```
c      **** 輸入四個端點自動分割四點元素(y_const 假想邊界平面) ****
c              modified 2000/6/13  逆時針


       parameter(nt1=100,nt2=10000)

     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='beach.in')
       OPEN(UNIT=2,FILE='beach_element.dat')
       OPEN(UNIT=3,FILE='beach_normal.dat')
       OPEN(UNIT=4,FILE='beach_node.dat')

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


       no=5
      write(*,*)
      write(*,*) '後壁邊界面編號   no = 5'
```
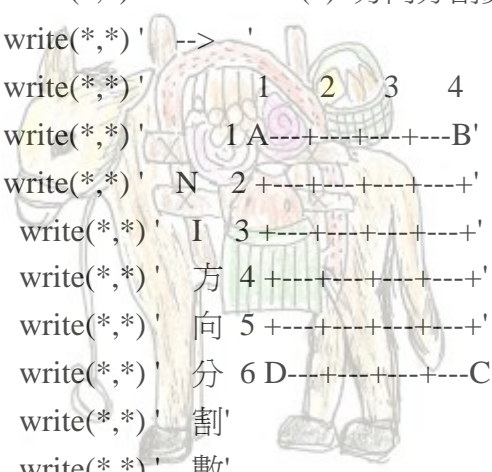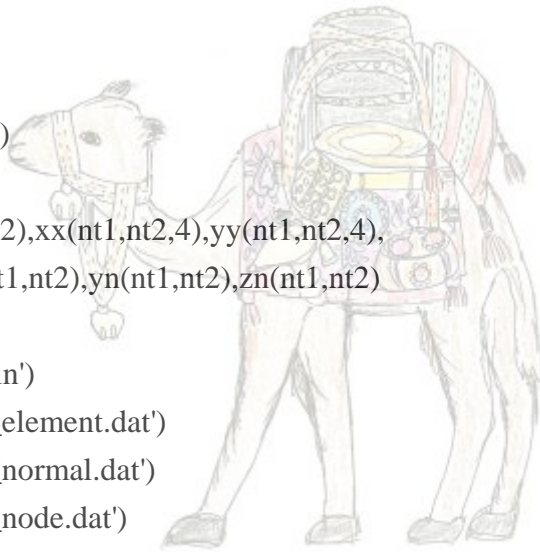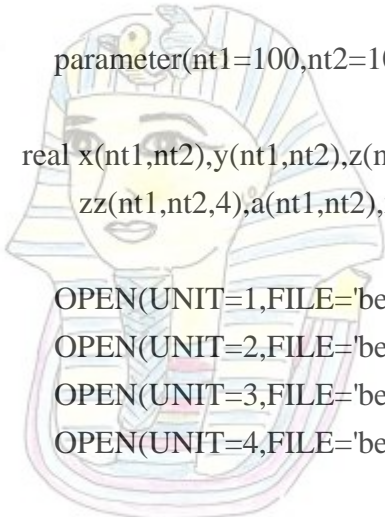
```fortran
write(*,*)
write(*,*) '輸入　y =const y 的座標'
read(*,*) yconst
write(*,*)
write(*,*) '輸入　NI (水深) 方向的座標數'
read(*,*) ni
write(*,*)
write(*,*)
write(*,*) '輸入　NJ (y) 方向的座標數'
read(*,*) nj

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

read(1,*) xa,za
read(1,*) xb,zb
read(1,*) xc,zc
read(1,*) xd,zd

x(1,1)=xa
z(1,1)=za
x(1,nj)=xb
z(1,nj)=zb
x(ni,nj)=xc
z(ni,nj)=zc
x(ni,1)=xd
z(ni,1)=zd

xab=(xb-xa)/nj1
zab=(zb-za)/nj1
xbc=(xc-xb)/ni1
zbc=(zc-zb)/ni1
xcd=(xd-xc)/nj1
zcd=(zd-zc)/nj1
xda=(xa-xd)/ni1
zda=(za-zd)/ni1
```

```
do j=2,nj1
x(1,j)=x(1,1)+xab*(j-1)
z(1,j)=z(1,1)+zab*(j-1)
end do


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

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


do i=2,ni1
ii=ni1+2-i
x(ii,1)=x(ni,1)+xda*(i-1)
z(ii,1)=z(ni,1)+zda*(i-1)
end do


    do i=2,ni1
do j=2,nj1
xij=(x(i,nj)-x(i,1))/nj1
zij=(z(i,nj)-z(i,1))/nj1
x(i,j)=x(i,1)+xij*(j-1)
z(i,j)=z(i,1)+zij*(j-1)
end do
end do

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


xx(ki,kj,1)=x(ki+1,kj)
xx(ki,kj,2)=x(ki+1,kj+1)
xx(ki,kj,3)=x(ki,kj+1)
xx(ki,kj,4)=x(ki,kj)
```
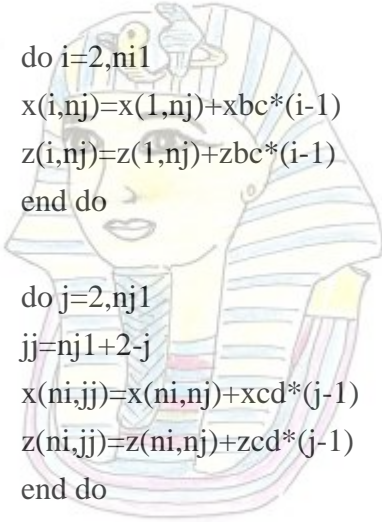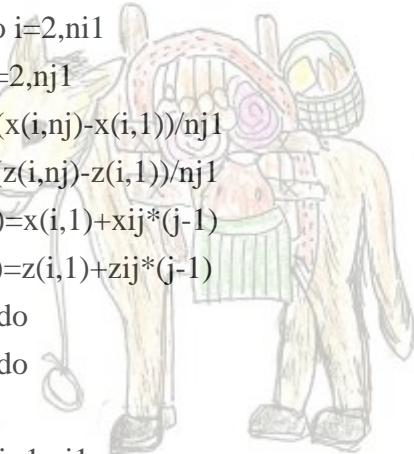
```fortran
zz(ki,kj,1)=z(ki+1,kj)
zz(ki,kj,2)=z(ki+1,kj+1)
zz(ki,kj,3)=z(ki,kj+1)
zz(ki,kj,4)=z(ki,kj)

   end do
end do

DO KI=1,NI
DO KJ=1,NJ
Y(KI,KJ)=YCONST
END DO
END DO

   do ki=1,ni1
   do kj=1,nj1
do j=1,4
yy(ki,kj,j)=yconst
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
```
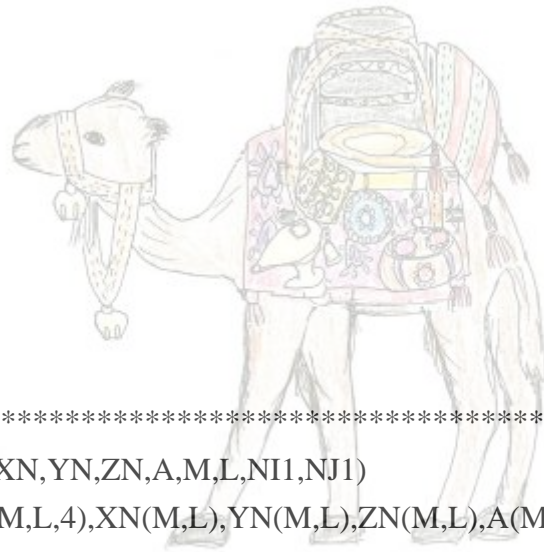
```fortran
      do kj=1,nj1
      write(3,2) xn(ki,kj),yn(ki,kj),zn(ki,kj),a(ki,kj),no,ki,kj
      end do
      end do
4     FORMAT(3F10.4,4i5)
3     FORMAT(3F10.4,3i5)
2     FORMAT(4F10.4,3i5)

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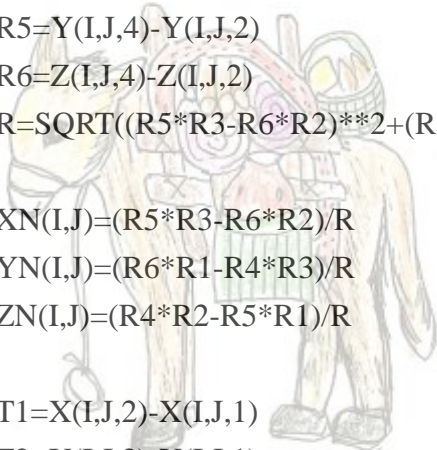
T=.5*SQRT((R2*T6-R3*T5)**2+(R3*T4-R1*T6)**2+(R1*T5-R2*T4)**2)
A(I,J)=R+T
END DO
END DO

RETURN
END

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