

Year 10 Computer Science Unit Plan 2021-22

Unit: Year 10 Computer Science HT1 2021					
Term delivered: Autumn 1			Length of unit: 7 Weeks (weeks 2-8)		
Knowledge content: J277/01: Computer Systems					
Skills: 1.1 Systems architecture 1.1.1 Architecture of the CPU 1.1.2 CPU performance 1.1.3 Embedded systems 1.2 Memory and storage 1.2.1 Primary storage (Memory) 1.2.2 Secondary storage 1.2.3 Units 1.2.4 Data storage 1.2.5 Compression					
Assessment Objectives: J277/01: Computer Systems: 1.1/1.2					
Lesson	Learning Objectives Key Terminology	Previous Knowledge Retrieval	Teaching Strategies and Resources (suggested) <i>(include GCSE Pod/web link to video resource for teaching if applicable)</i>	Knowledge/ Outcomes	Independent Learning <i>(include GCSE Pod/web link to video resource for students)</i>
1	To learn about the fetch, decode execute cycle. Keywords: <ul style="list-style-type: none"> ▪ Fetch ▪ Decode ▪ Execute 	Starter: OCR exam question: Paper 1: Computer Systems	Know-it folder on Q drive.	All: State what the fetch, decode, and execute cycle is. Most: Can describe what actions occur at each stage of the fetch, decode and execute cycle. Some: Can explain how the fetch, decode and execute cycle allows for threading.	Printout of 3 OCR exam questions on the following topic: 1.1
2-3	To learn about the CPU components and their function Keywords: <ul style="list-style-type: none"> ▪ ALU ▪ CU 	Starter: OCR exam question: Paper 1: Computer Systems	Know-it folder on Q drive.	All: Can state the role of each component. Most: Can describe the purpose of each register and what it stores (data/address)	

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	<ul style="list-style-type: none"> ▪ Cache ▪ Registers 			<p>Some: Can explain the difference between storing data and an address.</p>	
4-5	<p>To learn about the architecture within the CPU</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ Von Neumann ▪ MAR ▪ MDR ▪ Program Counter ▪ Accumulator 	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All: Can label an internal diagram of the CPU and describe the roles of the MAR and the MDR in the fetch part of the fetch-execute cycle.</p> <p>Most: Can describe the purpose of the accumulator</p> <p>Some: Can explain the purposes of the ALU, CU and the cache. They can also describe the importance of the Program Counter in the Fetch-Execute cycle.</p>	Printout of 3 OCR exam questions on the following topic: 1.1
5	<p>To learn about how common CPU characteristics affect performance</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ Clock speed ▪ Cache Size ▪ Number of cores 	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All: State the purpose of each characteristic.</p> <p>Most: Explain each characteristic.</p> <p>Some: Understand the effects of changing any common characteristics on system performance, either individually or in combination.</p>	
6	<p>To learn about the purpose and characteristics of embedded systems</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ Embedded System ▪ Firmware 	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All: Can state what an embedded system is</p> <p>Most: Can explain the typical characteristics of embedded systems</p> <p>Some: Can explain a range of embedded systems</p>	Printout of 3 OCR exam questions on the following topic: 1.2
7-8	<p>To learn about primary storage</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ RAM ▪ ROM <p>Virtual Memory</p>	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All: Can state why computers have primary storage: RAM, ROM and virtual memory.</p> <p>Most: Can explain the key characteristics of RAM and ROM</p> <p>Some: Can explain how virtual memory works.</p>	
9	<p>To learn about the common types of computer storage</p> <p>Keywords:</p>	<p>Starter: OCR exam question:</p>	Know-it folder on Q drive.	<p>All: Can state why computers have secondary storage</p>	Printout of 3 OCR exam questions on the following topics:

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	<ul style="list-style-type: none"> ▪ Optical ▪ Magnetic ▪ Solid State 	Paper 1: Computer Systems		<p>Most: Can recognise a range of secondary storage devices</p> <p>Some: Can explain the differences between the three main types of storage</p>	1.1/1.2
10	<p>To learn how to recommend storage devices for given application</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ Capacity ▪ Speed ▪ Portability ▪ Durability ▪ Reliability ▪ Cost 	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All: Can explain the different characteristics of storage devices</p> <p>Most: Can recommend a storage device based on its characteristics</p> <p>Some: Can justify the recommendation</p>	
11	<p>To learn how the computer stores data</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ 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) 	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All: Can understand why data must be stored in binary format</p> <p>Most: Familiarity with data units and moving between each</p> <p>Some: Can calculate capacity of devices.</p> <p>Can calculate required capacity for a given set of files.</p> <p>Calculate file sizes of sound, images and text files:</p> <ul style="list-style-type: none"> • sound file size = sample rate x duration (s) x bit depth • image file size = colour depth x image height (px) x image <p>text file size = bits per character x number of characters</p>	<p>Printout of 3 OCR exam questions on the following topics:</p> <p>1.2</p>
12-13	<p>To learn about number conversion in Computer Science</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ Binary shift 	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All/Most: Understanding of the terms most significant bit, and least significant bit Conversion of any number in these ranges to another number base</p>	

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	<ul style="list-style-type: none"> ▪ Binary ▪ Denary ▪ Hexadecimal 			<p>Ability to deal with binary numbers containing between 1 and 8 bits</p> <ul style="list-style-type: none"> • e.g. 11010 is the same as 00011010 <p>Denary number range 0 – 255 Hexadecimal range 00 – FF Binary number range 00000000 – 11111111</p> <p>Some: Understand the effect of a binary shift (both left or right) on a number</p>	
14	<p>To learn how characters are stored in the computer.</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ ASCII ▪ Unicode 	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All: Can understand: How characters are represented in binary How the number of characters stored is limited by the bits available</p> <p>Most: Can understand the differences between and impact of each character set.</p> <p>Some: Can understand how character sets are logically ordered.</p> <p>Note: Binary representation of ASCII in the exam will use 8 bits</p>	<p>Printout of 3 OCR exam questions on the following topics: 1.1/1.2</p>
15	<p>To learn how images are stored in the computer.</p> <p>Keywords:</p> <ul style="list-style-type: none"> ▪ Metadata ▪ Pixels ▪ Depth ▪ Resolution 	<p>Starter: OCR exam question: Paper 1: Computer Systems</p>	Know-it folder on Q drive.	<p>All: Can understand that pixel has a specific colour, represented by a specific code</p> <p>Most: Can understand the effect on image size and quality when changing colour depth and resolution</p> <p>Some: Can explain how metadata stores additional image information (e.g. height, width, etc)</p>	
16	<p>To learn how sound is stored in the computer.</p> <p>Keywords:</p>	<p>Starter: OCR exam question:</p>	Know-it folder on Q drive.	<p>All: Can explain why analogue sounds must be stored in binary</p>	<p>Printout of 3 OCR exam questions on the following topics:</p>

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	<ul style="list-style-type: none">▪ Sample rate▪ Duration▪ Bit Depth▪ Analogue▪ Digital	Paper 1: Computer Systems		Most: Can explain the sample rate and explain why it is measured in Hz Some: Can calculate a sample rate and discuss what factors affect this	1.1/1.2
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