Math 477 — Homework Assignment 3, due Oct.12, 2006

1. Consider the matrices

$$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 0 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & 2 \\ 0 & 1 \\ 1 & 0 \end{bmatrix}$$

used on the previous homework.

   (a) Using any method you like, determine (on paper) a reduced QR factorization $A = \hat{Q}\hat{R}$ and a full QR factorization $A = QR$.

   (b) Again using any method you like, determine reduced and full QR factorizations $B = \hat{Q}\hat{R}$ and $B = QR$.

2. Apply the Gram-Schmidt process (on paper) to the three vectors $[3, 4, 0]^T$, $[1, 1, 1]^T$, and $[1, 2, 0]^T$.

3. Let A be an $m \times n$ matrix. Determine the *exact* number of floating point additions, subtractions, multiplications and divisions involved in performing the classical and modified Gram-Schmidt algorithms as listed in the classnotes.