Quiz #2 (Make-up)
Due roughly 45 minutes after starting

So many good methods, so little time

Answer all below questions. You may consult only the proctor. Submit all scratch paper and full, clear reasoning; this will help us give you partial credit.

1) Suppose we wish to find x such that $A\underline{x} = \underline{b}$, where

$$A = \begin{pmatrix} a_{11} & 0 & \cdots & \cdots & 0 \\ a_{21} & \ddots & \ddots & & \vdots \\ 0 & \ddots & \ddots & \ddots & \vdots \\ \vdots & \ddots & \ddots & \ddots & 0 \\ 0 & \cdots & 0 & a_{n,n-1} & a_{n,n} \end{pmatrix}$$

is nonsingular. Note that by flops we mean only additions, subtractions, multiplications and divisions.

a) Find the LU factorization of A, showing the formulae defining the entries of L and U, no pivoting necessary.

b) How much work does solving $LU\underline{x} = \underline{b}$ require, including the factorization?

c) Is this more efficient or less efficient than just straightforward solving of $A\underline{x} = \underline{b}$? I.e. If we do not factor A into LU but merely take advantage of A's structure, which is more efficient? Show flop counts to get full credit.