Curriculum Map

Sandringham School
'Everybody can be Somebody'

Subject: *Computer Science: Paper 1 – Computer Systems* **Year group:** *13*

Time period	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Content *Declarative Knowledge – 'Know What'*	**1.1 The characteristics of contemporary processors, input, output and storage devices &** **1.2 Software and software development**		**1.4 Data types, data structures and algorithms** **1.3 Exchanging data** **1.2 Software and software development**			
	1.1.3 - Networks b) The internet structure - recap The TCP/IP Stack. • DNS • Protocol layering. • LANs and WANs. • Packet and circuit switching. *1.1.2 Types of processor* (a) CISC and RISC processors. (b) GPUs (c) Multicore and Parallel systems.	*1.2.1 - Systems Software* b) Memory Management (c) Interrupts, (d) Scheduling. *1.2.2 - Applications Generation* d)Translators: (e) Stages of compilation (f) Linkers and loaders	*1.4.3 - Boolean algebra* *a)* Boolean logic. (b) Manipulate Boolean expressions, (c) simplify statements in Boolean algebra: (d) Using logic gate diagrams and truth tables (e) D type flip flops, half and full adders.	*1.2.4 Types of programming languages* (c) Assembly language -recap 1.3.1 Compression, Encryption and Hashing (a) Lossy vs Lossless (b) Run length encoding and dictionary coding (c) Symmetric and asymmetric encryption. (d) Hashing 1.5.1 Computing related legislation (a) The Data Protection Act 1998. (b) The Computer Misuse Act 1990. (c) The Copyright Design and Patents Act 1988. (d) The Regulation of Investigatory Powers Act 2000. LAQ techniques and extensive practice	*Revision - See week by week "run in" schedule*	
Skills *Procedural Knowledge – 'Know How'*	1.3.3 – Networks • The TCP/IP Stack and protocol layering transmit packets of data using the internet protocol and transmission media. • How packet and circuit switching wok and their role and use. • The structure and definition of LAN's and WAN's. • The need for the Domain names and the DNS. *1.1.2 Types of processor*	*1.2.1 - Systems Software* (a) The function and purpose of operating systems Memory management using paging, segmentation and virtual memory. (c) the role of interrupts and Interrupt Service Routines (ISR), role within the Fetch-Decode-Execute Cycle. (d) round robin, first come first served, multi-level feedback queues, shortest	*1.4.3 - Boolean algebra* (a) Define problems using Boolean logic. (b) including the use of Karnaugh maps to simplify Boolean expressions. (c) De Morgan's Laws, distribution, association, commutation, double negation. d) To use logic gates and truth diagrams to determine logic circuits output. (e) use the logic associated with D type flip flops, half and full adders.	*1.2.4 – Types of programming languages* (c) Be able to read and write simple programs using the LMC simulator. *1.3.1 - Compression, Encryption and Hashing* (a) Lossy vs Lossless compression. (b) Run length encoding and dictionary coding for lossless compression. (c) Symmetric and asymmetric encryption. (d) Different uses of hashing 1.5.1 – Computing related legislation Know how each of then different acts affects an individual's data and effects of legislation	*Revision - See week by week "run in" schedule*	

	(a) The differences between and uses of CISC and RISC processors. (b) GPUs and their uses (including those not related to graphics). (c) How Multicore and Parallel systems work.	job first and shortest remaining time. *1.2.2 - Applications Generation* (d) Interpreters, compilers and assemblers. (e) lexical analysis, syntax analysis, code generation and optimisation. (f) The use of libraries		on how companies are entitled to use and legislate data.	
Key Questions	What is the definition and purpose of a network? What is the importance of using protocols? What is the purpose and benefits of layering protocols, particularly within the TCP/IP stack. What are the different layers within the TCP/IP stack? How is data is transmitted using the Internet? How are IP addresses and packets used in the transfer of data? What is a LAN and WAN? How is the Domain Name System used to find the IP of a URL? What is the purpose, function, benefits and drawbacks of both packet and circuit switching? What are the RISC and CISC architectures? What are the differences between RISC and CISC architectures? What is the GPU? Why do we use a GPU? Do we solely use the GPU for graphics? What is multicore system? What is a parallel system? What are the differences? Does it make a	How do operating systems manage memory? What is paging and segmentation? How do segments allow access to memory What is virtual memory? What is the role of interrupts and ISR's in the FEX cycle. What is round robin, first come first served, multi-level feedback queues, shortest job first and shortest remaining time. When do we use them and why? Why do we need translators? What does an Interpreter do? What does a compiler do? What does an Assembler do? What are the differences between using an interpreter and a compiler for HL code. What is source code and object code? Why do we need object code? What role does the lexical analyser play? Why do we need syntax analysis? What are the stages of compilation? Why do we need linkers and loaders?	Why do we use Boolean algebra in logic expressions? What are the main reasons to simplify a Boolean expression? Why do we need to apply the rules? How do we use the rules of association, distribution, commutation and double negation to simplify Boolean logic? What are D Type flip flops? Where do we use them? What are half adders? What is a full adder? How is Boolean logic applied to these adders? What are Karnaugh maps? How do we use them to apply deMorgan's law to simplify Boolean expressions?	How does assembly language make use of registers? How are data and addresses transferred between registers? What is addressing? Which should be integrated with assembly language? Why compression? Why do we need to compress files? What is lossy compression? What is lossless compression? What are the differences? What are the lossy and lossless algorithms that are used for compression? When using lossless compression what is RLE? How is RLE executed? How is the file decompressed? When do we need to use dictionary encoding? Why are text files compressed using lossless compression? Why use encryption? What is symmetric encryption? What is asymmetric encryption? Why use a public and primary key? Why is encryption used? Why use hashing? Why are hashing algorithms so useful? What are the different uses of hashing? What is the need for legislation when using digital technology? Why do we need to protect our privacy? What is data collection? Why the need for the data protection act? What is computer misuse? What is the legislation that constitutes misuse? Why have legislation in place? What is the regulatory powers Act? Why was it brought into place? Who does it protect? Why the need for patents and	

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	difference to the performance of the CPU? How?			copyright with software/hardware. Who does the patent or copyright protect?	
Assessment	End of unit tests, Past exam questions to consolidate learning Exam style HBL questions Programming exercises involving using the LMC assembly mnemonics				End of unit tests, Exam style HBL questions Past exam questions to consolidate learning Practical activities using LMC assembly mnemonics.
Literacy/Numeracy/ SMSC/Character	Computational literacy Exemplar modelling of answers. Understanding of key word defintions. Scaffolded answers to LAQ, guided through AO1, AO2 and AO3 evaluative skills	Computational literacy Scaffolded answers to LAQ, guided through AO1, AO2 and AO3 evaluative skills Mathematical computation Data handling	Computational literacy Exemplar modelling of answers Understanding of key word definitions. Scaffolded answers to LAQ, guided through AO1, AO2 and AO3 evaluative skills Mathematical computation Data handling Linear Algebra Discrete mathematics	Programming language literacy Computational literacy Exemplar modelling of answers Understanding of key word definitions. Scaffolded answers to LAQ, guided through AO1, AO2 and AO3 evaluative skills Computational literacy Scaffolded answers to LAQ, guided through AO1, AO2 and AO3 evaluative skills	Programming language literacy Computational literacy Exemplar modelling of answers Understanding of key word definitions. Scaffolded answers to LAQ, guided through AO1, AO2 and AO3 evaluative skills