```matlab
clear
clc
close all

format short

%A = [2 8 4; 2 5 1; 4 10 -1]
A = input('Enter the matrix: ')
```

```
A = 3×3
     2     0     4
     9     2     3
     6     7     8
```

```matlab
%B = [3;4;5]
augA = [A eye(3)]
```

```
augA = 3×6
     2     0     4     1     0     0
     9     2     3     0     1     0
     6     7     8     0     0     1
```

```matlab
[s,c] = size(A)
```

```
s = 3
c = 3
```

```matlab
for idx = 1:s
    if abs(augA(idx,idx)) < 1e-2
        disp('Need to row swap = ')
        disp(num2str(idx))
        %Find a row to swap with
        for jdx = (idx+1):c
            if abs(augA(jdx,idx)) > 1e-2
                sw = jdx;
            end
        end
        if ~exist('sw','var')
            disp('Matrix probably singular')
        end
        disp('Swapping with row = ')
        disp(num2str(sw))
        %perform the swap
        temp_row = augA(sw,:); %saves the sw row
        augA(sw,:) = augA(idx,:);
        augA(idx,:) = temp_row;
        clear sw
    end
    augA(idx,:) = augA(idx,:)/augA(idx,idx)
    for jdx = 1:c
        if idx ~= jdx
            augA(jdx,:) = augA(jdx,:) - augA(idx,:)*augA(jdx,idx)
```

```
        end
      end
end
```

```
augA = 3×6
    1.0000         0    2.0000    0.5000         0         0
    9.0000    2.0000    3.0000         0    1.0000         0
    6.0000    7.0000    8.0000         0         0    1.0000
augA = 3×6
    1.0000         0    2.0000    0.5000         0         0
         0    2.0000  -15.0000   -4.5000    1.0000         0
    6.0000    7.0000    8.0000         0         0    1.0000
augA = 3×6
    1.0000         0    2.0000    0.5000         0         0
         0    2.0000  -15.0000   -4.5000    1.0000         0
         0    7.0000   -4.0000   -3.0000         0    1.0000
augA = 3×6
    1.0000         0    2.0000    0.5000         0         0
         0    1.0000   -7.5000   -2.2500    0.5000         0
         0    7.0000   -4.0000   -3.0000         0    1.0000
augA = 3×6
    1.0000         0    2.0000    0.5000         0         0
         0    1.0000   -7.5000   -2.2500    0.5000         0
         0    7.0000   -4.0000   -3.0000         0    1.0000
augA = 3×6
    1.0000         0    2.0000    0.5000         0         0
         0    1.0000   -7.5000   -2.2500    0.5000         0
         0         0   48.5000   12.7500   -3.5000    1.0000
augA = 3×6
    1.0000         0    2.0000    0.5000         0         0
         0    1.0000   -7.5000   -2.2500    0.5000         0
         0         0    1.0000    0.2629   -0.0722    0.0206
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
         0    1.0000   -7.5000   -2.2500    0.5000         0
         0         0    1.0000    0.2629   -0.0722    0.0206
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
         0    1.0000         0   -0.2784   -0.0412    0.1546
         0         0    1.0000    0.2629   -0.0722    0.0206
```

```
disp('Using Built in Inverse')
```

```
Using Built in Inverse
```

```
disp(inv(A))
```

```
   -0.0258    0.1443   -0.0412
   -0.2784   -0.0412    0.1546
    0.2629   -0.0722    0.0206
```

```
disp('Using Gaussian Elimination')
```

```
Using Gaussian Elimination
```

```
disp(augA(:,4:6))
```

```
   -0.0258    0.1443   -0.0412
   -0.2784   -0.0412    0.1546
    0.2629   -0.0722    0.0206
```

```matlab
fprintf("The determinant of %f", det(A))
```

```
The determinant of 194.000000
```

```matlab
%xcomputed_w_inv = inv(A)*B


%1st column
augA(1,:) = augA(1,:)/augA(1,1)
```

```
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
         0    1.0000         0   -0.2784   -0.0412    0.1546
         0         0    1.0000    0.2629   -0.0722    0.0206
```

```matlab
augA(2,:) = augA(2,:) - augA(1,:)*augA(2,1)
```

```
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
         0    1.0000         0   -0.2784   -0.0412    0.1546
         0         0    1.0000    0.2629   -0.0722    0.0206
```

```matlab
augA(3,:) = augA(3,:) - augA(1,:)*augA(3,1)
```

```
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
         0    1.0000         0   -0.2784   -0.0412    0.1546
         0         0    1.0000    0.2629   -0.0722    0.0206
```

```matlab
%%2nd column
augA(2,:) = augA(2,:)/augA(2,2)
```

```
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
         0    1.0000         0   -0.2784   -0.0412    0.1546
         0         0    1.0000    0.2629   -0.0722    0.0206
```

```matlab
augA(1,:) = augA(1,:) - augA(2,:)*augA(1,2)
```

```
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
         0    1.0000         0   -0.2784   -0.0412    0.1546
         0         0    1.0000    0.2629   -0.0722    0.0206
```

```matlab
augA(3,:) = augA(3,:)-augA(2,:)*augA(3,2)
```

```
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
         0    1.0000         0   -0.2784   -0.0412    0.1546
         0         0    1.0000    0.2629   -0.0722    0.0206
```

```matlab
%3rd column
augA(3,:) = augA(3,:)/augA(3,3)
```

```
augA = 3×6
    1.0000         0         0   -0.0258    0.1443   -0.0412
```

```
     0    1.0000         0   -0.2784   -0.0412    0.1546
     0         0    1.0000    0.2629   -0.0722    0.0206
```

augA(1,:) = augA(1,:) - augA(3,:)*augA(1,3)

augA = 3×6
```
  1.0000         0         0   -0.0258    0.1443   -0.0412
       0    1.0000         0   -0.2784   -0.0412    0.1546
       0         0    1.0000    0.2629   -0.0722    0.0206
```

augA(2,:) = augA(2,:)-augA(3,:)*augA(2,3)

augA = 3×6
```
  1.0000         0         0   -0.0258    0.1443   -0.0412
       0    1.0000         0   -0.2784   -0.0412    0.1546
       0         0    1.0000    0.2629   -0.0722    0.0206
```