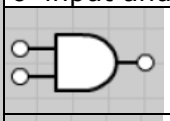
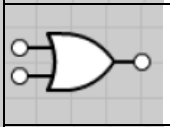
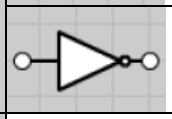
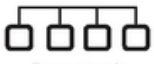
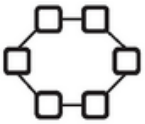
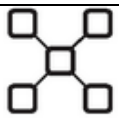
This represents a bite-sized selection of key theory for your forthcoming GCSE Computing exam. It is NOT a break-down of the full specification, but rather the minimum you MUST be able to remember before the exam.

Importance in Modern World	Consider the importance to banks / business / air-traffic control / traffic-lights / Security Systems/ Hospitals (**life / job critical areas**) Also the fact computers exist in most house-hold appliances (Micro-wave oven, car, fridge, washing machine, burglar alarms)
CPU Fetch Decode Execute (Clock Cycle)	CPU Fetches instructions from RAM – **Program counter** keeps track of instructions being taken - **Decode** part examines the binary instruction (op-code) to see which part is 'data' and which is the 'instruction itself' (what you actually *do* with the data) **Execute** is when the **ALU** performs Arithmetic and/or Logic calculation on the data. This cycle happens in a CPU **clock cycle**.
Hardware – Logic Gates	Logic Gates – Represent the **flow of electricity** through a CPU circuit and how it is 'channelled' to make decisions. **Truth Tables** are used to represent all the different combinations of '1' and '0' input and what the output would be.
	 **AND** Gate: Needs both inputs to be '1' to produce '1' as an output
	 **OR** Gate**:** Only needs one input to be '1' to produce '1' as an output
	 **NOT** Gate: Reverses the input: Comes in as '1' will produce '0' as output ('0' in = '1' out)
Clock Speed	Clock speed measured in **Hertz**. The amount of Instructions processed (Fetch/Decode,Executes)per second. 3GHz = (3 Giga Hertz / 3 Billion cycles)
Cache Memory	Cache is inside of the CPU – remembers **frequently processed** instructions / data. Saves CPU having to read from main RAM all the time. Cache is super-fast RAM, but expensive. Often a few MB in top processors.
Virtual Memory	When RAM used at full capacity, a part of **hard-drive** (the swap / page file) is used as RAM – A cheaper / quick method of holding more temporary data when needed. This is slow and causes a lag when used/accessed.
Flash Memory	Special **RAM** memory that is **Non-volatile** (keeps data without power) – Used in pendrives / SD-Cards. 'Solid-State' – no moving parts.
Technological Changes	Greater storage capacity / faster read-write speeds / less power consumption / lower costs: are all **technology developments** that affect how memory is creates / used. Devices are smaller/more portable and rely on wireless technology more (Bluetooth/WiFi/InfaRed)
Secondary Storage	Consider Capacity / Speed / Read-Write Times / Costs when choosing: **Magnetic** (Hard Drives) – Huge Capacity – Slow read / write times. **Flash** (Pen Drives) – Cheap – Reasonable Capacity / Fast speeds **Optical** (DVD / Blu-Ray) Cheap – Limited Capacity. Slow read / write
Utility Programs	Perform **specific** (non-creative) routine tasks – Remove Malware / Viruses / Disk Clean-up (removing temporary files) Compression & File conversion (one format to another) Sometimes part of the operating system.
Pixels	Single 'picture element' contains bit-sequence to represent a single colour – more bits greater the **bit-depth** more colour can be represented in an image – becomes more life-like.
Metadata	**Data '*about*' data** – Metadata for an image file is details about the height / width / byte-size / date etc of the image.
Instructions & Data	When 'high-level' language code (like Python) is run it is 'compiled' into binary machine code: part of this binary is the **instruction** 'op-code' (e.g ADD, LOAD, STORE etc) the rest of the binary code becomes the **data itself** (the part that needs to be examined and calculated)

Database Management System	A **gatekeeper** between a huge database and it's many users / devices. DBMS decides what **users are allowed to do** – Sets security / levels of access rights – Allows users to **query** the database and run **reports** / allows tables to be linked together through relationships. / runs back-up routines.	
Parts Of A Database	**FIELD** (column heading / category) **RECORD** (single piece of related data about a thing) also known as an *entity*. **PRIMARY KEY** in table is the unique part that identifies a record (usually user-ID or product-code). Primary keys are used to link tables linked through relationships – keeps data more manageable and removed duplicated data. **Simple Query** – uses one criteria (e.g Find equal to "Grade A") **Complex Query** – multiple criteria	
Network Hardware	**Router / Modem**: Connects LAN to WAN / Converts analogue to digital **Hub**: Shares one signal with many devices **Switch**: Sends specific data from one item to another specific item (used to connect many users to a single server) **Server**: Controls network – allows log-on – stores files centrally **Repeater**: Allows network to span large distances – repeats signal down cable.	
Client - Server & P2P Network	**Client Server Network**. **One server** controls the network – decides what clients are allowed access to. Provides central file storage. Expensive and technically difficult to set up. (Schools / Business uses this method) **Peer-to-peer** – **A series of clients** that share data **equally** amongst themselves – no-one in overall control – cheap and easy to set-up. (File sharing communities use this method)	
Network Topologies *Different Ways To Set-Up A Network* – Speed, Adaptability, Security And Cost Are All Considerations In Deciding Which To Use.		**BUS**: *Data flows along main backbone cable* Easy to add new workstations / Cheaper - Less Cable If problem with main backbone – Network Stops More workstations = slower speeds. Only one PC at a time can transmit data down it.
		**RING**: *Data 'token' passes from one PC to the next* No reliance on central PC. No Data collisions as data travels in one direction only. Network needs to be shut-down to add more devices. If one cable breaks – whole network fails.
		**STAR**: *Each device has a cable direct to the main server.* Reliable – If one cable fails, other users not effected. Expensive as uses most cable. Needs server to work.
Mac / IP Addresses	MAC (**M**edia **A**ccess **C**ontrol) Address identifies **specific item** on a network (a single PC, tablet, phone etc) IP (**I**nternet **P**rotocol) Address identifies **point the network connects** to wider internet (a single router or server will have an IP address that many PC will connect through)	
Network Policies	A network manager may create an '**Acceptable Use Of Policy**' document for users to sign. It will state what is allowed / not allowed on the network (E.g Do not install software / access certain websites)	
< HTML >	Hypertext Markup Language – Allows. Programmers write webpages in HTML – the **tags** specify the position, design / technical aspects of page content. Web-browsers (E.g Firefox) 'interpret' the HTML and display as a webpage. Tags have <start> and </end> points	
Iteration (Looping) For & While Loops	FOR Loop: *Runs a **specific number of times**, for example:* FOR *number* IN *things to revise* OUTPUT "Revise this thing" WHILE Loop: *Runs **until a condition has been met**, for example:* WHILE grade =! "A*": OUTPUT "Keep Revising"	
Programming Terms	**Variables** = Value that is **changed** as the program runs (E.g Score) **Constant** = Value that **does not change** during program (E.g Tax Rate) **Data Types** = Integer (whole number) Real Number (decimals) Boolean (One of two values – True[Yes]/False[No]) String (series of alpha-numeric characters) **Arrays** = Holds multiple values 'of the same data type' that can be **added to** as the program runs (e.g Pupil Names), different types = list in Python.	