Question: 5. (5 pts) Assume that function f is in the complexity class O(N (l...

python

n log n algorithms

5. (5 pts) Assume that function **f** is in the complexity class **O(N (log$_2$ N)^2)**, and that for **N = 1,000** the program runs in **10 seconds**.

(1) Write a formula, **T(N)** that computes the approximate time that it takes to run **f** for any input of size **N**. Show your work/calculations by hand, approximating logarithms, then finish/simplify all the arithmetic.

(2) Compute how long it will take to run when **N = 1,000,000** (which is also written **10^6**). Show your work/calculations by hand, approximating logarithms, finish/simplify all the arithmetic.

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Expert Answer

anonymous answered this
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$$T = k * n(log_2 n)^2$$

On putting n=1000 and T=6 we get

$$10 = k * 1000(log_2 1000)^2$$

$$k = 1.0006 * 10^{-4}$$

And Hence we get the formula

$$T = 1.0006 * 10^{-4} * n(log_2 n)^2$$

Q2

Hence on putting n=1000000

we get

$$T = 1.0006 * 10^{-4} * 10^6(log_2 10^6)^2$$

$$T = 39750.58$$

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Q: Assume that method m is in the complexity class O(N log_2 N), and that for N = 1,000 the program runs in 4 seconds. (a) write a formula, T(N) that computes the appoximate time that it takes to run m for any inout of size N. Show your work/calculations by hand, approximating logarithms, finish/simplify all the arithmetic. (b) Compute how long it will take to run when N = 1,000,00...

A: See answer 100% (1 rating)

Q: 5. (5 pts) Assume that function f is in the complexity class O(N (log2 N), and that for N = 1,000 the program runs in 10 seconds. (1) Write a formula, T(N) that computes the approximate time that it takes to run f for any input of size N. Show your work/calculations by hand, approximating logarithms, then finish/simplify all the arithmetic. (2) Compute how long it will take to run...

A: See answer 100% (3 ratings)

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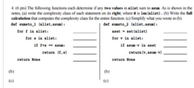
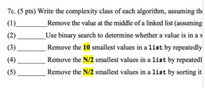
4. (6 pts) The following functions each determine if any two values in alist sum to asum. As is shown in the...



See answer

7c. (5 pts) Write the complexity class of each algorithm, assuming the required data structure stor...



See answer

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Q: Assume that function f is in the complexity class O(Squareroot N Log_2 N), and that for N = 1,000,000 the program runs in 06 seconds Write a formula, T(N) that computes the approximate time that it takes to run f for any input of size N. Show your work/calculations by hand, approximating logarithms, finish/simplify all the arithmetic. Compute how long it will take to run when N...

A: See answer 100% (3 ratings)

Q: Fill in the last line of the three empty rows, which shows the size of a problem can be solved in the same amount of time for each complexity class on a new machine that runs nine as fast as the old one. Solve by hand when you can, use Excel or a calculator when you must: I used a calculator only for O(N Log_2 N) and solved it to 3 significant digits. Solving a problem in the same...

A: See answer 100% (5 ratings)

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