1) In an "LU factorization", how would you describe "L" and "U"?

2) Why would anyone want to use an "LU factorization"?

3) Describe the "null space" of a matrix.

4) Find a space S in which the projection of $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ onto S is $\begin{bmatrix} 1 \\ 0 \\ 3 \end{bmatrix}$.