## HGS Curriculum Map Key Stage 4

## Year Group: 10 Computer Science GCSE - Autumn

Time period	Autumn 1	Autumn 2
	8 weeks	7 weeks
	System Architecture, Memory and Storage	Wired and Wireless Networks, Network tapalogies, Protocols and Lavers
sub-topics	System Architecture, Memory and Storage	whethand wheteess networks, network topologies, Protocols and Layers
Purpose	This is a short introductory unit; it begins by looking at the various components of the CPU used in the Von Neumann architecture. Subsequent lessons build on the fundamentals covered at KS3 on understanding computers concentrating on RAM, ROM, cache and the need for virtual memory. The unit concludes by examining the need for secondary storage devices and their practical advantages in applications	The unit begins by explaining the Internet and IP addressing, with practical exercises to help students understand the role of packet switching and DNS services. The lessons move on to look at LAN network topologies and Ethernet, with further material on virtual networking. Wireless networking, frequencies and encryption are covered in a subsequent lesson. Client-server networks and hosting are addressed with a final lesson describing common protocols and the concept of layers.
Crucial Learning	<ul> <li>Students will be able to: <ul> <li>Understand the purpose of the CPU</li> <li>Explain the role and operation of the following CPU registers used in Von Neumann architecture: <ul> <li>MAR (Memory Address Register),</li> <li>MDR (Memory Data Register),</li> <li>Program Counter,</li> <li>Accumulator</li> </ul> </li> <li>Describe common CPU components and their function: <ul> <li>ALU (Arithmetic Logic Unit), CU (Control Unit), Cache</li> <li>Explain the function of the CPU as fetch and execute instructions stored in memory</li> <li>Describe how common characteristics of CPUs affect their performance: clock speed, cache size, number of cores</li> <li>Explain the purpose and give examples of embedded systems</li> <li>Describe the difference between RAM and ROM</li> <li>Describe the purpose RAM and ROM in a computer system</li> <li>Explain the need for virtual memory</li> <li>Describe flash memory</li> <li>Discuss the need for secondary storage including optical, magnetic and solid-state storage</li> <li>Discuss data capacity of storage devices and</li> <li>Calculate data capacity requirements</li> <li>Evaluate suitable storage devices and storage media for a given application using the following characteristics: capacity,</li> </ul> </li> </ul></li></ul>	<ul> <li>All students should be able to:</li> <li>explain the advantages of networking stand-alone computers into a local area network</li> <li>explain the difference between a client-server and a peer-to-peer network</li> <li>describe, using diagrams or otherwise, the star and mesh network topologies</li> <li>describe the differences between a local area network and a wide area network such as the Internet</li> <li>describe the nature of the Internet as a worldwide collection of computer networks</li> <li>identify different transmission media</li> </ul> Most students will be able to: <ul> <li>explain the different roles of computers in a client-server and a peerto-peer network</li> <li>explain the terms IP addressing, MAC addressing, packet and protocols</li> <li>describe the hardware needed to connect to the Internet including routers and switches</li> <li>explain the need for IP addressing of resources on the Internet and how this can be facilitated by the role of DNS servers <ul> <li>describe the advantages and disadvantages of star and mesh network topologies</li> </ul></li></ul>

	speed, portability, durability, reliability, cost	<ul> <li>describe the concept of hosting and Cloud services</li> <li>state the advantages of different transmission media</li> </ul> Some students will be able to: <ul> <li>describe the different layers in the TCP/IP protocol stack and the protocols used at each stage</li> <li>explain the advantages of layering in this context</li> <li>explain how Wi-Fi frequencies and channels affect connectivity and transmission</li> </ul>
Sequence	<b>Prior Knowledge</b> In Y7 students complete a unit called 'How Computers Work'. This module introduces the basic components of a computer system and how they work together to process information	<b>Prior Knowledge</b> Students complete a unit in Y7 entitled Computer Networks. It is a brief introduction to the Internet, network hardware, wireless networking, the world wide web and HTTP.
	Future Learning:	Future Learning:
	<ul> <li>AQA Computer Science:</li> <li>4.6 Fundamentals of Computer Systems</li> <li>4.7 Fundamentals of computer organisation and architecture</li> </ul>	AQA Computer Science: - 4.9 Fundamentals of communication and networking
Skills Acquired	Computational Thinking Skills:	Computational Thinking Skills:
	<ul> <li>Decomposition - breaking down complex problem or system into smaller, more manageable parts</li> <li>Pattern recognition - looking for similarities among and within problems</li> <li>Abstraction - focusing on the important information only, ignoring irrelevant detail</li> <li>Algorithms - developing a step-by-step solution to the problem, or the rules to follow to solve the problem</li> </ul>	<ul> <li>Decomposition - breaking down complex problem or system into smaller, more manageable parts</li> <li>Pattern recognition - looking for similarities among and within problems</li> <li>Abstraction - focusing on the important information only, ignoring irrelevant detail</li> <li>Algorithms - developing a step-by-step solution to the problem, or the rules to follow to solve the problem</li> </ul>

Assessment:	Assessment	Assessment
Formative & summative	Verbal Feedback: Regular use of peer, self and teacher feedback	Verbal Feedback: Regular use of peer, self and teacher feedback
	<b>Written Feedback:</b> Individual feedback of home learning assessments in the Showbie 'Marking and Feedback' folder. Students have dedicated improvement and reflection time at the start of each lesson.	<b>Written Feedback:</b> Individual feedback of home learning assessments in the Showbie 'Marking and Feedback' folder. Students have dedicated improvement and reflection time at the start of each lesson.
	Learning Grids: - 1.1. System Architecture - 1.2. Memory - 1.3. Storage	Learning Grids: - 1.4 Wired and Wireless Networks - 1.5 Network Topologies, Protocols and Layers
	Topic Tests: - 1.1. System Architecture - 1.2. Memory Storage	Topic Tests: - 1.3 Networks - 1.4 Network Topologies
	SIMS: - AUT 1 OGCU	SIMS: - AUT 2 OGCU