KEY 4 STAGE OVERVIEW (Long Term Planning)

Subject: Computer Science

Week/ Lesson	Term	Topic	Knowledge	Skills Reading and writing tasks:
1	**Autumn T1**	1.1 Architecture of the CPU	CPU architecture CPU Cycle Registers	• describe the architecture of the CPU • explain the purpose of the CPU as fetching, decoding and executing • describe the common components
2		1.2 CPU Performance	Clocks, cores and cache embedded systems	• describe what impacts performance of a CPU • describe examples of embedded systems **read specifications of different cpus and write up a newspaper advert persuading them to purchase a chosen cpu over another**
3		1.3 Memory 1.4 Secondary Storage	RAM ROM virtual memory optical, magnetic and solid	• describe the purpose of RAM and ROM • explain why virtual memory is needed • compare the ads and disads of storage mediums • be able to select storage devices for a given application
4		2.1 Units of data storage and binary numbers	Converting of binary sizes of sound, images and text files binary addition	• calculate the denary equivalent of a binary no • explain how information is stored on the computer • calculate the answer to binary additions • explain binary shifts and overflow errors
5		2.2 Binary arithmetic and hexadecimal	Conversion to hexadecimal / denary and vice versa character sets	• convert positive denary into 8 bit binary • converting of hexadecimal • explain how images are represented as pixels in binary
6		**2.3 characters**	ASCII and Unicode	• explain the term character sets and explain the use of ASCII
7		Reteach week		
8		Short assessment and feedback 1.1 -2.3		
9	**Autumn T2**	2.4 Images	Image representation Metadata	• describe how an image is represented in pixels • describe what metadata is and what type is attached to images

			Colour depth and resolution	• describe the effect of colour depth
10		2.5 Sound	Sampling Playback quality and size of files	• describe how sound can be sampled and stored in digital form • explain the effect sample rate, duration and bit depth on playback quality and size of sound file
11		2.6 Compression	Compression types	• explain the advantages of compression • compare the two types of compression and select for a given task **for a given scenario, write a report to a music producer hoping to set up a music studio. The report will contain information about how sound is sampled and compressed with a recommendation of suitable equipment to purchase for the studio.**
12		Reteach week		
13		6.1 Computational Thinking	Algorithms Thinking methods Diagrams	• understand and apply computational thinking methods including abstraction, decomposition and algorithmic thinking • produce simple diagrams to show the structure of a problem and subsections
14		6.2 Searching algorithms	Searching algorithms	• Understand and trace linear and binary searching algorithms
15		6.3 Sorting algorithms	Sorting algorithms	• Understand and trace bubble, insertions and merge sort algorithms
16	**Spring T1**	6.4 developing algorithms using flowcharts	Flowcharts and pseudocode	• Design and create algorithms using flowcharts and pseudocode
17		6.4 developing algorithms using pseudocode	Flowcharts and pseudocode	• Design and create algorithms using flowcharts and pseudocode
18		6.5 interpret, correct and complete algorithms	Flowcharts and pseudocode	• Design and create algorithms using flowcharts and pseudocode **Read an article relating to a failed IT project: explain in two paragraphs the major failings and why planning would have made it a success. Explain some of the steps needed to implement such a project**
19		Reteach week		
20		Short assessment and feedback 1.1- 2.6 and 6.1 -6.5		
21	**Spring T2**	6.6 interpret, correct or complete algorithms	investigating errors and redesigning algorithms	• interpret, debug and correct flowcharts • interpret, debug and correct pseudocode
22		7.1 Programming fundamentals	data types casting constants and variables	• use data types such as integers, real, Booleans, characters and strings • use casting to change a type

				• use input and, output and assignment statements
23		7.2 Sequence and selection	case and IFS nested ifs validation of variables	• understand and implement IF statements in a Python program • allow for the program to use multiple case and if statements • validate the inputs using .lower/.upper and operators
24		7.3 iteration	for loops while loops	• implement a for loop into a program using parameters • implement multiple while loops into a program using Boolean conditions
25		7.4 arrays / 8.5 IDE	One and two dimensional arrays Use records to store data	• to be able to code a program that will cycle through an array/list of items to find a result • understand the useful features and limitations of the IDE **Read a day in the life of a programmer in 'devgenius' blogs post. Summarise the everyday tasks of a software developer**
26		Reteach week and Python syntax practice		
27	**Summer T1**	Python practice Sequence, selection and arrays	data types casting constants and variables investigating errors and redesigning algorithms One and two dimensional arrays Use records to store data case and IFS nested ifs validation of variables	• implement real, integer, Boolean and character strings into a program that calculates areas of a shape and a program that provides a leader board for a History revision game • implement Mod and Div within this program and game • use arrays within the program and game
28		Python practice Sequence, selection, iteration and arrays		
29		7.5 procedures and functions	Sub programs and functions	• use functions and procedures to produce structured code
30		7.6 records and files	File handling operations	• open, read, write and close files using python commands
31		Python syntax practice		
32		Reteach week and short assessment Unit 1, 2, 6 and 7		
33	**Summer T2**	Computer Networks, connections and protocols 3.1 The internet and WANs	Network performance IP Addressing DNS hosting the cloud servers and clients	• Understand the factors that affect network performance • Explain the difference roles of networks • Identify the hw necessary for a LAN – WAPs, routers, switches, NICs • To sketch out topologies and describe their advantages and disadvantages
34		3.2 LANs		

			LANs and WANs	
35		3.4 Client Servers and P2P	topologies	
36		3.5 Standards protocols and layers	Encryption mac addressing Protocols Layering concepts	• Describe the process of encryption to secure data across network connectons • Describe the format and uses of IP addresses • Describe MAC addressing within a network • Describe how layers benefit a network
37		Reteach week and end of year exam 1, 2, 3		
38		Reteach based on examination feedback		
39		Reteach based on examination feedback		
40				

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