```
function[L,U,P] = luFactor(A)
%
% Harvinder Singh Virk, MECH-105, Last Edited - 22-MAR-2018, Time:
 5:02 PM.
% { The lu function expresses a matrix A as the product of two
 essentially
% triangular matrices, one of them a permutation of a lower triangular
% matrix and the other an upper triangular matrix.
% The factorization is often called the LU, or sometimes the LR,
 factorization. A can be rectangular.}
% Inputs:
% A - coefficient matrix
% Outputs:
% L - lower triangular matrix
% U - upper triangular matrix
% P - the pivot matrix
%
[m,n] = size(A);
if m~=n
    error('It must be a square matrix')
end
U = A; % Making matrix U equal to matrix A.
P = eye(size(A));%
L = eye(size(A));
for j = (1:n-1)
    for i = (j+1:n)
        %pivoting
        [~,I] = max(abs(U(j:n,j))); % While pivoting finding the max
 of the desired column and all the rows of that column. It will also
 eliminate the previous rows when moves to the next column.
        I = I+(j-1); % storing the value of max. Indexing it.

        f = L(j, 1:j-1); %
        L(j, 1:j-1) = L(I, 1:j-1);
        L(I, 1:j-1) = f;

        f = U(j,j:n);
        U(j,j:n) = U(I,j:n);
        U(I,j:n) = f;

        f = P(j,:);
        jjs=P(I,:);
        P(j,:) = jjs;
        P(I,:) = f;



        L(j,j) =1;
        c = U(i,j)/U(j,j);
        L(i,j) = c;
        U(i,:) = U(i,:)-(c.*U(j,:));
```

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    end
end


end
```

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