CMPSC 455 Project 1 Work:

# Project 1 Prompt:

* Study the LU factorization of a square matrix A of order n. Use the A=LU factorization method to solve a linear system of equations. Further, write computer programs using MATLAB or **C++** or python for this method, solve different systems of linear equations using your computer programs and show your results.

**Zach’s Proposed Algorithm Outline:**

* A variable storing the size of the n x n matrix.
* Three 2d arrays for coefficients of size n x n, representing the A, L, & U matrices.
* Three 1d arrays for the b, c, and x vectors.

1. Store the size of the n x n matrix in the corresponding variable.
2. Convert a System of Linear Equations into a matrix of coefficients
   1. Store coefficients in the corresponding locations of the “A” 2d array
   2. For now, I am going to request that the user inputs the coefficients on their own.
3. Store the values of the b vector in the “b” 1d array.
4. Use Gaussian Elimination on A
   1. Calculate mij as aij/ajj, i < j (?)
   2. Multiply each row i with the corresponding mij, repeating for each column except the last.
      1. Store the mij values used in the eliminations in the “L” 2d array.
      2. Set all diagonal values (aij where i = j) to 1.
   3. Store the resulting values of A into U, or use the A array as U.
5. Solve for the c vector using L and b.
6. Solve for the x vector using U and c.
7. Return values of x vector in the form “xn = #”
8. Request if the user desires to solve another matrix.