



# YEAR 12 CURRICULUM SUMMARY

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When?	Knowledge	Knowledge	Assessment
<b>AUTUMN Term – FIRST Half</b>	a) How different input output and storage devices can be applied to the solution of different problems	Thinking ahead (introduced)	Simple problem solving tasks
	b) The uses of magnetic, flash and optical storage devices c) RAM and ROM d) Virtual storage	Introduction to the e) Use of an IDE to develop/debug a program	Procedural/Imperative language IDE of Centre's choice
	b) Writing and following algorithms	b) Programming constructs: sequence, iteration, branching	Programming exercises involving sequence
	a) The Arithmetic and Logic Unit; ALU, Control Unit and Registers (Program Counter; PC, Accumulator; ACC, Memory Address Register; MAR, Memory Data Register; MDR, Current Instruction Register; CIR):  How this relates to assembly language programs  b) The Fetch-Decode-Execute Cycle	Thinking logically (introduced)  a) Programming constructs: sequence, iteration, branching	Programming exercises involving branching (IF, nested IF, SELECT/CASE)



When?	Knowledge	Knowledge	Assessment
<b>AUTUMN Term – SECOND Half</b>	a) The function and purpose of operating systems  e) Distributed, Embedded, Multi-tasking, Multi-user and Real Time operating systems  f) BIOS  g) Device drivers	a) Programming constructs: sequence, iteration, branching	Programming exercises involving iteration (FOR, WHILE, REPEAT)
	a) The nature of applications  b) Utilities  c) Open source vs Closed source		
	a) Procedural languages	b) Recursion, how it can be used and compares to an iterative approach	Programming exercises demonstrating recursion (eg factorial)



When?	Knowledge	Knowledge	Assessment
<b>SPRING Term – SECOND Half</b> <b>(6 Weeks)</b>	a) Arrays (of up to 2 dimensions)	a) Arrays (of up to 2 dimensions)	Programming exercises involving arrays
	b) The following structures to store data: linked-list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table  c) How to create, traverse, add data to and remove data from the data structures mentioned	a) Understand the waterfall lifecycle, agile methodologies, extreme programming, the spiral model and rapid application development  b) The relative merits and drawbacks of different methodologies and when they might be used	Programming exercises including the algorithms for the main data structures



- a) Define problems using Boolean logic
- b) Use the following rules to derive or simplify statements in Boolean algebra: De Morgan's Laws, distribution, association, commutation, double negation

- a) Analysis and design of algorithms for a given situation
- b) The suitability of different algorithms for a given task and data set, in terms of execution time and space
- c) Algorithms for the main data structures, (Stacks, queues, trees, linked lists, depth-first (post-order) and breadth-first traversal of trees)
- d) Standard algorithms (Bubble sort, insertion sort, merge sort, quick sort, Dijkstra's shortest path algorithm, A\* algorithm, binary search and linear search)

When?	Knowledge	Knowledge	Assessment
<b>SUMMER</b> <b>Term –</b> <b>FIRST Half</b> <b>(6 Weeks)</b>	<b>a) Arrays (of up to 2 dimensions)</b>	<b>a) Arrays (of up to 2 dimensions)</b>	<b>Programming exercises involving arrays</b>
	<b>b) Assembly language (including following and writing simple programs with the Little Man Computer instruction set)</b> <b>c) Modes of addressing memory (immediate, direct, indirect and indexed)above</b>	<b>b) Assembly language (including following and writing simple programs with the Little Man Computer instruction set)</b>	<b>Assembly language programming exercises</b>

- 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**

- a) **Relational database, flat file, primary key, foreign key, secondary key, normalisation and indexing**
- b) **Normalisation to 3NF**
- c) **SQL - Interpret and modify (list of key words)**
- d) **Referential Integrity**
- e) **Transaction processing, ACID (Atomicity, Consistency, Isolation, Durability), record locking and redundancy**

**Practical exercises using appropriate DBMS**

When?	Knowledge	Knowledge	Assessment
<b>SUMMER Term – SECOND Half</b>	<ul style="list-style-type: none"> <li>a) The TCP/IP Stack</li> <li>b) Protocol layering</li> <li>c) LANs and WANs</li> <li>d) Packet and circuit switching</li> <li>e) Protocols</li> <li>f) Client-server and Peer to peer</li> </ul>		
	<ul style="list-style-type: none"> <li>a) HTML, CSS and JavaScript</li> <li>b) Search engine indexing</li> <li>c) PageRank Algorithm</li> <li>d) Server and client side processing</li> </ul>	<ul style="list-style-type: none"> <li>a) HTML, CSS and JavaScript</li> <li>b) Search engine indexing</li> <li>c) PageRank Algorithm</li> <li>d) Server and client side processing</li> </ul>	<b>Practical HTML, CSS, JavaScript exercises</b>