CPSC 289 Sec 502: Special Topics on Discrete Structures for Computing
Quiz 8
March 27, 2007

Printed Name: _____

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work. In particular, I certify that I have not received or given any assistance that is contrary to the letter or the spirit of the guidelines for this exam."

Signature: _____

The master theorem says: Suppose f is an increasing function such that $f(n) = a \cdot f(n/b) + c \cdot n^d$, where n is a power of b, $a > 1$ b is an integer greater than 1, c is a positive real number, d is a nonnegative real number, and $f(1)$ is $O(1)$. Then

- if $a < b^d$ then $f(n)$ is $O(n^d)$
- if $a = b^d$ then $f(n)$ is $O(n^d \log n)$
- if $a > b^d$ then $f(n)$ is $O(n^{\log_b a})$

1. (3 pts) Draw the tree diagram indicating the recursive calls. Be sure to indicate the number of children of each node, the depth of the tree, and the amount of nonrecursive work done at each node of the tree.

2. (2 pts) Suppose $f(n) = 3 \cdot f(n/4) + c \cdot n^2$. Use the master theorem to calculate the big-oh value of f. Show your work.