

CS 361, HW4

Prof. Jared Saia, University of New Mexico

Due: April 3rd, 2003

You are free to work with your group, or use any book or the web as a resource in doing this homework assignment. However, you must write up the work yourself.

1. Show $n * 2^n$ is $O(4^n)$
2. CLRS Problem 3-2 (You will find the approximation for $n!$ on page 55 of the text helpful)
3. CLRS Problem 3-3, part a) only, omit the four functions that contain terms with $lg*n$ in them.
4. CLRS Exercise 7.2-2
5. CLRS Exercise 7.2-3
6. Consider the recurrence $T(n) \leq T(99n/100) + T(n/100) + cn$. This is a recurrence for quicksort in an “unbalanced” case similar to the one we discussed in class.
 - (a) Use the recursion tree method to guess a tight upper bound (i.e. big-O) on the solution to this recurrence
 - (b) Now show this upper bound is correct by using proof by induction (and the substitution method)

(You may find it useful to refer to the analysis on pages 150-151 of the text)

7. Project proposal: Each group should email me a 2-3 paragraph description of the project they propose to do. Please email only one description per group. *Please email this to me by April 1st!*