GCSE Computer Science Key Vocabulary

Spec	Section	Term	Definition
1.1	Systems architecture	CPU	**Central Processing Unit:** "The main part of the computer, consisting of the registers, ALU and control unit."
1.1	Systems architecture	Von Neumann Architecture	"Traditional computer architecture that forms the basis of most digital computer systems. Instructions are fetched, decoded and executed one at a time."
1.1	Systems architecture	MAR	**Memory Address Register:** "Holds the address of data ready for use by the memory data register. or the address of an instruction passed from the program counter. Step 2 of the fetch, decode, execute cycle."
1.1	Systems architecture	MDR	**Memory Data Register:** "Holds the data fetched from or to be written to the memory. Step 3 of the fetch, decode, execute cycle."
1.1	Systems architecture	PC	**Program Counter:** "Holds the address of the next instruction. Step 1 of the fetch, decode, execute cycle."
1.1	Systems architecture	Accumulator	"Holds the result of calculations."
1.1	Systems architecture	ALU	**Arithmetic Logic Unit:** "Performs calculations e.g. x = 2 + 3 and logical comparisons e.g. IF x > 3 in the CPU."
1.1	Systems architecture	CU	**Control Unit:** "Decodes instructions. Sends signals to control how data moves around the CPU."
1.1	Systems architecture	Cache	"Memory in the processor providing fast access to frequently used instructions and data."
1.1	Systems architecture	F-D-E cycle	**Fetch-Decode-Execute Cycle:** "The complete process of retrieving an instruction from store, decoding it and carrying it out. Also known as the instruction cycle."
1.1	Systems architecture	Clock Speed	"Measured in Hertz, the clock speed is the frequency at which the internal clock generates pulses. The higher the clock rate, the faster the computer may work. The "clock" is the electronic unit that synchronises related components by generating pulses at a constant rate."
1.1	Systems architecture	Cache Size	"A part of the main store between the central processor and the rest of the memory. It has extremely fast access, so sections of a program and its associated data are copied there to take advantage of its short fetch cycle. The larger the size of the cache the more that can be copied and stored here without having to go back to slower main memory (RAM), this has a significant impact on the speed of processing."
1.1	Systems architecture	Cores	"A part of a multi-core processor. A multi-core processor is a single component with two or more independent actual CPUs, which are the units responsibly for the fetch-decode-execute cycle."
1.1	Systems architecture	Embedded System	"A computer which has been built to solve a very specific program and is not easily changed. For example the operating system placed inside a washing machine, microwave or set of traffic lights."
1.2	Memory	RAM	**Random Access Memory:** "Volatile (data lost when power is off) Read and write. Purpose: temporary store of currently executing instructions and their data. E.g. applications and the operating system in use."
1.2	Memory	ROM	**Read Only Memory:** "Non-volatile (data retained when power is off) Read only. Purpose: stores instructions for starting the computer called the bootstrap."
1.2	Memory	Virtual Memory	"Using part of the hard disk as if it were random access memory. Allows more applications to be open than physical memory could hold."

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1.2	Memory	Flash Memory	"Solid state (no moving parts). Faster than a hard disk drive. Robust. Used to store the BIOS."
1.3	Storage	Secondary Storage	"Permanent storage of instructions and data not in use by the processor. Stores the operating system, applications and data not in use. Read/write and non-volatile."
1.3	Storage	Optical Storage	"CD/R, CD/RW, DVD/R, DVD/RW Use: music, films and archive files. Low capacity. Slow access speed. High portability. Prone to scratches. Low cost."
1.3	Storage	Magnetic Storage	"Hard disk drive. Use: operating system and applications. High capacity. Medium data access speed. Low portability (except for portable drives). Reliable but not durable. Medium cost."
1.3	Storage	Solid State Storage	"Memory cards & solid state hard drive (SSD). Use: digital cameras and smartphones. Medium capacity. High portability. Reliable and durable. No moving parts. Fast data access speed. High cost."
1.3	Storage	Storage Capacity	"The amount of data a storage device is able to store. "
1.3	Storage	Storage Speed	"The read/write access speed of a storage device."
1.3	Storage	Storage Portability	"How easy it is to transport a given storage medium. E.g. Solid state and optical storage and designed to be highly portable, whereas more traditional magnetic storage is designed to stay in place."
1.3	Storage	Storage Durability	"How resistant to damage and wear a tear a storage device is. Devices with low durability will wear out easily over time."
1.3	Storage	Storage Cost	"The relative price of a storage medium on a"
1.4	Wired and wireless networks	LAN	**Local Area Network:** "Small geographic area. All the hardware for the LAN is owned by the organisation using it. Wired with UTP cable, fibre optic cable or wireless using routers and Wi-Fi access points."
1.4	Wired and wireless networks	WAN	**Wide Area Network:** "Large geographic area. Infrastructure is hired from telecommunication companies who own and manage it. Connected with telephone lines, fibre optic cables or satellite links."
1.4	Wired and wireless networks	Client-Server Network	"A client makes requests to the server for data and connections. A server controls access and security to one shared file store. A server manages access to the internet, shared printers and email services. A server runs a backup of data."
1.4	Wired and wireless networks	Peer-to-Peer Network	"All computers are equal. Computers serve their own files to each other. Each computer is responsible for its own security and backup. Computers usually have their own printer."
1.4	Wired and wireless networks	Stand-Alone Computer	"A single computing device not connected to any other on a network, either wired or wireless."
1.4	Wired and wireless networks	WAP	**Wireless Access Point:** "A networking hardware device that allows a Wi-Fi device to connect to a wired network."
1.4	Wired and wireless networks	Router / Switch	"In packet-switched networks such as the internet, a router is a device or, in some cases, software on a computer, that determines the best way for a packet to be forwarded to its destination."
1.4	Wired and wireless networks	NIC	**Network Interface Controller:** "A computer hardware component that connects a computer to a computer network."
1.4	Wired and wireless networks	Transmission Media	"The physical media over which data is transmitted, e.g. twisted copper cable, fibre optic etc. "
1.4	Wired and wireless networks	DNS	**Domain Name System:**
1.4	Wired and wireless networks	Hosting	"Websites stored on dedicated servers. Reasons include: Websites need to be available 24/7. Accessed by thousands of users at a time. Strong protection from hackers. They need an IP address that doesn't change."

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1.4	Wired and wireless networks	The Cloud	"Remote servers that store data that can be accessed over the internet. Advantages: Access anytime, anywhere from any device. Automatic backup. Collaborate on files easily."
1.4	Wired and wireless networks	Virtual Networks	"A logical software based network. Advantages: + Increased security, including more secure access to the network remotely. + The network can easily be expanded with less impact on the infrastructure and cost. + Log in to work from home."
1.5	Network topologies, protocols & layers	Star Network Topology	"Computers connected to a central switch. If one computer fails no others are affected. If the switch fails all connections are affected."
1.5	Network topologies, protocols & layers	Mesh Network Topology	"Switches (LAN) or routers (WAN) connected so there is more than one route to the destination. e.g. The Internet More resilient to faults but more cable needed."
1.5	Network topologies, protocols & layers	WiFi	"Wireless connection to a network. Requires a wireless access point or router. Data is sent on a specific frequency. Each frequency is called a channel."
1.5	Network topologies, protocols & layers	Frequency	"The number of occurrences of a repeating event per unit of time. Data is set on a specific frequency over a WiFi connection."
1.5	Network topologies, protocols & layers	Channels	"Each given signal frequency on a WiFi connection is known as a channel."
1.5	Network topologies, protocols & layers	Encryption	"Encoding readable data called plaintext into unreadable data called ciphertext. Only the intended recipient can decode the data using a key. Protects communications from hackers."
1.5	Network topologies, protocols & layers	Ethernet	"A standard for networking local area networks using protocols. Frames are used to transmit data. A frame contains the source and destination address, the data and error checking bits. Uses twisted pair and fibre optic cables. A switch connects computers together."
1.5	Network topologies, protocols & layers	IP Address	**Internet Protocol Address:** "A unique string of numbers separated by full stops that identifies each computer using the Internet Protocol to communicate over a network."
1.5	Network topologies, protocols & layers	MAC Address	**Media Access Control Address:** "A unique identifier assigned to network interfaces for communications at the data link layer of a network segment. MAC addresses are used as a network address for most network technologies, including Ethernet and Wi-Fi."
1.5	Network topologies, protocols & layers	Protocol	"A set of rules that allow two devices to communicate."
1.5	Network topologies, protocols & layers	TCP/IP	**Transmission Control Protocol / Internet Protocol:** "TCP provides an error free transmission between two routers. IP routes packets across a wide area network."
1.5	Network topologies, protocols & layers	HTTP	**Hypertext Transfer Protocol:** "A client-server method of requesting and delivering HTML web pages. Used when the information on a web page is not sensitive or personal."
1.5	Network topologies, protocols & layers	HTTPS	**Hypertext Transfer Protocol Secure:** "Encryption and authentication for requesting and delivering HTML web pages. Used when sensitive form or database data needs to be transferred. e.g. passwords and bank account details."
1.5	Network topologies, protocols & layers	FTP	**File Transfer Protocol:** "Used for sending files between computers, usually on a wide area network. Typically used for uploading web pages and associated files to a web server for hosting."
1.5	Network topologies, protocols & layers	POP	**Post Office Protocol:** "Used by email clients to retrieve email from an email server."
1.5	Network topologies, protocols & layers	IMAP	**Internet Message Access Protocol:** "Used by mail clients to manage remote mail boxes and retrieve email from a mail server."

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1.5	Network topologies, protocols & layers	SMTP	**Simple Mail Transfer Protocol:** "Sends email to an email server."
1.5	Network topologies, protocols & layers	Packet Switching	"TCP splits data into smaller packets. Each packet takes its own route. Packets are assembled back into the correct order when they arrive at the destination. Maximises the use of the network. More secure as the full data stream is not sent in the same direction."
1.6	System security	Malware	"Software written to cause loss of data, encryption of data, fraud and identity theft: virus, worm, trojan, ransomware and spyware."
1.6	System security	Phishing	"Sending emails purporting to be from reputable companies to induce people to reveal personal information."
1.6	System security	Social Engineering	"Most vulnerabilities are caused by humans. Not locking computers. Using insecure passwords. Not following/poor company network policies. Not installing protection software. Not being vigilant with email/files received. Not encrypting sensitive data."
1.6	System security	Brute Force Attacks	"A trial and error method of attempting passwords. Automated software is used to generate a large number of guesses."
1.6	System security	Denial of Service Attacks	"Flooding a server with so much traffic it is unable to process legitimate requests."
1.6	System security	Data Interception	"Stealing computer-based information."
1.6	System security	SQL Injection	"A hacking technique used to view or change data in a database by inserting SQL code instead of data into a text box on a form."
1.6	System security	Network Policies	"Rules put in place on a Local Area Network by a systems administrator. They control aspects such as what certain types of users are allowed to / what they are allowed to access etc."
1.6	System security	Penetration Testing	"Testing designed to check the security and vulnerabilities of a system."
1.6	System security	Network Forensics	"Network forensics is a sub-branch of digital forensics relating to the monitoring and analysis of computer network traffic for the purposes of information gathering, legal evidence, or intrusion detection."
1.6	System security	Anti-Malware Software	"Antimalware software protects against infections caused by many types of malware, including viruses, worms, Trojan horses, rootkits, spyware, key loggers, ransomware and adware."
1.6	System security	Firewalls	"A computer application used in a network to prevent external users gaining unauthorised access to a computer system."
1.6	System security	User Access Level	"The amount of access a given user is allowed to a computer. On a network most users will have restricted access. Whereas a systems administer or network technician would be allowed much greater access with fewer restrictions."
1.6	System security	Password	"A secret word or phrase that must be used to gain access to a computer / program / interface / system."
1.7	Systems software	Systems Software	"Collection of systems software that manages the computer. Usually supplied with the computer. Most common operating systems are Windows, Linux, Unix, MacOS, iOS."
1.7	Systems software	User Interface	"The means by which the user and a computer system interact, in particular the use of input devices and software."

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1.7	Systems software	Memory Management	"The process of the operating system deciding what should be in memory at any given time. Responsible for loading data and programs into and out of memory when required."
1.7	Systems software	Multitasking	"Running more than one application at a time by giving each one a slice of processor time."
1.7	Systems software	Peripheral Management	"The process of your operating system dealing with requests / input / output to and from any connected peripheral devices such as a mouse, keyboard, webcam, speaker, scanner, printer etc."
1.7	Systems software	Device Drivers	"Translates commands from the operating system into hardware specific commands that a device understands. e.g. A printer driver tells the printer how to print a document from the operating system."
1.7	Systems software	User Management	"Operating system provides for: Allowing different people to log into the same computer with a username and password. Remembering personal settings. Managing access rights to files."
1.7	Systems software	File Management	"Operating system provides: Access permissions for files (read and write). Opening files in associated programs. Moving, deleting and renaming files. Presenting a folder structure to the user."
1.7	Systems software	Utility System Software	"A systems program that performs some specific task in the operation of the computer, for example file backup, virus checking or a compression program."
1.7	Systems software	Encryption Software	"Turns plaintext data into unreadable ciphertext data using a key. Protects data from being read by hackers."
1.7	Systems software	Defragmentation Software	"Different sized files saved on disk are deleted over time creating gaps on the disk. New files fill up the gaps, but may need more space than the gap provides resulting in fragments of the file being spread across the disk. Defragmentation rearranges parts of files back to contiguous space. Makes access quicker."
1.7	Systems software	Data Compression	"Reduces the size of a file. Takes up less disk space. Quicker to download over the internet. Compressed files must be extracted before they can be read."
1.7	Systems software	Full Backup	"Every file is copied to an alternative storage device. E.g. portable hard drive. Files can be recovered if it is deleted or corrupted. Can be slow to copy large numbers of files."
1.7	Systems software	Incremental Backup	"Only the files that have changed since the last backup are copied. Files can be recovered if it is deleted or corrupted. Much quicker than a full backup."
1.8	Ethical, legal, cultural & environmental concerns	Ethical Issues	"The ethical and moral issues which have come about in modern society due to the increase use of computer science and its related technologies. e.g. Losing/changing jobs. Efficiency: robots work 24/7. Access to IT is not equal (digital divide). Invasion of privacy. Responsibility for content on the internet. "
1.8	Ethical, legal, cultural & environmental concerns	Legal Issues	"The legal issues which have come about in modern society due to the increase use of computer science and its related technologies. e.g. Copyright and ownership of digital content, different laws in different countries (crime may be committed in a certain country, but the people committing the crime could be physically located in another), hacking, piracy. "
1.8	Ethical, legal, cultural & environmental concerns	Cultural Issues	"The cultural moral issues which have come about in modern society due to the increase use of computer science and its related technologies. e.g. Censorship to prevent political unrest and preserve culture. Geography & economy of a country affects access to networks and power. Increased mobile technology impacts on how people communicate: cyberbullying. "

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1.8	Ethical, legal, cultural & environmental concerns	Environmental Issues	"The environmental issues which have come about in modern society due to the increase use of computer science and its related technologies. e.g. Manufacturing computers uses fossil fuels. Limited number of natural resources. Data centres use 2% of global energy. Computers contain hazardous materials, often shipped to other countries for disposal. "
1.8	Ethical, legal, cultural & environmental concerns	Privacy Issues	"The privacy issues which have come about in modern society due to the increase use of computer science and its related technologies. e.g. Increase in always on, voice activated devices in the home. Rise in CCTV. Rise in social networking and GPS tracking."
1.8	Ethical, legal, cultural & environmental concerns	Stakeholder	"Anyone with an interest in a business. e.g. Company owners: profits & reputation. Workers: jobs & salary. Customers: price & convenience. Suppliers: costs. Local community: environment & jobs."
1.8	Ethical, legal, cultural & environmental concerns	Open Source Software	"Users can modify and distribute the software. Can be installed on any number of computers. Support provided by the community. Users have access to the source code. May not be fully tested."
1.8	Ethical, legal, cultural & environmental concerns	Proprietary Software	"Users cannot modify the software. Copyright protected. Usually paid for. Licensed per user or per computer. Support provided by developers. Users do not have access to the source code. Fully tested and supported by developers."
1.8	Ethical, legal, cultural & environmental concerns	Data Protection Act	"Legislation which protects individuals from unreasonable use of their store personal data."
1.8	Ethical, legal, cultural & environmental concerns	Computer Misuse Act	"Legislation which defines electronic vandalism, unauthorised access to computer systems and theft of information."
1.8	Ethical, legal, cultural & environmental concerns	Copyright Designs and Patents Act	"Legislation which gives creators of literacy, dramatic, musical and artistic works the right to control the ways in which their material may be used."
1.8	Ethical, legal, cultural & environmental concerns	Creative Commons Licensing	"A way to grant copyright permissions to creative work. It allows an author to retain copyright while allowing others to copy, distribute, and make some uses of their work."
1.8	Ethical, legal, cultural & environmental concerns	Freedom of Information Act	"Members of the public can request information from public bodies about their activities. Public authorities are obliged to publish data about their activities when asked."