Question: (2 pts) (a) What “better-known”/simpler complexity class is equi…

(2 pts) (a) What “better-known”/simpler complexity class is equivalent to O(N log N2); briefly explain why. (b) Explain under what conditions sorted(set(l)) runs faster than set(sorted(l)) for a list l (they both produce the same answer); state the worst-case complexity class of each.

(a)

(b)

Expert Answer

Anonymous answered this
501 answers

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(a) The given complexity class is $O(n \log n^2)$. We can compute that $\log n^2 = 2 \log n$ and $n \log n^2 = 2n \log n$. Thus the complexity class $O(n \log n^2)$ is equivalent to the complexity class $O(n \log n)$.

(b) If the same elements appear more than once in l, then *set*(l) will eliminate the repeatations and then the number of elements will this get reduced. Running the *sorted* function will now take less time since the number of elements have decreased. On the other hand if we do the *sorted* function first, then it would operate on all the elements including the repetitions. Then when the *set* function is applied the repetitions will get deleted. This will take much longer time.

The worst case time complexity for both the classes is $O(n \log n)$ since the sorting takes $O(n \log n)$ time in the worst case and the set formation takes $O(n)$ time in the worst case.

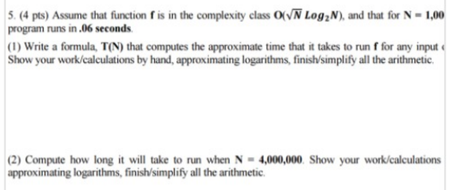
Comment

Up next for you in Computer Science

2. Assume that a function s is in the complexity class O(√N). (a) What is its doubling-signature: how much more time (by what factor) does it take to solve a problem twice as large (compute an actual number:

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 **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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Q: 1. In 1972, Intel's 8008 processor could execute 200,000 (200 thousand) instructions per second; at present, an Intel Core 2 processor can execute 3,200,000,000 (3.2 billion) instructions per second. Let's assume that we program the 8008 to run a fastO(N Log2 N) sorting algorithm, and program the Core 2 to run a slowO(N2)sorting algorithm. Assume the time to sort N values on the...

A: See answer 100% (1 rating)

Q: The following two functions each determine the distance between the two closest values in list 1, with len(1) = 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). a = set() for i in range (len(1)): for j in range (1en(1)): if...

A: See answer 100% (2 ratings)