

Topic 7: Algorithm Design and Problem-Solving

Keyword sheet - Cambridge IGCSE Computer Science 0984. Tick each term once you can define it from memory.

Keyword	Definition	Know it?
Algorithm	An ordered set of steps that solves a problem.	
Computational thinking	Problem-solving approach using decomposition, pattern recognition, abstraction and algorithms.	
Decomposition	Breaking a complex problem into smaller, more manageable sub-problems.	
Abstraction	Removing unnecessary detail so that only the essential features of a problem remain.	
Pattern recognition	Identifying similarities and trends between problems so that solutions can be reused.	
Program development life cycle	Analysis, design, coding and testing.	
Analysis	Stage in which the problem is investigated and requirements identified, e.g. inputs, processes and outputs.	
Design	Stage in which the solution is planned using tools such as flowcharts, pseudocode and structure diagrams.	
Flowchart	Diagram of an algorithm using standard symbols for start/end, process, input/output and decisions.	
Pseudocode	Language-independent, structured description of an algorithm using code-like statements.	
Structure diagram	Hierarchical diagram showing how a problem is broken into sub-tasks.	
Trace table	Table recording the values of variables at each step as an algorithm is dry-run.	
Dry run	Manually working through an algorithm with test data to check it works and find logic errors.	
Syntax error	A breach of the rules of the language that prevents the program running.	
Logic error	The program runs but produces incorrect or unexpected output.	
Linear search	Checks each item in a list in turn until the target is found or the end is reached; works on unsorted data.	
Bubble sort	Repeatedly compares adjacent items and swaps them if out of order, until a pass makes no swaps.	
Totalling / counting	Adding values to a running total / adding 1 to a counter each time an event occurs.	
Maximum / minimum / average	Finding the largest, smallest and mean values in a data set.	
Validation	Automatic check that data is reasonable and acceptable; it does not guarantee data is correct.	
Range / length / type / presence / format check	Validation checks: within limits / correct number of characters / correct data type / data entered / correct pattern.	

Keyword	Definition	Know it?
Verification	Checking that data has been entered or transferred accurately, e.g. visual check or double entry.	
Normal / abnormal / extreme / boundary data	Valid data / invalid data that should be rejected / largest and smallest valid values / values at and just outside the limits.	
Test data	Inputs chosen to check that a program works correctly for all expected and unexpected cases.	