CS2500 Homework 2

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1.

2.

3.

4. **4.4-2**
   Use a recursion tree to determine a good asymptotic upper bound on the recurrence $T(n) = T(n/2) + n^2$. Use the substitution method to verify your answer.

5. **4.4-3**
   Use a recursion tree to determine a good asymptotic upper bound on the recurrence $T(n) = 4T(n/2+2)+n$. Use the substitution method to verify your answer.

6. **4.4-4**
   Use a recursion tree to determine a good asymptotic upper bound on the recurrence $T(n) = 2T(n-1) + 1$. Use the substitution method to verify your answer.

Give asymptotic upper and lower bounds for $T(n)$ in each of the following recurrences. Assume that $T(n)$ is constant for sufficiently small n. Make your bounds as tight as possible, and justify your answers.

7. **4-3a**
   $T(n) = 4T(n/3) + n\lg n$

8. **4-3h**
   $T(n) = T(n-1) + \lg n$