

CSci 3501 Assignment 4
Due Friday, September 25 in class

Problem 1 (4 points). Use the substitution method to prove that the solution of $T(n) = 3T(\frac{n}{4}) + n$ is $O(n)$.

Problem 2 (10 points). Exercise 4-1 p. 85, parts a, b, c, d, e. Use the Master Theorem, show all your computations. If the Master Theorem is not applicable, please clearly explain why (you don't need to solve the problem in this case).

In your final result please do not compute the values of logarithms, i.e. leave expressions like $\log_2 7$ as is. The textbook section on logarithms on p. 53 gives helpful logarithms identities.

Problem 3 (4 points). Exercise 4-4 p. 86 part f. Hint: use a similar recurrence that **can** be solved by the Master Theorem to **estimate** the answer and then **prove** your answer using the substitution method. A bound that is correct, but not asymptotically tight, will get a partial credit.

Problem 4 (8 points). Exercises 7.1-1 p. 148, 7.2-3 and 7.2-4 p. 153. For 7.2-4 give the Θ approximation of the quicksort and insertion sort on the given kind of data and explain the approximations.