



Year 10 Summer 1 Keywords:

Computational Thinking

Topic Title: Computational Thinking

Keyword	Definition
Abstraction	Removing unimportant parts of a problem in order to concentrate on those that are important
Decomposition	Breaking down a problem into smaller more manageable ones
Algorithmic thinking	An approach to solving problems by the use of algorithms (sequences of steps that lead to a solution)
Structure diagram	A hierarchical diagram that shows how a problem is broken down into sub-sections/sub-tasks
Binary search	This only works on a sorted list The middle item of the list is first checked If the item searched for is less than this item the right of the list is discarded, and a binary search is carried out on the left of the list
Linear search	Each item in the list is checked against the search item in order
Sorting algorithms	<ul style="list-style-type: none"> • Bubble sort • Insertion sort • Merge sort <p>Choice of algorithm - Merge sort is generally faster to sort lists, so would be the recommended algorithm</p>
Flowchart Symbols	<p>Input / Output</p> <p>Process – Maths operations and assignment of variables</p> <p>Line – shows direction of flow</p> <p>Terminal – for start and stop</p> <p>Decision – change flow based on a decision</p> <p>Sub program – call a different function or procedure</p> <p> PG ONLINE</p>

Data Types	Data type	Description	Example	
	INTEGER	A whole number	1475, 0, -5	
	REAL	A number with a decimal point	56.75, 6.0, -2.456, 0.0	
	BOOLEAN	Either TRUE or FALSE	TRUE, FALSE	
	CHARACTER	A single alphabetic or numeric character	'a', 'K', '4', '@', '%'	
	STRING	A sequence of one or more characters	"Jo Hobson", "123"	
Boolean operators and programming symbols	Symbol / keyword	Meaning	Symbol / keyword	Meaning
	<	Less than	+	Concatenation
	<=	Less than or equal to	if elseif else	Branch depending on condition
	>	Greater than	switch case default	Branch depending on case
	>=	Greater than or equal to	input()	Get user input
	==	Equal to	print()	Output to the user
	=	Assignment	for	Repeat a set number of times
	!=	Not equal to	while	Repeat while a condition is true
	*	Multiply	do until	Do a loop until a condition is true
	^	Exponent	str()	Convert to a string
+	Addition	int()	Convert to an integer	
Trace Tables	Trace tables are used to help find errors in a program. Variable names and outputs are put in columns. The programmer traces through the program line by line. updating the values of variables and outputs. A row is used for each iteration.			
Syntax error	An error caused by not following the rules of the language e.g missing brackets or quotemarks.			
Logical error	The logic of the program is incorrect – e.g. wrong values used to create a total.			
Boolean Functions	AND, OR and NOT are Boolean operators A computer can calculate the results of A AND B , A OR B , or NOT A			
Truth Tables	A truth table shows the output from all possible combinations of inputs from a Boolean expression			
Logic Gates	A logic gate is a device that acts as a building block for digital circuits. They perform basic logical functions that are fundamental to digital circuits.			
Logic Diagrams	Diagrams to represent digital circuits and logic gates.			
Truth Table	It shows all possible combinations of inputs and the outputs they create.			
Input validation	Checking input meets certain rules, e.g. the type of data			
Anticipating misuse	Preventing too many entries of a password to make it harder for hackers to guess			
Authentication	Entering data twice or checking from an alternative source			
Syntax errors	A syntax error is one where the code written doesn't conform to the rules of the language			

Logic Error	The program will run, but it won't work as the programmer intended
Machine Code	Instructions that computers can understand e.g. binary
Assembly language	Allows a programmer to create programs more easily than writing in machine code
High level languages	High-level languages – programming language such as Python that generally have statements that look a bit like English or Maths.