Midterm #1 Topics

Spring 2004

You are responsible for chapters 1 through 4 in the book (with less emphasis on section 4.4), as well as appendices A and B. Much of this material should be a review from your 101 class.
Here are the topics we have covered in lecture so far:

1. Problems, algorithms, instances,
2. Size measures on instances; worst-case, average-case, and best case analysis
3. Elementary operations, barameter instructions (using a basic operation as a proxy for the running time, like counting comparisions for sorting algorithms)
4. Facts and proofs,
5. Proofs by induction, and induction over structures.
6. c and n_0 style definitions of asymptotic notation (O, Ω, Θ, o), limit style implications with L'Hopital's rule.
7. Proving that an asymptotic relation holds (or not)
8. Implications between asymptotic relationships
9. Recurrences and the "guess and prove" technique
10. Bracketing recurrences and sums to get good bounds
11. The Master theorem, how to apply it, and its relationship to recursion trees.
12. Divide and conquer algorithms and their relationship to recurrences.
13. Functions and expressions in "closed form" (i.e. not using Summations, products, or integrals)