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A computer science portal for geeks

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Which sorting algorithm makes minimum number of memory writes?

Minimizing the number of writes is useful when making writes to some huge data set is very expensive, such as with EEPROMs or Flash memory, where each write reduces the lifespan of the memory.

Among the sorting algorithms that we generally study in our data structure and algorithm courses, Selection Sort makes least number of writes (it makes O(n) swaps). But, Cycle Sort almost always makes less number of writes compared to Selection Sort. In Cycle Sort, each value is either written zero times, if it's already in its correct position, or written one time to its correct position. This matches the minimal number of overwrites required for a completed in-place sort.

Sources:

http://en.wikipedia.org/wiki/Cycle_sort
http://en.wikipedia.org/wiki/Selection_sort

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

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DS+Algo=Placement • 9 months ago
Every element must be placed where it is to be in sorted order, so the swaps that selection sort do must be done in any sorting, then why is the selection sort less optimal than cycle sort
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samthebest • 10 months ago
can someone explain the algorithm of cycle sort?
moreover i didnt understand that even in selection sort if the element is at its place we dont make any swaps ..then how it is diff from cycle sort
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iota samthebest • 3 months ago
For example..
Input: 1,7,2,3,5,4,6
No of misplaced elements: 5 (7,2,3,4, and 6)

Selection: 1,2,7,3,5,4,6 (2 writes)
1,2,3,7,5,4,6(2 more)

1,2,3,4,5,7,6(2 more)
1,2,3,4,5,6,7(2)
Total: 8 writes(4 swaps)

Cycle: 1,7,2,3,5,4,7 temp:6 (1 write)
1,7,2,3,5,6,7 temp:4 (1 write)
1,7,2,4,5,6,7 temp:3 (1 write)
1,7,3,4,5,6,7 temp:2 (1 write)
1,2,3,4,5,6,7 temp:7 (1 write)
*temp stores the element that is deleted.
Total: 5 writes

1 • Reply • Share ›

iota samthebest • 3 months ago

SortingAlgorithm P0I Explanation
Selection Sort place value We find the element for the current place value in each iteration. Let the no of miss-paced elements(and the incorrectly holding place value) be k. So the max no of swaps required is k(can be less upto k/2 if some/all swap fixes the other, i.e. the two elements r in each others position). So a max of 2k(2 per swap) writes r possible and min 2*k/2(i.e k).
Writes: [k, 2k]

Cycle Sort elements We find the place value for each
element in a cyclic fashion (ie. place value of current element, then that of the element at the former's place value/position and so on..) and we don't write until we find the correct place value of the element, so a total of k writes (where k being the no of miss-placed elements).
Writes: k

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groomnestle • a year ago

I had no idea about cycle sort b4.. thanks for the info.

3 • Reply • Share ›

akanksha • a year ago

what is the reason for o(n) being the tightest upper bound for the no. of swaps required to sort n nos.

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guest akanksha • a year ago

coz u will be having max n swaps for n elements

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ravikant • 4 years ago

Can somebody explain me the difference between cycle sort and selection sort ?

4 • Reply • Share ›

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