

```

c      n1      n2      n3      n4
c n1  A11      A12      A13      A14
c n2  A21      A22      A23      A24
c n3  A31      A32      A33      A34
c n4  A41      A42      A43      A44

```

```

c      4 x 4 部份矩陣的逆矩陣
c      依序將數據存入 unit 1,2,3,4

```

```

c      REWIND 1
c      WRITE(1) ((A(I,J),J=1,N1),I=1,N1)
c      WRITE(1) ((A(I,J),J=1,N2),I=1,N1)
c      WRITE(1) ((A(I,J),J=1,N1),I=1,N2)
c      WRITE(1) ((A(I,J),J=1,N2),I=1,N2)

```

```

c      REWIND 2
c      WRITE(2) ((A(I,J),J=1,N3),I=1,N1)
c      WRITE(2) ((A(I,J),J=1,N4),I=1,N1)
c      WRITE(2) ((A(I,J),J=1,N3),I=1,N2)
c      WRITE(2) ((A(I,J),J=1,N4),I=1,N2)

```

```

c      REWIND 3
c      WRITE(3) ((A(I,J),J=1,N3),I=1,N3)
c      WRITE(3) ((A(I,J),J=1,N4),I=1,N3)
c      WRITE(3) ((A(I,J),J=1,N3),I=1,N4)
c      WRITE(3) ((A(I,J),J=1,N4),I=1,N4)

```

```

c      REWIND 4
c      WRITE(4) ((A(I,J),J=1,N3),I=1,N3)
c      WRITE(4) ((A(I,J),J=1,N4),I=1,N3)
c      WRITE(4) ((A(I,J),J=1,N3),I=1,N4)
c      WRITE(4) ((A(I,J),J=1,N4),I=1,N4)

```

C*****

```

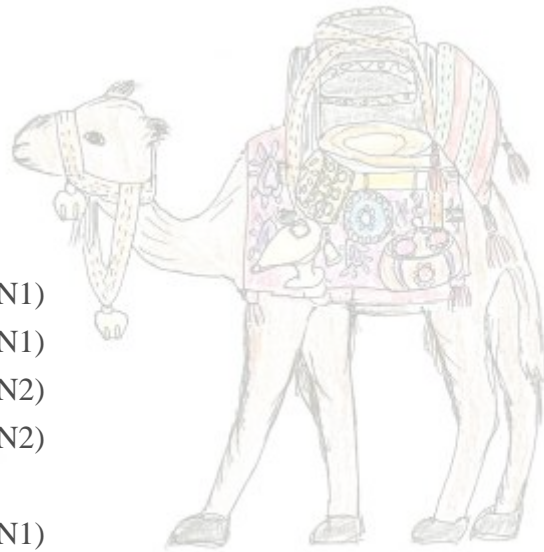
SUBROUTINE mir4(A,B,NX,N1,N2,N3,N4,I1,I2,I3,I4,I5,I6,I7,I8)
REAL A(NX,NX),B(NX,NX)

```

```

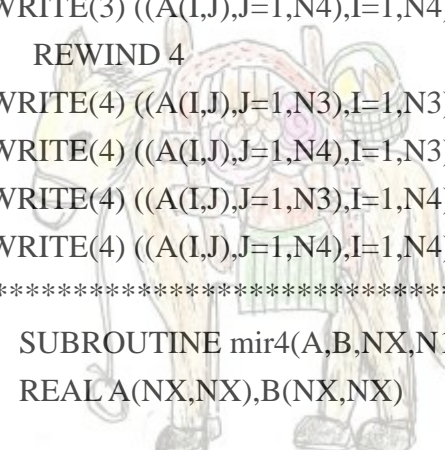
OPEN(UNIT=39,FILE='39.apr',FORM='UNFORMATTED',status='UNKNOWN')
OPEN(UNIT=42,FILE='42.apr',FORM='UNFORMATTED',status='UNKNOWN')
OPEN(UNIT=43,FILE='43.apr',FORM='UNFORMATTED',status='UNKNOWN')
OPEN(UNIT=44,FILE='44.apr',FORM='UNFORMATTED',status='UNKNOWN')
OPEN(UNIT=45,FILE='45.apr',FORM='UNFORMATTED',status='UNKNOWN')
OPEN(UNIT=46,FILE='46.apr',FORM='UNFORMATTED',status='UNKNOWN')

```



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c D11
 CALL mir2(A,B,NX,N3,N4,I4,42)
 CALL mtr2(A,B,NX,N3,N4,N3,N4,N1,N2,42,I3,43)
 CALL mtr2(A,B,NX,N1,N2,N3,N4,N1,N2,I2,43,42)
 CALL sa2 (A,B,NX,N1,N2,N1,N2,I1,42,44)
 CALL mir2(A,B,NX,N1,N2,44,I5)

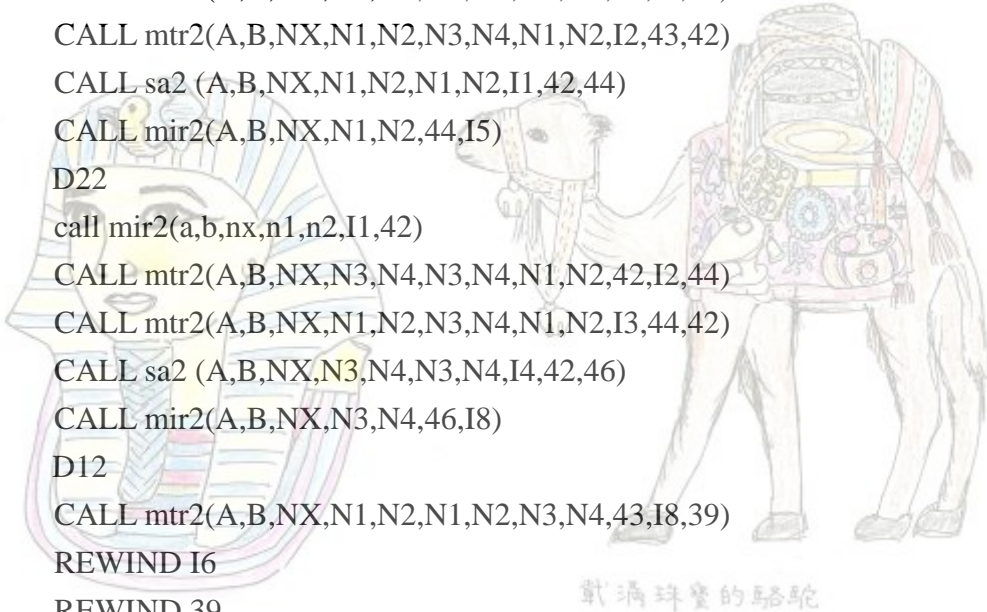
c D22
 call mir2(a,b,nx,n1,n2,I1,42)
 CALL mtr2(A,B,NX,N3,N4,N3,N4,N1,N2,42,I2,44)
 CALL mtr2(A,B,NX,N1,N2,N3,N4,N1,N2,I3,44,42)
 CALL sa2 (A,B,NX,N3,N4,N3,N4,I4,42,46)
 CALL mir2(A,B,NX,N3,N4,46,I8)

c D12
 CALL mtr2(A,B,NX,N1,N2,N1,N2,N3,N4,43,I8,39)
 REWIND I6
 REWIND 39

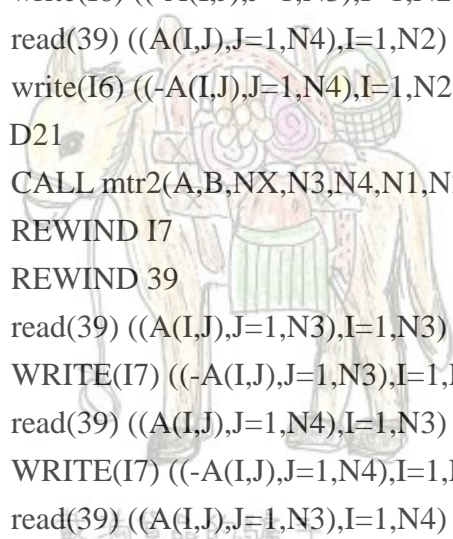
read(39) ((A(I,J),J=1,N3),I=1,N1)
 write(I6) ((-A(I,J),J=1,N3),I=1,N1)
 read(39) ((A(I,J),J=1,N4),I=1,N1)
 write(I6) ((-A(I,J),J=1,N4),I=1,N1)
 read(39) ((A(I,J),J=1,N3),I=1,N2)
 write(I6) ((-A(I,J),J=1,N3),I=1,N2)
 read(39) ((A(I,J),J=1,N4),I=1,N2)
 write(I6) ((-A(I,J),J=1,N4),I=1,N2)

c D21
 CALL mtr2(A,B,NX,N3,N4,N1,N2,N1,N2,44,5,39)
 REWIND I7
 REWIND 39
 read(39) ((A(I,J),J=1,N3),I=1,N3)
 WRITE(I7) ((-A(I,J),J=1,N3),I=1,N3)
 read(39) ((A(I,J),J=1,N4),I=1,N3)
 WRITE(I7) ((-A(I,J),J=1,N4),I=1,N3)
 read(39) ((A(I,J),J=1,N3),I=1,N4)
 WRITE(I7) ((-A(I,J),J=1,N3),I=1,N4)
 read(39) ((A(I,J),J=1,N4),I=1,N4)
 WRITE(I7) ((-A(I,J),J=1,N4),I=1,N4)

CLOSE(39)



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CLOSE(42)

CLOSE(43)

CLOSE(44)

CLOSE(45)

CLOSE(46)

return

end

c*****

SUBROUTINE mtr4(A,B,NX,N1,N2,N3,N4,

/ I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11,I12)

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

OPEN(UNIT=42,FILE='42.apr',FORM='UNFORMATTED',status='UNKNOWN')

OPEN(UNIT=43,FILE='43.apr',FORM='UNFORMATTED',status='UNKNOWN')

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CALL mtr2(A,B,NX,N1,N2,N1,N2,N1,N2,I1,I5,42)

CALL mtr2(A,B,NX,N1,N2,N3,N4,N1,N2,I2,I7,43)

CALL Wa2 (A,B,NX,N1,N2,N1,N2,42,43,I9)

CALL mtr2(A,B,NX,N1,N2,N1,N2,N3,N4,I1,I6,42)

CALL mtr2(A,B,NX,N1,N2,N3,N4,N3,N4,I2,I8,43)

CALL Wa2 (A,B,NX,N1,N2,N3,N4,42,43,I10)

CALL mtr2(A,B,NX,N3,N4,N1,N2,N1,N2,I3,I5,42)

CALL mtr2(A,B,NX,N3,N4,N3,N4,N1,N2,I4,I7,43)

CALL Wa2 (A,B,NX,N3,N4,N1,N2,42,43,I11)

CALL mtr2(A,B,NX,N3,N4,N1,N2,N3,N4,I3,I6,42)

CALL mtr2(A,B,NX,N3,N4,N3,N4,N3,N4,I4,I8,43)

CALL Wa2 (A,B,NX,N3,N4,N3,N4,42,43,I12)

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CLOSE(42) 載滿貨品的驢子

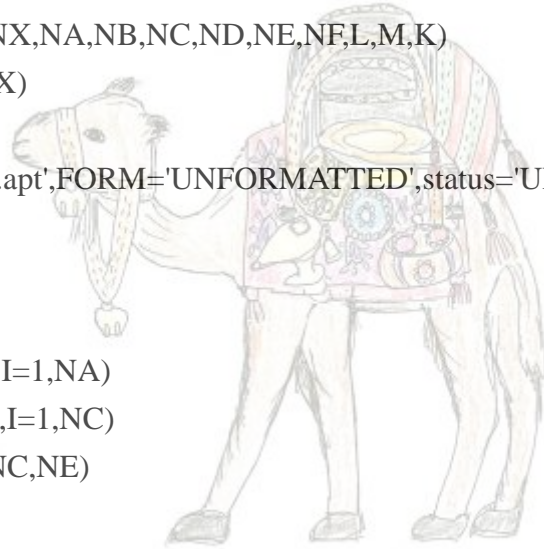
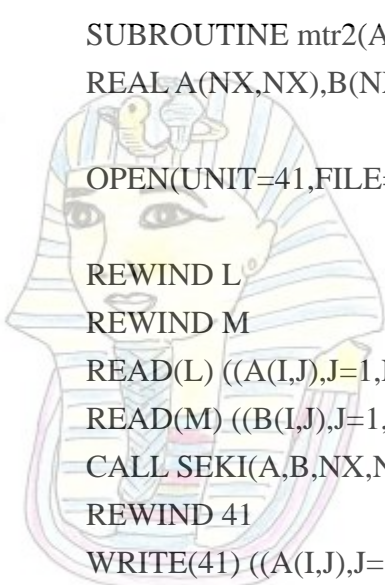
CLOSE(43)

return

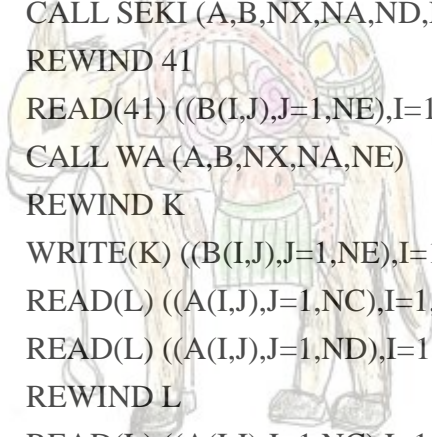
end

C CAUTION : FILE UNIT 40,41, ARE REQUIRED

```
SUBROUTINE mtr2(A,B,NX,NA,NB,NC,ND,NE,NF,L,M,K)
REAL A(NX,NX),B(NX,NX)
OPEN(UNIT=41,FILE='41.apf',FORM='UNFORMATTED',status='UNKNOWN')
REWIND L
REWIND M
READ(L) ((A(I,J),J=1,NC),I=1,NA)
READ(M) ((B(I,J),J=1,NE),I=1,NC)
CALL SEKI(A,B,NX,NA,NC,NE)
REWIND 41
WRITE(41) ((A(I,J),J=1,NE),I=1,NA)
BACKSPACE L
READ(L) ((A(I,J),J=1,NC),I=1,NA)
READ(M) ((B(I,J),J=1,NF),I=1,NC)
CALL SEKI(A,B,NX,NA,NC,NF)
WRITE(41) ((A(I,J),J=1,NF),I=1,NA)
READ(L) ((A(I,J),J=1,ND),I=1,NA)
READ(M) ((B(I,J),J=1,NE),I=1,ND)
CALL SEKI(A,B,NX,NA,ND,NE)
REWIND 41
READ(41) ((B(I,J),J=1,NE),I=1,NA)
CALL WA(A,B,NX,NA,NE)
REWIND K
WRITE(K) ((B(I,J),J=1,NE),I=1,NA)
READ(L) ((A(I,J),J=1,NC),I=1,NB)
READ(L) ((A(I,J),J=1,ND),I=1,NB)
REWIND L
READ(L) ((A(I,J),J=1,NC),I=1,NA)
READ(L) ((A(I,J),J=1,ND),I=1,NA)
READ(M) ((B(I,J),J=1,NF),I=1,ND)
CALL SEKI(A,B,NX,NA,ND,NF)
READ(41) ((B(I,J),J=1,NF),I=1,NA)
CALL WA(A,B,NX,NA,NF)
WRITE(K) ((B(I,J),J=1,NF),I=1,NA)
```



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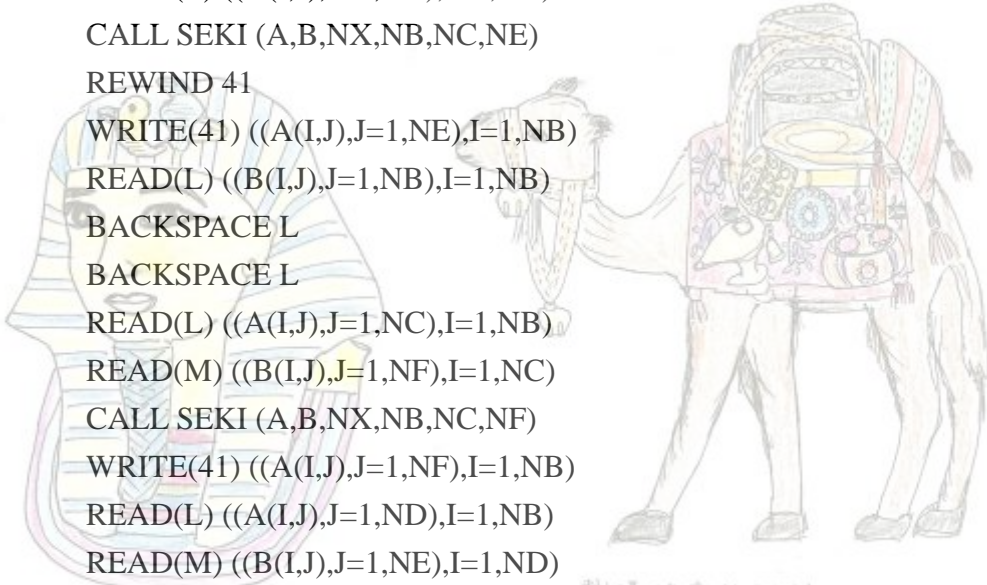


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```

REWIND M
READ(M) ((B(I,J),J=1,NE),I=1,NC)
READ(L) ((A(I,J),J=1,NC),I=1,NB)
CALL SEKI (A,B,NX,NB,NC,NE)
REWIND 41
WRITE(41) ((A(I,J),J=1,NE),I=1,NB)
READ(L) ((B(I,J),J=1,NB),I=1,NB)
BACKSPACE L
BACKSPACE L
READ(L) ((A(I,J),J=1,NC),I=1,NB)
READ(M) ((B(I,J),J=1,NF),I=1,NC)
CALL SEKI (A,B,NX,NB,NC,NF)
WRITE(41) ((A(I,J),J=1,NF),I=1,NB)
READ(L) ((A(I,J),J=1,ND),I=1,NB)
READ(M) ((B(I,J),J=1,NE),I=1,ND)
CALL SEKI (A,B,NX,NB,ND,NE)

```



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```

REWIND 41
READ(41) ((B(I,J),J=1,NE),I=1,NB)
CALL WA (A,B,NX,NB,NE) 及尼羅河之旅
WRITE(K) ((B(I,J),J=1,NE),I=1,NB)
BACKSPACE L
READ(L) ((A(I,J),J=1,ND),I=1,NB)
READ(M) ((B(I,J),J=1,NF),I=1,ND)
CALL SEKI (A,B,NX,NB,ND,NF)
READ(41) ((B(I,J),J=1,NF),I=1,NB)
CALL WA (B,A,NX,NB,NF)
WRITE(K) ((A(I,J),J=1,NF),I=1,NB)

```

```

CLOSE(41)
RETURN
END

```

載滿貨品的驢子



阿拉丁神燈

C*****

```

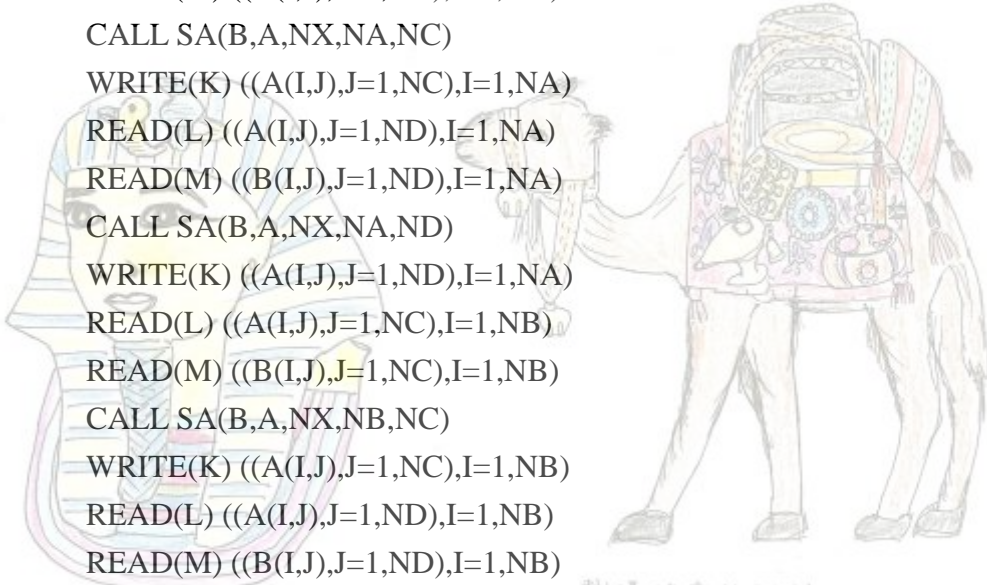
SUBROUTINE sa2 (A,B,NX,NA,NB,NC,ND,L,M,K)
REAL A(NX,NX),B(NX,NX)
REWIND L
REWIND M

```

```

REWIND K
READ(L) ((A(I,J),J=1,NC),I=1,NA)
READ(M) ((B(I,J),J=1,NC),I=1,NA)
CALL SA(B,A,NX,NA,NC)
WRITE(K) ((A(I,J),J=1,NC),I=1,NA)
READ(L) ((A(I,J),J=1,ND),I=1,NA)
READ(M) ((B(I,J),J=1,ND),I=1,NA)
CALL SA(B,A,NX,NA,ND)
WRITE(K) ((A(I,J),J=1,ND),I=1,NA)
READ(L) ((A(I,J),J=1,NC),I=1,NB)
READ(M) ((B(I,J),J=1,NC),I=1,NB)
CALL SA(B,A,NX,NB,NC)
WRITE(K) ((A(I,J),J=1,NC),I=1,NB)
READ(L) ((A(I,J),J=1,ND),I=1,NB)
READ(M) ((B(I,J),J=1,ND),I=1,NB)
CALL SA(B,A,NX,NB,ND)
WRITE(K) ((A(I,J),J=1,ND),I=1,NB)
RETURN
END

```



載滿珠寶的駱駝

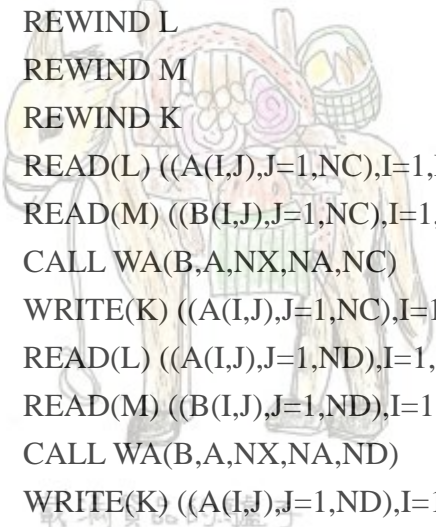
2011 埃及尼羅河之旅

C*****

```

SUBROUTINE Wa2 (A,B,NX,NA,NB,NC,ND,L,M,K)
REAL A(NX,NX),B(NX,NX)
REWIND L
REWIND M
REWIND K
READ(L) ((A(I,J),J=1,NC),I=1,NA)
READ(M) ((B(I,J),J=1,NC),I=1,NA)
CALL WA(B,A,NX,NA,NC)
WRITE(K) ((A(I,J),J=1,NC),I=1,NA)
READ(L) ((A(I,J),J=1,ND),I=1,NA)
READ(M) ((B(I,J),J=1,ND),I=1,NA)
CALL WA(B,A,NX,NA,ND)
WRITE(K) ((A(I,J),J=1,ND),I=1,NA)
READ(L) ((A(I,J),J=1,NC),I=1,NB)
READ(M) ((B(I,J),J=1,NC),I=1,NB)
CALL WA(B,A,NX,NB,NC)
WRITE(K) ((A(I,J),J=1,NC),I=1,NB)
READ(L) ((A(I,J),J=1,ND),I=1,NB)

```



阿拉丁神燈

```

READ(M) ((B(I,J),J=1,ND),I=1,NB)
CALL WA(B,A,NX,NB,ND)
WRITE(K) ((A(I,J),J=1,ND),I=1,NB)
RETURN
END

```

C*****

```

SUBROUTINE WA(A,B,NX,N,NS)

```

C [A]n,ns + [B]n,ns =====> [B]n,ns

C*****

```

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

```

```

DO I=1,N

```

```

DO J=1,NS

```

```

B(I,J)=A(I,J)+B(I,J)

```

```

end do

```

```

RETURN

```

```

END

```

C*****

```

SUBROUTINE SA(A,B,NX,N,NS)  尼羅河之旅

```

C*****

C [A]n,ns - [B]n,ns =====> [B]n,ns

C*****

```

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

```

```

DO I=1,N

```

```

DO J=1,NS

```

```

B(I,J)=A(I,J)-B(I,J)

```

```

end do

```

```

RETURN

```

```

END

```

C*****

```

SUBROUTINE mir2(A,B,NX,N,NS,L,M)

```

C*****

C Calculate large matrix A(n+ns,n+ns)'s inverse [A1]n,n [A2]n,ns *

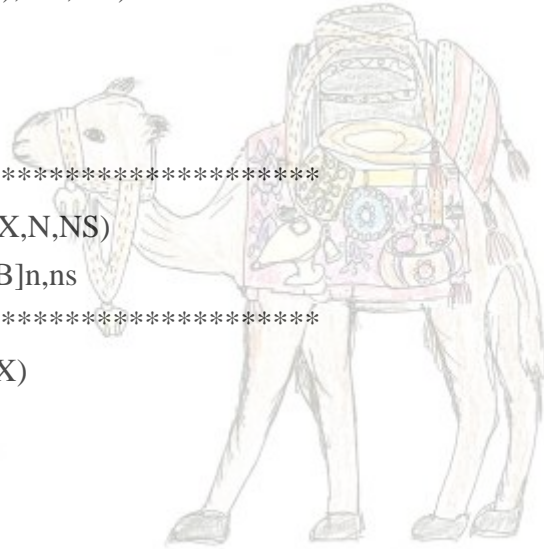
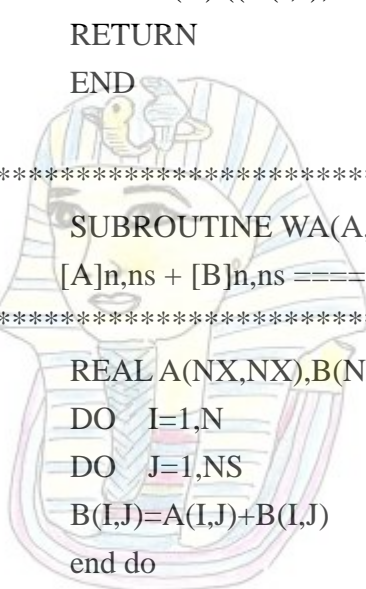
C read A from unit L file, after calculating, [A3]ns,n [A4]ns,ns *

C write to unit M file with : *

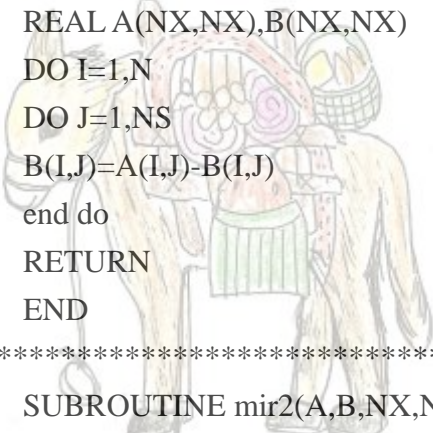
C [M1] = [[A1] - [A2] [A4]^ [A3]]^ , ^ means inverse *

C [M3] = - [A4]^ [A3] [M1] *

C [M4] = [[A4] - [A3] [A1]^ [A2]]^ *



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C

[M2] = - [A1]^ [A2] [M4]

*

C*****

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

OPEN(UNIT=40,FILE='40.apr',FORM='UNFORMATTED',status='UNKNOWN')

OPEN(UNIT=41,FILE='41.apr',FORM='UNFORMATTED',status='UNKNOWN')

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 (*,10) ILLD,ILL

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

REWIND 41

WRITE(41) ((B(I,J),J=1,N),I=1,NS)

BACKSPACE L 2011 埃及尼羅河之旅

BACKSPACE L

BACKSPACE L

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 (*,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)

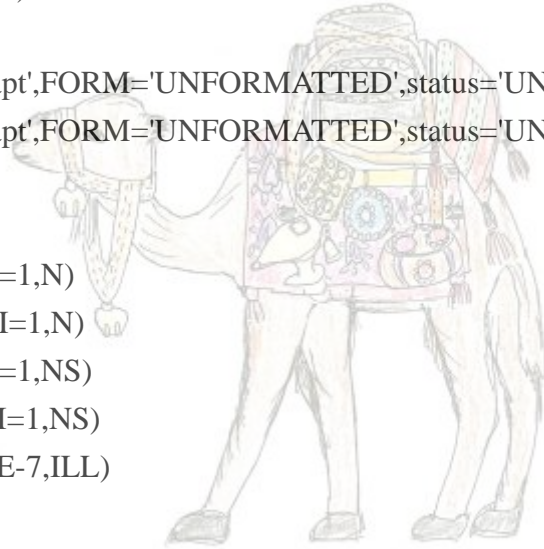
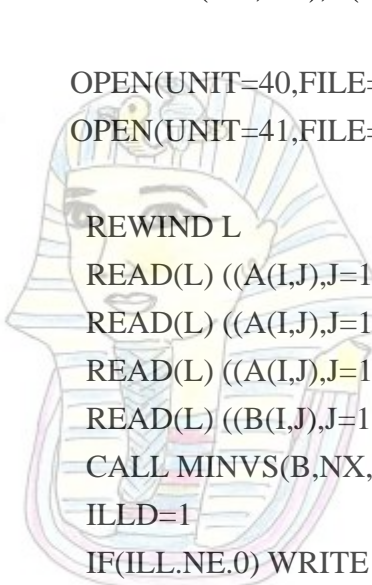
READ(L) ((B(I,J),J=1,NS),I=1,NS)

REWIND M

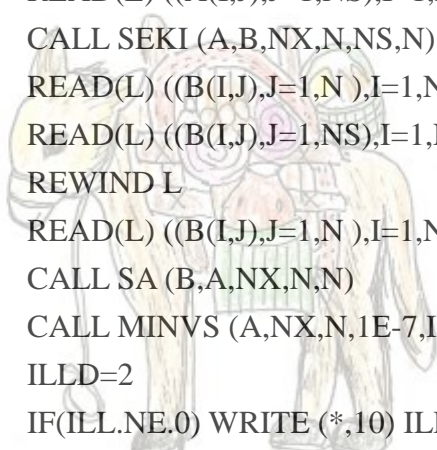
WRITE(M) ((A(I,J),J=1,N),I=1,N)

REWIND 41

READ(41) ((B(I,J),J=1,N),I=1,NS)



載滿珠寶的駱駝

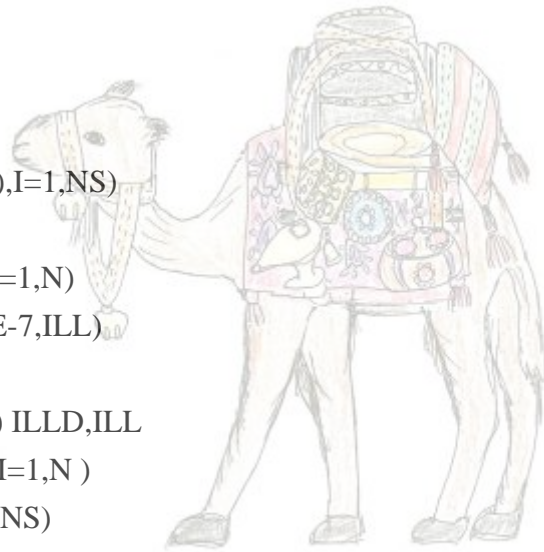
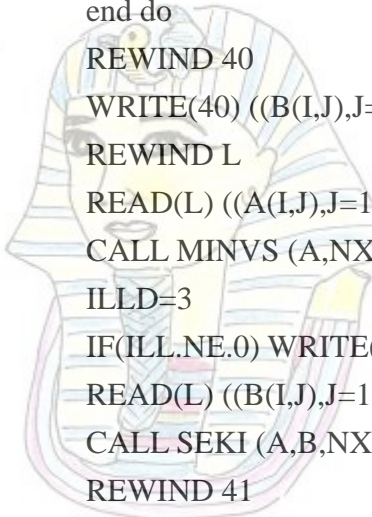


阿拉丁神燈

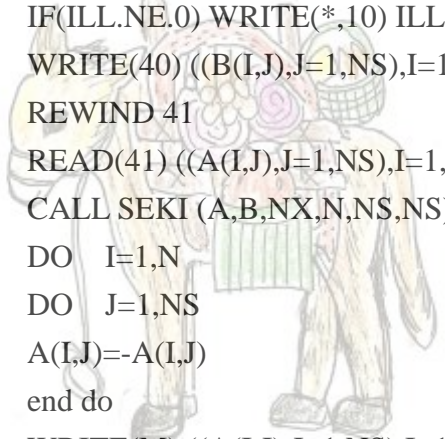

```

CALL SEKI (B,A,NX,NS,N,N)
DO I=1,NS
DO J=1,N
B(I,J)=-B(I,J)
end do
REWIND 40
WRITE(40) ((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 41
WRITE(41) ((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(40) ((B(I,J),J=1,NS),I=1,NS)
REWIND 41
READ(41) ((A(I,J),J=1,NS),I=1,N)
CALL SEKI (A,B,NX,N,NS,NS)
DO I=1,N
DO J=1,NS
A(I,J)=-A(I,J)
end do
WRITE(M) ((A(I,J),J=1,NS),I=1,N)
REWIND 40
READ(40) ((A(I,J),J=1,N ),I=1,NS)
WRITE(M) ((A(I,J),J=1,N),I=1,NS)
READ(40) ((A(I,J),J=1,NS),I=1,NS)
WRITE(M) ((A(I,J),J=1,NS),I=1,NS)
FORMAT(1X,'ILL(',I1,')=' ,I7)

```



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close(40)

close(41)

RETURN

END

C*****

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

REAL A(NX,NX),B(NX,NX),C(10000)

DO 100 I=1,NA

DO K=1,NK

C(K)=A(I,K)

end do

DO 100 J=1,NB

R=0.

DO K=1,NK

R=R+C(K)*B(K,J) 2011 埃及尼羅河之旅

end do

A(I,J)=R

100 CONTINUE

RETURN

END

C*****

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

C*****

REAL A(KO,KO)

INTEGER X(10000)

LOGICAL B

ILL=0

IF((KO.GE.N).AND.(N.GE.2).AND.(N.LE.10000).AND.(EPS.GT.0.0))

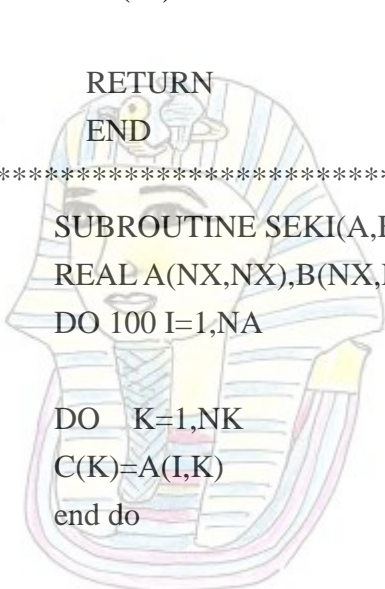
/ GO TO 1

ILL=30000

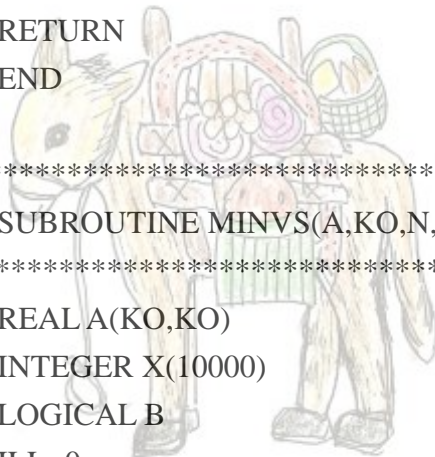
RETURN

1 DO I=1,N

X(I)=I



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```

END DO
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
W=ABSA
M=I
20 CONTINUE
IF(M.EQ.K) GO TO 50
L=X(M)
X(M)=X(K)
X(K)=L
DO J=1,N
W=A(K,J)
A(K,J)=A(M,J)
A(M,J)=W

```

```

50 IF(ABS(A(K,K)).GE.EPS) GO TO 60
ILL=K
RETURN

```

```

60 P=1.0/A(K,K)
DO J=1,N
A(K,J)=A(K,J)*P
END DO
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 J=1,N
A(I,J)=A(I,J)+A(K,J)*T
END DO

```

```

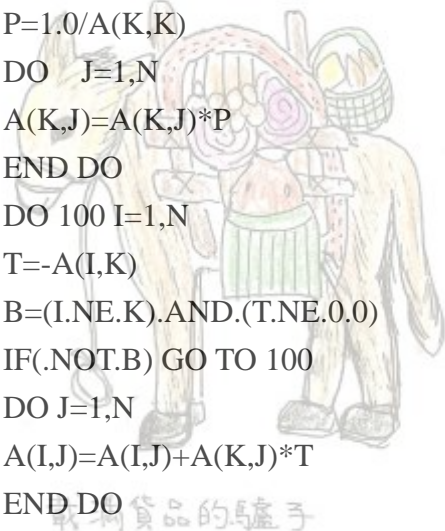
100 A(I,K)=P*T
A(K,K)=P
110 CONTINUE
DO 140 I=1,N
120 IF(X(I).EQ.I) GO TO 140

```



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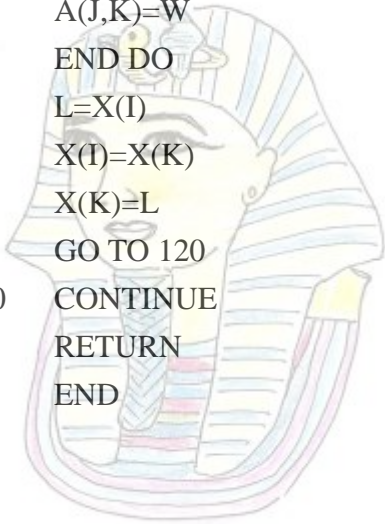


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```
K=X(I)
DO J=1,N
W=A(J,I)
A(J,I)=A(J,K)
A(J,K)=W
END DO
L=X(I)
X(I)=X(K)
X(K)=L
GO TO 120
140 CONTINUE
RETURN
END
```



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