

! 2008/01/23 周宗仁
 SUBROUTINE G2_2D(H,G,X,Y,S,NP,ID,NT1,NT2)

! 計算[K]=[H]^G
 ! 使用 UNFORMATTED UNIT : 7,8,10
 ! 結果存放在 UNIT 10 ((H(I,J),J=1,NP)I=1,NP)



REAL X(NP),Y(NP),S(NP),H(NP,NP),G(NP,NP)

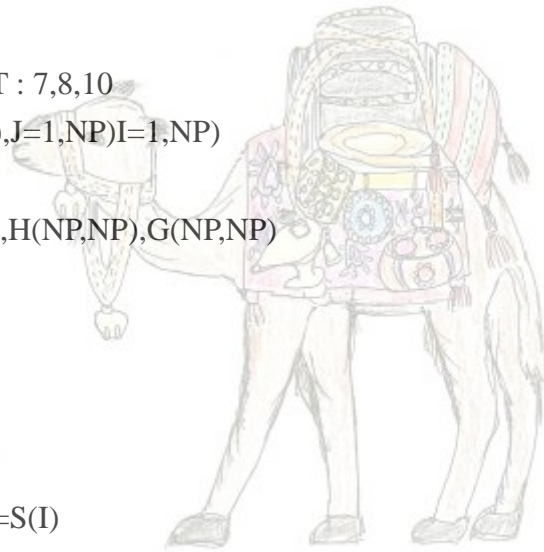
PAI=3.1415927

SMAX=S(1)

DO I=1,NP-ID

IF(S(I).GT.SMAX) SMAX=S(I)

END DO



載滿珠寶的駱駝

DO I=1,NP

INDEX=0

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XI=X(I)

YI=Y(I)

DO J=1,NP

J1=J-1

J2=J+1

XJ=X(J)

YJ=Y(J)



IF(J.EQ.1) THEN

XJ1=0

YJ1=0

ELSE

XJ1=X(J1)

YJ1=Y(J1)

END IF



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IF(J.EQ.NP) THEN

XJ2=0

YJ2=0

ELSE

XJ2=X(J2)

YJ2=Y(J2)

END IF

IF(J.EQ.1) R1=0

IF(J.NE.1) R1=SQRT((XJ1-XJ)**2+(YJ1-YJ)**2)

IF(J.EQ.NP) R2=0

IF(J.NE.NP) R2=SQRT((XJ2-XJ)**2+(YJ2-YJ)**2)

IF(XJ.EQ.XJ2.AND.YJ.EQ.YJ2) INDEX=INDEX+1

IF(R2.GT.SMAX) INDEX=INDEX+1

IF(J.EQ.1) SJ1 =0 2011 埃及尼羅河之旅

IF(J.NE.1) SJ1 =S(J-INDEX)

SJ2=S(J-INDEX)

IF(R2.EQ.0) SJ2=0

IF(R1.EQ.0) SJ1=0

IF(R2.GT.SMAX) SJ2=0

IF(R1.GT.SMAX) SJ1=0

IF(I.EQ.J) GO TO 31

CALL HG1(H1,G1,XI,YI,XJ2,YJ2,XJ,YJ,SJ2)

CALL HG2(H2,G2,XI,YI,XJ,YJ,XJ1,YJ1,SJ1)

GO TO 25

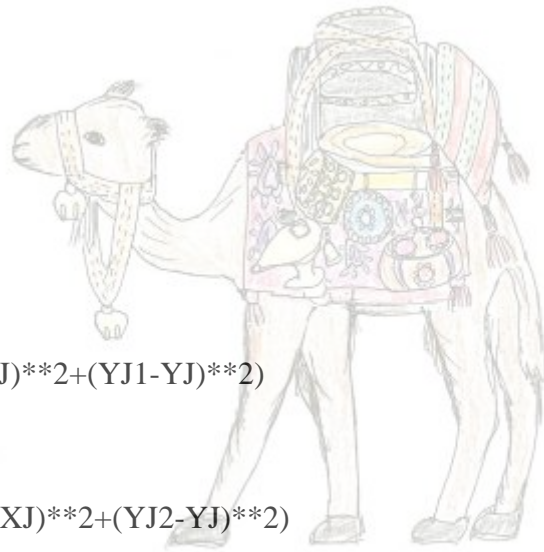
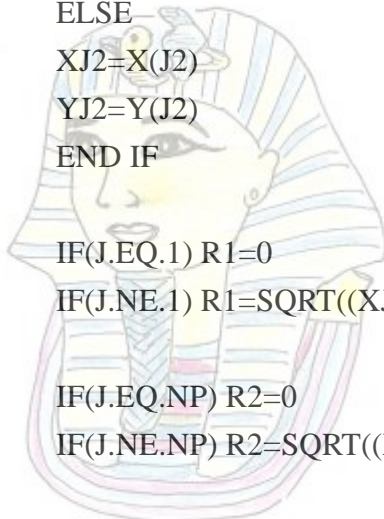
H1=0

H2=0

IF(SJ2.EQ.0) G1=0

IF(SJ2.NE.0) G1=SJ2/2/PAI*(3./4.-1./2.*ALOG(SJ2/2))

IF(SJ1.EQ.0) G2=0



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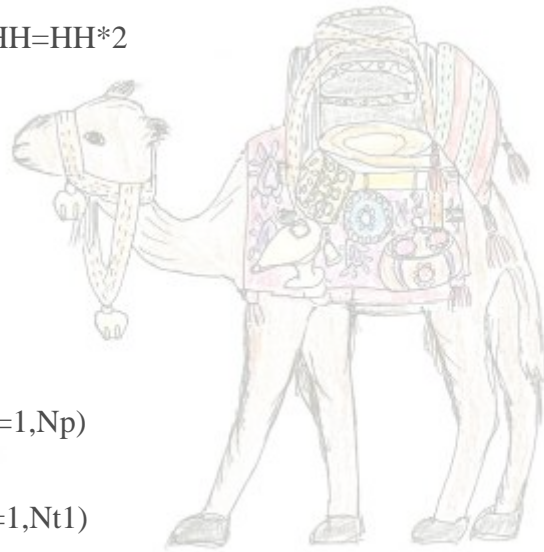
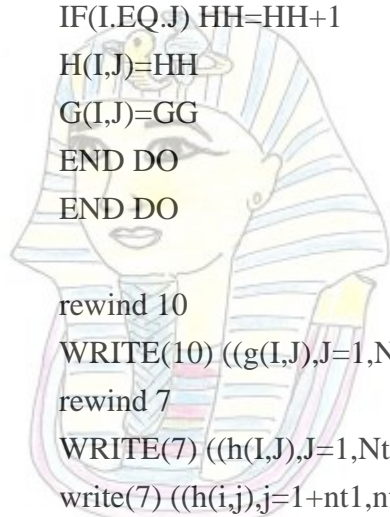


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IF(SJ1.NE.0) G2=SJ1/2/PAI*(5./4.-3./2.*ALOG(SJ1/2))
25  HH=H1+H2
    GG=G1+G2
    IF(R1.EQ.0.OR.R2.EQ.0) HH=HH*2

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```

IF(I.EQ.J) HH=HH+1
H(I,J)=HH
G(I,J)=GG
END DO
END DO

rewind 10
WRITE(10) ((g(I,J),J=1,Np),I=1,Np)
rewind 7
WRITE(7) ((h(I,J),J=1,Nt1),I=1,Nt1)
write(7) ((h(i,j),j=1+nt1,nt1+nt2),i=1,nt1)
write(7) ((h(i,j),j=1,nt1),i=1+nt1,nt1+nt2)
write(7) ((h(i,j),j=1+nt1,nt1+nt2),i=1+nt1,nt1+nt2)

```

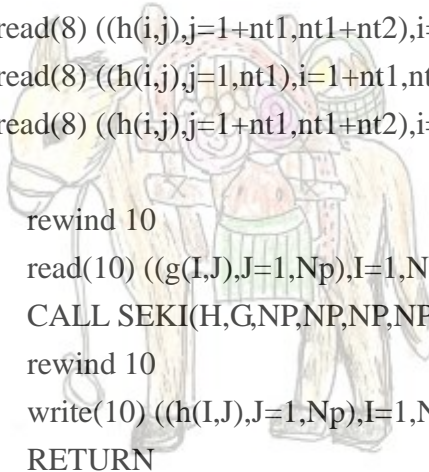
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call MIR2(h,g,Np,Nt1,Nt2,7,8) 及尼羅河之旅

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rewind 8
read(8) ((h(I,J),J=1,Nt1),I=1,Nt1)
read(8) ((h(i,j),j=1+nt1,nt1+nt2),i=1,nt1)
read(8) ((h(i,j),j=1,nt1),i=1+nt1,nt1+nt2)
read(8) ((h(i,j),j=1+nt1,nt1+nt2),i=1+nt1,nt1+nt2)

```



```

rewind 10
read(10) ((g(I,J),J=1,Np),I=1,Np)
CALL SEKI(H,G,NP,NP,NP,NP)
rewind 10
write(10) ((h(I,J),J=1,Np),I=1,Np)
RETURN
END

```

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載滿貨品的驢子

!*****

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SUBROUTINE HG1(H1,G1,XI,YI,XJ2,YJ2,XJ,YJ,SJ2)
IF(SJ2.EQ.0) GO TO 100
PAI=3.1415927

```

Z=.57735

X1=(XJ2+XJ)/2

X2=(XJ2-XJ)/2

Y1=(YJ2+YJ)/2

Y2=(YJ2-YJ)/2

XE1=X1+X2*(-Z)

YE1=Y1+Y2*(-Z)

XE2=X1+X2*Z

YE2=Y1+Y2*Z

X11=XE1-XI

Y11=YE1-YI

X22=XE2-XI

Y22=YE2-YI

RM1=SQRT(X11**2+Y11**2)

RM2=SQRT(X22**2+Y22**2)

A1=XI*2*Y2-YI*2*X2

A2=YJ*2*X2-XJ*2*Y2

AA=ABS(A1+A2)

BB=SQRT((2*Y2)**2+(2*X2)**2) 羅河之旅

RRP=AA/BB

C1=(XJ-XI)*(YJ2-YI)

D1=(XJ2-XI)*(YJ-YI)

IF(C1.LT.D1) RRP=-RRP

H1=-SJ2/4/PAI*(1.57735*RRP/RM1**2+.42265*RRP/RM2**2)

G1=-SJ2/4/PAI*(1.57735*ALOG(RM1)+.42265*ALOG(RM2))

GO TO 101

100 H1=0

G1=0

101 CONTINUE

RETURN

END

!*****

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SUBROUTINE HG2(H2,G2,XI,YI,XJ,YJ,XJ1,YJ1,SJ1)

IF(SJ1.EQ.0) GO TO 100

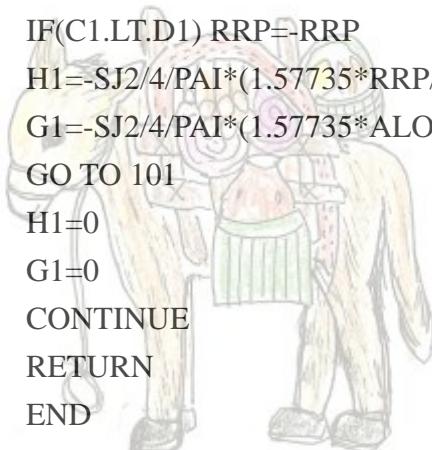
PAI=3.1415927

Z=.57735

X1=(XJ+XJ1)/2



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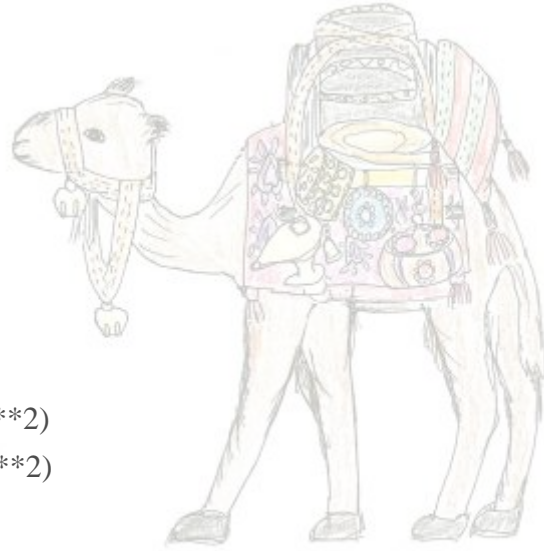


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X2=(XJ-XJ1)/2
Y1=(YJ+YJ1)/2
Y2=(YJ-YJ1)/2
XE1=X1+X2*(-Z)
YE1=Y1+Y2*(-Z)
XE2=X1+X2*Z
YE2=Y1+Y2*Z
X11=XE1-XI
Y11=YE1-YI
X22=XE2-XI
Y22=YE2-YI
RM1=SQRT(X11**2+Y11**2)
RM2=SQRT(X22**2+Y22**2)
A1=XI*2*Y2-YI*2*X2
A2=YJ1*2*X2-XJ1*2*Y2
AA=ABS(A1+A2)
BB=SQRT((2*Y2)**2+(2*X2)**2)
RRP=AA/BB

```



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C1=(XJ1-XI)*(YJ-YI) 011 埃及尼羅河之旅

D1=(XJ-XI)*(YJ1-YI)

IF(C1.LT.D1) RRP=-RRP

H2=-SJ1/4/PAI*(0.42265*RRP/RM1**2+1.57735*RRP/RM2**2)

G2=-SJ1/4/PAI*(0.42265*ALOG(RM1)+1.57735*ALOG(RM2))

GO TO 101

100 H2=0

G2=0

101 CONTINUE

RETURN

END

SUBROUTINE MIR2(A,B,Nx,N,NS,L,M)

C*****

C 計算 A(n+ns,n+ns)的逆矩陣 [A1]n,n [A2]n,ns 阿拉丁神燈 *

C A 存於 unit L,結果存於 unit M [A3]ns,n [A4]ns,ns *

c n ns *

c n A11 A12 *

c ns A21 A22 *

c *



```

C          [M1] = [ [A1] - [A2] [A4]^ [A3] ]^ , ^ 表示逆矩阵 *
C          [M3] = - [A4]^ [A3] [M1] *
C          [M4] = [ [A4] - [A3] [A1]^ [A2] ]^ *
C          [M2] = - [A1]^ [A2] [M4] *
C*****

```

```

REAL A(NX,NX),B(NX,NX)

REWIND L
READ(L) ((A(I,J),J=1,N ),I=1,N)
READ(L) ((A(I,J),J=1,NS),I=1,N)
READ(L) ((A(I,J),J=1,N ),I=1,NS)
READ(L) ((B(I,J),J=1,NS),I=1,NS)
CALL MINVS(B,NX,NS,1E-7,ILL)
ILLD=1

```

```

IF(ILL.NE.0) WRITE (6,10) ILLD,ILL
CALL SEKI(B,A,NX,NS,NS,N)

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```
REWIND 40
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```
WRITE(40) ((B(I,J),J=1,N),I=1,NS)
```

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BACKSPACE L      2011 埃及尼罗河之旅
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BACKSPACE L
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BACKSPACE L
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```
READ(L) ((A(I,J),J=1,NS),I=1,N)
```

```
CALL SEKI (A,B,NX,N,NS,N)
```

```
READ(L) ((B(I,J),J=1,N ),I=1,NS)
```

```
READ(L) ((B(I,J),J=1,NS),I=1,NS)
```

```
REWIND L
```

```
READ(L) ((B(I,J),J=1,N ),I=1,N )
```

```
CALL SA (B,A,NX,N,N)
```

```
CALL MINVS (A,NX,N,1E-7,ILL)
```

```
ILLD=2
```

```
IF(ILL.NE.0) WRITE (6,10) ILLD,ILL
```

```
READ(L) ((B(I,J),J=1,NS),I=1,N)
```

```
READ(L) ((B(I,J),J=1,N ),I=1,NS)
```

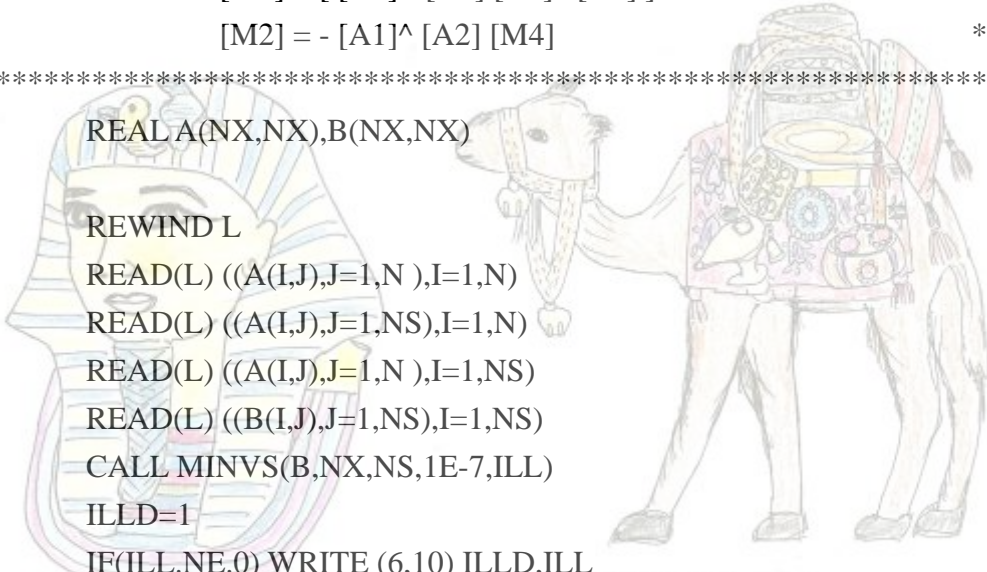
```
READ(L) ((B(I,J),J=1,NS),I=1,NS)
```

```
REWIND M
```

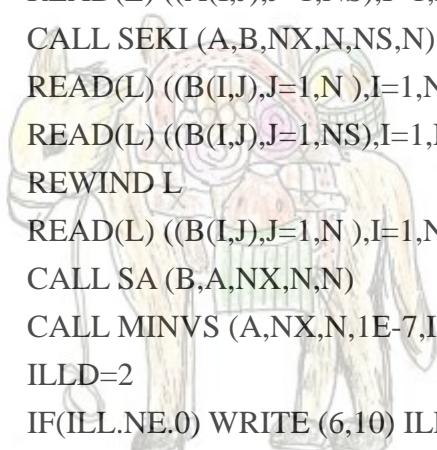
```
WRITE(M) ((A(I,J),J=1,N ),I=1,N)
```

```
REWIND 40
```

```
READ(40) ((B(I,J),J=1,N ),I=1,NS)
```



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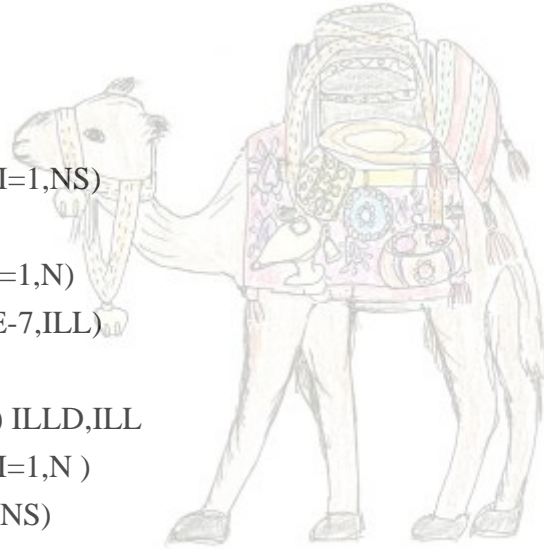
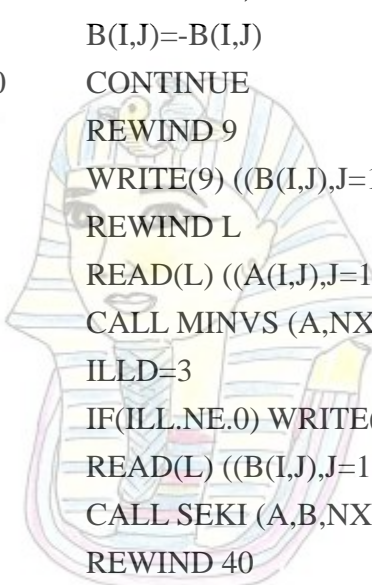


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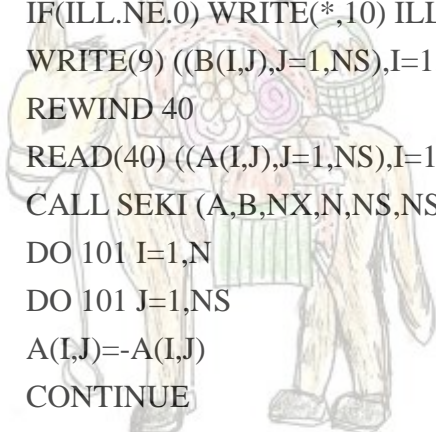
```

CALL SEKI (B,A,NX,NS,N,N)
DO 100 I=1,NS
DO 100 J=1,N
B(I,J)=-B(I,J)
100 CONTINUE
REWIND 9
WRITE(9) ((B(I,J),J=1,N ),I=1,NS)
REWIND L
READ(L) ((A(I,J),J=1,N ),I=1,N)
CALL MINVS (A,NX,N,1E-7,ILL)
ILLD=3
IF(ILL.NE.0) WRITE(*,10) ILLD,ILL
READ(L) ((B(I,J),J=1,NS),I=1,N)
CALL SEKI (A,B,NX,N,N,NS)
REWIND 40
WRITE(40) ((A(I,J),J=1,NS),I=1,N)
READ(L) ((B(I,J),J=1,N ),I=1,NS)
CALL SEKI (B,A,NX,NS,N,NS)
READ(L) ((A(I,J),J=1,NS),I=1,NS)
CALL SA (A,B,NX,NS,NS)
CALL MINVS (B,NX,NS,1E-7,ILL)
ILLD=4
IF(ILL.NE.0) WRITE(*,10) ILLD,ILL
WRITE(9) ((B(I,J),J=1,NS),I=1,NS)
REWIND 40
READ(40) ((A(I,J),J=1,NS),I=1,N)
CALL SEKI (A,B,NX,N,NS,NS)
DO 101 I=1,N
DO 101 J=1,NS
A(I,J)=-A(I,J)
101 CONTINUE
WRITE(M) ((A(I,J),J=1,NS),I=1,N)
REWIND 9
READ(9) ((A(I,J),J=1,N ),I=1,NS)
WRITE(M) ((A(I,J),J=1,N),I=1,NS)
READ(9) ((A(I,J),J=1,NS),I=1,NS)
WRITE(M) ((A(I,J),J=1,NS),I=1,NS)
10 FORMAT(1X,'ILL(',I1,')=' ,I7)

```



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RETURN

END

C*****

SUBROUTINE SEKI(A,B,M,NA,NK,NB)

REAL A(M,M),B(M,M),C(3000)

DO 100 I=1,NA

DO 101 K=1,NK

C(K)=A(I,K)

101 CONTINUE

DO 100 J=1,NB

R=0.

DO 102 K=1,NK

R=R+C(K)*B(K,J)

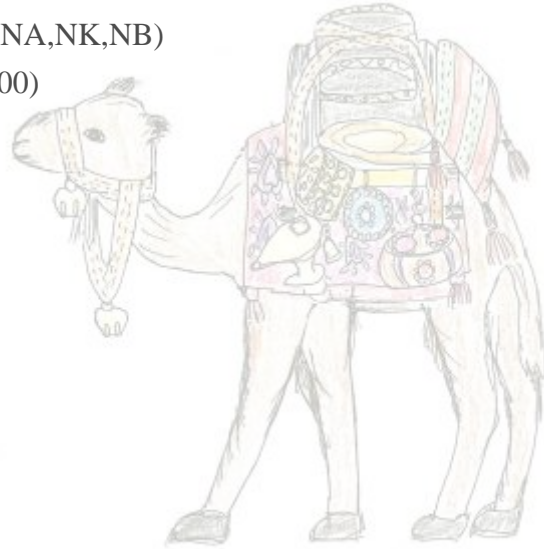
102 CONTINUE

A(I,J)=R

100 CONTINUE

RETURN

END



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SUBROUTINE MINVS(A,KO,N,EPS,ILL)

C*****

REAL A(KO,KO)

INTEGER X(3000)

LOGICAL B

ILL=0

IF((KO.GE.N).AND.(N.GE.2).AND.(N.LE.3000).AND.(EPS.GT.0.0))

/ GO TO 1

ILL=30000

RETURN

1 DO 10 I=1,N

X(I)=I

10 CONTINUE

DO 110 K=1,N

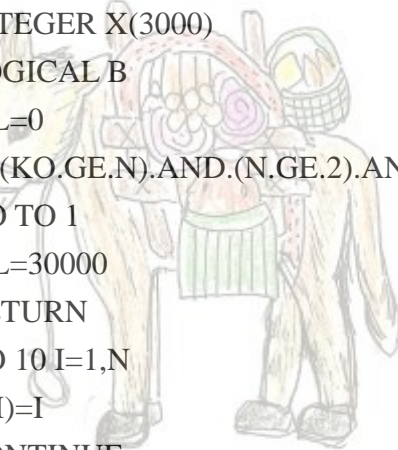
M=K

W=0.0

DO 20 I=K,N

ABSA=ABS(A(I,K))

IF(ABSA.LE.W) GO TO 20



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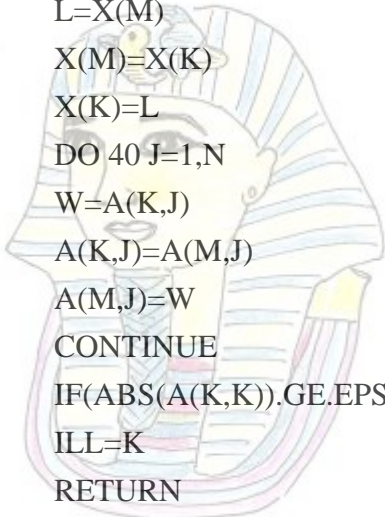


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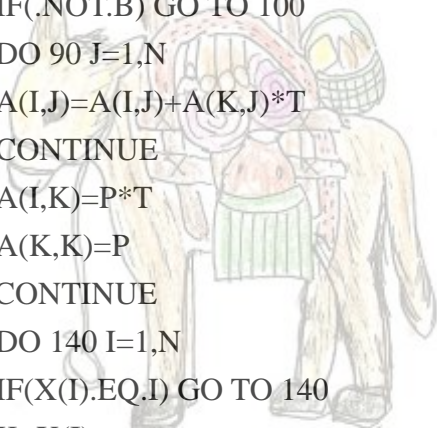
W=ABSA
M=I
20 CONTINUE
IF(M.EQ.K) GO TO 50
L=X(M)
X(M)=X(K)
X(K)=L
DO 40 J=1,N
W=A(K,J)
A(K,J)=A(M,J)
A(M,J)=W
40 CONTINUE
50 IF(ABS(A(K,K)).GE.EPS) GO TO 60
ILL=K
RETURN
60 P=1.0/A(K,K)
DO 70 J=1,N
A(K,J)=A(K,J)*P
70 CONTINUE
DO 100 I=1,N
T=-A(I,K)
B=(I.NE.K).AND.(T.NE.0.0)
IF(.NOT.B) GO TO 100
DO 90 J=1,N
A(I,J)=A(I,J)+A(K,J)*T
90 CONTINUE
100 A(I,K)=P*T
A(K,K)=P
110 CONTINUE
DO 140 I=1,N
120 IF(X(I).EQ.I) GO TO 140
K=X(I)
DO 130 J=1,N
W=A(J,I)
A(J,I)=A(J,K)
A(J,K)=W
130 CONTINUE
L=X(I)

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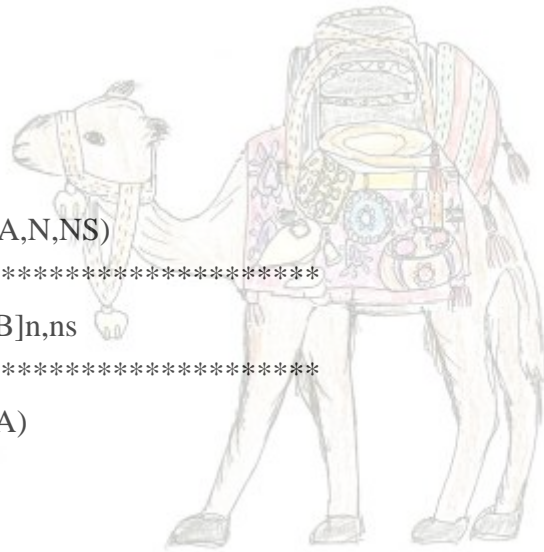
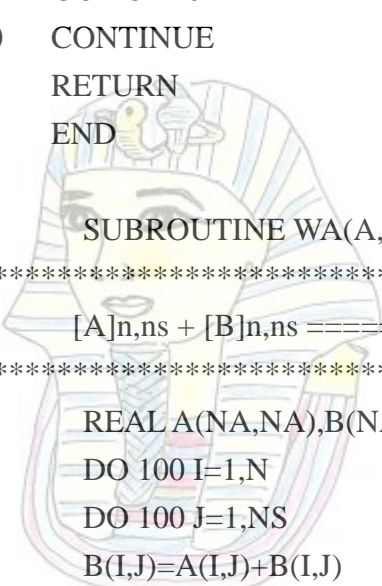
X(I)=X(K)
X(K)=L
GO TO 120
140 CONTINUE
RETURN
END

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SUBROUTINE WA(A,B,NA,N,NS)
C*****
C [A]n,ns + [B]n,ns =====> [B]n,ns
C*****
REAL A(NA,NA),B(NA,NA)
DO 100 I=1,N
DO 100 J=1,NS
B(I,J)=A(I,J)+B(I,J)
100 CONTINUE
RETURN
END

```



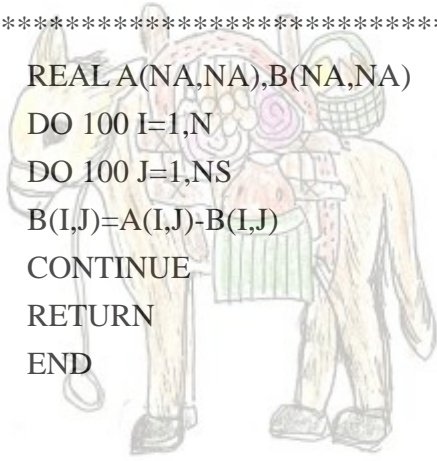
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SUBROUTINE SA(A,B,NA,N,NS)
C*****
C [A]n,ns - [B]n,ns =====> [B]n,ns
C*****
REAL A(NA,NA),B(NA,NA)
DO 100 I=1,N
DO 100 J=1,NS
B(I,J)=A(I,J)-B(I,J)
100 CONTINUE
RETURN
END

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