1. Find the $A = LU$ decomposition (no pivoting), and output the matrix after every step of row operation. Note that MATLAB build-in `lu` does partial pivoting and produces much accurate decomposition.

\[
A = \begin{pmatrix}
2 & 1 & -1 \\
-2 & 0 & 3 \\
-4 & 1 & 11
\end{pmatrix}.
\]

Check the answer.

**Ans:**

\[
A = [2 \ 1 \ -1; \ -2 \ 0 \ 3; \ -4 \ 1 \ 11]
\]

Asave=A;

```
n=size(A,1);
for i=1:n-1,
  for j=i+1:n
    fprintf(['\texttt{Elim a(' num2str(j) ', ' num2str(i) ', ')\n}']);
    A(j,i)=A(j,i)/A(i,i);
    A(j,i+1:n)=A(j,i+1:n)-A(i,i+1:n)*A(j,i),
  end
end

% retrieve L and U from A
L=tril(A,-1)
L=L+eye(n)
U=triu(A)

% Check:
Asave -L*U
```

\[
L =
\begin{pmatrix}
1 & 0 & 0 \\
-1 & 1 & 0 \\
-2 & 3 & 1
\end{pmatrix}
\]

\[
U =
\begin{pmatrix}
2 & 1 & -1 \\
0 & 1 & 2 \\
0 & 0 & 3
\end{pmatrix}
\]

On-line computer lab: 4
Copy your program and output into the web page.

1. Find the $A = LU$ decomposition (no pivoting), and output the matrix after every step of row operation. Note that MATLAB build-in `lu` does partial pivoting ($PA = LU$) and produces much accurate decomposition.

\[
A = \begin{pmatrix}
3 & 1.5 & -1 \\
-27 & -12.5 & 11.736 \\
-6 & 1 & 15.944
\end{pmatrix}.
\]

Check the answer.