บรรณานุกรม.

นายประเวทย์ ศรีสุนทร การกำหนดสายงานวิกฤตสำหรับการผลิตมาตรวัดน้ำ วิทยานิพนธ์ของนิสิต ภาควิชาวิศวกรรมคอมพิวเตอร์ จุฬาลงกรณ์มหาวิทยาลัย พ.ศ. ๒๕๑๖

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```
IV 3.0-LEVEL=2.0-479  3-3          MAINPGM          DATE  13/03/80      TIME  12
C     II,JJ NODE NUMBER
C     IKM KIND OF M/C
C     IKW JOB
      DIMENSION L(5)
      COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
      COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
      WRITE(3,29)
    1 READ(1,27)II,JJ,IKM,IKW,(L(M),M=1,5),T,IA,IK,CIN,U1,U2,U3,U4,IKC
      IF(IKM.EQ.99) GO TO 32
      IF(IKM.EQ.01) GO TO 3
      IF(IKM.EQ.02) GO TO 8
      IF(IKM.EQ.03) GO TO 10
      IF(IKM.EQ.04) GO TO 12
      IF(IKM.EQ.05) GO TO 14
      IF(IKM.EQ.06) GO TO 16
      IF(IKM.EQ.07) GO TO 31
    2 WRITE(3,28) (L(M),M=1,5),IKW
      GO TO 1
    3 IF(IKW.EQ.00) GO TO 4
      IF(IKW.EQ.01) GO TO 5
      IF(IKW.EQ.02) GO TO 6
      IF(IKW.EQ.03) GO TO 7
      GO TO 2
    4 CALL DRILLG
      GO TO 100
    5 CALL REAMNG
      GO TO 100
    6 CALL TAP
      GO TO 100
    7 CALL BORING
      GO TO 100
    8 IF(IKW.EQ.00) GO TO 9
      GO TO 2
    9 CALL SHAPER
      GO TO 100
   10 IF(IKW.EQ.00) GO TO 11
      GO TO 2
   11 CALL GRINDG
      GO TO 100
   12 IF(IKW.EQ.00) GO TO 13
      GO TO 2
   13 CALL MILLNG
      GO TO 100
   14 IF(IKW.EQ.00) GO TO 15
      GO TO 2
   15 CALL MILLNG
      GO TO 100
   16 IF(IKW.EQ.00) GO TO 17
      IF(IKW.EQ.01) GO TO 18
      IF(IKW.EQ.02) GO TO 19
      IF(IKW.EQ.03) GO TO 20
      IF(IKW.EQ.04) GO TO 21
      IF(IKW.EQ.05) GO TO 22
      IF(IKW.EQ.06) GO TO 23
```

```
OOS FORTRAN IV 360N-FO-479 3-8          SHAPEE          DATE  13/03/8

0001          SUBROUTINE SHAPEE
0002          COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKA,NA
0003          COMMON N3,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
              C     COMPUTE TIME FOR SHAPPING M/C
              C     IA = KIND OF MATERIAL
              C     IK = KIND OF SYSTEM
              C     L = LENGTH OF WORK TO BE CUT
              C     W = WIDTH  OF WORK TO BE CUT
              C     D = DEPTH OF CUT
              C
              C
0004          CL=U1
0005          W=U2
0006          D=U3
0007          IF(IA.EQ.0) GO TO 101
0008          IF(IA.EQ.1) GO TO 102
0009          IF(IA.EQ.2) GO TO 103
0010          IF(IA.EQ.3) GO TO 104
0011          IF(IA.EQ.4) GO TO 105
0012          GO TO 106
0013      101 V=80.
0014          F=.010
0015          GO TO 107
0016      102 V=50.
0017          F=.020
0018          GO TO 107
0019      103 V=60.
0020          F=.020
0021          GO TO 107
0022      104 V=160.
0023          F=.010
0024          GO TO 107
0025      105 V=200.
0026          F=.015
0027      107 IF(IK.EQ.1) GO TO 108
0028          V=V*.3
0029          F=F*25.4
0030          CL=(CL+30.)/1000.
0031          J=V*.6/CL
0032          N=W+10.
0033          AA=D/5.
0034          GO TO 109
0035      108 CL=CL+1.
0036          J=7.*V/CL
0037          N=W+.5
0038          AA=D/.2
0039      109 J=AA+1.
0040          CJ=J
0041          CALL NSHAPE
0042          CALL NM
0043          CJ=N
0044          CALL FHSHAP
0045          CALL FM
0046          T=(W*CJ*CIN)/(F*CN)
```

```
IV 36J=EU=475 3=8          MAINPGM          DATE   13/03/80      TIME   1
      IF(IKW.EQ.07) GO TO 24
      IF(IKW.EQ.08) GO TO 50
      IF(IKW.EQ.09) GO TO 26
      IF(IKW.EQ.10) GO TO 25
      GO TO 2
   50 CALL THREAD
      GO TO 100
   17 CALL TURN
      GO TO 100
   18 CALL FACING
      GO TO 100
   19 CALL BORING
      GO TO 100
   20 CALL DRILLG
      GO TO 100
   24 CALL TAP
      GO TO 100
   22 CALL TAPER
      GO TO 100
   25 CALL GROOVE
      GO TO 100
   24 CALL REAMNG
      GO TO 100
   25 CALL SCUT
      GO TO 100
   26 CALL KNURNG
  100 WRITE(3,30)II,JJ,(L(M),M=1,3),L(4),L(5),IK,N,E,T
      GO TO 1
   27 FORMAT(4I2,5A3,F5.0,2I1,F1.0,3F6.2,E4.2,I1)
   28 FORMAT(20X,5HUSE  ,3A3,17HIKW NOT MORE THAN,I2/)
   29 FORMAT(20X,'II',5X,'JJ',5X,'MACHINE  ',5X,'  JOB  ',
     1 13X,'SYSTEM',6X,'RPM.',7X,'FEED  ',5X,'TIME'//)
   30 FORMAT(20X,I2,5X,I2,5X,3A3,5X,2A3,7X,I1,8X,I4,5X,F7.4,5X,E4.0/)
   31 IK=0
      I=0
      F=0.
      GO TO 100
   32 STOP
      END
```

```
DOS EDITRAN 1/ 36JN-EC-479 3-8          SHAPEH                  DATE   13/03/8

0047                T=T+5.
0048                GO TO 201
0049            100 WRITE(3,200)II,JJ
0050            200 FORMAT(16X,I2,I3,14HIA MORE THAN 4)
0051            201 RETURN
0052                END



DOS EDITRAN 1/ 36JN-EC-479 3-8          DRILLG                  DATE   13/03/8

0001                SUBROUTINE DRILLG
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON N3,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C       COMPUTE TIME FOR DRILLING
                C       IA = MATERIAL
                C       IK = SYSTEM
                C       J = THROUGH OR NOT
                C       IKM = TYPE OF M/C
                C       L = LENGTH
                C       D = DIA. OF DRILL
                C       CIN = NO. OF WORK
0004                LL=U1
0005                D=U2
0006                IA=U3
0007                CALL VDL
0008                V=V*.9
0009                IF(IK.EQ.1) GO TO 20
0010                N=318.*V/D
0011                CL=.05
0012                GO TO 30
0013            20  N=4.*V/D
0014                CL=.02
0015            30  CALL EDR
0016                IF(IKM.EQ.01) GO TO 40
0017                CALL NLATHE
0018                CALL FLATHE
0019                GO TO 50
0020            40  CALL NDRILL
0021                CALL EDRILL
0022            50  CALL NM
0023                CN=N
0024                CALL FM
0025                IF(IA.EQ.0) GO TO 60
0026                LL=LL+CL+.3*D
0027                GO TO 70
0028            60  LL=LL+2.*CL+.3*D
0029            70  T=(LL*CIN)/(F*CN)+6.
0030                RETURN
0031                END
```

DOS FORTRAN IV 360N-FO-479 3-8 TURN DATE 13/03/8

```
0001                SUBROUTINE TURN
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR TURNING BY LATHE
                C   IA = KIND OF MATERIAL
                C   IK = KIND OF SYSTEM
                C   CL = LENGTH TO BE TURN
                C   D= DIA. OF WORK
                C   D1 = DEPTH OF CUT
                C   CIN = NO. OF WORK
                C
                C
                C
0004                CL=U1
0005                D=U2
0006                D1=U3
0007                R=D-D1
0008                CALL VDL
0009                IF(IK.EQ.1) GO TO 20
0010                N=318.*V/D
0011                R=R-.80
0012                R=R/3.
0013                GO TO 40
0014            20  N=4.*V/D
0015                R=R-.032
0016                R=R/.125
0017            40  J=R+3.
0018            50  CJ=J
0019                CALL NLATHE
0020                CALL NM
0021                CN=N
0022                CALL FTURN
0023                CALL EHLATH
0024                CALL FM
0025                T=(CL*CJ)/(F*CN)
0026                T=(1.5*T+1.)*CIN
0027                RETURN
0028                END
```

DOS FORTRAN IV 360N-FO-479 3-8 FACING DATE 13/03/8

```
0001                SUBROUTINE FACING
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR TURNING
                C   IA = KIND OF MATERIAL
                C   IK = KIND OF SYSTEM
                C   D = DIA. OF WORK
                C   D1 = DEPTH OF CUT
                C   CIN = NO. OF WORK TO BE FACING
0004                D=U1
0005                D1=U2
0006                CALL VDL
0007                IF(IK.EQ.1) GO TO 20
0008                J=318.*V/D
0009                CL=D/2.+5.
0010                D1=D1/3.
0011                GO TO 30
0012             20 J=4.*V/D
0013                CL=D/2.+.2
0014                D1=D1-.032
0015                D1=D1/.125
0016             30 CALL NLATHE
0017                CALL NM
0018                CN=N
0019                CALL RTURN
0020                CALL FCLATH
0021                CALL EM
0022             40 J=D1+3.
0023             50 CJ=J
0024                T=(CL*CJ)/(F*CN)
0025                T=(1.5*T+1.)*CIN
0026                RETURN
0027                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          GROOVE          DATE  13/03/8

0001                SUBROUTINE GROOVE
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR GROOVING
                C   IA = KIND OF MATERIAL
                C   IK = KIND OF SYSTEM
                C   D = DIA.
                C   CL = LENGTH
                C   CIN = NO. OF WORK TO BE GROOVE
0004                CL=U1
0005                D=U2
0006                CALL VDL
0007                V=V/2.
0008                IF(IK.EQ.1) GO TO 20
0009                N=318.*V/D
0010                F=.08
0011                CL=CL+5.
0012                GO TO 30
0013             20 N=4.*V/D
0014                F=.003
0015                CL=CL+.2
0016             30 CALL NLATHE
0017                CALL NM
0018                CN=N
0019                T=(CL*CIN)/(F*CN)+3.
0020                RETURN
0021                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          SCUT            DATE  13/03/8

0001                SUBROUTINE SCUT
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
0004                D=U1
0005                CL=D/2.
0006                CALL VDL
0007                IF(IK.EQ.1) GO TO 1
0008                N=318.*V/D
0009                GO TO 2
0010             1  N=4.*V/D
0011             2  CALL NLATHE
0012                CALL NM
0013                CN=N
0014                CALL RTURN
0015                CALL RM
0016                T=CL/(F*CN)
0017                T=T+1.
0018                RETURN
0019                END
```

```
DOS FORTRAN IV 360N-FD-479 3-8          KNURNG                  DATE  13/03/8

0001                SUBROUTINE KNURNG
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR KNURLING
                C   IA = KIND OF MATERIAL
                C   IK = KIND OF SYSTEM
                C   D = DIA.
                C   CL = LENGTH
                C   CIN = NO. OF WORK TO BE KNURL
0004                CL=U1
0005                D=U2
0006                CALL VDL
0007                V=V/4.
0008                IF(IK.EQ.1) GO TO 30
0009                F=.38
0010                N=318.*V/D
0011                GO TO 40
0012             30 F=.015
0013                N=4.*V/D
0014             40 CALL NLATHE
0015                CALL NM
0016                CN=N
0017                CALL FHLATH
0018                CALL FM
0019                T=(10.*CL*CIN)/(F*CN)+5.
0020                RETURN
0021                END

DOS FORTRAN IV 360N-FD-479 3-8          TAP                     DATE  13/03/8

0001                SUBROUTINE TAP
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR TAPPING
                C   IKM = TYPE OF M/C
                C   W = WIDTH
                C   D = MAJOR DIA.
                C   P = PITCH
                C   CIN = NO. OF WORK
0004                W=U1
0005                D=U2
0006                P=U3
0007                CL=6.*P+W
0008                IF(IKM.EQ.01) GO TO 15
0009                CALL NLATHE
0010                GO TO 20
0011             15 CALL NDRILL
0012             20 N=A(1)
0013                CN=N
0014                F=P
0015                T=CL/(F*CN)
0016                T=(4.8*T+5.)*CIN
0017                RETURN
0018                END
```

DOS FORTRAN IV 360N-FO-479 3-8 BORING DATE 13/03/

```
0001                  SUBROUTINE BORING
0002                  COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKN,NA
0003                  COMMON N3,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C     COMPUTE TIME FOR BORING BY LATHE OR DRILLING M/C
                C     IA = MATERIAL
                C     IK = SYSTEM
                C     IKM = TYPE OF M/C
                C     CL = LENGTH
                C     D = DIA. BEFOR BORING
                C     D1 = DIA. AFTER BORING
                C     CIN = NO. OF WORK
0004                  CL=U1
0005                  D=U2
0006                  D1=U3
0007                  CALL VDL
0008                  IF(IK.EQ.1) GO TO 15
0009                  J=318.*V/D
0010                  R=(D1-D)-.8
0011                  J=R/3.+5.
0012                  GO TO 20
0013               15 J=4.*V/D
0014                  R=(D1-D)-.032
0015                  J=R/.125+5.
0016               20 CJ=J
0017                  IF(IKM.EQ.01) GO TO 25
0018                  CALL NLATHE
0019                  F=.006
0020                  GO TO 30
0021               25 CALL NDRILL
0022                  F=.004
0023               30 CALL NM
0024                  CN=N
0025                  IF(IK.EQ.1) F=F*25.4
0026                  T=(CL*CJ)/(F*CN)
0027                  IF(IKM.EQ.01) GO TO 35
0028                  T=CIN*(T+10.)
0029                  GO TO 40
0030               35 T=CIN*(T+15.)
0031               40 RETURN
0032                  END
```

DOS FORTRAN IV 360N-FO-479 3-8 TAPER DATE 13/03/

```
0001                SUBROUTINE TAPER
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR TAPERTURNING
                C   IA = KIND OF MATERIAL
                C   IK = KIND OF SYSTEM
                C   CL = LENGTH
                C   D = MAX. DIA.
                C   D1 = MIN. DIA.
                C   CIN = NO. OF WORK
0004                CL=U1
0005                D=U2
0006                D1=U3
0007                CALL FTURN
0008                CALL EHLATH
0009                CALL FM
0010                R=D-D1
0011                CALL VDL
0012                IF(IK.EQ.1) GO TO 20
0013                N=318.*V/D
0014                R=(R-.80)/3.
0015                C=10.
0016                GO TO 30
0017             20 N=4.*V/D
0018                R=(R-.032)/.125
0019                C=.39
0020             30 CL=(D-D1)**2/4.+CL**2+C
0021                J=R+3.
0022                CJ=J
0023                CALL NLATHE
0024                CALL NM
0025                CN=N
0026                T=(CL*CJ*CIN)/(F*CN)
0027                T=1.5*T+5.
0028                RETURN
0029                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          GRINDG                DATE   13/03/8

0001                SUBROUTINE GRINDG
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR GRINDING M/C
                C   IK = SYSTEM
                C   AL = LENGTH
                C   B = WIDTH OF WORK
                C   D = DEPTH OF WORK
                C   CIN = NO. OF WORK
0004                AL=U1
0005                BB=U2
0006                D=U3
0007                IF(IK.EQ.1) GO TO 15
0008                F=1.
0009                V=6.
0010                AL=AL+10.
0011                N=500.*V/AL
0012                D=D-.010
0013                D=D/.075
0014                GO TO 20
0015             15 F=.25
0016                V=20.
0017                AL=AL+.4
0018                N=V/2.*AL
0019                D=D-.0004
0020                D=D/.003
0021             20 D=D+3.
0022                CJ=J
0023                CN=N
0024                T=(BB*CJ*CIN)/(F*CN)
0025                RETURN
0026                END

DOS FORTRAN IV 360N-FO-479 3-8          FTURN                 DATE   13/03/8

0001                SUBROUTINE FTURN
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   FIND FEED "F" FOR TURNING
                C   IA = KIND OF MATERIAL FROM MAINPROGRAM
                C   IK = KIND OF SYSTEM L FROM MAINPROGRAM
                C
                C
                C
0004                IF(IA.EQ.0.OR.IA.EQ.1) GO TO 20
0005                IF(IA.EQ.2.OR.IA.EQ.3.OR.IA.EQ.4) GO TO 30
0006                WRITE(3,10)
0007             10 FORMAT(20X,'ERROR IA>4')
0008                GO TO 50
0009             20 F=.010
0010                GO TO 40
0011             30 F=.015
0012             40 IF(IK.EQ.1) GO TO 50
0013                F=F*25.4
0014             50 RETURN
0015                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          NM                    DATE   13/03/8

0001                SUBROUTINE NM
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE"N"
0004                I=1
0005                IF(N.LE.A(I)) GO TO 44
0006                IF(N.GE.A(NJ)) GO TO 33
0007              5 I=I+1
0008                IF(N.LT.A(I)) GO TO 22
0009                GO TO 5
0010             33 J=A(NJ)
0011                GO TO 11
0012             22 CN=N
0013                X=A(I)-CN
0014                Y=CN-A(I-1)
0015                IF(X.LT.Y) GO TO 44
0016                J=A(I-1)
0017                GO TO 11
0018             44 J=A(I)
0019             11 RETURN
0020                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          FM                    DATE   13/03/8

0001                SUBROUTINE FM
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   SELECT FEED "F" FROM M/C
                C   F=FEED
                C   IK=SYSTEM
                C   IA=INDEX
                C   NB=NO. OF FEED
                C   B(J)=FEED OF M/C
0004                IF(IK-NA) 5,25,15
0005              5 DO 10 J=1,NB
0006                B(J)=B(J)*25.4
0007             10 CONTINUE
0008                GO TO 25
0009             15 DO 20 J=1,NB
0010                B(J)=B(J)/25.4
0011             20 CONTINUE
0012             25 J=1
0013                IF(F.LE.B(J)) GO TO 40
0014                IF(F.GE.B(NB)) GO TO 33
0015             30 J=J+1
0016                IF(F.LT.B(J)) GO TO 35
0017                GO TO 30
0018             33 F=B(NB)
0019                GO TO 45
0020             35 X=B(J)-F
0021                Y=F-B(J-1)
0022                IF(X.LT.Y) GO TO 40
0023                F=B(J-1)
0024                GO TO 45
0025             40 F=B(J)
0026             45 RETURN
0027                END
```

DOS FORTRAN IV 360N-FO-479 3-8 THREAD DATE 13/03/8

```
0001                SUBROUTINE THREAD
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR THREADING BY LATHE
                C   IA = MATERIAL
                C   IK = SYSTEM
                C   KT = TYPE OF THREAD
                C   DD = MAJOR DIA.
                C   P = PITCH
                C   AL = LENGTH
                C   CIN = NO. OF WORK
0004                AL=U1
0005                DD=U2
0006                P=U3
0007                KT=IKC
0008                IF(IA.EQ.0) GO TO 25
0009                IF(IA.EQ.1) GO TO 30
0010                IF(IA.EQ.2.OR.IA.EQ.3) GO TO 35
0011                IF(IA.EQ.4) GO TO 40
0012                WRITE(3,20)
0013             20 FORMAT(20X,10HERROR IA>4)
0014             25 V=35.
0015                GO TO 45
0016             30 V=30.
0017                GO TO 45
0018             35 V=25.
0019                GO TO 45
0020             40 V=60.
0021             45 IF(IK.EQ.1) GO TO 50
0022                V=V*.3
0023                N=318.*V/DD
0024                GO TO 55
0025             50 N=4.*V/DD
0026             55 CALL NLATHE
0027                CALL NN
0028                CN=N
0029                F=P
0030                IF(KT.EQ.1.OR.KT.EQ.6) GO TO 65
0031                IF(KT.EQ.2) GO TO 70
0032                IF(KT.EQ.3) GO TO 75
0033                IF(KT.EQ.4) GO TO 80
0034                IF(KT.EQ.5) GO TO 81
0035                IF(KT.EQ.7) GO TO 85
0036                WRITE(3,60)
0037             60 FORMAT(20X,10HERROR KT>7)
0038             65 D=.5000*P
0039                GO TO 90
0040             70 D=.6945*P
0041                GO TO 90
0042             75 D=.6495*P
0043                GO TO 90
0044             80 D=.6403*P
0045                GO TO 90
0046             81 D=.6134*P
```

```
DOS FORTRAN IV 360N-FO-479 3-8          THREAD          DATE  13/03/8

0047                GO TO 90
0048             85 D=.6866*P
0049             90 IF(IK.EQ.1) GO TO 95
0050                D=D-1.23
0051                J=D/.25
0052                GO TO 100
0053             95 D=D-.405
0054                J=D/.10
0055            100 CJ=J
0056                T=(2.*AL*CJ)/(F*CN)
0057                T=CIN*(T+10)
0058                RETURN
0059                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          REAMNG          DATE  13/03/8

0001                SUBROUTINE REAMNG
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   IKM = TYPE OF M/C
                C   IA = MATERIAL
                C   IK = SYSTEM
                C   D = DIA.
                C   L = LENGTH
                C   CIN = NO. OF WORK
0004                CL=U1
0005                D=U2
0006                CALL FDR
0007                CALL VDI
0008                V=V*.6
0009                F=F*2.5
0010                IF(IK.EQ.1) GO TO 15
0011                N=318.*V/D
0012                GO TO 20
0013             15 N=4.*V/C
0014             20 IF(IKM.EQ.01) GO TO 25
0015                CALL NLATHE
0016                CALL FLATHE
0017                GO TO 30
0018             25 CALL NDRILL
0019                CALL FDRILL
0020             30 CALL NM
0021                CN=N
0022                CALL FM
0023                T=CL/(F*CN)
0024                T=CIN*(1.6*T+10.)
0025                RETURN
0026                END
```

DOS FORTRAN IV 360N-FC-479 3-8 MILLNG DATE 13/03/8

```
0001                SUBROUTINE MILLNG
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKH,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   COMPUTE TIME FOR MILLING M/C
                C   IKM = TYPE OF M/C
                C   IKC = TYPE OF CUTTER
                C   P = LENGHT OF WORK
                C   IA = MATERIAL
                C   IK = SYSTEM
                C   D = CUTTER DIA.
                C   CNT = NO. OF TEETH
                C   D1 = DEPTH OF CUT
                C   CIN = NO. OF WORK
0004                P=U1
0005                D=U2
0006                CNT=U3
0007                D1=U4
0008                IF(IKC.EQ.1) GO TO 20
0009                IF(IKC.EQ.2) GO TO 63
0010                IF(IKC.EQ.3) GO TO 76
0011                IF(IKC.EQ.4) GO TO 81
0012                IF(IKC.EQ.5) GO TO 86
0013                IF(IKC.EQ.6) GO TO 91
0014                WRITE(3,15)
0015             15 FORMAT(20X,'NO.RECOMMENDED THIS CUTER')
0016                GO TO 999
0017             20 IF(IA.EQ.0) GO TO 25
0018                IF(IA.EQ.1) GO TO 30
0019                IF(IA.EQ.2) GO TO 35
0020                IF(IA.EQ.3) GO TO 40
0021                V=750.
0022                FT=.022
0023                GO TO 50
0024             25 V=85.
0025                FT=.012
0026                GO TO 50
0027             30 V=65.
0028                FT=.010
0029                GO TO 50
0030             35 V=65.
0031                FT=.013
0032                GO TO 50
0033             40 V=93.
0034                FT=.014
0035             50 IF(IK.EQ.1) GO TO 55
0036                N=4.*V/D
0037                CL=.125
0038                GO TO 60
0039             55 V=V*.3
0040                FT=FT*25.4
0041                N=318.*V/D
0042                CL=3.
0043             60 IF(IKM.EQ.04) GO TO 61
0044                AL=P+D+2.*CL
```

```
0045            CALL NVMILL
0046            CALL FVMILL
0047            GO TO 62
0048         61 AA=SQRT(D1*(D-D1))
0049            AL=P+2.*AA+2.*CL
0050            CALL NHMILL
0051            CALL FHMILL
0052         62 CALL NM
0053            CN=N
0054            F=FT*CNT*CN
0055            CALL FM
0056            T=CIN*AL/F+10.
0057            GO TO 999
0058         63 IF(IA.EQ.0) GO TO 64
0059            IF(IA.EQ.1) GO TO 65
0060            IF(IA.EQ.2) GO TO 70
0061            IF(IA.EQ.3) GO TO 75
0062            V=750.
0063            FT=.018
0064            GO TO 50
0065         64 V=85.
0066            FT=.010
0067            GO TO 50
0068         65 V=65.
0069            FT=.008
0070            GO TO 50
0071         70 V=65.
0072            FT=.010
0073            GO TO 50
0074         75 V=93.
0075            FT=.011
0076            GO TO 50
0077         76 IF(IA.EQ.0) GO TO 77
0078            IF(IA.EQ.1) GO TO 78
0079            IF(IA.EQ.2) GO TO 79
0080            IF(IA.EQ.3) GO TO 80
0081            V=750.
0082            FT=.013
0083            GO TO 50
0084         77 V=85.
0085            FT=.007
0086            GO TO 50
0087         78 V=65.
0088            FT=.006
0089            GO TO 50
0090         79 V=65.
0091            FT=.007
0092            GO TO 50
0093         80 V=93.
0094            FT=.008
0095            GO TO 50
0096         81 IF(IA.EQ.0) GO TO 82
0097            IF(IA.EQ.1) GO TO 83
0098            IF(IA.EQ.2) GO TO 84
```

DOS FORTRAN IV 360N-FO-479 3-8 MILLING DATE 13/03/8

```
0099            IF(IA.EQ.3) GO TO 85
0100            V=750.
0101            FT=.011
0102            GO TO 50
0103         82 V=85.
0104            FT=.006
0105            GO TO 50
0106         83 V=65.
0107            FT=.005
0108            GO TO 50
0109         84 V=65.
0110            FT=.007
0111            GO TO 50
0112         85 V=93.
0113            FT=.007
0114            GO TO 50
0115         86 IF(IA.EQ.0) GO TO 87
0116            IF(IA.EQ.1) GO TO 88
0117            IF(IA.EQ.2) GO TO 89
0118            IF(IA.EQ.3) GO TO 90
0119            V=750.
0120            FT=.007
0121            GO TO 50
0122         87 V=85.
0123            FT=.004
0124            GO TO 50
0125         88 V=65.
0126            FT=.003
0127            GO TO 50
0128         89 V=65.
0129            FT=.004
0130            GO TO 50
0131         90 V=93.
0132            FT=.004
0133            GO TO 50
0134         91 IF(IA.EQ.0) GO TO 92
0135            IF(IA.EQ.1) GO TO 93
0136            IF(IA.EQ.2) GO TO 94
0137            IF(IA.EQ.3) GO TO 95
0138            V=750.
0139            FT=.005
0140            GO TO 50
0141         92 V=85.
0142            FT=.003
0143            GO TO 50
0144         93 V=65.
0145            FT=.003
0146            GO TO 50
0147         94 V=65.
0148            FT=.003
0149            GO TO 50
0150         95 V=93.
0151            FT=.003
0152            GO TO 50
0153        999 RETURN
0154            END
```

```
OOS FORTRAN IV 360N-FO-479 3-8          NLATHE          DATE  13/03/8

0001                SUBROUTINE NLATHE
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   FIND R.P.M. FOR LATHE
                C
                C
0004                JJ=11
0005                A(1)=30.
0006                A(2)=45.
0007                A(3)=72.
0008                A(4)=152.
0009                A(5)=225.
0010                A(6)=350.
0011                A(7)=525.
0012                A(8)=720.
0013                A(9)=1060.
0014                A(10)=1660.
0015                A(11)=2500.
0016                RETURN
0017                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          VDL                    DATE   13/03/8

0001            SUBROUTINE VDL
0002            COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003            COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C       FIND SPEED "V"
                C       IA = MATERIAL
                C       IK = SYSTEM
0004            IF(IA.EQ.0.OR.IA.EQ.3) GO TO 20
0005            IF(IA.EQ.1) GO TO 30
0006            IF(IA.EQ.2) GO TO 40
0007            IF(IA.EQ.4) GO TO 50
0008            WRITE(3,10)
0009         10 FORMAT(20X,'ERROR IA>4')
0010         20 V=90.
0011            GO TO 60
0012         30 V=70.
0013            GO TO 60
0014         40 V=60.
0015            GO TO 60
0016         50 V=200.
0017         60 IF(IK.EQ.1) GO TO 70
0018            V=V*.3
0019         70 RETURN
0020            END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          FDR                    DATE   13/03/8

0001            SUBROUTINE FDR
0002            COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003            COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C       FIND FEED"F" FOR DRILLING OR REAMMING
                C       IK = SYSTEM
                C       D = DIA.
0004            R=U2
0005            IF(IK.EQ.1) GO TO 21
0006          5 IF(R.LE.3.) GO TO 20
0007            IF(R.LE.6.) GO TO 30
0008            IF(R.LE.13.) GO TO 40
0009            IF(R.LE.25.) GOTO 50
0010            IF(R.LE.38.) GO TO 60
0011            WRITE(3,10)
0012         10 FORMAT(20X,'USE BORING')
0013         20 F=.035
0014            GO TO 70
0015         30 F=.075
0016            GO TO 70
0017         40 F=.140
0018            GO TO 70
0019         50 F=.280
0020            GO TO 70
0021         21 R=R*25.4
0022            GO TO 5
0023         60 F=.505
0024         70 IF(IK.EQ.0) GO TO 80
0025            F=F/25.4
0026         80 RETURN
```

```
DOS FORTRAN IV 360N-FO-479 3-8          EHLATH          DATE  13/03/8

0001                SUBROUTINE EHLATH
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   HORIZONTAL FEED FOR LATHE
0004                NA=1
0005                NB=39
0006                B(1)=.0007
0007                B(2)=.0008
0008                B(3)=.0009
0009                B(4)=.0010
0010                B(5)=.0011
0011                B(6)=.0012
0012                B(7)=.0013
0013                B(8)=.0014
0014                B(9)=.0015
0015                B(10)=.0017
0016                B(11)=.0018
0017                B(12)=.0020
0018                B(13)=.0022
0019                B(14)=.0024
0020                B(15)=.0026
0021                B(16)=.0030
0022                B(17)=.0040
0023                B(18)=.005
0024                B(19)=.006
0025                B(20)=.007
0026                B(21)=.008
0027                B(22)=.009
0028                B(23)=.01
0029                B(24)=.011
0030                B(25)=.012
0031                B(26)=.014
0032                B(27)=.015
0033                B(28)=.016
0034                B(29)=.017
0035                B(30)=.019
0036                B(31)=.021
0037                B(32)=.022
0038                B(33)=.024
0039                B(34)=.028
0040                B(35)=.03
0041                B(36)=.032
0042                B(37)=.034
0043                B(38)=.038
0044                B(39)=.042
0045                RETURN
0046                END
```

```
OOS FORTRAN IV 360N-FC-479 3-8          ECLATH          DATE  13/03/8

0001                SUBROUTINE ECLATH
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKh,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   CROSS FEED FOR LATHE
0004                IA=1
0005                NB=32
0006                B(1)=.0005
0007                B(2)=.0006
0008                B(3)=.0007
0009                B(4)=.0008
0010                B(5)=.0009
0011                B(6)=.001
0012                B(7)=.0011
0013                B(8)=.0012
0014                B(9)=.0014
0015                B(10)=.0015
0016                B(11)=.0016
0017                B(12)=.0018
0018                B(13)=.002
0019                B(14)=.003
0020                B(15)=.004
0021                B(16)=.005
0022                B(17)=.006
0023                B(18)=.007
0024                B(19)=.008
0025                B(20)=.009
0026                B(21)=.01
0027                B(22)=.011
0028                B(23)=.012
0029                B(24)=.013
0030                B(25)=.015
0031                B(26)=.016
0032                B(27)=.018
0033                B(28)=.02
0034                B(29)=.022
0035                B(30)=.024
0036                B(31)=.026
0037                B(32)=.03
0038                RETURN
0039                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          NDRILL          DATE  13/03/8

0001                SUBROUTINE NDRILL
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   SPEED FOR DRILLING
0004                JJ=9
0005                A(1)=77.
0006                A(2)=123.
0007                A(3)=200.
0008                A(4)=245.
0009                A(5)=305.
0010                A(6)=452.
0011                A(7)=560.
0012                A(8)=705.
0013                A(9)=1260.
0014                RETURN
0015                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          FDRILL          DATE  13/03/8

0001                SUBROUTINE FDRILL
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   FEED RANGE ( INS./REV.  OR  MM./REV. )
0004                NA=0
0005                JJ=3
0006                B(1)=.076
0007                B(2)=.152
0008                B(3)=.229
0009                RETURN
0010                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          NSHAPE          DATE  13/03/8

0001                SUBROUTINE NSHAPE
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   STROKE PER MINUTE FOR SHAPER
0004                JJ=6
0005                A(1)=13.5
0006                A(2)=26.5
0007                A(3)=42.5
0008                A(4)=60.
0009                A(5)=85.
0010                A(6)=118.
0011                RETURN
0012                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          FHSHAP          DATE  13/03/8

0001                SUBROUTINE FHSHAP
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   HORIZONTAL FEED FOR SHAPER
0004                IA=0
0005                IB=8
0006                B(1)=.3
0007                B(2)=.6
0008                B(3)=.9
0009                B(4)=1.2
0010                B(5)=1.5
0011                B(6)=1.8
0012                B(7)=2.1
0013                B(8)=2.4
0014                RETURN
0015                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          FVSHAP          DATE  13/03/8

0001                SUBROUTINE FVSHAP
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
                C   VERTICAL FEED FOR SHAPER
0004                IA=0
0005                IB=5
0006                B(1)=.25
0007                B(2)=.5
0008                B(3)=.75
0009                B(4)=1.
0010                B(5)=1.25
0011                RETURN
0012                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          NVMILL          DATE  13/03/8

0001                SUBROUTINE NVMILL
                C   TO STORE R.P.M. OF MILLING M/C
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
0004                JJ=15
0005                A(1)=67.
0006                A(2)=115.
0007                A(3)=134.
0008                A(4)=180.
0009                A(5)=230.
0010                A(6)=275.
0011                A(7)=360.
0012                A(8)=550.
0013                A(9)=920.
0014                A(10)=1100.
0015                A(11)=1500.
0016                A(12)=1840.
0017                A(13)=2300.
0018                A(14)=3000.
0019                A(15)=4600.
0020                RETURN
0021                END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          FVMILL          DATE  13/03/8

0001                SUBROUTINE FVMILL
                C   TO STORE FEED OF MILLING M/C
0002                COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003                COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
0004                NA=0
0005                NB=16
0006                B(1)=20.
0007                B(2)=25.
0008                B(3)=30.
0009                B(4)=40.
0010                B(5)=50.
0011                B(6)=75.
0012                B(7)=100.
0013                B(8)=125.
0014                B(9)=180.
0015                B(10)=200.
0016                B(11)=250.
0017                B(12)=375.
0018                B(13)=500.
0019                B(14)=685.
0020                B(15)=750.
0021                B(16)=875.
0022                RETURN
0023                END
```

DOS FORTRAN IV 360N-FO-479 3-8 NHMILL DATE 13/03/8

```
0001          SUBROUTINE NHMILL
0002          COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003          COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
              C   TO STORE R.P.M. OF MILLING M/C
0004          NJ=18
0005          A(1)=30.
0006          A(2)=38.
0007          A(3)=48.
0008          A(4)=60.
0009          A(5)=76.
0010          A(6)=95.
0011          A(7)=120.
0012          A(8)=150.
0013          A(9)=190.
0014          A(10)=240.
0015          A(11)=300.
0016          A(12)=380.
0017          A(13)=480.
0018          A(14)=600.
0019          A(15)=760.
0020          A(16)=950.
0021          A(17)=1200.
0022          A(18)=1500.
0023          RETURN
0024          END
```

DOS FORTRAN IV 360N-FO-479 3-8 FHMILL DATE 13/03/8

```
0001          SUBROUTINE FHMILL
              C   TO STORE FEED OF M/C
0002          COMMON A(100),B(100),T,N,F,IA,IK,V,IKM,IKW,NA
0003          COMMON NB,NJ,II,JJ,CIN,U1,U2,U3,U4,IKC
0004          NA=0
0005          NB=18
0006          B(1)=12.
0007          B(2)=16.
0008          B(3)=20.
0009          B(4)=25.
0010          B(5)=32.
0011          B(6)=41.
0012          B(7)=52.
0013          B(8)=67.
0014          B(9)=85.
0015          B(10)=110.
0016          B(11)=140.
0017          B(12)=180.
0018          B(13)=220.
0019          B(14)=300.
0020          B(15)=370.
0021          B(16)=470.
0022          B(17)=600.
0023          B(18)=750.
0024          RETURN
0025          END
```

```
DOS FORTRAN IV 360N-FO-479 3-8          MAINPGM          DATE  25/03/

0001          DIMENSION IT(70,70,4),ITS(70,70,4),IKM(70,70,4),ITM
             1NJJ(70,4),I(70),J(70),T(70),ES(70),EF(70),ET(70),TT(
             1FF(70),SS(70),TS(70),FS(70),NJ1(70),KM(70)
              C
              C     CLEAR MEMORY=0
0002          DO 50 KK=1,4
0003          DO 50 II=1,70
0004          DO 50 JJ=1,70
0005          IT(II,JJ,KK)=0
0006          ITS(II,JJ,KK)=0
0007          IKM(II,JJ,KK)=0
0008          NJ1(JJ)=0
0009          NJJ(JJ,KK)=0
0010       50 CONTINUE
0011          REWIND 6
              C
              C     READ TOTAL NUMBER OF ACTIVITIES AND JOB NUMBER
0012          READ(1,1) N,KK,NK
0013        1 FORMAT(3I3)
              C     READ DATA ACTIVITY
0014          DO 3 K=1,N
0015          READ(1,2) I(K),J(K),KM(K),T(K)
0016          IT(I(K),J(K),KK)=T(K)
0017          IKM(I(K),J(K),KK)=KM(K)
0018          ITM(I(K),J(K),KK)=T(K)
0019          NJ1(J(K))=NJ1(J(K))+1
0020        2 FORMAT(3I2,F3.0)
0021        3 CONTINUE
0022          DO 4 K=1,70
0023        4 ET(K)=0
0024          TMIN=0
0025          DO 8 K=1,N
0026          INODE=I(K)
0027          JNODE=J(K)
0028          ES(K)=ET(INODE)
0029          EF(K)=ES(K)+T(K)
0030          IF(EF(K)-ET(JNODE)) 6,6,5
0031        5 ET(JNODE)=EF(K)
0032        6 IF(EF(K)-TMIN) 8,8,7
0033        7 TMIN=EF(K)
0034        8 CONTINUE
0035          DO 9 K=1,N
0036        9 TT(K)=TMIN
0037          DO 12 K=1,N
0038          L=N+1-K
0039          INODE=I(L)
0040          JNODE=J(L)
0041          FF(L)=TT(JNODE)
0042          SS(L)=FF(L)-T(L)
0043          IF(SS(L)-TT(INODE)) 10,11,11
0044       10 TT(INODE)=SS(L)
0045       11 TS(L)=SS(L)-ES(L)
0046       12 CONTINUE
0047          WRITE(3,13)
```

```
DOS FORTRAN IV 360N-FO-479 3-8          MAINPGM                 DATE    25/03/
0048          15 FORMAT(30X,'I',3X,'J',3X,'K',5X,'T',5X,'TS'//)
0049             DO 14 K=1,N
0050             INODE=J(K)
0051             JNODE=I(K)
0052             II=I(K)
0053             JJ=J(K)
0054             ITS(II,JJ,KK)=TS(K)
0055          14 WRITE(3,15) I(K),J(K),KK,T(K),TS(K)
0056          15 FORMAT(29X,3(I2,2X),2(3X,F5.0)/)
0057             DO 16 JJ=1,N
0058             NJ(JJ,KK)=NJ1(JJ)
0059          16 CONTINUE
0060             DO 17 KK=1,4
0061             DO 17 II=1,40
0062             DO 17 JJ=1,40
0063          17 WRITE(6,18) IT(II,JJ,KK),ITS(II,JJ,KK),IKM(II,JJ,KK
                1ITN(II,JJ,KK),NJ(JJ,KK)
0064          18 FORMAT(5I6)
0065             END FILE 6
0066             REWIND 6
0067             WRITE(3,24)
0068             DO 19 KK=1,NK
0069             DO 19 II=1,40
0070             DO 19 JJ=1,40
0071             READ(6,18) IAA,IBB,ICC,IDD,IEE
0072          19 WRITE(3,26) II,JJ,KK,IAA,IBB,ICC,IDD,IEE
0073          24 FORMAT(/////30X,' I',3X,' J',3X,' K',5X,' T ',5X,'
                15X,'IKM',5X,'ITN',5X,'NJ'//)
0074          26 FORMAT(30X,3(I2,3X),2X,5(I4,5X))
0075             REWIND 6
0076             STOP
0077             END
```

ประวัติการศึกษา

ชื่อ นายรังสรรค์ สุวรรณญ

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