Problem Set 1B

Your critique is due Tuesday, September 20 at 11:59PM.

Problem 1B-1. Proof Critique

Previous Proof. Previously on the 6.006, I only compare the asymptotic notation raguely.

Critique. Use different fucntion to transmite the inequel relation;

0.1 1-1

a.I need to compare f_1 with f_2 and f_3 with f_4. I only look at the oder of growth. Truly, $nlog(n) = O(n)$. But for function 1 and 2, since $lg^b(n) = O(n^a)$ for any postive a, $n^{0.9999999}log(n) = O(n^{0.9999999} \cdot n^{0.0000000001}) = O(n) = O(f_2)$;

c. the only trouble is f_1. $f_1 = 2^{\sqrt{n}log(n)}$.However, $f_2 = 2^n$, $f_3 = x^{\frac{n}{2}+10log(n)}$. So $f_3 = O(f_2)$, $f_1 = O(f_3)$. The Big-O notation of $f(n) = O(g(n))$ means some constant multiple of g(n) is the upper bound for f(n).

0.2 1-2

This problem ask to compute the recursive computational complexity.

a. expand the recursive tree to an geometric series, which is bounded by 2(x + y). Thus O(n) si the correct anwser.

b. almost the same procedure for 1-2(a);

c. solve the mutually recusive relation. $T(x, y) = O(x) + O(y/2) + T(x/2, y/2) = O(x + y) + T(x/2, y/2)$. Then the problem is reduced to problem 1-2 a;

0.3 1-3, Peak Finding

To deal with recursive algorithms, I need to look at problems more holistically, in other words, more complete and systematic instead of reduclistically.