```
C      ,GGGGG       A       U     U    .sss     .sss
C     G            A A      U     U    *S.      *S.
C     G  **g      AaaaA     U     U       S        S
C      `GGGG'    A     A     u u u     ssS*     ssS*
C ---------------------------------------------------------------------
      PROGRAM GAUSS_ELIMINATION
      INCLUDE 'Gauss.inc'
C..
      open(33,FILE='Gauss.inp')
      open(34,FILE='Gauss.out')
      read(33,51) NN
51    format(I5,I5)
      if( NN .gt. 5000) then
        write(6,*)'Array size should be < 5000. Please correct input.'
        stop
      endif
C..
      do i = 1,NN
        read(33,*) (A(i,j), j = 1,NN+1)
      enddo
C..
      write(*,*)
      call GAUSS
C..
      write(34,*) 'The upper traingular matrix is: '
      do i = 1,NN
        write(34,12) (A(i,j), j = 1,NN+1)
  12    format(5x,6F10.2)
      enddo
C..
      write(34,*) 'The value of unknowns are: '
      write(34,13) (i, phi(i), i = 1,NN)
  13  format(I5,5x,F20.3)
C..
      close(33)
      close(34)
      stop
      end
C ---------------------------------------------------------------------
      subroutine GAUSS
      INCLUDE 'Gauss_Elimination.inc'
C ---------------------------------------------------------------------
C     Forward Elimination
      do k = 1,NN-1
        if (k .LT. NN) then
          p = k+1
        else
          p = k
        endif
C..
        do i = p,NN
          xkk = A(i,k) / A(k,k)
          do j = k, NN+1
            A(i,j) = A(i,j) - A(k,j) * xkk
```

```
          enddo
C..
        enddo
C..
      enddo
C..
C..   Backward Substitution to Calculate Unknown
      phi(NN) = A(NN,NN+1) / A(NN,NN)
      do i =  NN-1, 1, -1
        sum = 0.0
        do j = i+1, NN
          sum = sum + A(i,j)*phi(j)
        enddo
        phi(i) = (A(i,NN+1) - sum)/A(i,i)
      enddo
      return
      end
C ---------------------------------------------------------------------
C..   Example-1 for Testing the Program
C..   x  +  y  +  z =  6
C..   2x -  y  +  z =  3
C..   x  +  0  +  z =  4
C..   Solution: x=1, Y=2, z=3
C..   The matrix is
C..   1     1     1    6
C..   2    -1     1    3
C..   1     0     1    4
C ---------------------------------------------------------------------
C..   Example-1 for Testing the Program
C..
C..  -2   1   0   0   0    -800.0
C..   1  -4   1   0   0    -1600.0
C..   0   1  -4   2   0    -50.0
C..   0   0   1  -4   1    -850.0
C..   0   0   0   2  -4    -850.0
C..   Solution is: 741.56, 683.12, 390.91, 415.26, 420.13
```

```
IMPLICIT NONE
integer i,j,k,p,NN,N, N1
parameter (N = 5000)
parameter (N1 = 5001)
real A(N,N1), xkk, sum, phi(N)
common A, phi, NN
```