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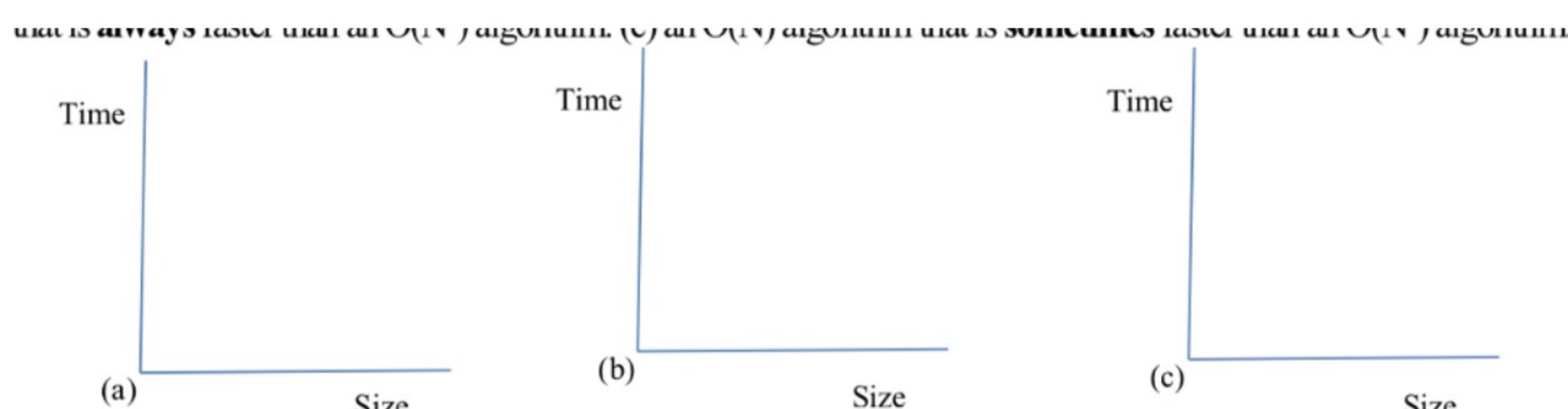
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Question: PYTHON 3: Analysis of Algorithms/ Complexity classes Sketch ...

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 1



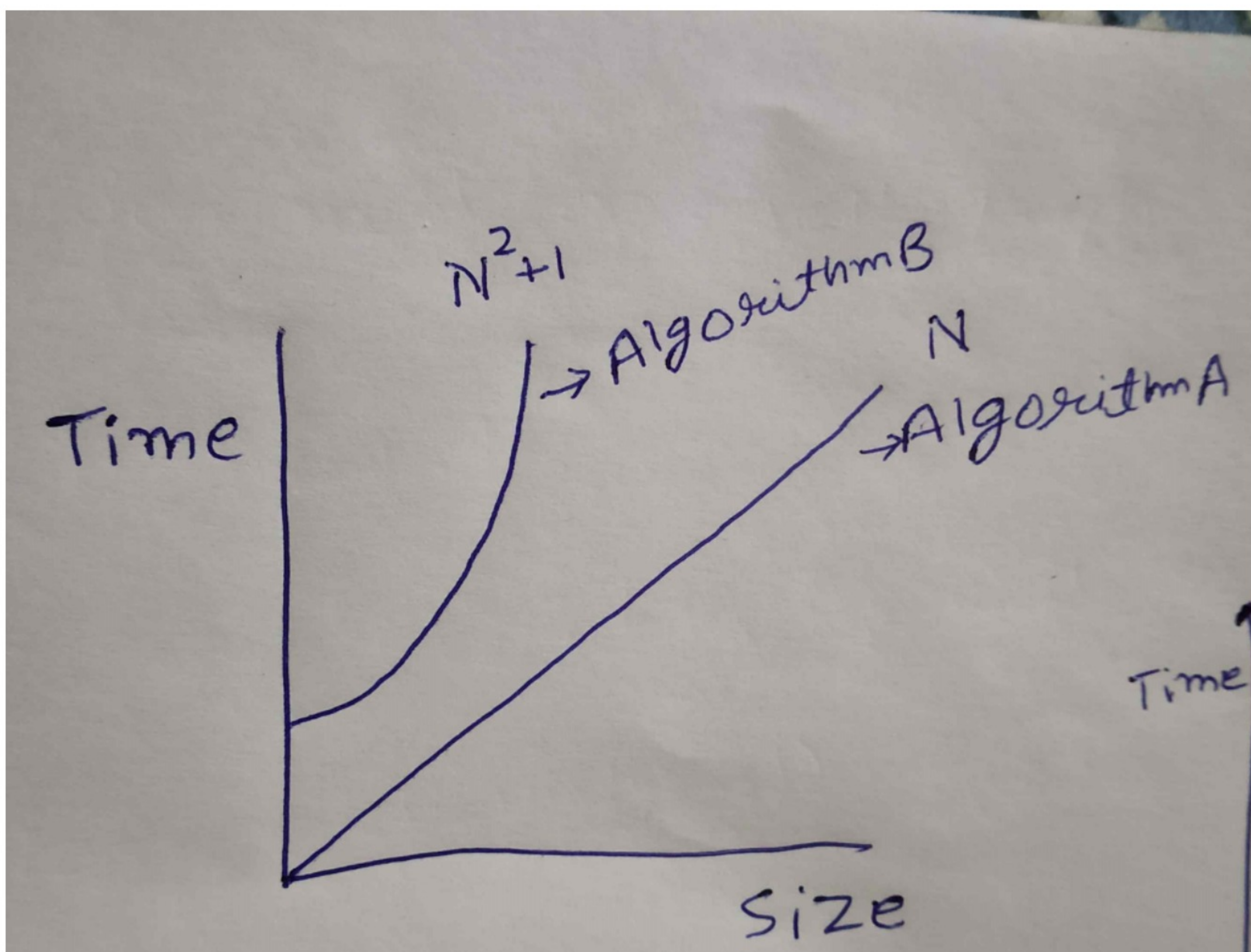
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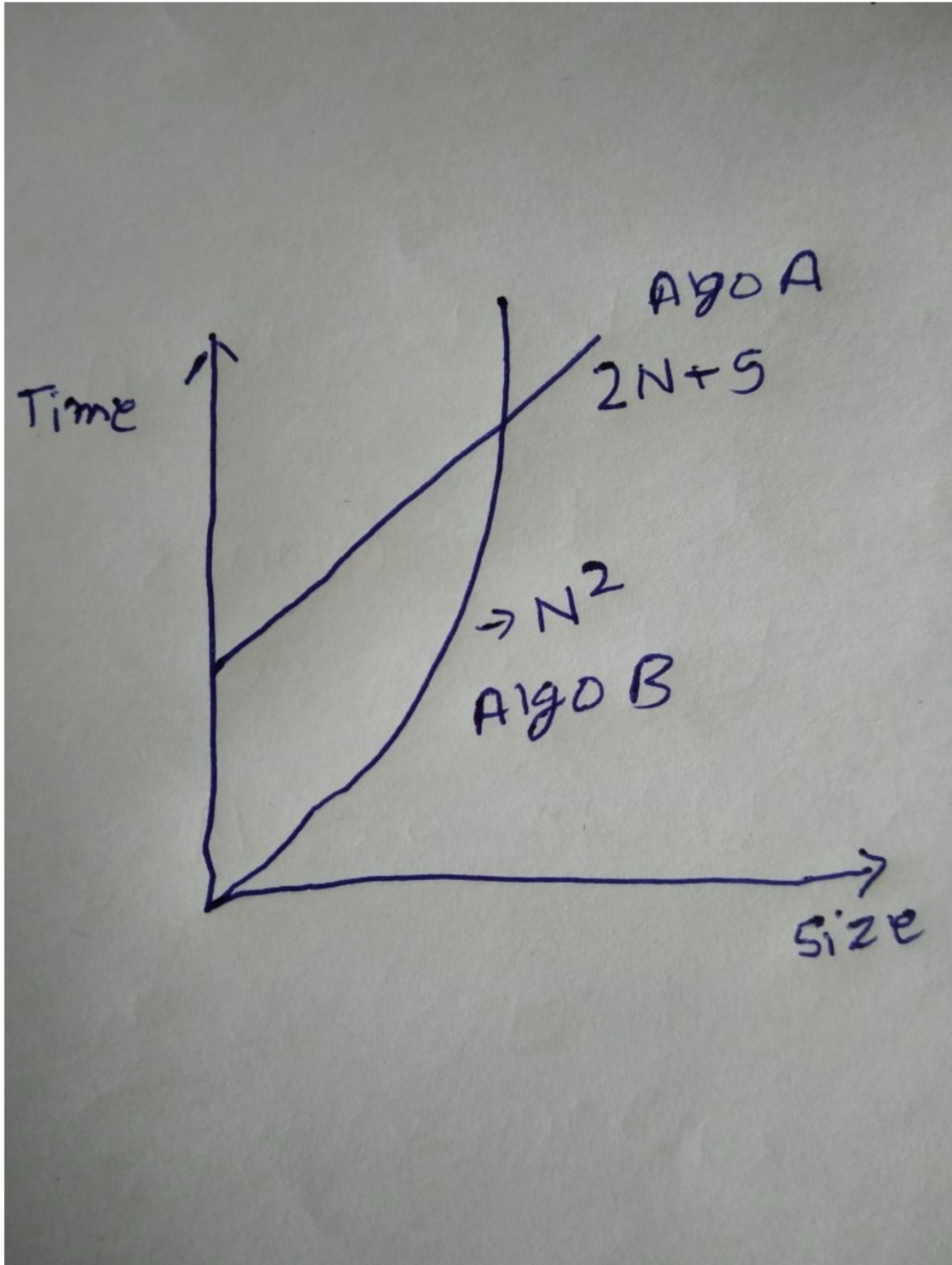
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- a. This part is impossible because every $O(N)$ time algorithm will run faster then $O(N^2)$ time algorithm after $N > n_0$ for some integer n_0
- b. Let algorithm A has time complexity $T(N) = N = O(N)$ while algorithm B has time complexity $T(N) = N^2 + 1 = O(N^2)$.
- 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 $\text{sorted}(l)$ runs faster than $\text{set}(\text{sorted}(l))$ for a

See answer

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A: See answer 100% (1 rating)

Q: python

A: See answer

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