Assignment for LU-Factorization

Section 3.5

From our text book; you must use the factorization and solve the linear system employing a forward, then back substitution.

Page 201 #4a, #6a, #7, #10a (do not use pivoting or any row interchanges on 10a)

Additional Exercises from Dr. Hill.

H1. Let $\mathbf{A} = \begin{bmatrix} 2 & 1 \\ 6 & -3 \end{bmatrix}$. Determine $\mathbf{L} = \begin{bmatrix} 1 & 0 \\ \mathbf{s} & 1 \end{bmatrix}$ and $\mathbf{U} = \begin{bmatrix} \mathbf{a} & \mathbf{b} \\ 0 & \mathbf{c} \end{bmatrix}$ so that $\mathbf{A} = \mathbf{L} * \mathbf{U}$ using only matrix multiplication.

H2. Let $\mathbf{A} = \begin{bmatrix} 4 & 1 & 0 \\ 1 & 4 & 1 \\ 0 & 1 & 4 \end{bmatrix}$. Determine $\mathbf{L} = \begin{bmatrix} \mathbf{a} & 0 & 0 \\ \mathbf{b} & \mathbf{c} & 0 \\ \mathbf{d} & \mathbf{e} & \mathbf{f} \end{bmatrix}$ and $\mathbf{U} = \begin{bmatrix} 1 & \mathbf{g} & \mathbf{h} \\ 0 & 1 & \mathbf{j} \\ 0 & 0 & 1 \end{bmatrix}$ so that $\mathbf{A} = \mathbf{L} * \mathbf{U}$ using only matrix multiplication.

H3. Find an LU-factorization of $\mathbf{A} = \begin{bmatrix} -1 & 2 & 3 \\ 2 & 1 & 1 \\ 5 & 0 & 2 \end{bmatrix}$. Use **partial pivoting and the pivot vector device**. Express **L** and **U** in pseudo triangular form.