

15-451 Algorithms, Fall 2003

Mini # 1

due: midnight September 2, 2003

This mini is due via *email* to your TA, by midnight Tuesday Sept 2. Please use the subject line "15-451 MINI #1" in your email.

1. An algorithm to factor positive integers takes as input a number N and outputs the prime factorization of N . Q: What is n , the size (length) of the input, as a function of N ?
2. For a pair of functions f and g , is it possible to have $f(n) = o(g(n))$ and $f(n) = \Theta(g(n))$? Why or why not?
3. For each pair $\langle f, g \rangle$ of functions below, list which of the following are true: $f(n) = o(g(n))$, $f(n) = \Theta(g(n))$, or $g(n) = o(f(n))$.
 - (a) $f(n) = 100n^2$, $g(n) = n^3$.
 - (b) $f(n) = (\lg n)^{\lg n}$, $g(n) = n^{\lg \lg n}$.
 - (c) $f(n) = 2^n$, $g(n) = 4^n$.