

Homework Assignment 1

This assignment is due by Tuesday January 27 (in class).
Assignments should be handed in *before the class begins*.

Please note: I would like to emphasize the process of analysis and writing of proofs. Please make sure to write clearly, and explain your arguments or line of thought as clearly as possible. If you do not know the answer for a particular question, explain what partial analysis you can make and/or how you can approach the problem.

Problem 1: Solve exercises 2.2-3, 2.2-4 (page 27), 2.3-5 (page 37), 3.1-4, 3.1-6 (page 50) in the textbook.

Problem 2: Solve problem 2-4 parts a,b,c (page 39) in the textbook.
You may want to solve part d as well but it is not required.

Problem 3: For each of the following claims, state whether it is true or false and prove your statement. (c is a constant independent of n .)

- $n^8 = \Omega(n^9)$
- $O(f(n)) * O(g(n)) = O(f(n) * g(n))$
- $f(n) = O(g(n))$ implies $2^{f(n)} = O(2^{g(n)})$
- $\binom{n}{c} = O(n^c)$ where $\binom{n}{c} = \frac{n!}{c!(n-c)!}$
- $\binom{n}{c} = \Omega(n^c)$