Assignment 2.

Given Oct 6 2000, due Oct 17 2000.

(1) Do exercises 2.4, 2.8 and 2.10 of the textbook.

(2) Show that a Gaussian elimination with partial pivoting can be decomposed into the product of an upper triangular U, lower triangular M_n's and permutation P_n's. Then show that there exists a P such that $PA = LU$. (Hint: Does M_m commute with P_n? Ans: not quite, but almost)

(3) We showed in class that Cramer's rule is too expensive for solving linear system since it involves computing determinants. Give a CPU time estimate (you should refer to your estimate in problem 4 of homework 1) for computing the determinant the way we showed in class. Can you come up with a more effective algorithm for computing a determinant using the methods from Chapter 2?

(4) Give an operation count for Gaussian elimination for a banded $n \times n$ matrix with zero elements except the main diagonal, l subdiagonal and m superdiagonal entries next to the main diagonal. Here $l, m \ll n$.