

Topic 9: Algorithm Design and Problem-Solving

Keyword sheet - Cambridge AS & A Level Computer Science 9618. Tick each term once you can define it from memory.

Keyword	Definition	Know it?
Computational thinking	Abstraction, decomposition, pattern recognition and algorithmic thinking applied to problems.	
Abstraction	Removing unnecessary detail to focus on essential features.	
Decomposition	Splitting a problem into smaller independent sub-problems.	
Stepwise refinement	Repeatedly breaking an algorithm into more detailed steps.	
Structured English / pseudocode / flowchart	Alternative representations of algorithms.	
Trace table / dry run	Tabulate variable values while manually executing an algorithm to test it.	
Selection / iteration	IF/CASE choices / FOR, WHILE and REPEAT loops.	
Linear search	Sequential check of each element; $O(n)$.	
Binary search	Repeatedly halves a sorted list; $O(\log n)$.	
Bubble sort	Repeated swaps of adjacent out-of-order items; $O(n^2)$.	
Insertion sort	Inserts each element into its correct place in the sorted portion; $O(n^2)$.	
Subroutine: procedure / function	Named reusable code block; functions return a value.	
Parameter / local / global	Value passed into a subroutine / variable with subroutine scope / variable with program scope.	
Modular programming	Dividing a program into independent, reusable modules.	
Efficiency	Use of time and memory by an algorithm.	