

LU Factorization (SIMPLE)

- 1) Ask the user to input a matrix. We will call it A. Has to be a squared matrix.
- 2) Now we take the size of matrix A and store in in a variable we will call n.
- 3) Next, we create 2 more matrices, we call them L and U. Matrices L and U need to have the following characteristics, they both need to be the same size as matrix A, all of the diagonal elements of L will be 1 and the rest will be 0. All the elements of U will be 0.
- 4) Next step is to create an auxiliary variable we will call M and its initial value is the same as A.
- 5) Show the user the zero-step printing the matrices L and U.
- 6) Now we will begin to execute the method.
 - a) we make a cycle for $i=1 < n-1$
 - (i) if a diagonal element $= 0$
 - (1) print "Method doesn't work, other method needed"
 - (2) for $j = i+1 < n$
 - (3) if element $M_{ji} \neq 0$, we then find the multipliers for the pivot. We will assign these as elements of L: $L_{ji} = M_{ji} / M_{ii}$
 - (ii) Now the row operation commences for the elements of the matrix that are below the element M_{ii} . Turning them all 0
 - (iii) End cycle j
 - b) Now we assign each element in row i of M and of row i in U and we add 1 to i so it can take the next element in the diagonal.
 - c) Print each step so the user can see the process.
 - d) End of cycle i
- 7) End of method