

Year 9 Computer Science	Unit	Substantive Knowledge	Disciplinary Aim	Cultural Capital
Term 1 HT 1	<p>Theory: Systems Architecture</p> <p>Programming: Output, assignment, data types and selection (IF and ELSE)</p>	<p>Theory:</p> <ul style="list-style-type: none"> Know the purpose of the Central Processing Understand the common CPU components and their functions Know the registers used as data moves through the fetch, decode and execute cycle (Von Neumann) Understand the factors that affect CPU performance Know what an embedded systems is <p>Programming:</p> <ul style="list-style-type: none"> Understand the need for Variables and assigning different types of data to them 	<p>Theory:</p> <ul style="list-style-type: none"> State the purpose of the CPU Describe the Fetch-Decode-Execute Process Explain the difference between the ALU and the CU Identify the registers used in the FDE cycle Explain the effects on CPU performance of improving the clock speed, number of cores and cache Give examples of embedded systems <p>Programming:</p> <ul style="list-style-type: none"> Assign string and integers to variables Assign user input to variables Output data to screen Demonstrate an understanding of using IF and ELSE Show confidence in indentation when programming 	<p>Key words: Key words: Processor, MHz, GHz, Hertz, Instruction, Execute, Embedded System, Clock Speed, Cache, Core, Von Neumann Architecture, Memory Address Register, Memory Data Register, Program Counter, Accumulator, Arithmetic Logic Unit, Control Unit, Busses.</p> <p>Extra-curricular: Explore the devices you have at home and compare the performance of their CPU's – sky box, Xbox, phones, tablets, desktops, etc.</p>
Term 1 HT 2	<p>Theory: Memory</p> <p>Programming: Assignment, data types, formatting, selection (IF, ELIF and ELSE)</p>	<p>Theory:</p> <ul style="list-style-type: none"> Know the purpose of Random Access Memory Understand the importance of Read Only Memory Understand the benefits of Virtual Memory <p>Programming:</p> <ul style="list-style-type: none"> Develop programming with variables, assignment and selection including ELIF Know how to produce and interpret Flowcharts & pseudocode 	<p>Theory:</p> <ul style="list-style-type: none"> Explain the difference between RAM and ROM Explain the purpose of virtual memory including the advantages, disadvantages and location <p>Programming:</p> <ul style="list-style-type: none"> Assign values to a variables with different data types Apply the use of IF, ELIF, ELSE and nested statements 	<p>Key words: Central processing unit, Random Access memory, Volatile, Read Only Memory, Non-Volatile, BIOS, Firmware, Disk Thrashing, Virtual Memory, Flash Memory, Portable, Internal, External, Secondary Storage</p> <p>Extra-curricular: Explore online shops to see the amount of RAM of laptops and PC's. Is there a difference in price the more RAM you have?</p>
Term 2 HT 1	<p>Theory: Storage</p> <p>Programming: Procedures</p>	<p>Theory:</p> <ul style="list-style-type: none"> Know the purpose of secondary storage Understand the difference between secondary storage devices <p>Programming:</p> <ul style="list-style-type: none"> Know how to define procedures and call them Understand the advantages to using procedures 	<p>Theory:</p> <ul style="list-style-type: none"> Give examples of secondary storage devices and compare them using given characteristics Suggest and justify suitable secondary storage devices for given scenarios <p>Programming:</p> <ul style="list-style-type: none"> Write, call and send values to procedures 	<p>Key words: Storage, Hardware, Secondary Storage, Optical, Magnetic, Solid State, Characteristics, Estimate, Overheads.</p> <p>Extra-curricular: Apps such as Code combat, micro bit, solo learn, code academy and code club are excellent resources to make progress with programming using the Python programming language.</p>

<p>Term 2 HT 2</p>	<p>Theory: Networks</p> <p>Programming: Loops</p>	<p>Theory:</p> <ul style="list-style-type: none"> Know the difference between LAN (Local Area Network) and WAN (Wide Area Network) Understand the factors that affect the performance of networks Know the different roles of computers in a client-server and a peer-to-peer network Understand the roles of a range of networking hardware, transmission media, DNS (Domain Name Server), cloud computing and virtual networks <p>Programming:</p> <ul style="list-style-type: none"> Know the difference between a count controlled loop and a condition controlled loop 	<p>Theory</p> <ul style="list-style-type: none"> Describe the characteristics of a LAN and WAN Discuss the factors that affect the performance of a network and how they can be improved Explain the role and purpose of DNS, hosting, the cloud and virtual network Highlight the benefits and draw backs of a client-server network and a peer-to-peer network Understand the benefits of a virtual network and how they can be used <p>Programming:</p> <ul style="list-style-type: none"> Use a while loop to repeat code until a condition has been met Repeat code a specific number of times using a for loop 	<p>Key words: Network, LAN, WAN, Client-server, Peer-to-peer, Wireless access point (WAP), Router, Switch, Network interface card (NIC), Transmission media, Network performance, Internet, DNS, Hosting, The cloud, Virtual network, VPN.</p> <p>Extra-curricular: Using a free online tool compare the bandwidth of your internet connection to your friends and family. Does a fibre service make any difference to this?</p>
<p>Term 3 HT 1</p>	<p>Theory: Systems Software</p> <p>Programming: Challenges</p>	<p>Theory</p> <ul style="list-style-type: none"> Understand aspects of an operating system including the user interface, memory management, multitasking, peripheral management and drivers, user and file management Know a range of utility system software including encryption software, defragmentation and data compression Understand the role and methods of full and incremental backups 	<p>Theory:</p> <ul style="list-style-type: none"> Describe the process in brief of the following aspects of an Operating System; Peripheral Management, Memory Management, Processor Allocation, File Management and User Management Explain the difference between full and incremental backups Describe the steps required to compress a file (by lossless or lossy), Encrypt data and perform Disk Defragmentation 	<p>Key words: System Software, Operating System (OS), Virtual Machine, Utility Programs, Device Drivers, Multitasking, Processor Management, User Interface, Graphical User Interface, Command Line Interface, Peripheral Management, File Management, Utility Program, Operating System, Defragmentation, Compression, Lossy, Lossless, Encryption, Backup, Incremental, Full.</p> <p>Extra-curricular: Research and compare a Linux operating system to a Windows operating system.</p>
<p>Term 3 HT 2</p>	<p>Theory: System Security</p> <p>Programming: Challenges</p>	<p>Theory:</p> <ul style="list-style-type: none"> Know the threats posed to networked computers Understand how to identify and prevent against vulnerabilities 	<p>Theory:</p> <ul style="list-style-type: none"> Explain the differences in malicious software, including worms and viruses Describe the signs of phishing attacks and how to prevent against them Explain botnets and DOS attacks Understand how to set a secure password and the threat of a brute force attack Have a basic knowledge of network forensics, data interception and network policy Discuss the effects of encryption on organisations such as the Government 	<p>Key words: Malware, virus, Trojan horse, phishing, social engineering, data interception, network policy, brute force attack, DDOS, botnet, SQL injection, network forensics, penetration testing, anti-malware software, firewall, anti-virus software, legislation, packet sniffing, user access levels, password, encryption, cipher, key.</p> <p>Extra-curricular: Have a go at McAfee's cyber security game.</p>

