

SORTING ALGORITHMS

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WHY SORTING ALGORITHMS?

Key Stage 3

Pupils should be taught to...

understand at least two key algorithms for each of sorting and searching; use logical reasoning to evaluate the performance trade-offs of using alternative algorithms to solve the same problem

CONTEXT

Football league table

Eurovision voting results

Music sales charts

Top Trumps style topics

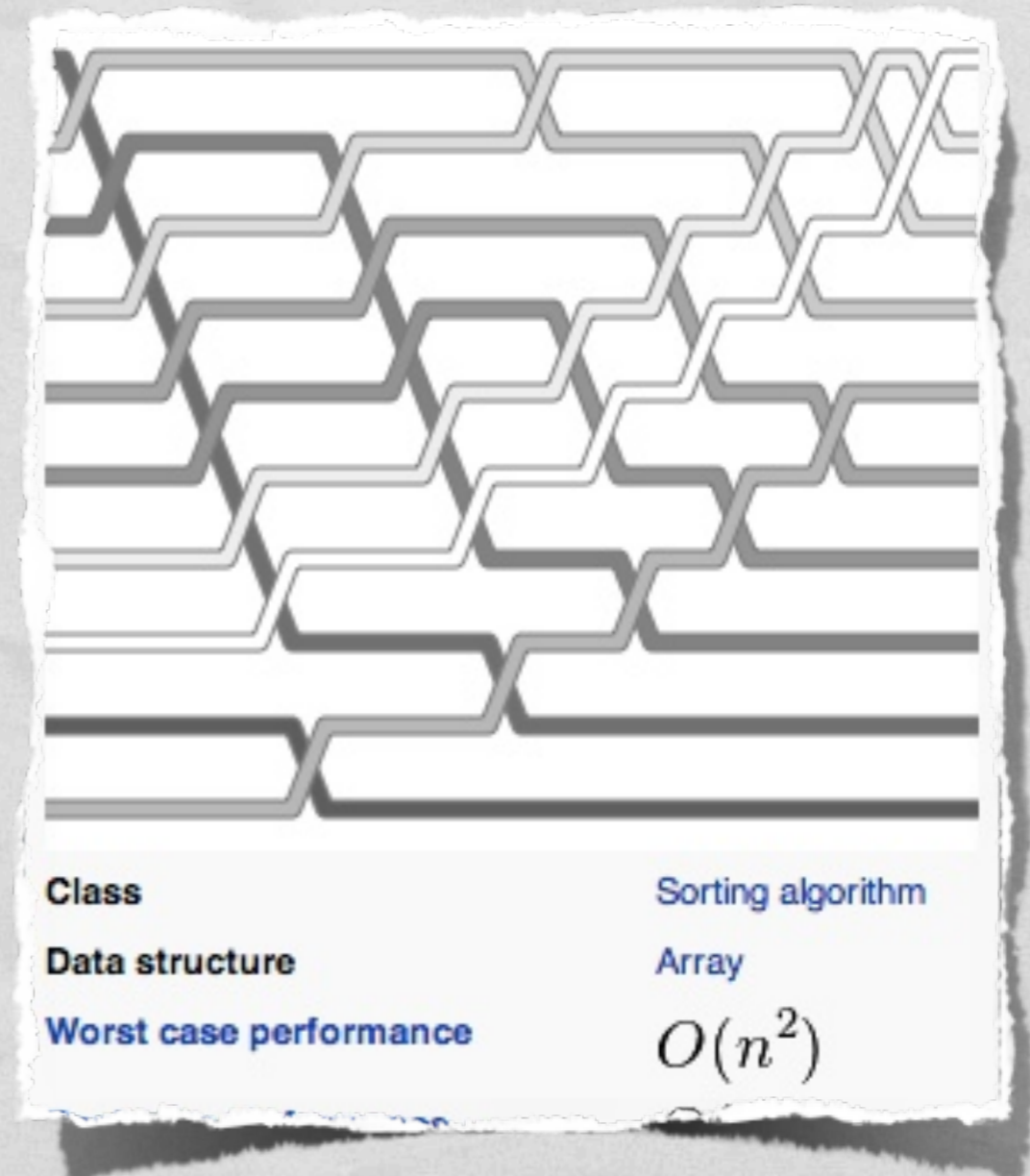
SIMPLE SORT I - BUBBLE

Line the cards up

Compare 1 & 2
Swap if needed

Compare 2 & 3
Swap if needed

Compare 3 & 4
Swap if needed



SIMPLE SORT 2 - SELECTION

Line the cards up

Scan through to find the lowest card

Move it to the left & shuffle the others up

Scan through to find 2nd lowest card...

- L be a non-empty set and
1. L' is a permutation of
 2. $e_i \leq e_{i+1}$ for all $e \in$
 3. $f(L) = \begin{cases} L, \\ \{s\} \cup \end{cases}$
 4. s is the smallest element
 5. L_s is the set of elements

COMPLEX SORT I - MERGE

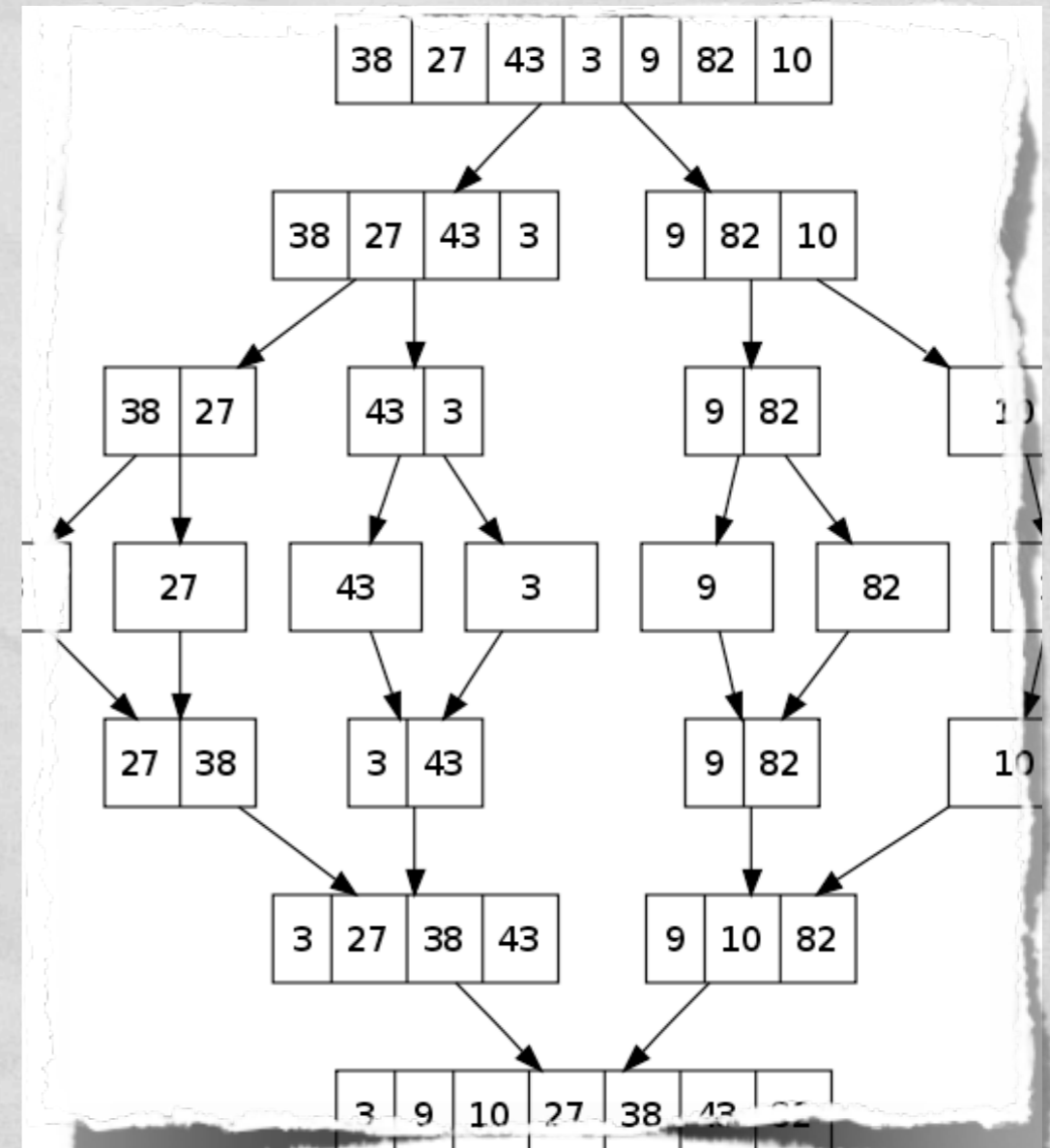
Split the cards into 2 piles

Keep splitting until you have 1 or 2 cards in each

Sort each pile individually

Merge piles 1 & 2

Merge piles 3 & 4...



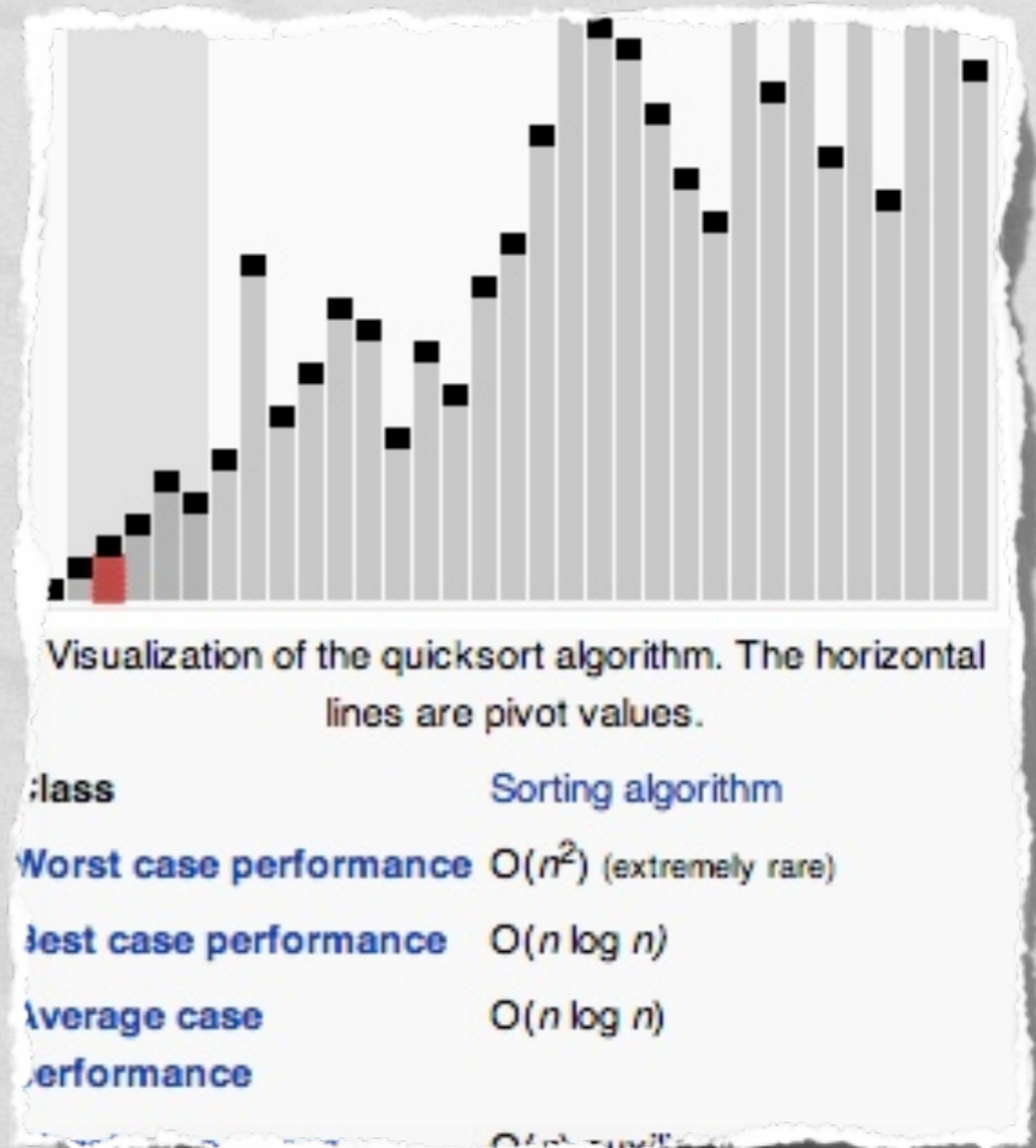
COMPLEX SORT 2 - QUICK

Line the cards up

Choose a random card as the “pivot”

Compare each card to the pivot & make a pile on each side

Repeat for each pile



MORE RESOURCES

- ❖ Your maths department!
- ❖ Animated sorting algorithms - www.sorting-algorithms.com/
- ❖ AlgoRythmics - Sorting algorithms to Hungarian folk dancing - www.youtube.com/user/AlgoRythmics/videos



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