Topic 9: Algorithm Design and Problem-Solving

EAL keyword sheet - Cambridge International AS & A Level Computer Science 9618. Write the word in your own language in the last column.

Keyword	Meaning	Example sentence	In my language
computational thinking	A way of solving problems using computer science methods.	*Computational thinking includes abstraction.*	
abstraction	Hiding unnecessary detail and focusing on what matters.	*A tube map is an abstraction.*	
decomposition	Breaking a problem into smaller parts.	*Decomposition makes big projects easier.*	
pattern recognition	Finding similarities between problems.	*Pattern recognition reuses earlier solutions.*	
algorithm	A set of steps that solves a problem.	*The algorithm sorts the list.*	
stepwise refinement	Repeatedly breaking steps into more detailed steps.	*Stepwise refinement gives a clear design.*	
structured English	A way to write algorithms using plain English and programming terms.	*Structured English is easy to read.*	
flowchart	A diagram of an algorithm using symbols and arrows.	*A diamond shows a decision.*	
pseudocode	A code-like description of an algorithm.	*Pseudocode does not depend on a language.*	
identifier	The name of a variable, constant or subroutine.	*Use meaningful identifier names.*	
trace table	A table to follow the values of variables during a dry run.	*I completed a trace table.*	
dry run	Testing an algorithm by hand.	*A dry run can find logic errors.*	
selection	Choosing between paths using IF or CASE.	*Selection uses a condition.*	
iteration	Repeating instructions using a loop.	*FOR, WHILE and REPEAT are iteration.*	
count-controlled loop	A loop that repeats a set number of times.	*A FOR loop is count-controlled.*	
condition-controlled loop	A loop that repeats until or while a condition is met.	*WHILE is condition-controlled.*	
linear search	Checking each item in turn until the target is found.	*Linear search works on unsorted data.*	
binary search	Repeatedly halving a sorted list to find an item.	*Binary search needs a sorted list.*	

Keyword	Meaning	Example sentence	In my language
bubble sort	Comparing and swapping neighbouring items repeatedly.	*A bubble sort passes through the list many times.*	
insertion sort	Placing each item in the correct position in the sorted part.	*Insertion sort works like sorting playing cards.*	
totalling / counting	Adding values / counting how many items.	*Counting how many numbers are above 50.*	
subroutine	A named block of code that can be called.	*Subroutines make code reusable.*	
procedure	A subroutine that does not return a value.	*CALL PrintMenu()*	
function	A subroutine that returns a value.	*RETURN total*	
parameter	A value passed to a subroutine.	*The function has two parameters.*	
local / global variable	A variable that exists only in one subroutine / in the whole program.	*A global variable is visible everywhere.*	
modular programming	Writing a program as separate modules.	*Modular programming helps teams.*	
efficiency	How well a program uses time and memory.	*A binary search has good efficiency.*	
validation	Checking that input is allowed.	*A range check stops numbers over 100.*	