

$\log n$ - Space, $n^{3/2}$ Time Quantum Sort.

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[Kla03], [Fun21]

Result: Sorting A_1, A_2, \dots, A_n

```
1 for  $i \in [n]$  do
2   for  $j \in [n]$  do
3     if  $A_i < A_j$  then
4       swap  $A_i \leftrightarrow A_j$ 
5     end
6   end
7 end
```

Algorithm 1: "ICan'tBelieveItCanSort" alg.

Result: Sorting A_1, A_2, \dots, A_n

```
1 swap  $A_1 \leftrightarrow \max A$ 
2 for  $i \in [n - 1]$  do
3   for  $j \in [n]$  do
4     Find the first  $k$  such  $A_k > A_i$ 
5     Set  $A \leftarrow A_1, A_2 \dots A_{k-1}, A_i, A_{k+1}, \dots, A_{i-1}, A_{i+1} \dots, A_n$ 
6   end
7 end
```

Algorithm 2: "ICan'tBelieveItCanSort" alg.

References

- [Kla03] Hartmut Klauck. *Quantum Time-Space Tradeoffs for Sorting*. 2003. arXiv: [quant-ph/0211174](#) [quant-ph].
- [Fun21] Stanley P. Y. Fung. "Is this the simplest (and most surprising) sorting algorithm ever?" In: *CoRR* abs/2110.01111 (2021). arXiv: [2110.01111](#). URL: <https://arxiv.org/abs/2110.01111>.