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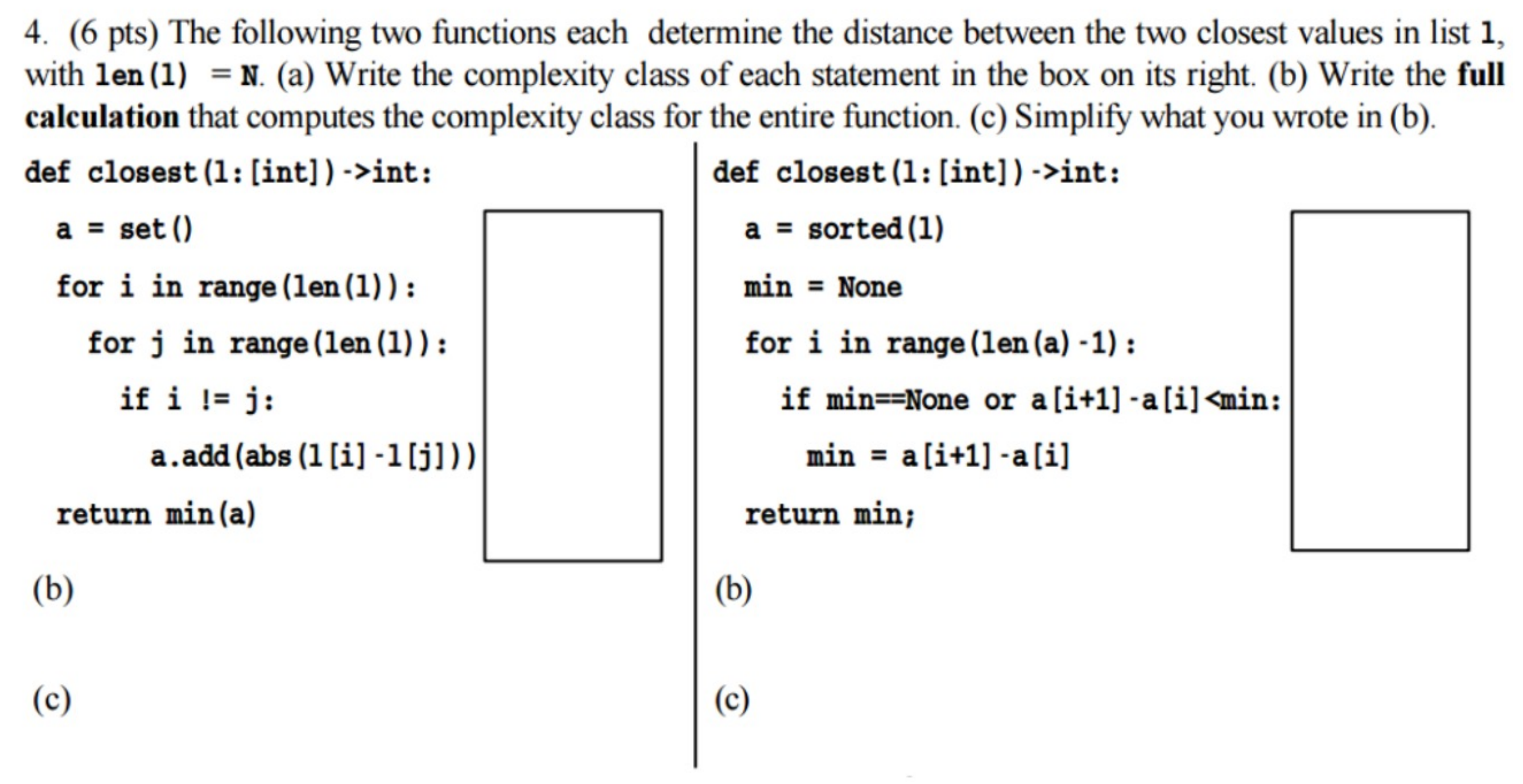
Question: The following two functions each determine the distance betw…



4. (6 pts) The following two functions each determine the distance between the two closest values in list `l`, with `len(l)` = `N`. (a) Write the complexity class of each statement in the box on its right. (b) Write the **full calculation** that computes the complexity class for the entire function. (c) Simplify what you wrote in (b).

```
def closest(l:[int])->int:
  a = set()
  for i in range(len(l)):
    for j in range(len(l)):
      if i != j:
        a.add(abs(l[i]-l[j]))
  return min(a)
```

(b)

(c)

```
def closest(l:[int])->int:
  a = sorted(l)
  min = None
  for i in range(len(a)-1):
    if min==None or a[i+1]-a[i]<min:
      min = a[i+1]-a[i]
  return min;
```

(b)

(c)

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Expert Answer ⓘ

Brittny Stickland answered this
1,697 answers

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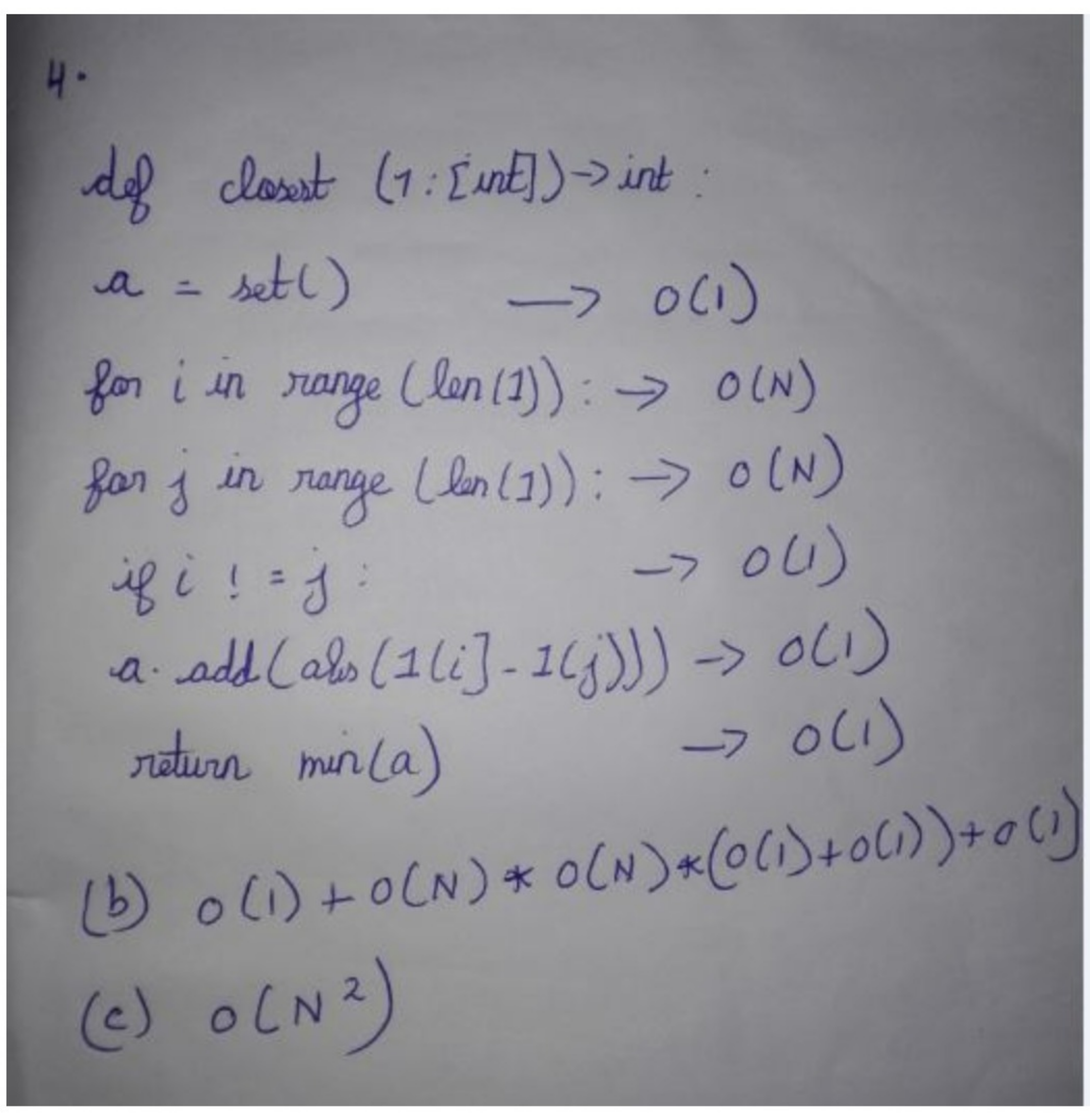
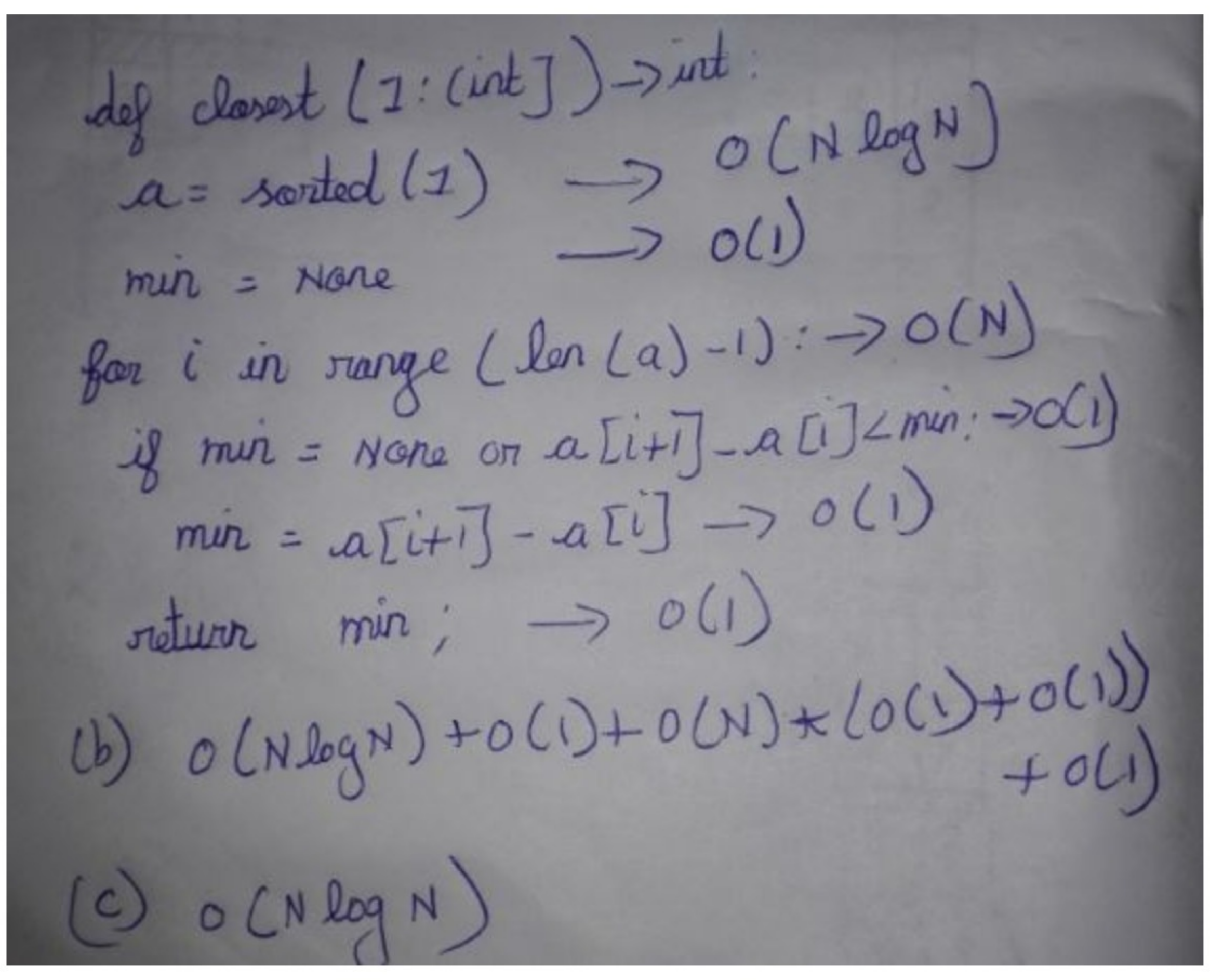


```
4.
def closest (1:[int])->int :
a = set()              --> O(1)
for i in range (len(1)): -> O(N)
for j in range (len(1)): -> O(N)
 if i ! = j :           -> O(1)
 a.add(abs(1[i]-1[j])) -> O(1)
 return min(a)          -> O(1)
```

(b) O(1) + O(N) * O(N) * (O(1)+O(1)) + O(1)

(c) O(N²)



```
def closest (1:[int])->int :
 a = sorted (1)      --> O(N log N)
 min = None          --> O(1)
for i in range (len(a)-1): -> O(N)
 if min = None or a[i+1]-a[i]<min: -> O(1)
   min = a[i+1]-a[i] -> O(1)
 return min;         -> O(1)
```

(b) O(N logN) + O(1) + O(N) * (O(1)+O(1))
+ O(1)

(c) O(N log N)

yes sorted (1)=O(n log n)

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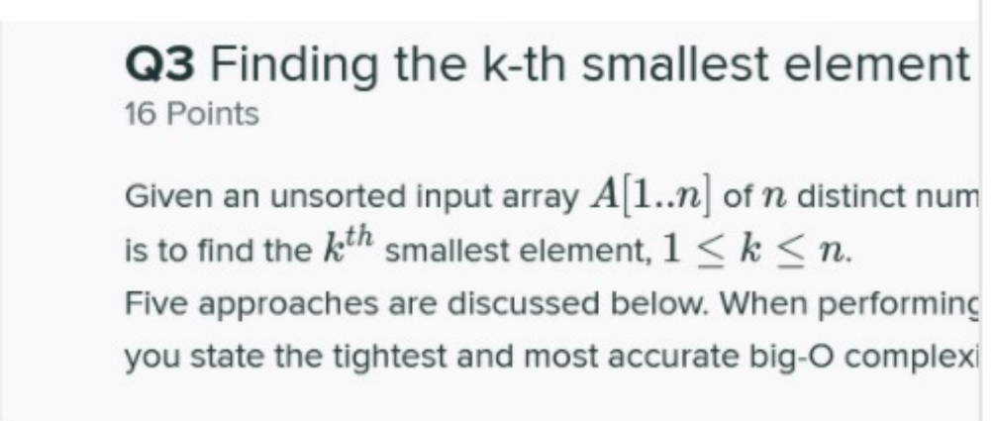
Q3 Finding the k-th smallest element in an array 16 Points Given an unsorted input array A[1..n] of n distinct nu…

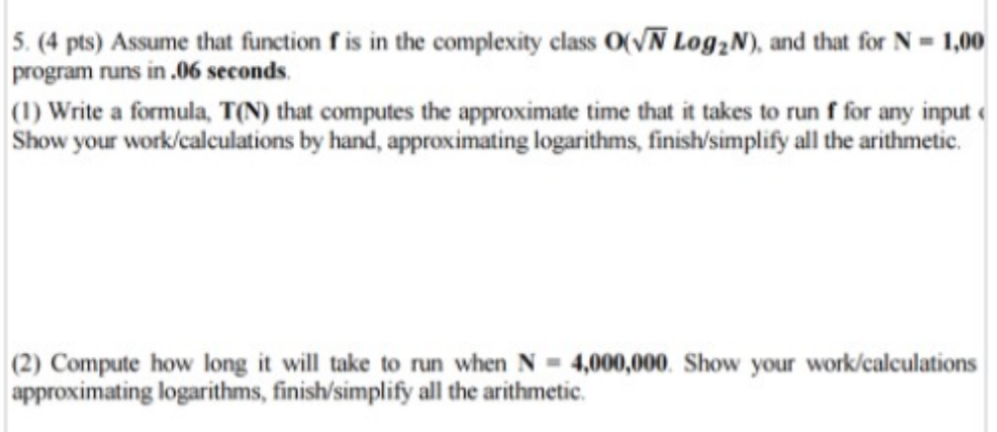


Q3 Finding the k-th smallest element
16 Points

Given an unsorted input array $A[1..n]$ of n distinct num
is to find the k^{th} smallest element, $1 \leq k \leq n$.
Five approaches are discussed below. When performing
you state the tightest and most accurate big-O complexi

See answer

Assume that function f is in the complexity class O(Squareroot N Log_2 N), and that for N = 1,000,000…



5. (4 pts) Assume that function **f** is in the complexity class $\mathbf{O(\sqrt{N}\ Log_2 N)}$, and that for **N = 1,00**
program runs in **.06 seconds**.
(1) Write a formula, **T(N)** that computes the approximate time that it takes to run **f** for any input
Show your work/calculations by hand, approximating logarithms, finish/simplify all the arithmetic.

(2) Compute how long it will take to run when **N = 4,000,000**. Show your work/calculations
approximating logarithms, finish/simplify all the arithmetic.

See answer

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A: See answer

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A: See answer

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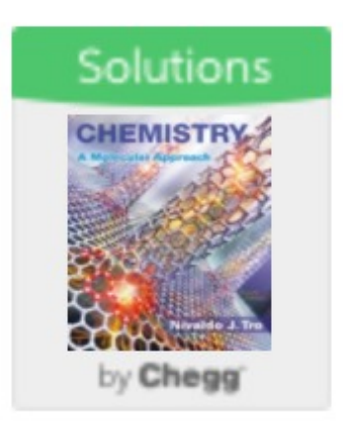

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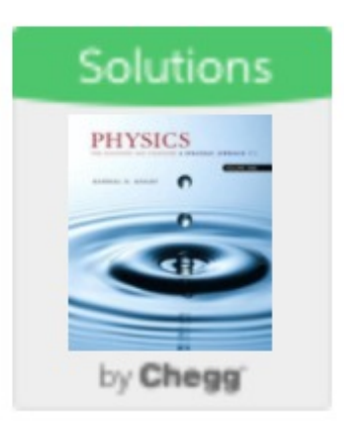

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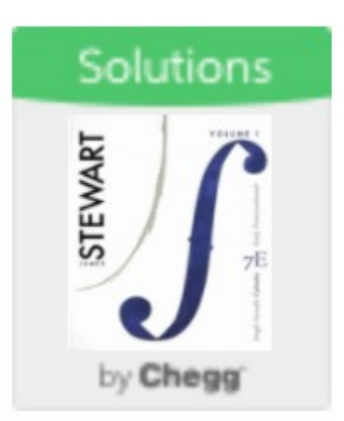

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