Gaussian Elimination Algorithm
Original

Forward Elimination

for *k* = 1:*n* .....*The outer loop - this eliminates variable k*
  if $A_{k,k} = 0$
    Determine *l* such that $|A_{l,k}| = \max\{|A_{i,k}| : i \geq k\}$ .....*find the largest of the candidate pivots*
    if $A_{l,k}$ = 0.....*if the largest is zero, no possible pivot*
      warning ('Pivot in Gaussian Elimination is zero')and **stop**.....and maybe get out of here
    end
    swap $A_{k,k},...,A_{k,n}$ **with** $A_{l,k},...,A_{l,n}$ .....swap the rows to get the pivot into position
    swap b_k **with** b_l .....swap the corresponding right hand sides
  end
  for *i* = *k*+1:*n* .....*loop on the rows*
    $m = A_{i,k} / A_{k,k}$
    for *j* = *k*+1:*n*.....*loop on the columns – innermost loop*
      $A_{i,j} = A_{i,j} - mA_{k,j}$ .....update the i,j element
    end
    $b_i = b_i - mb_k$ ..... it's just like b was an extra column
  end
end

This results in the upper triangle of the eliminated system in the upper triangle of A.

Solving .....

for *i* = *n*:-1:1.....*here is where we solve the upper triangular system*

  for *j* = *i*+1:*n*.....
    $b_i = b_i - A_{i,j}x_j$ .....*this loop stores b(i) minus the summation A(i,j)*x(j) into b(i)*
  end.....
  $x_i = b_i / A_{i,i}$ .....*and divide by A(i,i) to get x(i)*
end

and the output is the solution x.