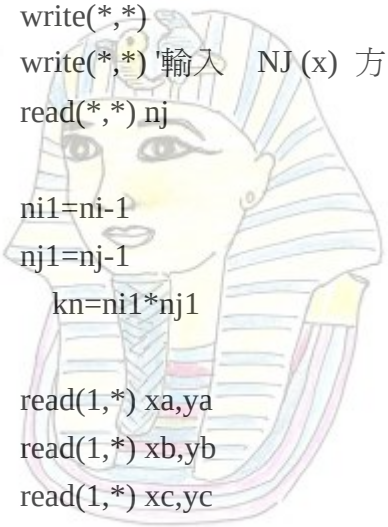
```
c       **** 輸入四個端點自動分割四點元素(等深海底) ****
c       modified 2000/6/13    逆時針

        parameter(nt1=1000,nt2=1000)

      real x(nt1,nt2),y(nt1,nt2),z(nt1,nt2),xx(nt1,nt2,4),yy(nt1,nt2,4),
     /       zz(nt1,nt2,4),a(nt1,nt2),xn(nt1,nt2),yn(nt1,nt2),zn(nt1,nt2)

        OPEN(UNIT=1,FILE='bottom.in')
        OPEN(UNIT=2,FILE='bottom_element.dat')
        OPEN(UNIT=3,FILE='bottom_normal.dat')
        OPEN(UNIT=4,FILE='bottom_node.dat')

        write(*,*) '輸入四個端點自動分割四點元素(平面)'
      write(*,*) '輸入  A,B,C,D  四個端點的座標'
      write(*,*)
      write(*,*) '輸    入    例'
      write(*,*)
      write(*,*)
      write(*,*) '    N'
      write(*,*) '    I'
      write(*,*) '    方  6 D---+---+---+---C'
      write(*,*) '    向  5 +---+---+---+---+'
      write(*,*) '    分  4 +---+---+---+---+'
      write(*,*) '    割  3 +---+---+---+---+'
      write(*,*) '    數  2 +---+---+---+---+'
      write(*,*) '    =    1 A---+---+---+---B'
      write(*,*) '    6'
      write(*,*) '           1     2     3     4     5'
      write(*,*) '    -->    '
      write(*,*) '           NJ (x)  方向分割數  = 5    '

        no=6
      write(*,*)
      write(*,*) '規則海底邊界面編號    no = 6'
      write(*,*)
      write(*,*) '輸入    z =const z  的座標'
      read(*,*) zconst
```

```
write(*,*)
write(*,*) '輸入　NI (y)  方向的座標數'
read(*,*) ni
write(*,*)
write(*,*)
write(*,*) '輸入　NJ (x)  方向的座標數'
read(*,*) nj

ni1=ni-1
nj1=nj-1
   kn=ni1*nj1

read(1,*) xa,ya
read(1,*) xb,yb
read(1,*) xc,yc
read(1,*) xd,yd

x(1,1)=xa
y(1,1)=ya
x(1,nj)=xb
y(1,nj)=yb
x(ni,nj)=xc
y(ni,nj)=yc
x(ni,1)=xd
y(ni,1)=yd

xab=(xb-xa)/nj1
yab=(yb-ya)/nj1
xbc=(xc-xb)/ni1
ybc=(yc-yb)/ni1
xcd=(xd-xc)/nj1
ycd=(yd-yc)/nj1
xda=(xa-xd)/ni1
yda=(ya-yd)/ni1

do j=2,nj1
x(1,j)=x(1,1)+xab*(j-1)
y(1,j)=y(1,1)+yab*(j-1)
```



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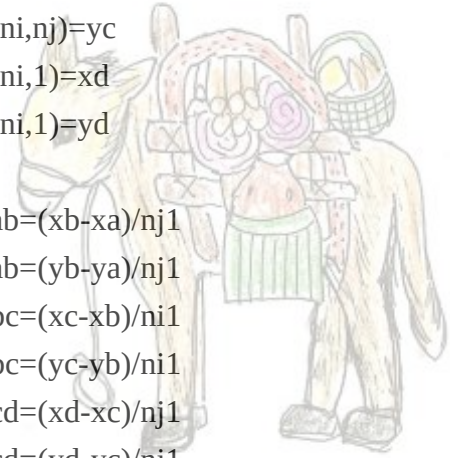

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```
end do

do i=2,ni1
x(i,nj)=x(1,nj)+xbc*(i-1)
y(i,nj)=y(1,nj)+ybc*(i-1)
end do

do j=2,nj1
jj=nj1+2-j
x(ni,jj)=x(ni,nj)+xcd*(j-1)
y(ni,jj)=y(ni,nj)+ycd*(j-1)
end do

do i=2,ni1
ii=ni1+2-i
x(ii,1)=x(ni,1)+xda*(i-1)
y(ii,1)=y(ni,1)+yda*(i-1)
end do
```

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```
   do i=2,ni1
do j=2,nj1
xij=(x(i,nj)-x(i,1))/nj1
yij=(y(i,nj)-y(i,1))/nj1
x(i,j)=x(i,1)+xij*(j-1)
y(i,j)=y(i,1)+yij*(j-1)
end do
end do

do ki=1,ni1
do kj=1,nj1

xx(ki,kj,1)=x(ki,kj)
xx(ki,kj,2)=x(ki,kj+1)
xx(ki,kj,3)=x(ki+1,kj+1)
xx(ki,kj,4)=x(ki+1,kj)

yy(ki,kj,1)=y(ki,kj)
yy(ki,kj,2)=y(ki,kj+1)
```

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```
yy(ki,kj,3)=y(ki+1,kj+1)
yy(ki,kj,4)=y(ki+1,kj)

   end do
end do

DO KI=1,NI
DO KJ=1,NJ
z(KI,KJ)=-zconst
END DO
END DO

   do ki=1,ni1
   do kj=1,nj1
do j=1,4
zz(ki,kj,j)=-zconst
end do
end do
end do

do ki=1,ni
do kj=1,nj
write(4,3) x(ki,kj),y(ki,kj),z(ki,kj),no,ki,kj
   end do
end do

do ki=1,ni1
do kj=1,nj1
write(2,4)((xx(ki,kj,j),yy(ki,kj,j),zz(ki,kj,j),no,ki,kj,j),j=1,4)
   end do
end do

   CALL normal(Xx,Yy,Zz,XN,YN,ZN,A,NT1,NT2,NI1,NJ1)

   do ki=1,ni1
do kj=1,nj1
write(3,2) xn(ki,kj),yn(ki,kj),zn(ki,kj),a(ki,kj),no,ki,kj
end do
```

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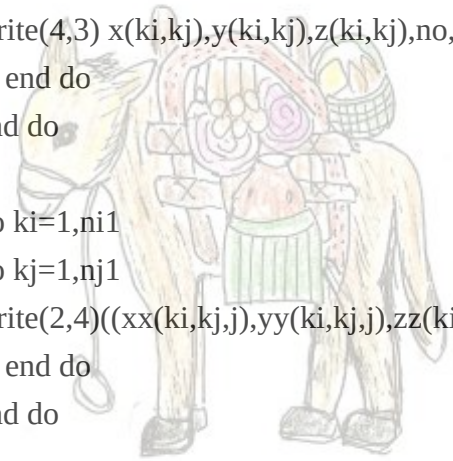

```
      end do
4     FORMAT(3F10.4,4i5)
3     FORMAT(3F10.4,3i5)
2     FORMAT(4F10.4,3i5)

      stop
      end

C*************************************************************
      SUBROUTINE normal(X,Y,Z,XN,YN,ZN,A,M,L,NI1,NJ1)
      REAL X(M,L,4),Y(M,L,4),Z(M,L,4),XN(M,L),YN(M,L),ZN(M,L),A(M,L)

      DO I=1,NI1
      DO J=1,NJ1
      R1=X(I,j,3)-X(I,J,1)
      R2=Y(I,J,3)-Y(I,J,1)
      R3=Z(I,J,3)-Z(I,J,1)
      R4=X(I,J,4)-X(I,J,2)
      R5=Y(I,J,4)-Y(I,J,2)
      R6=Z(I,J,4)-Z(I,J,2)
      R=SQRT((R5*R3-R6*R2)**2+(R6*R1-R4*R3)**2+(R4*R2-R5*R1)**2)

      XN(I,J)=(R5*R3-R6*R2)/R
      YN(I,J)=(R6*R1-R4*R3)/R
      ZN(I,J)=(R4*R2-R5*R1)/R

      T1=X(I,J,2)-X(I,J,1)
      T2=Y(I,J,2)-Y(I,J,1)
      T3=Z(I,J,2)-Z(I,J,1)
      T4=X(I,J,4)-X(I,J,1)
      T5=Y(I,J,4)-Y(I,J,1)
      T6=Z(I,J,4)-Z(I,J,1)

      R=.5*SQRT((T2*R3-T3*R2)**2+(T3*R1-T1*R3)**2+(T1*R2-T2*R1)**2)
      T=.5*SQRT((R2*T6-R3*T5)**2+(R3*T4-R1*T6)**2+(R1*T5-R2*T4)**2)
      A(I,J)=R+T
      END DO
      END DO
```

RETURN
END

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