

# Topic 2.1 | GCSE Computer Science | Algorithms

## Binary Search

In a sorted list, find the middle of the list, compare with search criteria. If it's the item you want, stop. Otherwise see which side of the list you can discard - repeat until item is found or not in the list

1	2	4	5	8	9	11	15	18
1	2	4	5	8	9	11	15	18
1	2	4	5	8	9	11	15	18
1	2	4	5	8	9	11	15	18

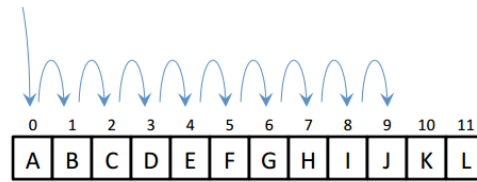
**Search 9.**

- Go to the middle (8)
- Compare with 9 (smaller)
- Discard left side of list
- Repeat

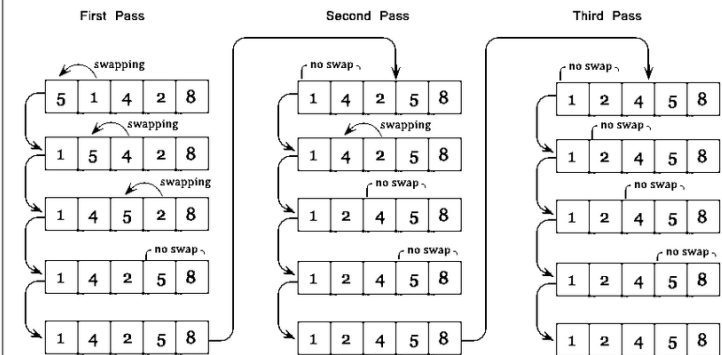
## Linear Search

Start at the beginning of the list, compare each item individually as you go through the list. When you have found what you are looking for, then stop

Find "J"



## Bubble Sorting

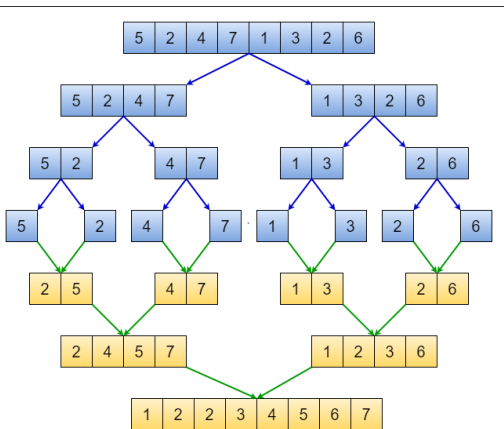


## Bubble Sort

Start at the beginning of the list, compare next 2 items, and swap if not in order. Repeat working through your list. Once you reach the end, if there has been swaps, go back to the beginning and repeat compares and swapping (second pass).

Keep doing passes until there have been no swaps, which means your list is sorted.

## Merge sort



Split the list by halving until each item is on its own. Start to merge by pairing items together sorting at the same time. Then merge the pairs together, repeat until all items are merged and sorted.

## Insertion sort

Start at the beginning of the list. Take the next item, remove it and insert it where it needs to go. Repeat until you get to the end of the list.



<b>Computational thinking</b>	A problem-solving method using computer science techniques, where possible solutions are developed and presented in a way that can be understood by humans and computers.
<b>Abstraction</b>	The process of extracting or removing something.
<b>Decomposition</b>	Breaking down a complex problem or system into smaller parts that are more manageable and easier to understand.
<b>Pattern Recognition</b>	Finding patterns in a problem, so they can be solved together.
<b>Algorithm</b>	A sequence of logical instructions for carrying out a task. In computing, algorithms are needed to design computer programs.
<b>Pseudocode</b>	Also written as pseudo-code. A method of writing up a set of instructions for a computer program using plain English. This is a good way of planning a program before coding.
<b>Trace table</b>	Trace tables are used to allow programmers to trace the value of variables as each line of code is executed. The values of the variables are displayed in a table and assist the programmer in identifying any potential errors.

## Flowcharts

	Line		Input/output
	Process		Decision
	Sub Program		Terminal

# Programming