## PROJECT 2

Write a code that solves an $n \times n$ system by Gaussian elimination. Your program should solve the system $A\mathbf{x} = \mathbf{b}$ by (i) computing the LU factoraization of $A$, (ii) solving $L\mathbf{y} = \mathbf{b}$ by forward substitution and (iii) solving $U\mathbf{x} = \mathbf{y}$ by backward substitution. Define your solver as a function, which should work for any proper $A$ and $\mathbf{b}$.

Minimize the usage of memory. For example, you only need to store the nonzero entries of $L$ and $U$. Similar to Project 1, you can solve the sub problems by overwritng $\mathbf{b}$ for $\mathbf{y}$ and $\mathbf{x}$.

Use your code to solve the following example for verification:

$$\begin{bmatrix} 2 & 4 & 1 \\ 4 & 7 & 3 \\ 2 & 5 & 6 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ -4 \end{bmatrix}.$$

Matlab or Python is suggested. Email your code to `xlwan@math.lsu.edu` with the subject **math4064_Project_02**.