packets as they are sent around a network.
SQL Injection	Where SQL code is entered as a data input. Many databases use SQL code to interrogate the data and maintain the structure. SQL code can be inputted as data, which can cause errors or unintended operations.
Penetration testing	Systems are tested for vulnerabilities to reveal any weaknesses in the system which can be fixed.
Anti-malware	A type of computer program which detects, prevents and removes malware on a system.
Firewall	An application that prevents unauthorised connections to and from the Internet.
User-access level	These are the permissions given to a user to access facilities on a computer.
Encryption	Files that are encrypted have been altered using a secret code and are unreadable to unauthorised parties.

Encryption

A simple method of encryption requires the use of a technique known as the Caesar cipher. The cipher works by giving a number value to a key. Each plaintext letter is replaced by a new letter, the one found at the original letter's position in the alphabet plus the value of the key. The example uses a key value of 3.

Plaintext	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
Ciphertext	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c

COMPUTER SYSTEMS

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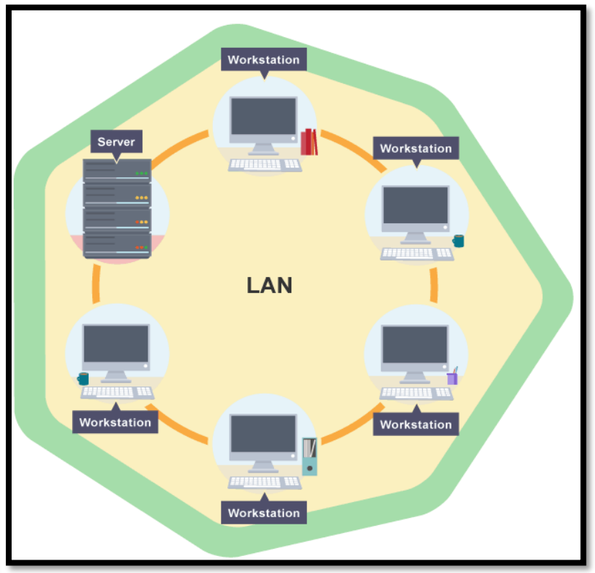
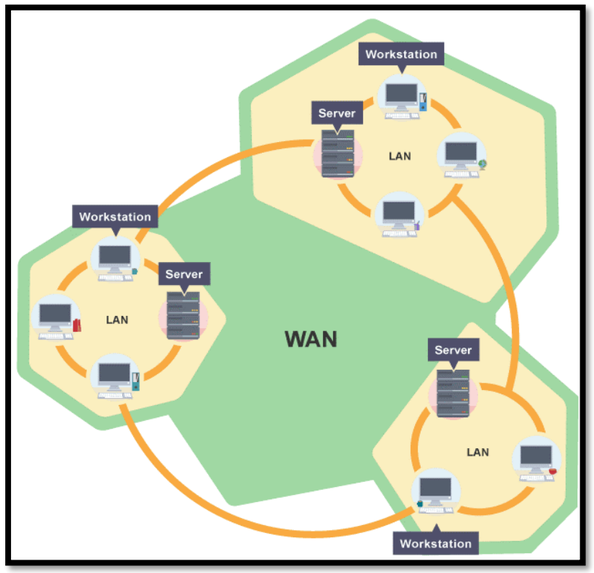
NETWORK TYPES

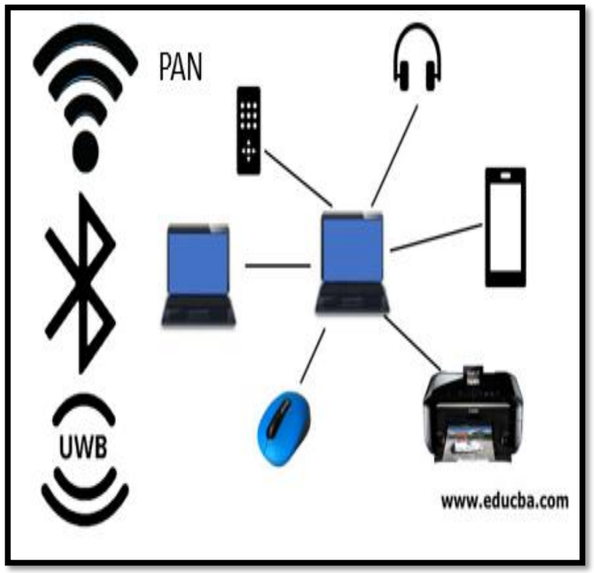
LAN



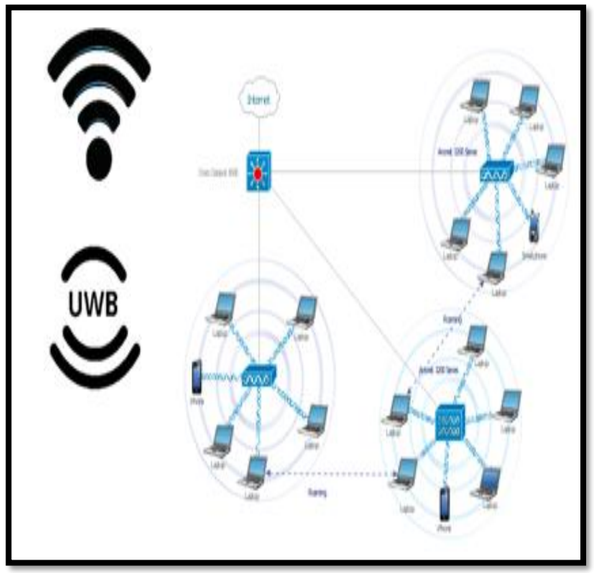
WAN



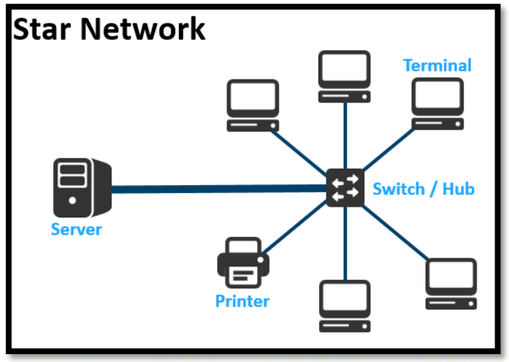
PAN

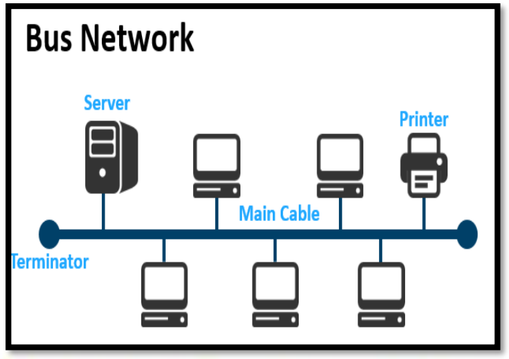


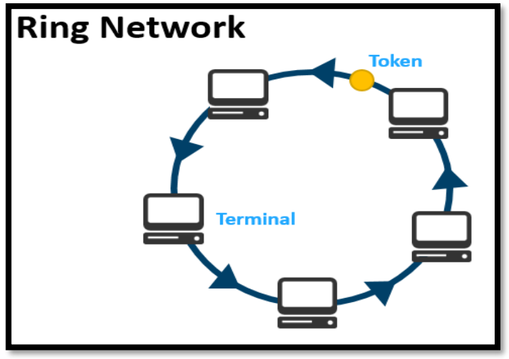
WLAN

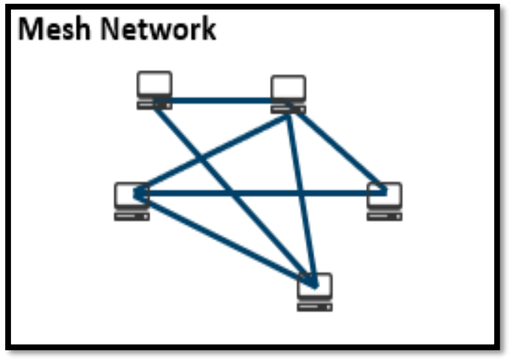


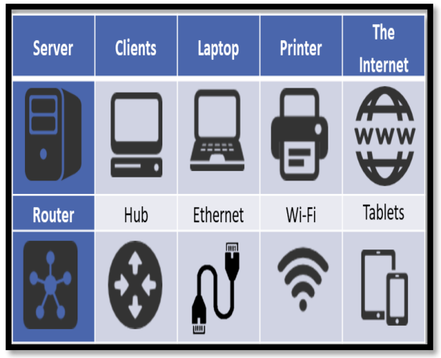
NETWORK TOPOLOGIES











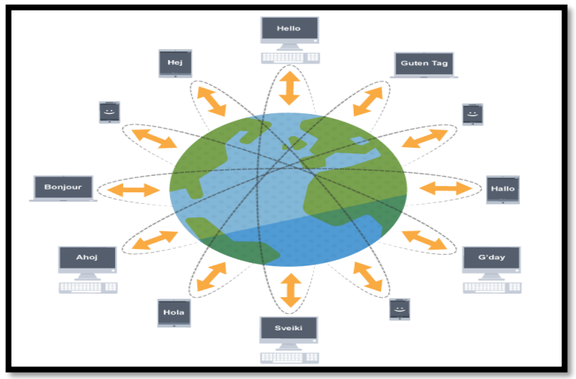
WE CARE • WE CHALLENGE • WE COMMIT

COMPUTER SYSTEMS

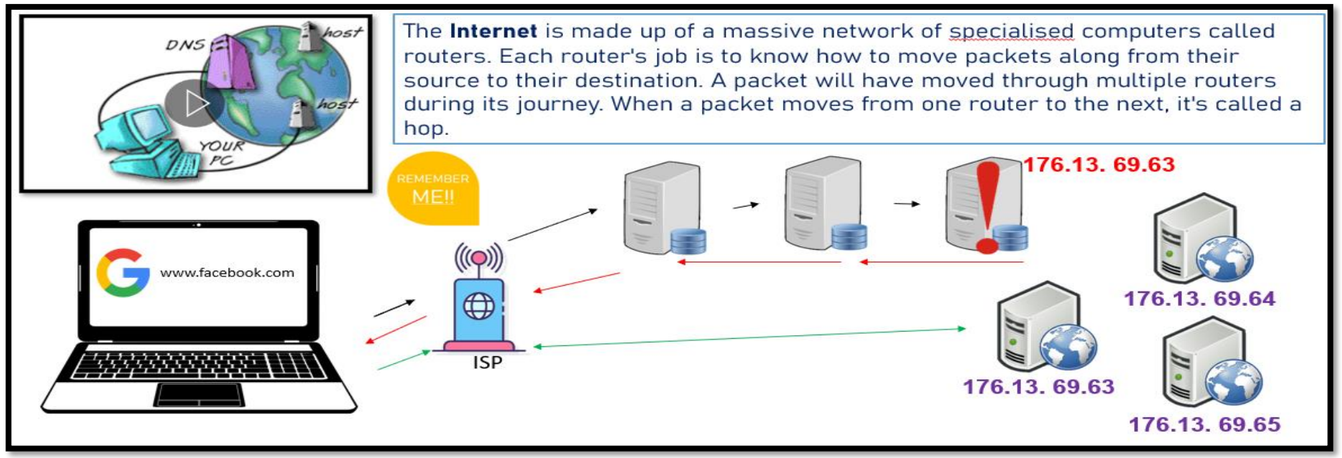
KNOWLEDGE ORGANISER:

THE INTERNET

WAN



HOW IT WORKS



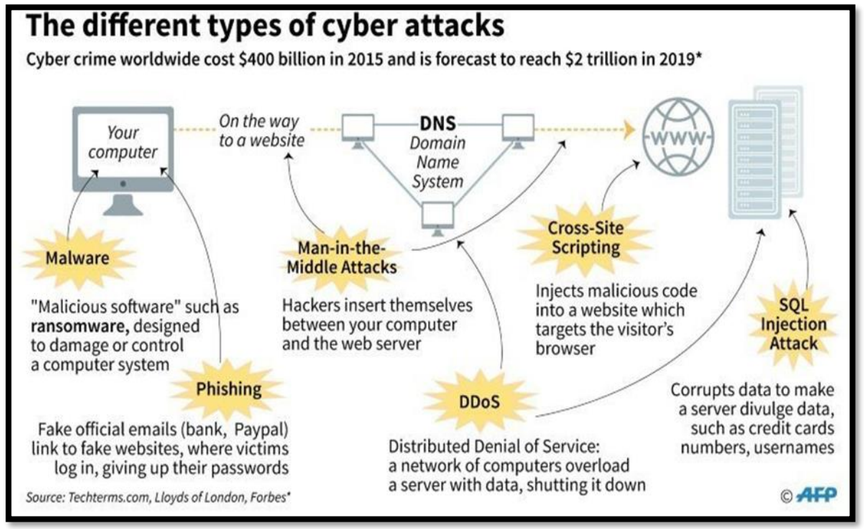
The **Internet** is made up of a massive network of specialised computers called routers. Each router's job is to know how to move packets along from their source to their destination. A packet will have moved through multiple routers during its journey. When a packet moves from one router to the next, it's called a hop.

Internet
A global computer network providing a variety of information and communication facilities consisting of interconnected networks using standardized communication protocols.

NETWORK SECURITY

Networks operate on the principles of communication and sharing. That means network traffic and data could be accessed by people who have no authority to do so. Network security can be improved by implementing different techniques which help to prevent cyberattacks.

ATTACKS ON NETWORKS



FACTORS PREVENTING PERFORMANCE

2. Factors affecting performance of a network	
Latency	You can get bottlenecks in parts of your network, either because of a faulty switch, or due to the design of your network. Latency is the term used describe the time it takes data to travel from one designated point to another on the network
Bandwidth	The maximum amount of data transmitted over an internet or LAN connection in a given amount of time.
Transmission Media	WiFi generally has less bandwidth than wired connections. Wired connections (ethernet) can be different speeds (10Mbps, 100Mbps, Gigabit). Switches and routers also have maximum speeds
Concurrent Users	The more users there are on a network the more data is likely being transmitted. This means it can take longer as you have to wait your turn for your packets to travel across the network