Curriculum Information Year 10

Throughout year 10, alongside the theory topics outlined below students will develop their practical programming skills using a combination of teacher taught lessons Time2code and various online platforms. This is assessed through observations, discussions and screenshot evidence of work submitted into Google classroom.

Autumn Term

Unit title	Key Questions	Knowledge	Assessing Understanding
Systems Architecture	What is the architecture of the CPU? What factors affect the CPU performance? What is an embedded system and what are their characteristics?	Understand what the CPU of a computer does. Know what the registers in a CPU are. Know the stages of the fetch, execute cycle. Know what factors affect the speed of a CPU. Know the stages of the fetch, execute cycle. Know what is meant by the term: 'embedded system'. Know several examples of embedded systems.	***How understanding is assessed*** Completion of online workbooks, homework notes, online quizzes and smartrevise tasks - Peer, self and teacher assessment throughout the term of work produced. ***Skills*** *Understanding the CPU (ALU, CU, Cache, Registers), the Fetch-Execute cycle, and CPU performance factors* ***Assessment Point Information*** End of unit assessment (exam questions)

Memory and Storage	Why do computers have primary storage? How does virtual memory work? Why do computers have secondary storage? What are the differences between secondary storage devices? What features of secondary storage make devices suitable for different situations?	Understand the need for primary storage Know the difference between RAM and ROM. Know the purpose of ROM in a computer system. Know the purpose of RAM in a computer system. Understand the need for virtual memory. Understand the need for secondary storage. Know the common types of storage. Know the characteristics of storage devices. Know the characteristics of storage devices.	***How understanding is assessed*** Completion of online workbooks, homework notes, online quizzes and smartrevise tasks - Peer, self and teacher assessment throughout the term of work produced. ***Skills*** Differentiating between RAM/ROM, volatile/non-volatile memory, and calculating data storage requirements ***Assessment Point Information*** End of unit assessment (exam questions)
Memory and Storage	Why is data stored in binary? How do you calculate data capacity? What can happen to the most significant bit when you add two binary numbers together? What actions can an ALU perform?	Understand what is meant by the terms bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte and petabyte. Know how to represent the capacity of data storage using these units, and be able to convert between them. Understand that data needs to be converted into a binary format to be processed by a computer Know what data capacity means.	***How understanding is assessed*** Completion of online workbooks, homework notes, online quizzes and smartrevise tasks - Peer, self and teacher assessment throughout the term of work produced. ***Skills*** Differentiating between RAM/ROM, volatile/non-volatile memory, and calculating data storage requirements

	What is the relationship between denary, binary and hexadecimal? How does a computer store characters and what are the implications for the number of bits used? How does a computer store graphics and what are the implications for image size and resolution? How do computers store sound and what are the implications for sample rate, duration and bit depth? Where is compression used and why?	Understand how to calculate data capacity requirements. Know how to perform a left and right binary shift. Understand what binary shift achieves. Know how to convert positive denary whole numbers (0–255) into 2 digit hexadecimal numbers and vice versa. Know how to convert from binary to hexadecimal equivalents and vice versa. Understand that all data must be represented in binary numbers, including text. Know what is meant by the term “character set”. Understand the relationship between the number of bits in the character set and the number of characters that can be represented. Know two common character sets: ASCII and Unicode. Understand how an image is represented as a series of pixels represented in binary.	***Assessment Point Information*** End of unit assessment (exam questions)

		Know what is meant by the term ‘metadata’ and be able to give examples. Understand the effect of colour depth and resolution on the size of an image file. Understand how sound can be sampled and stored in digital form. Understand how sampling rates, duration and bit depth affect the size of a sound file and the quality of its playback. Know why data is often compressed for transfer and storage. Understand the difference between lossy and lossless compression. Know why some types of data are only suitable for one type of compression.	

Spring Term

Unit title	Key Questions	Knowledge	Assessing Understanding
Computer networks, connections and protocols	What are the characteristics of LANs and WANs? What can affect the performance of a network?	Know what is meant by ‘stand-alone’ computers. Know the different types of networks: LAN and WAN. Understand the advantages of networking.	***How understanding is assessed*** Completion of online workbooks, homework notes, online quizzes and smartrevise tasks -

	What are the differences between peer-to-peer and client-server networks? How do you set up a LAN? How does The Internet work? Why is a mesh network better than a star network? Which is better, a wired or wireless network? What is the purpose of encryption? What are standards and protocols? What are the benefits of layering protocols?	Know what factors affect the performance of networks Know what a client-server model is. Know what a peer-to-peer model is. Understand the different roles computers have in each model. Know the hardware needed to connect a LAN. Understand what The Internet actually is. Understand the term DNS (Domain Name Server). Understand what is meant by the terms 'hosting' and 'cloud'. Understand what is meant by the terms 'web server' and 'client'. Know what a star network is. Know what a mesh network is. Understand that Ethernet is a wired method of connection. Understand that Wi-Fi and Bluetooth and wireless method of connection.	Peer, self and teacher assessment throughout the term of work produced. ***Skills*** Understanding network types (LAN/WAN), hardware, topologies, and protocols (TCP/IP, HTTP). ***Assessment Point Information*** End of unit assessment (exam questions)

		Understand the benefits and drawbacks of wired versus wireless connections. Be able to commend a connection type for a given scenario. Know the basics of how cryptography can work with a simple key. Know how wireless devices authenticate with each other before communicating data. Understand the uses of MAC and IP addressing. Understand the difference between IPv4 and IPv6. Understand the need for IPv6. Understand the need for standards in computing. Understand the 7 common protocols and what they are used for.	
Network security	What are the threats to devices and computers? What effect do different malware attacks have on your computer? How is a phishing attack used? How does a brute force attack work on passwords?	Understand the different forms of attack to computer systems Understand the threat from malware. Understand how to identify and protect against malware. Understand phishing. Understand how to identify and protect against phishing.	***How understanding is assessed*** Completion of online workbooks, homework notes, online quizzes and smartrevise tasks - Peer, self and teacher assessment throughout the term of work produced.

	What is the effect of a DDOS? What do we mean by “humans are a weak point”? How does a SQL injection hack work? How can you protect yourself against hackers?	Understand brute force attacks. Understand how to identify and protect against brute force attacks. Understand denial of service attacks. Understand how to identify and protect against denial of service attacks. Understand data interception and theft as a security threat. Understand how to identify and protect against data interception. Understand ways in which people are a weak point in secure systems. Known how the following prevention methods help again the various forms of attack: Penetration testing Anti-malware software Firewalls User access levels Passwords Encryption Physical security Know how the following prevention methods help again the various forms of attack: Penetration testing Anti-malware software Firewalls	***Skills*** Identifying threats (malware, phishing) and prevention methods (firewalls, encryption). ***Assessment Point Information*** End of unit assessment (exam questions) ***Further test on all topics covered so far (exam questions)***

		User access levels Passwords Encryption Physical security	

Summer Term

Unit title	Key Questions	Knowledge	Assessing Understanding
Systems software	Why does your computer need an operating system? How does a computer manage having lots of programs open and running at the same time? What features does an operating system give users? What is the purpose of utility software?	Know the purpose and functionality of operating systems. Know the different types of user interface and understand the features of each. Know what is meant by the term multi-tasking. Understand how the OS manages the memory. Understand the need for device drivers. Understand what is meant by the term, 'user management'. Understand ways in which the operating system manages files Understand encryption utilities. Understand defragmentation utilities. Understand data compression utilities.	***How understanding is assessed*** Completion of online workbooks, homework notes, online quizzes and smartrevise tasks - Peer, self and teacher assessment throughout the term of work produced. ***Skills*** Understanding of Operating systems, utility software, and user interfaces ***Assessment Point Information*** End of unit assessment (exam questions)

Ethical, legal, cultural and environmental concerns	What are the ethical issues of computing? What privacy issues does computing give society? What does the legislation for computing prohibit? What is the impact of computing on people? What is the environmental impact of computing?	Know a range of things to consider beyond development when implementing new computer systems. Understand at least one issue related to privacy and computer technologies. Know the principles of the Acts of Parliament: Data Protection Act 2018 Computer Misuse Act 1990 Copyright Designs and Patents Act 1988 Understand some of the key cultural issues of computer science: The impact of technology on our daily lives. The 'digital divide'. Globalisation. Understand the environmental impact of computers in terms of: Manufacturing Use Disposal	***How understanding is assessed*** Completion of online workbooks, homework notes, online quizzes and smartrevise tasks - Peer, self and teacher assessment throughout the term of work produced. ***Skills*** Understanding the social impact of technology, privacy issues, and environmental considerations ***Assessment Point Information*** End of unit assessment (exam questions) End of year test covering all material covered in year 10 (exam questions)