Beckfoot

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Algorithms

1 There are two ways to write algorithms:

- Flowchart
- Pseudocode

```
start
put teabag in cup
boil water
water boiled?  no
yes
pour water in cup
want sugar?  yes → add teaspoon
no
want milk?  yes → add milk
no
need to stir?  yes → stir
no
finish
```

```
PROGRAM make tea

put teabag in cup

WHILE (water not boiled)
    boil water
ENDWHILE
pour water in cup

WHILE (sugar needed)
    add sugar
ENDWHILE

WHILE (milk needed)
    add milk
ENDWHILE

WHILE (need to stir)
    stir tea
ENDWHILE

Server and finish
```

Searching Algorithms

1 - Binary Search
  - Find the center of the list
  - N + 1 / 2
  - Compare the middle item

| 1 | 4 | 6 | 7 | 8 | 12 | 13 | 15 | 19 |

NEW LIST:

| 12 | 13 | 15 | 19 |

  - Discard half of the list
  - Repeat until found

Searching Algorithms

2 - Linear Search

DATA SET

| Item1 | Item2 | Item3 | Item4 | Item5 | Item6 | Item7 |

Direction of search

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Sorting Algorithms

1 - Bubble Sort

Original set	9 23 2 5 34 56
Step 1	9 23 2 5 34 56
No swap needed	9 23 2 5 34 56
Step 2	9 23 2 5 34 56
Swap	9 2 23 5 34 56

2 Merge Sort

UNSORTED LIST

| 2 | 45 | 6 | 9 | 15 | 12 | 7 | 8 |

| 2 | 45 | 6 | 9 | | 15 | 12 | 7 | 8 |

| 2 | 45 | 6 | 9 | | 15 | 12 | | 7 | 8 |

| 2 | 45 | 6 | 9 | 15 | 12 | 7 | 8 |

| 2 | 45 | 6 | 9 | 12 | 15 | 7 | 8 |

| 2 | 6 | 9 | 45 | 7 | 8 | 12 | 15 |

| 2 | 6 | 7 | 8 | 9 | 12 | 15 | 45 |

Split into individual lists

Sort and merge lists

Key Vocabulary

1	Abstraction	picking out the important bits of the problem and removing unnecessary detail from a problem.
2	Decomposition	breaking a problem into a number of sub problems these sub problems can then be solved individually
3	Algorithm	is a step by step set of rules or instructions.
4	Pseudocode	is a set of step by step instructions in the style of a programming language but using plain English.