1. Consider the following matrix A = $\begin{bmatrix} 1 & 1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$, A^TA has eigenvalues 3,1,0 with corresponding eigenvectors $[-1 \quad -2 \quad 1]^T$, $[1 \quad 0 \quad 1]^T$, and $[-1 \quad 1 \quad 1]^T$, compute the rank 1 approximation of A.

$\begin{bmatrix} 1/2 & 1 & -1/2 \\ -1/2 & -1 & 1/2 \end{bmatrix}$

2. Use the PLU decomposition to solve the following linear system Ax=b,

b = $\begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}$, A = $\begin{bmatrix} 0 & 1 & 4 \\ 1 & 2 & 2 \\ 3 & 1 & 3 \end{bmatrix}$

$\begin{bmatrix} -9/17 \\ 6/17 \\ 7/17 \end{bmatrix}$