COMP 312
Assignment 3
Due at 9:00 am, Tuesday, October 6, 2009
All problems are of equal value.

Reading

Cormen, Leiserson, Rivest and Stein, Chapters 7 and 9 (also sections 2.3, 28.2, 33.4).

Practice

CLRS, 2.3-3, 2.3-5, 2-4, 7.2-1, 7.2-2, 7.2-3, 7.2-4, 7.4-1, 7.4-2, 7.4-3, 7-3, 7-5, 9.1-1, 9.1-2, 9.3-1...8, 9-1, 9-2, 9.3, 28.2-1, 28.2-2, 28.2-5, 28.2-6, 33.4-3, 33.4-4, 33.4-5, 33-3.

To Be Handed In

1. CLRS, 2.3-7
2. CLRS, 4-7 (c),(d),(e)
3. CLRS, 9.3-9
4. (a) CLRS, 28.2-3
   (b) CLRS, 28.2-4
5. Consider the problem of squaring an $n \times n$ matrix, i.e., computing A^2 given A. Show that one can square a 2×2 matrix using only five multiplications. If you could use this fact recursively to square an $n \times n$ matrix what would the running time of the resulting algorithm be? Why doesn't this work? Show that squaring a matrix is just as hard as multiplying two different matrices, i.e., show that if there is an algorithm that squares an $n \times n$ matrix in $\Theta(n^\alpha)$ time for some constant $\alpha \geq 2$ then there is a algorithm that multiplies two $n \times n$ matrices in $\Theta(n^\alpha)$ time.