

# YEAR 10 CURRICULUM PLAN FOR Computer Science



TOPIC	KEY LEARNING	ASSESSMENT
<ul style="list-style-type: none"> <li>• Introduction to the course</li> <li>• SLR 1.1 Systems architecture                             <ul style="list-style-type: none"> <li>○ 6 lessons</li> </ul> </li> <li>• SLR 1.2 Memory and storage – Part 1                             <ul style="list-style-type: none"> <li>○ 5 lessons</li> </ul>                             Plus 5 dedicated programming lessons                         </li> </ul>	<p>Architecture of the CPU The purpose of the CPU: The fetch-execute cycle common CPU components and their function: ALU (Arithmetic Logic Unit) CU (Control Unit) Cache Registers Von Neumann architecture: MAR (Memory Address Register) MDR (Memory Data Register) Program Counter Accumulator CPU Performance how common characteristics of CPUs affect their performance clock speed cache size number of cores</p>	<p>SLR 1.1 Student workbook SLR 1.1 End-of-topic test</p>
<ul style="list-style-type: none"> <li>• SLR 1.2 Memory and storage – Part 1                             <ul style="list-style-type: none"> <li>○ 2 lessons</li> </ul> </li> <li>• SLR 1.2 Memory and storage (Part 2)                             <ul style="list-style-type: none"> <li>○ 12 lessons</li> </ul>                             Plus 6 dedicated programming lessons                         </li> </ul>	<p>Primary storage (Memory), The need for primary storage, The difference between RAM and ROM, The purpose of ROM in a computer system, The purpose of RAM in a computer system, Virtual memory, Secondary storage, the need for secondary storage, common types of storage:, optical, magnetic, solid state, suitable storage devices and storage media for a given application, the advantages and disadvantages of these, using characteristics:, capacity, speed, portability, durability, reliability, cost., Units, The units of data storage: Bit, Nibble (4 bits), Byte (8 bits), Kilobyte (1,000 bytes or 1 KB), Megabyte (1,000 KB), Gigabyte (1,000 MB), Terabyte (1,000 GB), Petabyte (1,000 TB), how data needs to be converted into a binary format to be processed by a computer., data capacity and calculation of data capacity requirements, Data storage, How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice versa, how to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur, How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa, How to convert binary integers to their hexadecimal equivalents and vice versa, binary shifts, the use of binary codes to represent characters, the term ‘character-set’, the relationship between the number of bits per character in a character set, and the number of characters which can be represented, e.g.: ASCII, Unicode</p>	<p>SLR 1.2 Student workbook – Part 1 SLR 1.2 End-of-topic test – Part 1 SLR 1.2 Student workbook (Part 2) SLR 1.2 End-of-topic test (Part 2)</p>
<ul style="list-style-type: none"> <li>• SLR 1.3 Computer networks, connections and protocols                             <ul style="list-style-type: none"> <li>○ 12 lessons</li> </ul>                             Plus 3 dedicated programming lessons                         </li> </ul>	<p>Networks and topologies, types of networks: LAN (Local Area Network), WAN (Wide Area Network), factors that affect the performance of networks, the different roles of computers in a client-server and a peer-to-peer network, the hardware needed to connect stand-alone computers into a Local Area Network: wireless access points, routers, switches, NIC (Network Interface Controller/Card), transmission media, the internet as a worldwide collection of computer networks: DNS (Domain Name Server), hosting, the cloud, web servers and clients, star and mesh network topologies</p>	
<ul style="list-style-type: none"> <li>• SLR 1.3 Computer networks, connections and protocols                             <ul style="list-style-type: none"> <li>○ 2 lessons</li> </ul> </li> <li>• SLR 1.4 Network security                             <ul style="list-style-type: none"> <li>○ 10 lessons</li> </ul>                             Plus 3 dedicated programming lessons                         </li> </ul>	<p>Wired and wireless networks, protocols and layer, Modes of connection: Wired, Ethernet, Wireless, Wi-Fi, Bluetooth, Encryption, IP addressing and MAC addressing, Network standards, Common protocols including: TCP/IP (Transmission Control Protocol/Internet Protocol), HTTP (Hyper Text Transfer Protocol), HTTPS (Hyper Text Transfer Protocol Secure), FTP (File Transfer Protocol), POP (Post Office Protocol), IMAP (Internet Message Access Protocol), SMTP (Simple Mail Transfer Protocol), Threats to computer systems and networks, Forms of attacks, Malware, Social engineering, e.g. phishing, people as the ‘weak point’, Brute-force attacks, Denial of service attacks, Data interception and theft, The concept of SQL injection1.</p>	<p>SLR 1.3 Student workbook SLR 1.3 End-of-topic test</p>

<ul style="list-style-type: none"> <li>• SLR 1.4 Computer networks, connections and protocols <ul style="list-style-type: none"> <li>○ 2 lessons</li> </ul> </li> <li>• SLR 1.5 System software <ul style="list-style-type: none"> <li>○ 6 lessons</li> </ul> </li> </ul> <p>Plus 5 dedicated programming lessons</p>	<p>Identifying and preventing vulnerabilities, Common prevention methods: Penetration testing, Anti-malware software, Firewalls, User access levels, Passwords, Encryption, Physical security, Operating systems, The purpose and functionality of operating systems, user interface, memory management and multitasking, peripheral management and drivers, user management, file management, Utility software, the purpose and functionality of utility software, utility system software: encryption software, defragmentation, data compression</p>	<p>SLR 1.4 Student workbook  SLR 1.4 End-of-topic test  SLR 1.5 Student workbook  SLR 1.5 End-of-topic test</p>
<ul style="list-style-type: none"> <li>• SLR 1.6 Ethical, legal, cultural and environmental concerns <ul style="list-style-type: none"> <li>○ 9 lessons</li> </ul> </li> </ul> <p>8 lesson text-based adventure game</p>	<p>Ethical, legal and environmental impact, impacts of digital technology on wider society including:, Ethical issues, Legal issues, Cultural issues, Environmental issues, Privacy issues, Legislation relevant to Computer Science:, The Data Protection Act 2018, Computer Misuse Act 1990, Copyright Designs and Patents Act 1988, Software licences (i.e. open source and proprietary)</p>	<p>SLR 1.6 Student workbook  SLR 1.6 End-of-topic test</p>