Math 451 Assignment 13, Spring 2014 **Due at 3 PM Tuesday, May 13th**

Take your **function** file `rr3` and modify it so that it takes in a square matrix A and gives out two matrices L and U, where L is lower triangular and U is upper triangular, and $LU = A$. Name the resulting file *yourfirstname_LU*. Here are a couple things to keep in mind:

- The function should have *TWO* outputs, the matrices L and U. When you run it you will only get one output, U. In order to see both outputs when you run it, you need to declare some variables to accept those values. Do this by using a statement in the command window like

  ```
  [X,Y]=gregg_LU(A)
  ```

  This would create a matrix X that is the the lower triangular matrix for A, and another matrix Y that is the upper triangular matrix. (Of course you can call them something other than X and Y, like L and U.)

- You need to have the procedure for determining an LU-factorization by hand well understood in order to create this function file.

There are more hints below that you can use if you wish, but it would be good for you to try it without them first.

- The output of `rr3` is the upper triangular matrix U, so you might want to do some renaming within your function to indicate this.

- Note that `rr3` initializes its output as the input matrix, which is still a good idea. You should initialize L as the appropriately sized identity matrix, and then you will replace the zeros in the lower left with the correct values.

- The lower part of L can be filled within the loop that is row-reducing A to U, using a single line. The location of that line relative to the one that is already there is important, so you might want to change that if you do something and it doesn't run.