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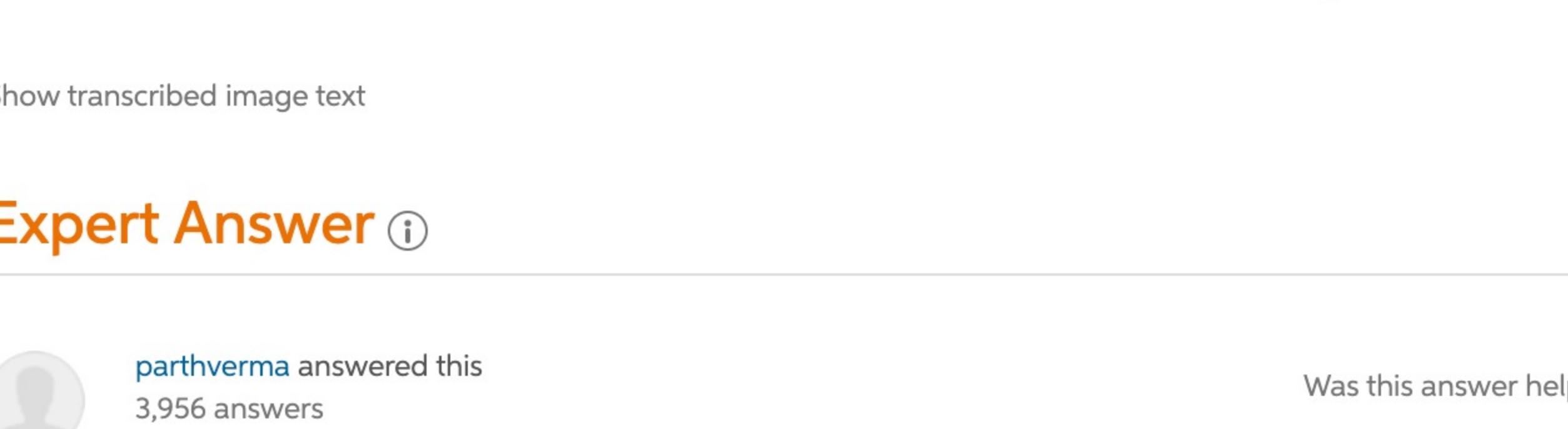
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Question: PYTHON 3: Analysis of Algorithms/ Complexity classes Sketch ...

PYTHON 3: Analysis of Algorithms/ Complexity classes

Sketch Size vs. Time curves for the two algorithmic complexity classes required in each of the pictures below: for one, write **Impossible** instead: (a) an O(N) algorithm that is **never faster** than an O(N^2) algorithm. (b) an O(N) algorithm that is **always faster** than an O(N^2) algorithm. (c) an O(N) algorithm that is **sometimes faster** than an O(N^2) algorithm.

a)



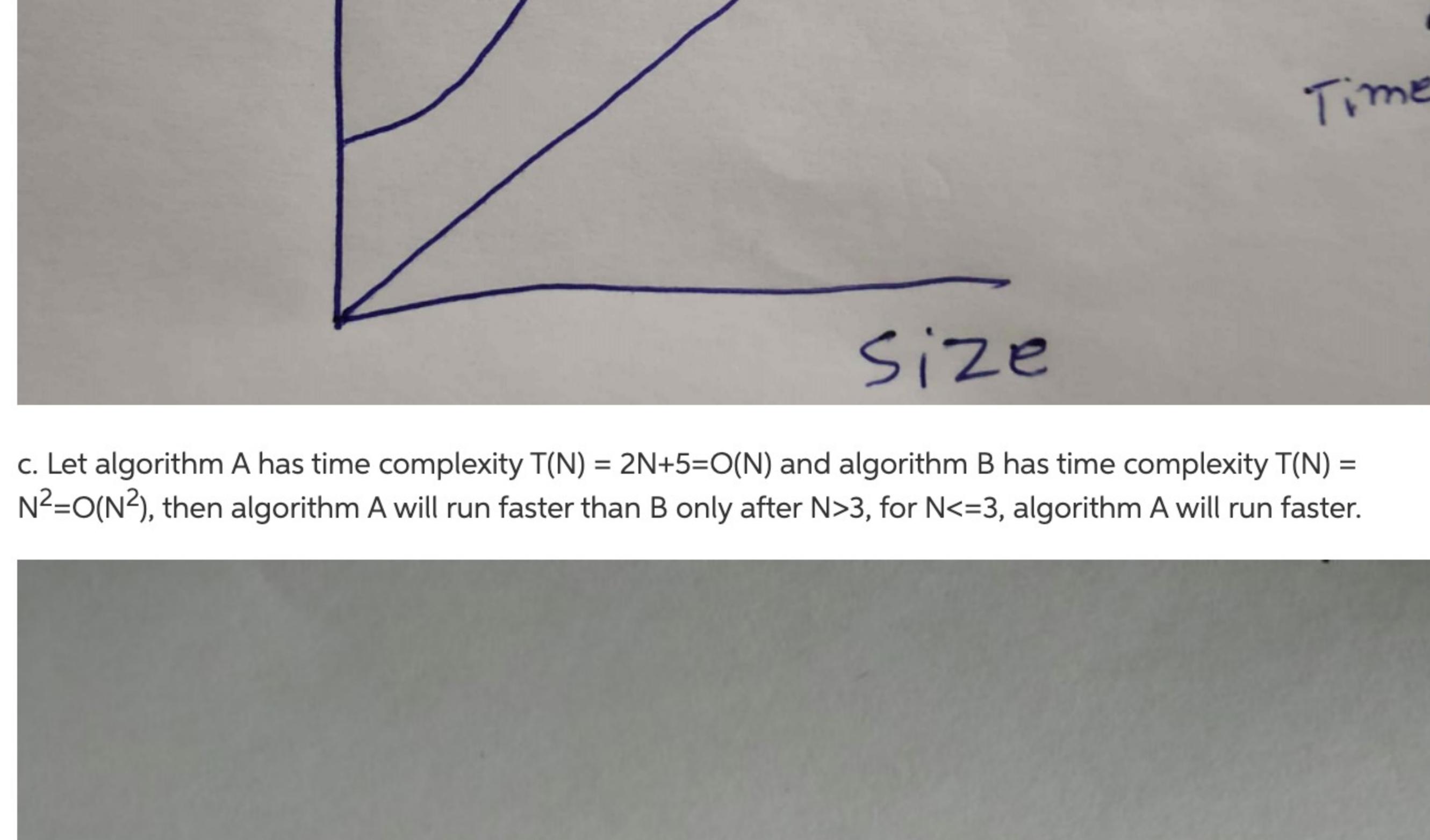
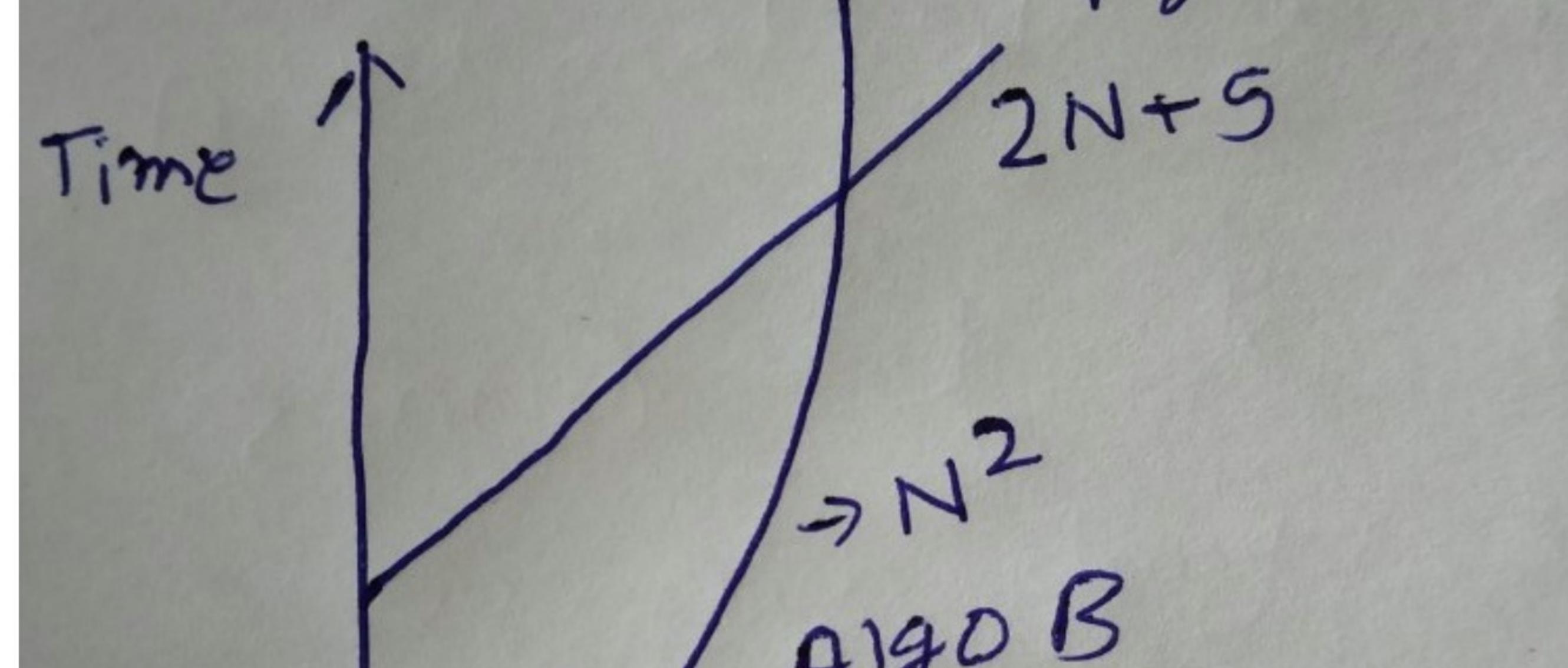
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Expert Answer ⓘparthverma answered this
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a. This part is impossible because every O(N) time algorithm will run faster than O(N^2) time algorithm after $N > n_0$ for some integer n_0 b. Let algorithm A has time complexity $T(N) = N = O(N)$ while algorithm B has time complexity $T(N) = N^2 = O(N^2)$.

Clearly algorithm A always run faster than B.

c. Let algorithm A has time complexity $T(N) = 2N+5 = O(N)$ and algorithm B has time complexity $T(N) = N^2 = O(N^2)$, then algorithm A will run faster than B only after $N > 3$, for $N \leq 3$, algorithm A will run faster.

Please comment for any clarification.

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```
def selection_sort(arr, start_ix): "Sort arr[start_ix:]"
    if start_ix >= len(arr) - 1:
        return min_value, min_ix = ...

```

[See answer](#)

(2 pts) (a) What "better-known"/simpler complexity class is equivalent to $O(N \log N)$? briefly explain why. (b) Explain under what conditions `sorted(set(l))` runs faster than `set(sorted(l))` for a

[See answer](#)

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