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APPENDIX A

TERMINOLOGY

A definition of the following terms is necessary for an understanding of the procedures and results of this research.

Link - Branch of street which connected two adjacent intersections.

Bounds - The ways go into an intersection. There are 4-ways for this model, N-bound, S-bound, E-bound and W-bound.

Lane - The division of highway or street along which traffic moves in one line. The model studied here has three or more lanes, including turn-left lane, turn-right lane and straighforward lane. For the last one, it can be more than one lanes, the other assumed to be one lane only.

2-Phase signal - The timing signal light for signs, one is red another is green. The formation of the timing signal for the traffic control is characterized by following detail: During red phase only turn-left vehicles can be served, and during green phase vehicles in any lanes can be served. The flow diagram is shown in Fig. A-1.

4-Phase signal - The timing signal light with 4 phases controlled. It is composed of phase-1, phase-2, phase-3 and phase-4. The behavior of each phase is shown in Fig. A-2, step by step respectively.

Phase ratio - The ratio of red phase per green phase of timing at an intersection, using red phase as starting phase for N-S bound and the opposite phase for E-W bound for the condition of 2-phase signal, and the ratio of phase-1 per phase-2 per phase-3 per phase-4 for 4-phase signal light.

Volume - The volume of vehicles which equal to the total additive number of vehicles waiting in queue of every lane.

Queue-length - The number of vehicles waiting in queue which are ready to be served.

Detector - The artificial counter using in computer programming for counting the number of vehicles passing a given point.

Arrivals - The intervals of time for one vehicles come after the other. It can be generated by any kind of distribution form which described in later chapter.

Services - The intervals of time that one vehicle can be served to cross the head way of an intersection.

Clock Time - The clock time for recording the evens happen in every unit of time.

Probability ratio of L-F-R - The choices of vehicles drived into the specific lanes can be stated as probability with the various percentages of turn-left, turn-right and go straightforward. From these three conditions, it can be expressed as a probability ratio. (L-turn left, F-straightforward, R-turn right).

Probability of Services - Normally vehicles can be served by a quite certain interval of time, but there are some cases that make it off the normal time. So, it should be stated as the probability of services, for how many percentages to serve one vehicle in different intervals of time.

Cycle of Timing - The repeated cycle of controlled signal light, for example, 2-phase signal has two phases, red phase and green phase, to complete the cycle of timing.

APPENDIX B

RANDU The subroutine from IBM 1130 Scientific Subroutine Package

PURPOSE:

Computes uniformly distributed random floating point numbers between 0 and 1.0 and integers in the range 0 to 2**15.

USAGE:

CALL RANDU(IX,IY,R)

DESCRIPTION OF PARAMETERS:

IX - For the first entry this must contain any odd positive integer less than 32,768. After the first entry, IX should be the previous value of IY computed by this subroutine.

IY - A resultant integer random number required for the next entry to this subroutine. The range of this number is from zero to 2**15.

R - The resultant uniformly distributed, floating point, random number in the range 0 to 1.0.

REMARKS:

This subroutine is specific to the IBM 1130. This subroutine should not repeat its cycle in less than 2 to the 13th entries.

NOTE: If random bits are needed, the high order bits of IY should be chosen.

SUBROUTINES AND FUNCTION SUBPROGRAMS REQUIRED:

None.

METHOD:

Power residue method discussed in IBM manual Random Number Generation and Testing (C20-8011).

APPENDIX C

```
PAGE    1     SUBPROG.

// JOB                                                    SUBPROG.

LOG DRIVE    CART SPEC    CART AVAIL   PHY DRIVE
  0000         0001         0001         0000

V2 M09   ACTUAL  8K  CONFIG  8K

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO GENERATE ARRIVAL-TIME FOR MAIN PROGRAM
C.....TRAF1
      SUBROUTINE ARRIV(IX,R,I,J,K,TMEAN,TIMEX,CLKTM,CKARL,
     $CKARF,CKARR,TARV)
      INTEGER TIMEX,CLKTM,TARV,CKARL(200),CKARF(200)
      INTEGER CKARR(200)
      COMMON PB1,PB2
      IF(R-PB1) 1,1,2
    1 I=I+1
      CKARL(I)=CLKTM+TARV
      GO TO 6
    2 IF(R-PB2) 4,4,5
    4 J=J+1
      CKARF(J)=CLKTM+TARV
      GO TO 6
    5 K=K+1
      CKARR(K)=CLKTM+TARV
    6 CONTINUE
      CLKTM=CLKTM+TARV
      CALL TEXPA(IX,TMEAN,TARV)
      TIMEX=TIMEX+TARV
      CALL RANDU(IX,IY,R)
      IX=IY
      RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR ARRIV
 COMMON       4  VARIABLES       2  PROGRAM     146

RELATIVE ENTRY POINT ADDRESS IS 0003 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE    2     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO GENERATE ARRIVAL-TIME FOR MAIN PROGRAM
C.....TRAF3
       SUBROUTINE DEARV(IX,R,I,J,K,TIMEX,CLKTM,CKARL,CKARF,
      $CKARR,KT,KBP,PROB,NVEHC,KTARV,LX)
       INTEGER TIMEX,CLKTM,CKARL(200),CKARF(200),CKARR(200)
       DIMENSION PROB(25),KBP(25)
       COMMON PB1,PB2
       DO 10 L=1,NVEHC
       IF(R-PB1) 1,1,2
     1 I=I+1
       CKARL(I)=CLKTM+KTARV
       GO TO 3
     2 IF(R-PB2) 4,4,5
     4 J=J+1
       CKARF(J)=CLKTM+KTARV
       GO TO 3
     5 K=K+1
       CKARR(K)=CLKTM+KTARV
     3 CONTINUE
       CALL RANDU(IX,IY,R)
       IX=IY
    10 CONTINUE
       CLKTM=CLKTM+KTARV
       CALL DISCR(IX,KT,KBP,PROB,NVEHC,KTARV,LX)
       TIMEX=TIMEX+KTARV
       RETURN
       END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR DEARV
 COMMON       4  VARIABLES       4  PROGRAM     172

RELATIVE ENTRY POINT ADDRESS IS 0005 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE    3     SUBPROG.

// FOR
*ONE WORD INTEGERS
*LIST SOURCE PROGRAM
C.....SUBPROGRAM CALLED IN SUBPROGRAM DEARV
      SUBROUTINE DISCR(IX,K,KB,PROB,NVEHC,KTARV,LX)
      DIMENSION PROB(25),KB(25)
      CALL RANDU(IX,IY,R)
      IX=IY
      DO 1 I=1,K
      IF(R-PROB(I)) 2,2,1
    2 INDEX=I
      GO TO 3
    1 CONTINUE
    3 A=KB(INDEX)
      B=A+FLOAT(LX)
      CALL UNFRM(IX,A,B,NVEHC,KTARV)
      RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR DISCR
 COMMON       0  VARIABLES     10  PROGRAM      86

RELATIVE ENTRY POINT ADDRESS IS 000B (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE    4     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO FIND THE FREQUENCY DISTRIBUTION AND
C.....ACCUMULATIVE PROBABILITY GENERATED BY DETECTOR IN WEST-
C.....BOUND FOR MAIN PROGRAM TRAF2
      SUBROUTINE GPROB(KA,KB,PROB,N,K,LX)
      DIMENSION KA(25),KB(25),PROB(25),IFREQ(25)
      MAX=KA(1)
      MIN=KA(1)
      DO 1 I=2,N
      IF(KA(I)-MAX) 2,2,3
    3 MAX=KA(I)
    2 CONTINUE
      IF(KA(I)-MIN) 4,1,1
    4 MIN=KA(I)
    1 CONTINUE
      MAXA=MAX+5
      MAXA=MAXA/10
      MAXA=MAXA*10
      IF(MAXA-MAX) 5,6,6
    5 MAX=MAXA+10
      GO TO 7
    6 MAX=MAXA
    7 CONTINUE
      MINA=MIN+5
      MINA=MINA/10
      MINA=MINA*10
      IF(MINA-MIN) 8,9,9
    8 MIN=MINA+1
      GO TO 10
    9 MIN=MINA-9
   10 CONTINUE
      IF((MAX-MIN)-60) 18,18,19
   18 L=5
      LX=4
      GO TO 20
   19 L=10
      LX=9
   20 K=1
      KB(1)=MIN
   11 K=K+1
      KB(K)=KB(K-1)+L
      IF(KB(K)-MAX) 11,12,12
   12 K=K-1
      DO 13 I=1,K
   13 IFREQ(I)=0
      DO 14 I=1,N
      DO 15 J=1,K
      IF(KA(I)-(KB(J)+LX)) 16,16,15
```

```
PAGE    5     SUBPROG.

    16 IFREQ(J)=IFREQ(J)+1
       GO TO 14
    15 CONTINUE
    14 CONTINUE
       WRITE(3,100)
   100 FORMAT(1H1,38X'TABLE FOR 5 MINS.'/39X,17('-'),//17X'NO
     $. OF VEHICLE'11X'FREQUENCY'10X'ACC. PROB.'/17X,15('-'),
     $11X,9('-'),10X,10('-')//)
       FREQ=0
       DO 17 I=1,K
       A=IFREQ(I)
       FREQ=FREQ+A
       PROB(I)=FREQ/N
       JB=KB(I)+LX
       WRITE(3,200) KB(I),JB,IFREQ(I),PROB(I)
   200 FORMAT(/20X,I3'-'I3,19X,I2,12X,F10.4)
    17 CONTINUE
       RETURN
       END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR GPROB
 COMMON       0  VARIABLES     40  PROGRAM     508

RELATIVE ENTRY POINT ADDRESS IS 0081 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE    6     SUBPROG.

// FOR
*ONE WORD INTEGERS
*LIST SOURCE PROGRAM
C.....SUBPROGRAM TO FIND THE MAXIMUM VOLUME AND QUEUE FOR
C.....EACH BOUND OF INTERSECTIONS
      SUBROUTINE MAXVQ(CLOCK,MAXA,MAXB,MAXC,VQA,VQB,VQC,CLKA
     $,CLKB,CLKC)
      INTEGER CLOCK,CLKA,CLKB,CLKC,VQA,VQB,VQC
      IF(CLOCK-1) 1,1,2
    1 MAXA=VQA
      MAXB=VQB
      MAXC=VQC
      CLKA=CLOCK
      CLKB=CLOCK
      CLKC=CLOCK
      GO TO 3
    2 IF(MAXA-VQA) 4,5,5
    4 MAXA=VQA
      CLKA=CLOCK
    5 CONTINUE
      IF(MAXB-VQB) 6,7,7
    6 MAXB=VQB
      CLKB=CLOCK
    7 CONTINUE
      IF(MAXC-VQC) 8,3,3
    8 MAXC=VQC
      CLKC=CLOCK
    3 RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR MAXVQ
 COMMON       0  VARIABLES     0  PROGRAM    122

RELATIVE ENTRY POINT ADDRESS IS 0001 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE    7     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO FIND THE INSTANTANEOUS QUEUE FOR MAIN
C.....PROGRAM TRAF3
       SUBROUTINE PARTQ (ITQ,CLOCK,CKARV,II,I,NI)
       INTEGER CLOCK,CKARV(200)
       IF(NI) 1,2,1
     1 IF(CLOCK-CKARV(II)) 2,3,3
     3 ITQ=ITQ+1
       IF(CKARV(II)-CKARV(II+1)) 4,4,5
     4 II=II+1
       IF(II-I) 3,3,6
     5 II=II+1
       IF(II-I) 2,2,6
     6 NI=0
     2 RETURN
       END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR PARTQ
 COMMON       0  VARIABLES       2  PROGRAM     104

RELATIVE ENTRY POINT ADDRESS IS 0004 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE    8     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO FIND THE QUEUE OF STRAIGHTFORWARD LANES
C.....WHICH DEPEND ON THE NO. LANES
      SUBROUTINE QLANE(IFWQ,LANE)
      IFQ=IFWQ/LANE
      IF(IFQ*LANE-IFWQ) 1,2,1
    1 IFWQ=IFQ+1
      RETURN
    2 IFWQ=IFQ
      RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR QLANE
 COMMON       0  VARIABLES       2  PROGRAM      42

RELATIVE ENTRY POINT ADDRESS IS 0003 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE    9     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO FIND THE INSTANTANEOUS QUEUE FOR MAIN
C.....PROGRAM TRAF1
      SUBROUTINE QUEUE(ITQ,CLOCK,CKARV,II,I,NI)
      INTEGER CLOCK,CKARV(200)
      IF(NI) 1,2,1
    1 IF(CLOCK-CKARV(II)) 2,4,4
    4 ITQ=ITQ+1
      II=II+1
      IF(II-I) 2,2,5
    5 NI=0
    2 RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR QUEUE
 COMMON       0  VARIABLES       2  PROGRAM      62

RELATIVE ENTRY POINT ADDRESS IS 0004 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE  10     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO GENERATE THE RANDOM NUMBERS, PREPARED
C.....BY IBM 1130 SYSTEM
      SUBROUTINE RANDU(IX,IY,R)
      IY=IX*899
      IF(IY) 1,2,2
    1 IY=IY+32767+1
    2 R=IY
      R=R/32767.
      RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR RANDU
 COMMON       0  VARIABLES       0  PROGRAM      52

RELATIVE ENTRY POINT ADDRESS IS 0005 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE  11     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM CALLED IN SUBPROGRAM ARRIV
      SUBROUTINE TEXPA(IX,TMEAN,TARV)
      INTEGER TARV
      CALL RANDU(IX,IY,R)
      IX=IY
      X=-TMEAN*ALOG(R)+1.0
      TARV=X
      RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR TEXPA
 COMMON       0  VARIABLES       8  PROGRAM      42

RELATIVE ENTRY POINT ADDRESS IS 000A (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE  12     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO GENERATE THE SERVICE-TIME FOR BOTH TRAF1
C.....AND TRAF3
      SUBROUTINE TNORS(IX,PROB1,PROB2,TSERV)
      INTEGER TSERV
      CALL RANDU(IX,IY,R)
      IX=IY
      IF(R-PROB1) 1,1,2
    1 TSERV=2
      GO TO 5
    2 IF(R-PROB2) 3,3,4
    3 TSERV=3
      GO TO 5
    4 TSERV=1
    5 RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR TNORS
 COMMON       0  VARIABLES       4  PROGRAM      58

RELATIVE ENTRY POINT ADDRESS IS 0007 (HEX)

END OF COMPILATION

// EJECT
```

```
PAGE  13     SUBPROG.

// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
C.....SUBPROGRAM TO GENERATE THE UNIFORM ARRIVAL-TIME.
C.....CALLED IN SUBPROGRAM DISCR
      SUBROUTINE UNFRM(IX,A,B,NVEHC,KTARV)
      CALL RANDU(IX,IY,R)
      IX=IY
      TARV=A+(B-A)*R
      KTARV=300.*FLOAT(NVEHC)/TARV+0.50
      RETURN
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS

CORE REQUIREMENTS FOR UNFRM
 COMMON       0  VARIABLES       6  PROGRAM      52

RELATIVE ENTRY POINT ADDRESS IS 000A (HEX)

END OF COMPILATION
```

```
PAGE    1     (TRAF1)

// JOB                                                    (TRAF1)

LOG DRIVE   CART SPEC   CART AVAIL  PHY DRIVE
  0000         0001         0001        0000

V2 M09   ACTUAL  8K  CONFIG  8K

// FOR
*IOCS(CARD,TYPEWRITER,KEYBOARD,1132PRINTER,DISK)
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
*NAME TRAF1
C.....MAIN PROGRAM TO FIND THE MAXIMUM QUEUE AND VOLUMN OF
C.....EACH BOUND OF AN INTERSECTION, THROUGH THE 2-HOUR
C.....PERIOD OF SIMULATION
      INTEGER PHASE,TRED,TRSEV,CLOCK,TIMEA,TARV,TCHEK,CLKTM
      INTEGER TSEVL,TSEVF,TSEVR,A(80),B(80),C(80),D(80)
      INTEGER TIMES,TIME,FSERV,RSERV,CKARL(200),CKARF(200)
      INTEGER CKARR(200)
      DIMENSION IPHAS(4),MM(3),AA(5),KB(16),KEY(18),NINPT(3)
      DIMENSION NOUTP(3)
      COMMON PB1,PB2,K01
      COMMON JN,N,JAK,CKARL,CLOCK,NSTH,NEAST,NT,NE,MM,M,KEY
      COMMON IPHAS,NINPT,NOUTP,TIME,INDEX,NPHAS,NOCYL,ITLQS
      COMMON IFWQS,ITRQS,MCKSL,MCKSF,MCKSR,ITLQN,IFWQN,ITRQN
      COMMON MCKNL,MCKNF,MCKNR,ITLQE,IFWQE,ITRQE,MCKEL,MCKEF
      COMMON MCKER,K4,IPROB(3,3),LANE
      DEFINE FILE 1(7300,18,U,IND),2(121,240,U,IND)
      DEFINE FILE 100(5,320,U,IND),200(2,320,U,IND)
      DEFINE FILE 300(2,320,U,IND)
      DATA KB / 16*0 /
      DO 170 IS=1,3
      NINPT(IS)=0
  170 NOUTP(IS)=0
C---------( STATION - A )---------
      JN=1
      JAK=3
      READ(2,200) M,(MM(I),I=1,M),IX,LANE
  200 FORMAT(10I5)
      READ(2,201) TMEAN,PBL1,PBL2,PBF1,PBF2,PBR1,PBR2
  201 FORMAT(8F10.0)
      READ(2,200) NPHAS,N,K4
C---------( STATION - K )---------
      READ(2,200) (IPHAS(I),I=1,NPHAS),NOCYL
C---------( STATION - J )---------
    1 READ(2,200) IBOUN,(IPROB(JN,J1),J1=1,3)
      READ(2,203) AA,PB1,PB2
  203 FORMAT(5A4,2F10.0)
      WRITE(3,204) AA
  204 FORMAT(10X,5A4)
```

```
PAGE    2     (TRAF1)

      IF(IBOUN-1) 2,2,3
    2 IF(NPHAS-2) 4,4,5
    4 PHASE=IPHAS(2)
      TRED=IPHAS(1)
      KPK=0
      GO TO 6
    5 TRED=IPHAS(1)+IPHAS(2)
      LXY=0
      KPK=1
    6 CONTINUE
      ID=1
      IE=0
      GO TO 7
    3 IF(NPHAS-2) 8,8,9
    8 PHASE=IPHAS(1)
      TRED=IPHAS(2)
      KPK=0
      GO TO 10
    9 PHASE=IPHAS(1)
      TRED=IPHAS(3)+IPHAS(4)
      KPK=1
      LXY=0
   10 ID=0
      IE=1
    7 CONTINUE
      TRSEV=0
      ITLQ=0
      IFWQ=0
      ITRQ=0
      I=0
      J=0
      K=0
      CLOCK=0
      TIMEA=0
      JA3=6*JAK-6
   11 CALL TEXPA(IX,TMEAN,TARV)
      TIMEA=TIMEA+TARV
      CALL RANDU(IX,IY,R)
      IX=IY
      IF(ID) 12,12,13
   12 IF(TIMEA-PHASE)14,14,15
   13 IF(TIMEA-TRED) 14,14,146
  146 NINPT(JN)=NINPT(JN)+I+J+K
      GO TO 16
   15 TCHEK=TIMEA-PHASE
      NINPT(JN)=NINPT(JN)+I+J+K
      GO TO 17
C***GO TO ...D.
   14 CONTINUE
      IF(R-PB1) 18,18,19
```

```
PAGE   3     (TRAF1)

    18 I=I+1
       CKARL(I)=TIMEA
       GO TO 20
    19 IF(R-PB2) 21,21,22
    21 J=J+1
       CKARF(J)=TIMEA
       GO TO 20
    22 K=K+1
       CKARR(K)=TIMEA
    20 CONTINUE
       CLKTM=TIMEA
       GO TO 11
C----------( STATION - B )----------
    16 TCHEK=TIMEA-TRED
       FSERV=0
       RSERV=0
       NI=1
       NJ=1
       NK=1
       NX=1
       II=1
       JJ=1
       KK=1
       TIME=0
       TIMES=TRSEV
       IF(ID) 23,24,23
    23 ID=0
       CALL TNORS(IX,PBL1,PBL2,TSEVL)
       TIMES=TSEVL
    24 CONTINUE
    25 TIME=TIME+1
       IF(TIME-TRED) 26,26,27
    27 TRSEV=TIMES
       LXY=0
       GO TO 28
C***GO TO ...C.
    26 CLOCK=CLOCK+1
       CALL QUEUE(ITLQ,CLOCK,CKARL,II,I,NI)
       IF(CLOCK-TIMES) 29,30,30
    29 LSERV=0
       GO TO 31
    30 IF(ITLQ) 32,32,33
    32 LSERV=0
       TIMES=TIMES+1
       GO TO 31
    33 ITLQ=ITLQ-1
       NX=0
       LSERV=1
    31 CONTINUE
       CALL QUEUE(IFWQ,CLOCK,CKARF,JJ,J,NJ)
```

```
PAGE   4     (TRAF1)

       CALL QUEUE(ITRQ,CLOCK,CKARR,KK,K,NK)
       IF(NX) 34,35,34
    35 CALL TNORS(IX,PBL1,PBL2,TSEVL)
       NX=1
       TIMES=TIMES+TSEVL
    34 CONTINUE
       NOUTP(JN)=NOUTP(JN)+LSERV+FSERV+RSERV
       IF(JAK-1) 139,139,140
   139 WRITE(1'CLOCK) ITRQ,RSERV,IFWQ,FSERV,ITLQ,LSERV
       GO TO 141
   140 WRITE(1'CLOCK) (KB(L),L=1,JA3),ITRQ,RSERV,IFWQ,FSERV,
      $ITLQ,LSERV
   141 CONTINUE
       GO TO 25
C---------( STATION - C )---------
    28 IF(CLOCK-7200) 131,90,90
   131 I=0
       J=0
       K=0
       IF(KPK) 36,37,36
    36 IF(LXY-1) 38,39,88
C***GO TO G..
    38 IF(IBOUN-1) 171,171,172
   171 PHASE=IPHAS(3)
       GO TO 37
   172 PHASE=IPHAS(1)
       GO TO 37
    39 IF(IBOUN-1) 173,173,174
   173 PHBSE=IPHAS(4)
       GO TO 37
   174 PHASE=IPHAS(2)
    37 CONTINUE
    41 CALL ARRIV(IX,R,I,J,K,TMEAN,TCHEK,CLKTM,CKARL,CKARF,
      $CKARR,TARV)
       IF(TCHEK-PHASE) 41,41,42
    42 TCHEK=TCHEK-PHASE
       NINPT(JN)=NINPT(JN)+I+J+K
C---------( STATION - D )---------
    17 CONTINUE
       II=1
       NX=1
       IK=1
       IF(I) 132,132,133
   132 IK=0
   133 TIME=0
       TIMES=TRSEV
       IF(IE) 43,44,43
    43 IE=0
       CALL TNORS(IX,PBL1,PBL2,TSEVL)
       TIMES=TSEVL
```

```
PAGE   5     (TRAF1)

    44 CONTINUE
    45 TIME=TIME+1
       IF(TIME-PHASE) 46,46,47
    47 TRSEV=TIMES
       GO TO 40
    46 CLOCK=CLOCK+1
       CALL QUEUE (ITLQ,CLOCK,CKARL,II,I,IK)
       IF(CLOCK-TIMES) 48,49,49
    48 LSERV=0
       GO TO 50
    49 IF(ITLQ) 51,51,52
    51 TIMES=TIMES+1
       LSERV=0
       GO TO 50
    52 ITLQ=ITLQ-1
       NX=0
       LSERV=1
    50 CONTINUE
       IF(NX) 53,54,53
    54 CALL TNORS(IX,PBL1,PBL2,TSEVL)
       TIMES=TIMES+TSEVL
    53 CONTINUE
       NOUTP(JN)=NOUTP(JN)+LSERV
       A(TIME)=ITLQ
       B(TIME)=LSERV
       NX=1
       GO TO 45
C---------( STATION - E )---------
    40 CLOCK=CLOCK-PHASE
       TIMES=CLOCK
       JJ=1
       NX=1
       IK=1
       IF(J) 135,135,136
   135 IK=0
   136 TIME=0
       IF(KPK) 55,56,55
    55 IF(LXY) 57,56,57
    56 CONTINUE
    58 CALL TNORS(IX,PBF1,PBF2,TSEVF)
       TIMES=TIMES+TSEVF
    57 CONTINUE
    59 TIME=TIME+1
       CLOCK=CLOCK+1
       CALL QUEUE(IFWQ,CLOCK,CKARF,JJ,J,IK)
       IF(KPK) 60,61,60
    60 IF(LXY) 62,61,62
    61 CONTINUE
       IF(CLOCK-TIMES) 63,64,64
    63 FSERV=0
```

```
PAGE   6     (TRAF1)

       GO TO 65
    64 IF(IFWQ) 66,66,67
    66 FSERV=0
       TIMES=TIMES+1
       GO TO 65
    67 IF(IFWQ-LANE) 181,181,182
   181 FSERV=IFWQ
       IFWQ=0
       GO TO 183
   182 IFWQ=IFWQ-LANE
       FSERV=LANE
   183 NX=0
       GO TO 65
    62 FSERV=0
    65 CONTINUE
       NOUTP(JN)=NOUTP(JN)+FSERV
       C(TIME)=IFWQ
       D(TIME)=FSERV
C***GO TO ...F.
       IF(TIME-PHASE) 68,69,69
    68 IF(NX) 59,70,59
    70 NX=1
       GO TO 58
C---------( STATION - F )---------
    69 CONTINUE
       CLOCK=CLOCK-PHASE
       TIMES=CLOCK
       KK=1
       NX=1
       IK=1
       IF(K) 137,137,138
   137 IK=0
   138 TIME=0
       IF(KPK) 71,72,71
    71 IF(LXY) 72,73,72
    72 CONTINUE
    74 CALL TNORS(IX,PBR1,PBR2,TSEVR)
       TIMES=TIMES+TSEVR
    73 CONTINUE
    75 TIME=TIME+1
       CLOCK=CLOCK+1
       CALL QUEUE (ITRQ,CLOCK,CKARR,KK,K,IK)
       IF(KPK) 76,77,76
    76 IF(LXY) 77,78,77
    77 CONTINUE
       IF(CLOCK-TIMES) 79,80,80
    79 RSERV=0
       GO TO 81
    80 IF(ITRQ) 82,82,83
    82 RSERV=0
```

```
PAGE   7    (TRAF1)

       TIMES=TIMES+1
       GO TO 81
    83 ITRQ=ITRQ-1
       RSERV=1
       NX=0
       GO TO 81
    78 RSERV=0
    81 CONTINUE
       IF(JAK-1) 142,142,143
   142 WRITE(1'CLOCK) ITRQ,RSERV,C(TIME),D(TIME),A(TIME),
      $B(TIME)
       GO TO 144
   143 WRITE(1'CLOCK) (KB(L),L=1,JA3),ITRQ,RSERV,C(TIME),
      $D(TIME),A(TIME),B(TIME)
   144 CONTINUE
       NOUTP(JN)=NOUTP(JN)+RSERV
C---------( CALL SW 2 - FOR CHECKING RESULTS )---------
       CALL DATSW(2,IO)
       GO TO (153,154),IO
   153 READ(1'CLOCK) KEY
       WRITE(3,209) CLOCK,JN,KEY
   209 FORMAT(/5X'CLOCK ='I5,5X'JN ='I5/5X'EAST'5X'Q-S'5X'R',
      $2I6,5X'F'2I6,5X'L'2I6/5X'NORTH'4X'Q-S'5X'R'2I6,5X'F',
      $2I6,5X'L'2I6/5X'SOUTH'4X,'Q-S'5X'R'2I6,5X'F'2I6,5X'L',
      $2I6)
   154 CONTINUE
       IF(TIME-PHASE) 84,85,85
    84 IF(NX) 75,86,75
    86 NX=1
       GO TO 74
C***GO TO ...G.
    85 IF(KPK) 87,88,87
    87 LXY=LXY+1
       GO TO 28
C***GOTO...C.
C---------( STATION - G )---------
    88 CONTINUE
C***GO TO ...H.
       IF(CLOCK-7200) 89,90,90
    89 TIMEA=TCHEK
       I=0
       J=0
       K=0
    91 CALL ARRIV(IX,R,I,J,K,TMEAN,TIMEA,CLKTM,CKARL,CKARF,
      $CKARR,TARV)
       IF(TIMEA-TRED) 91,91,126
   126 CONTINUE
       NINPT(JN)=NINPT(JN)+I+J+K
       GO TO 16
    90 JN=JN+1
```

```
PAGE    8     (TRAF1)

       IF(JN-N) 145,145,92
  145 JAK=JAK-1
       GO TO 1
   92 CALL LINK(TRAF2)
       END

FEATURES SUPPORTED
 ONE WORD INTEGERS
 IOCS

CORE REQUIREMENTS FOR TRAF1
 COMMON     278  VARIABLES     842  PROGRAM    1672

END OF COMPILATION
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```
PAGE    1     (TRAF2)

// JOB                                                    (TRAF2)

LOG DRIVE   CART SPEC   CART AVAIL  PHY DRIVE
  0000         0001         0001        0000

V2 M09   ACTUAL  8K  CONFIG  8K

// FOR
*LIST SOURCE PROGRAM
*IOCS(CARD,TYPEWRITER,KEYBOARD,1132PRINTER,DISK)
*ONE WORD INTEGERS
*NAME TRAF2
C.....MAIN PROGRAM TO FIND THE FREQUENCY DISTRIBUTION FORM
C.....OF VEHICLES PASS ON THE DETECTOR PLACED IN WEST-BOUND
C.....OF THE BASIC INTERSECTION AND PRINT OUT THE RESULT
      INTEGER DETEC,CKARL(200),A(60),B(60),C(60),D(60)
      INTEGER CLOCK,TIME,FSERV,RSERV,SOUTH,EAST,VSOTH,VNOTH
      INTEGER VEAST,DD
      DIMENSION NINPT(3),NOUTP(3),IPHAS(4),MM(3),KEY(18)
      DIMENSION KBP(25),PROB(25),KAI(25),QNOTE(8),KNS(2)
      DIMENSION KNN(4),KNE(4)
      COMMON PB1,PB2,K01
      COMMON JN,N,JAK,CKARL,CLOCK,NSTH,NEAST,NT,NE,MM,M,KEY
      COMMON IPHAS,NINPT,NOUTP,TIME,INDEX,NPHAS,NOCYL,ITLQS
      COMMON IFWQS,ITRQS,MCKSL,MCKSF,MCKSR,ITLQN,IFWQN,ITRQN
      COMMON MCKNL,MCKNF,MCKNR,ITLQE,IFWQE,ITRQE,MCKEL,MCKEF
      COMMON MCKER,K4,IPROB(3,3),LANE
      DEFINE FILE 1(7300,18,U,IND),2(121,240,U,IND)
      DEFINE FILE 100(5,320,U,IND),200(2,320,U,IND)
      DEFINE FILE 300(2,320,U,IND)
      DATA  KNS,KNN,KNE / 10*0 /
C---------( STATION - H )---------
      CLOCK=0
      TIME=0
      INDEX=1
   93 CLOCK=CLOCK+1
      IF(CLOCK-7200) 94,94,95
C***GO TO ...I.
   94 CONTINUE
      TIME=TIME+1
      DETEC=KNS(1)+KNN(1)+KNE(1)
      READ(1'CLOCK) ITRQ3,RSERV,IFWQ3,EAST,ITLQ3,LSERV,
     $ITRQ2,NORTH,IFWQ2,FSERV,ITLQ2,LSERV,
     $ITRQ1,RSERV,IFWQ1,FSERV,ITLQ1,SOUTH
      KNS(1)=KNS(2)
      KNS(2)=SOUTH
      DO 96 IP=1,3
      KNN(IP)=KNN(IP+1)
   96 KNE(IP)=KNE(IP+1)
      KNN(4)=NORTH
```

```
PAGE   2     (TRAF2)

      KNE(4)=EAST
      A(TIME)=ITLQ1+IFWQ1+ITRQ1
      B(TIME)=ITLQ2+IFWQ2+ITRQ2
      C(TIME)=ITLQ3+IFWQ3+ITRQ3
      D(TIME)=DETEC
C---------( CALL SW2 - FOR CHECKING RESULTS )---------
      CALL DATSW(2,I0)
      GO TO (164,165),I0
  164 WRITE(3,212) CLOCK,D(TIME),A(TIME),B(TIME),C(TIME)
  212 FORMAT(/5X'CLOCK ='I5,5X'DETEC ='I5,5X'VS ='I5,5X'VN =
     $'I5,5X'VE ='I5)
  165 CONTINUE
      CALL MAXVQ(CLOCK,ITLQS,IFWQS,ITRQS,ITLQ1,IFWQ1,ITRQ1,
     $MCKSL,MCKSF,MCKSR)
      CALL MAXVQ(CLOCK,ITLQN,IFWQN,ITRQN,ITLQ2,IFWQ2,ITRQ2,
     $MCKNL,MCKNF,MCKNR)
      CALL MAXVQ(CLOCK,ITLQE,IFWQE,ITRQE,ITLQ3,IFWQ3,ITRQ3,
     $MCKEL,MCKEF,MCKER)
      IF(TIME-60) 93,166,166
  166 WRITE(2'INDEX) A,B,C,D
      INDEX=INDEX+1
      TIME=0
      GO TO 93
C---------( STATION - I )---------
   95 CONTINUE
      NIND=INDEX-1
      READ(2,305) QNOTE
  305 FORMAT(8A4)
      WRITE(3,217) NPHAS,NOCYL,(IPHAS(IH),IH=1,NPHAS)
  217 FORMAT(1H1,7X,'NO. OF PHASES ='I6,5X'PERIOD OF CYCLE =
     $'I8,3X'SECONDS'//8X'AND PHASE RATIO =',5X'/',4(I3,' /'
     $))
      WRITE(3,304) QNOTE
  304 FORMAT(/8X,8A4)
      DO 124 JR=1,M
      MN=MM(JR)
      WRITE(3,210) MN
  210 FORMAT( //,8X'VEHICLES  PER'I8'  SECONDS'//10X'CLOCK'
     $15X'DETECTOR'/)
      KTOL=0
      CLOCK=0
      TIME=0
      DD=0
      K3=0
      DO 120 JZ=1,NIND
      READ(2'JZ) A,B,C,D
      DO 120 KZ=1,60
      VSOTH=A(KZ)
      VNOTH=B(KZ)
      VEAST=C(KZ)
```

```
PAGE   3     (TRAF2)

      DETEC=D(KZ)
      CLOCK=CLOCK+1
      TIME=TIME+1
      DD=DD+DETEC
      CALL MAXVQ(CLOCK,MAXS,MAXN,MAXE,VSOTH,VNOTH,VEAST,MSCK
     $,MNCK,MECK)
      IF(TIME-MN) 121,122,122
  122 TIME=0
      KTOL=KTOL+DD
      IF(MN-300) 301,302,301
  302 K3=K3+1
      KAI(K3)=DD
  301 WRITE(3,202) CLOCK,DD
  202 FORMAT(9X,I5,17X,I5)
      DD=0
  121 CONTINUE
      IF(CLOCK-7200) 120,126,126
  126 WRITE(3,308) KTOL
  308 FORMAT(50X'TOTAL ='I7,5X'VEHICLES')
  120 CONTINUE
  124 CONTINUE
      CALL QLANE(IFWQS,LANE)
      CALL QLANE(IFWQN,LANE)
      CALL QLANE(IFWQE,LANE)
      KLANE=LANE+2
C---------( PRINTING THE RESULTS )---------
      WRITE(3,211) MSCK,MNCK,MECK,MAXS,MAXN,MAXE
  211 FORMAT(/10X'MSCK ='I10,5X'MNCK ='I10,5X'MECK ='I10/10X
     $'MAXS ='I10,5X'MAXN ='I10,5X'MAXE ='I10)
      WRITE(3,213) MCKSL,MCKSF,MCKSR,ITLQS,IFWQS,ITRQS
  213 FORMAT(/10X'MAX. QUEUE FOR SOUTH BOUND'//10X'CLOCK'3I10
     $/10X'L-F-R'3I10)
      WRITE(3,214) MCKNL,MCKNF,MCKNR,ITLQN,IFWQN,ITRQN
  214 FORMAT(/10X'MAX. QUEUE FOR NORTH BOUND'//10X'CLOCK'3I10
     $/10X'L-F-R'3I10)
      WRITE(3,215) MCKEL,MCKEF,MCKER,ITLQE,IFWQE,ITRQE
  215 FORMAT(/10X'MAX. QUEUE FOR EAST BOUND'//10X'CLOCK'3I10
     $/10X'L-F-R'3I10)
      WRITE(3,216) NINPT,NOUTP
  216 FORMAT(/10X'TOTAL INPUT VEHICLES / 2 HRS. PERIOD'//10X
     $'FOR S-BOUND ='I8/10X'FOR N-BOUND ='I8/10X'FOR E-BOUND'
     $,' ='I8//10X'TOTAL OUTPUT VEHICLES / 2 HRS. PERIOD'//
     $10X'FOR S-BOUND ='I8/10X'FOR N-BOUND ='I8/10X'FOR E-'
     $,'BOUND ='I8)
      WRITE(3,218) ((IPROB(I1,J1),J1=1,3),I1=1,3),KLANE
  218 FORMAT(///10X'ACCORDING TO THE FOLLOWING ASSUMPTIONS'/
     $/10X'PROB. RATIO OF L-F-R FOR S-BOUND = /'3(I3' /')/10X
     $'PROB. RATIO OF L-F-R FOR N-BOUND = /'3(I3' /')/10X,
     $'PROB. RATIO OF L-F-R FOR E-BOUND = /'3(I3' /')//10X,
     $'(NOTE)    NO. OF LANES ='I3)
```

```
PAGE   4     (TRAF2)

      CALL GPROB(KAI,KBP,PROB,24,KT,LX1)
      WRITE(200'K4) NPHAS,(IPHAS(I1),I1=1,NPHAS),KT,KBP,PROB
     $,LX1
      IF(K4-2) 128,303,303
  303 K01=0
      CALL LINK(TRAF3)
  128 CALL LINK(TRAF1)
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS
 IOCS

CORE REQUIREMENTS FOR TRAF2
 COMMON     278  VARIABLES     446  PROGRAM    1292

END OF COMPILATION
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```
PAGE    1     (TRAF3)

// JOB                                                    (TRAF3)

LOG DRIVE   CART SPEC   CART AVAIL  PHY DRIVE
  0000         0001         0001        0000

V2 M09   ACTUAL  8K  CONFIG  8K

// FOR
*LIST SOURCE PROGRAM
*IOCS(CARD,TYPEWRITER,KEYBOARD,1132PRINTER,DISK)
*ONE WORD INTEGERS
*NAME TRAF3
C.....MAIN PROGRAM TO FIND THE MAXIMUM QUEUE AND VOLUME FOR
C.....THE LINK BETWEEN TWO SIMULATED INTERSECTIONS
      INTEGER PHASE,TRED,CLOCK,TIME,TIMEA,TIMES,TCHEK,TSEVL
      INTEGER TSEVF,TSEVR,FSERV,RSERV,CLKTM,CLKA,CLKB,AB(4)
      INTEGER CKARL(200),CKARF(200),CKARR(200)
      INTEGER A(80),B(80),C(80),D(80)
      DIMENSION IPHAS(4),KBP(25),PROB(25),IPROB(2,3),NOUTP(2)
      DIMENSION NINPT(2),KB(8)
      COMMON PB1,PB2,K01
      DEFINE FILE 1(7300,18,U,IND),2(121,240,U,IND)
      DEFINE FILE 100(5,320,U,IND),200(2,320,U,IND)
      DEFINE FILE 300(2,320,U,IND)
      DATA KB / 8*0 /
C---------( STATION - A )---------
      READ(2,199) NVEHC,IX,LANE
C----------( STARTING FROM TRAF3 - SET SWITCH 3 ON )---------
      CALL DATSW(3,KSW)
      GO TO (172,173),KSW
  172 K01=0
  173 CONTINUE
      K01=K01+1
      DO 6 IS=1,2
      NINPT(IS)=0
      NOUTP(IS)=0
      READ(2,199) (IPROB(IS,IR),IR=1,3)
  199 FORMAT(3I5)
    6 CONTINUE
      JAK=2
      READ(200'1) NPHAS,(AB(I1),I1=1,NPHAS),KT,KBP,PROB,LX1
      WRITE(300'1) NPHAS,(AB(I1),I1=1,NPHAS),KT,KBP,PROB,LX1
      READ(200'2) NPHAS,(IPHAS(I1),I1=1,NPHAS),KT,KBP,PROB,
     $LX1
      WRITE(300'1) NPHAS,(IPHAS(I1),I1=1,NPHAS)
      WRITE(300'2) NPHAS,(AB(I1),I1=1,NPHAS),KT,KBP,PROB,LX1
      DO 2 JN=1,2
      IE=1
      READ(2,198) PB1,PB2,PBL1,PBL2,PBF1,PBF2,PBR1,PBR2
  198 FORMAT(8F10.0)
```

```
PAGE   2     (TRAF3)

      READ(300'JN) NPHAS,(IPHAS(I2),I2=1,NPHAS),KT,KBP,PROB,
     $LX1
      IF(NPHAS-2) 3,3,4
    3 PHASE=IPHAS(1)
      TRED=IPHAS(2)
      KPK=0
      GO TO 5
    4 TRED=IPHAS(3)+IPHAS(4)
      PHASE=IPHAS(1)
      KPK=1
      LXY=0
    5 CONTINUE
      CLOCK=0
      TIMEA=0
      TRSEV=0
      ITLQ=0
      IFWQ=0
      ITRQ=0
      I=0
      J=0
      K=0
      JA2=6*JAK-6
      CALL RANDU(IX,IY,R)
      IX=IY
    7 CALL DISCR(IX,KT,KBP,PROB,NVEHC,KTARV,LX1)
      TIMEA=TIMEA+KTARV
      IF(TIMEA-PHASE) 8,8,9
    8 DO 300 LK=1,NVEHC
      IF(R-PB1) 10,10,11
   10 I=I+1
      CKARL(I)=TIMEA
      GO TO 12
   11 IF(R-PB2) 13,13,14
   13 J=J+1
      CKARF(J)=TIMEA
      GO TO 12
   14 K=K+1
      CKARR(K)=TIMEA
   12 CONTINUE
      CALL RANDU(IX,IY,R)
      IX=IY
  300 CONTINUE
      CLKTM=TIMEA
      GO TO 7
    9 TCHEK=TIMEA-PHASE
      NINPT(JN)=NINPT(JN)+I+J+K
      GO TO 15
C---------( STATION - B )---------
   16 TCHEK=TIMEA-TRED
      FSERV=0
```

```
PAGE   3     (TRAF3)

       RSERV=0
       NI=1
       NJ=1
       NK=1
       II=1
       JJ=1
       KK=1
       NX=1
       TIME=0
       TIMES=TRSEV
    17 TIME=TIME+1
       IF(TIME-TRED) 18,18,19
    18 CLOCK=CLOCK+1
       CALL PARTQ(ITLQ,CLOCK,CKARL,II,I,NI)
       IF(CLOCK-TIMES) 20,21,21
    20 LSERV=0
       GO TO 22
    21 IF(ITLQ) 23,23,24
    23 TIMES=TIMES+1
       LSERV=0
       GO TO 22
    24 ITLQ=ITLQ-1
       NX=0
       LSERV=1
    22 CONTINUE
       CALL PARTQ(IFWQ,CLOCK,CKARF,JJ,J,NJ)
       CALL PARTQ(ITRQ,CLOCK,CKARR,KK,K,NK)
       IF(NX) 25,26,25
    26 CALL TNORS(IX,PBL1,PBL2,TSEVL)
       NX=1
       TIMES=TIMES+TSEVL
    25 CONTINUE
       NOUTP(JN)=NOUTP(JN)+LSERV+FSERV+RSERV
       IF(JAK-1) 27,27,28
    27 WRITE(1'CLOCK) ITRQ,RSERV,IFWQ,FSERV,ITLQ,LSERV
       GO TO 29
    28 WRITE(1'CLOCK) (KB(L),L=1,JA2),ITRQ,RSERV,IFWQ,FSERV,
      $ITLQ,LSERV
    29 CONTINUE
       GO TO 17
    19 TRSEV=TIMES
       LXY=0
C---------( STATION - C )---------
    30 IF(CLOCK-7200) 31,32,32
    31 I=0
       J=0
       K=0
       IF(KPK) 33,34,33
    33 IF(LXY-1) 35,36,37
    35 PHASE=IPHAS(1)
```

```
PAGE   4     (TRAF3)

       GO TO 34
   36  PHASE=IPHAS(2)
   34  CONTINUE
       CALL DEARV(IX,R,I,J,K,TCHEK,CLKTM,CKARL,CKARF,CKARR,KT
      $,KBP,PROB,NVEHC,KTARV,LX1)
       IF(TCHEK-PHASE) 34,34,38
   38  TCHEK=TCHEK-PHASE
       NINPT(JN)=NINPT(JN)+I+J+K
C---------( STATION - D )---------
   15  II=1
       NX=1
       IK=1
       IF(I) 39,39,40
   39  IK=0
   40  TIME=0
       TIMES=TRSEV
       IF(IE) 41,42,41
   41  IE=0
       CALL TNORS(IX,PBL1,PBL2,TSEVL)
       TIMES=TSEVL
   42  CONTINUE
       TIME=TIME+1
       IF(TIME-PHASE) 43,43,44
   43  CLOCK=CLOCK+1
       CALL PARTQ(ITLQ,CLOCK,CKARL,II,I,IK)
       IF(CLOCK-TIMES) 45,46,46
   45  LSERV=0
       GO TO 47
   46  IF(ITLQ) 48,48,49
   48  TIMES=TIMES+1
       LSERV=0
       GO TO 47
   49  ITLQ=ITLQ-1
       NX=0
       LSERV=1
   47  CONTINUE
       IF(NX) 50,51,50
   51  CALL TNORS(IX,PBL1,PBL2,TSEVL)
       TIMES=TIMES+TSEVL
   50  CONTINUE
       NOVTP(JN)=NOUTP(JN)+LSERV
       A(TIME)=ITLQ
       B(TIME)=LSERV
       NX=1
       GO TO 42
   44  TRSEV=TIMES
C---------( STATION - E )--------
       CLOCK=CLOCK-PHASE
       TIMES=CLOCK
       JJ=1
```

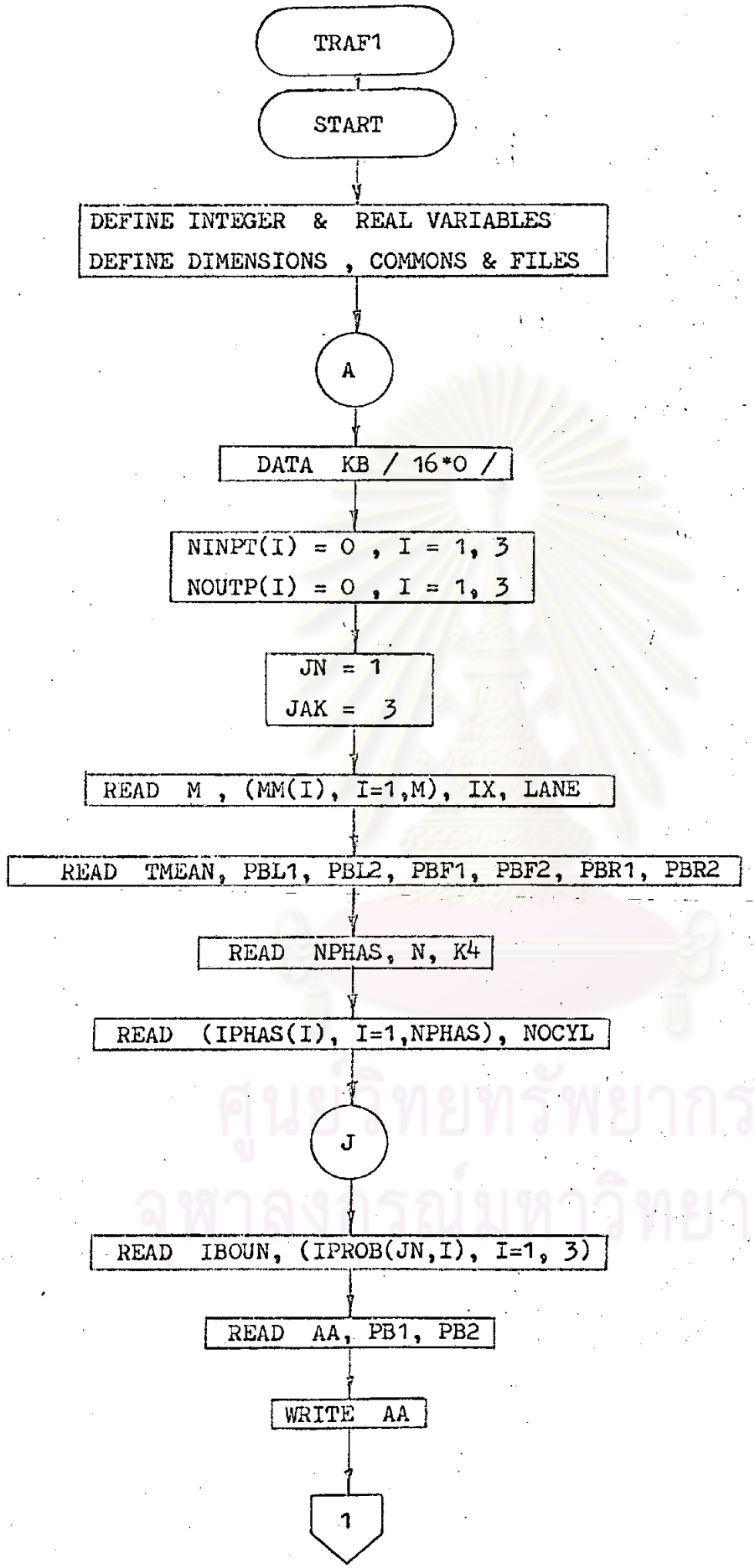
```
PAGE    5     (TRAF3)

       NX=1
       IK=1
       IF(J) 52,52,53
    52 IK=0
    53 TIME=0
       IF(KPK) 54,55,54
    54 IF(LXY) 56,55,56
    55 CONTINUE
    57 CALL TNORS(IX,PBF1,PBF2,TSEVF)
       TIMES=TIMES+TSEVF
    56 TIME=TIME+1
       CLOCK=CLOCK+1
       CALL PARTQ(IFWQ,CLOCK,CKARF,JJ,J,IK)
       IF(KPK) 58,59,58
    58 IF(LXY) 61,59,61
    59 CONTINUE
       IF(CLOCK-TIMES) 61,62,62
    61 FSERV=0
       GO TO 63
    62 IF(IFWQ) 64,64,65
    64 FSERV=0
       TIMES=TIMES+1
       GO TO 63
    65 IF(IFWQ-LANE) 181,181,182
   181 FSERV=IFWQ
       IFWQ=0
       GO TO 183
   182 IFWQ=IFWQ-LANE
       FSERV=LANE
   183 NX=0
    63 CONTINUE
       NOUTP(JN)=NOUTP(JN)+FSERV
       C(TIME)=IFWQ
       D(TIME)=FSERV
       IF(TIME-PHASE) 60,66,66
    60 IF(NX) 56,67,56
    67 NX=1
       GO TO 57
C---------( STATION - F )---------
    66 CLOCK=CLOCK-PHASE
       TIMES=CLOCK
       KK=1
       IK=1
       NX=1
       IF(K) 68,68,69
    68 IK=0
    69 TIME=0
       IF(KPK) 70,71,70
    70 IF(LXY) 71,72,71
    71 CONTINUE
```

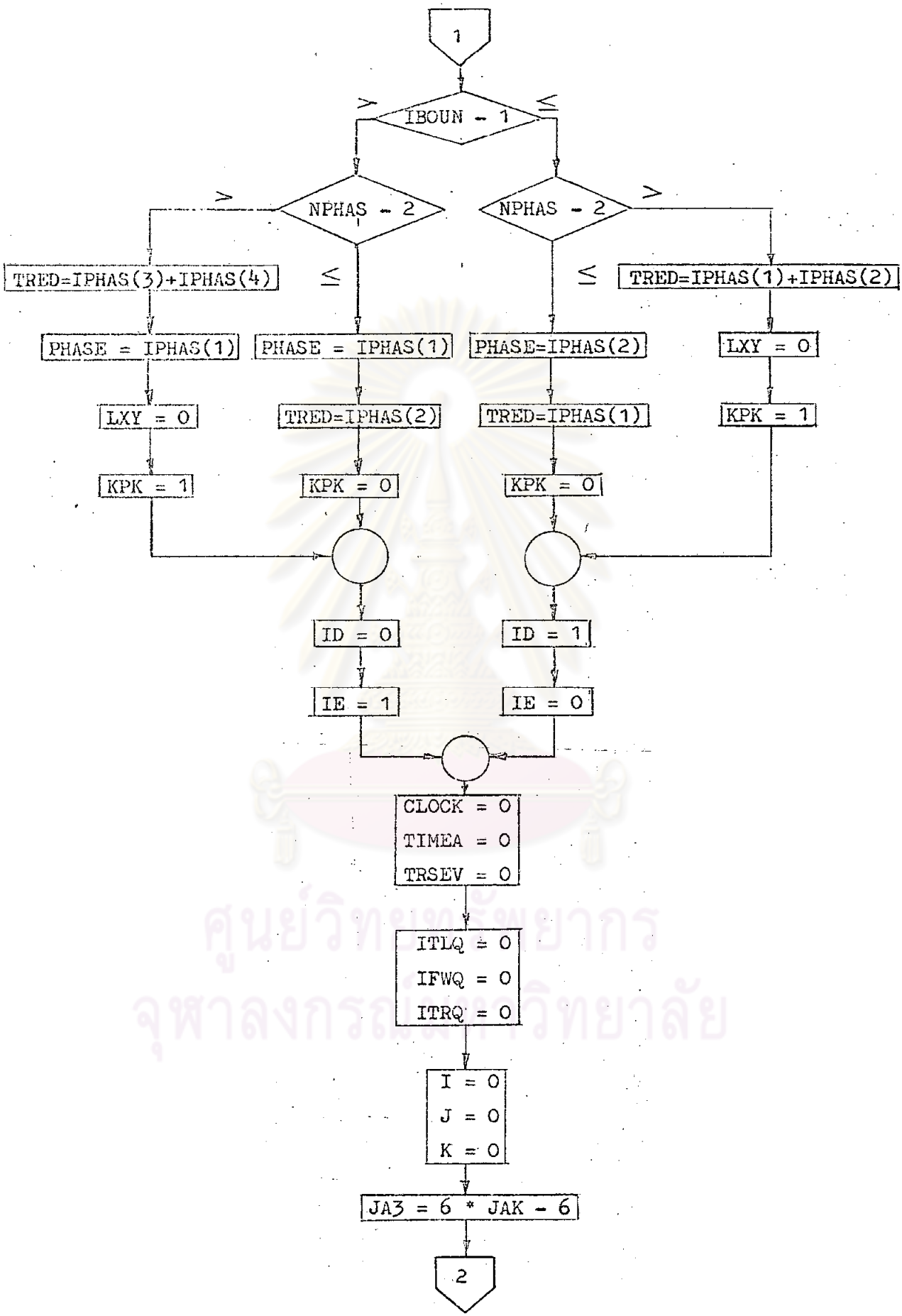
```
PAGE   6     (TRAF3)

       CALL TNORS(IX,PBR1,PBR2,TSEVR)
       TIMES=TIMES+TSEVR
    72 TIME=TIME+1
       CLOCK=CLOCK+1
       CALL PARTQ(ITRQ,CLOCK,CKARR,KK,K,IK)
       IF(KPK) 73,74,73
    73 IF(LXY) 74,76,74
    74 IF(CLOCK-TIMES) 76,77,77
    76 RSERV=0
       GO TO 75
    77 IF(ITRQ) 78,78,79
    78 RSERV=0
       TIMES=TIMES+1
       GO TO 75
    79 ITRQ=ITRQ-1
       RSERV=1
       NX=0
    75 CONTINUE
       IF(JAK-1) 80,80,81
    80 WRITE(1'CLOCK) ITRQ,RSERV,C(TIME),D(TIME),A(TIME),
      $B(TIME)
       GO TO 82
    81 WRITE(1'CLOCK) (KB(L),L=1,JA2),ITRQ,RSERV,C(TIME),
      $D(TIME),A(TIME),B(TIME)
    82 CONTINUE
       NOUTP(JN)=NOUTP(JN)+RSERV
       IF(TIME-PHASE) 83,84,84
    83 IF(NX) 72,86,72
    86 NX=1
       GO TO 71
    84 IF(KPK) 87,37,87
    87 LXY=LXY+1
       GO TO 30
C---------( STATION - G )---------
    37 IF(CLOCK-7200) 88,32,32
    88 TIMEA=TCHEK
       I=0
       J=0
       K=0
    89 CALL DEARV(IX,R,I,J,K,TIMEA,CLKTM,CKARL,CKARF,CKARR,KT,
      $KBP,PROB,NVEHC,KTARV,LX1)
       IF(TIMEA-TRED) 89,89,90
    90 NINPT(JN)=NINPT(JN)+I+J+K
       GO TO 16
    32 JAK=JAK-1
C---------( GO TO - B )---------
     2 CONTINUE
C---------( STATION - H )---------
       DO 91 CLOCK=1,7200
       READ(1'CLOCK) ITRQ2,RSERV,IFWQ2,FSERV,ITLQ2,LSERV,
```

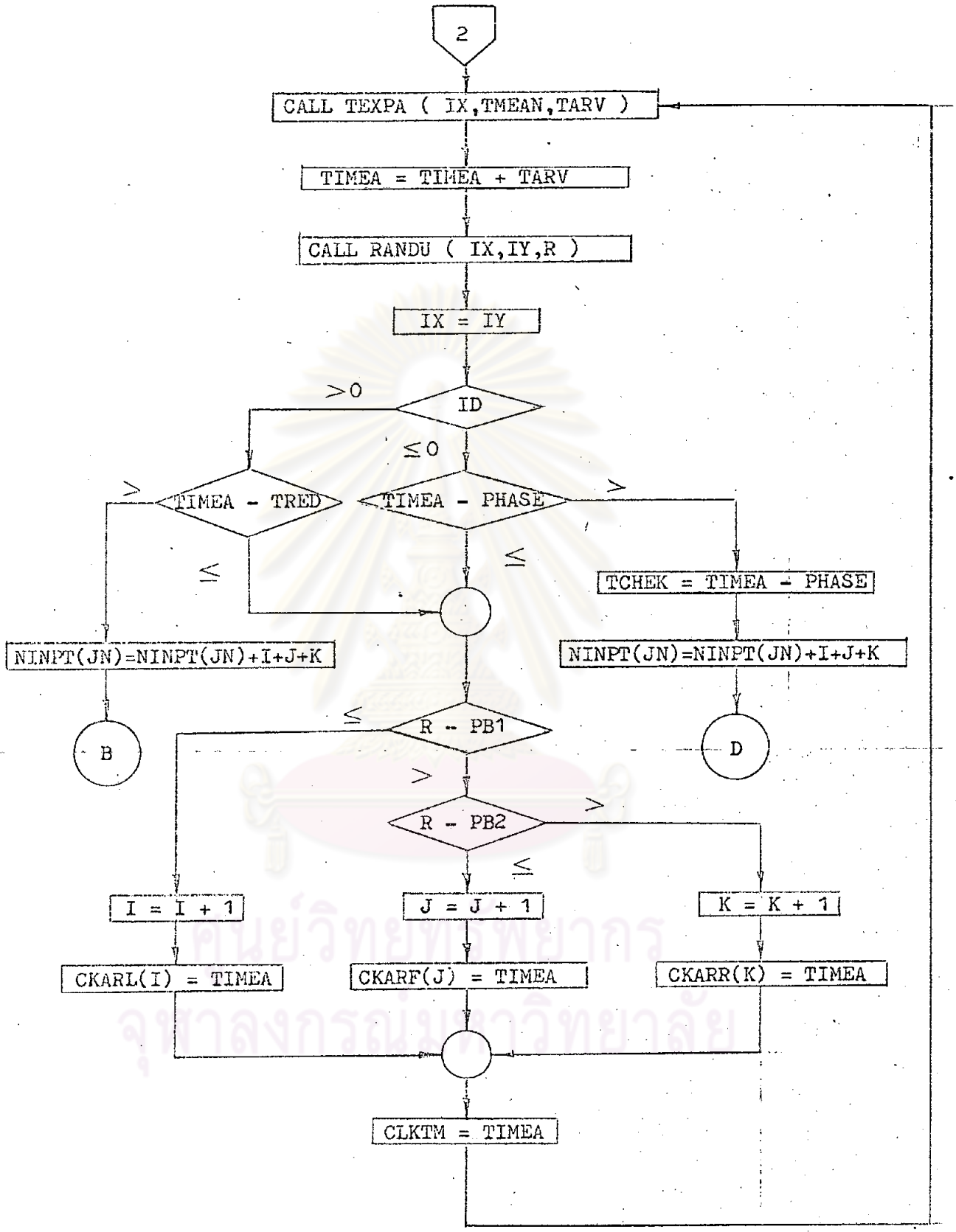
```
PAGE   7     (TRAF3)

      $ITRQ1,RSERV,IFWQ1,FSERV,ITLQ1,LSERV
       CALL MAXVQ(CLOCK,ITLQA,IFWQA,ITRQA,ITLQ1,IFWQ1,ITRQ1,
      $MCKAL,MCKAF,MCKAR)
       CALL MAXVQ(CLOCK,ITLQB,IFWQB,ITRQB,ITLQ2,IFWQ2,ITRQ2,
      $MCKBL,MCKBF,MCKBR)
       KVA=ITLQ1+IFWQ1+ITRQ1
       KVB=ITLQ2+IFWQ2+ITRQ2
       IF(CLOCK-1) 92,92,93
    92 MAXA=KVA
       MAXB=KVB
       CLKA=CLOCK
       CLKB=CLOCK
       GO TO 91
    93 IF(MAXA-KVA) 94,95,95
    94 MAXA=KVA
       CLKA=CLOCK
    95 IF(MAXB-KVB) 96,91,91
    96 MAXB=KVB
       CLKB=CLOCK
    91 CONTINUE
C---------( PRINTING THE RESULTS )---------
       CALL QLANE(IFWQA,LANE)
       CALL QLANE(IFWQB,LANE)
       KLANE=LANE+2
C---------( STATION - I )---------
       WRITE(3,200)
   200 FORMAT(1H1,9X,'SOLUTION FOR MAX. QUEUE FROM INTERSEC'
      $,'TION -A- , DUE TO SIGNAL -B-')
       WRITE(3,201) MCKAL,MCKAF,MCKAR,ITLQA,IFWQA,ITRQA
   201 FORMAT(/10X'CLOCK'3I10/10X/10X'L-F-R'3I10)
       WRITE(3,202)
   202 FORMAT(//10X'SOLUTION FOR MAX. QUEUE FROM INTERSECTION'
      $,' -B- , DUE TO SIGNAL -A-')
       WRITE(3,203) MCKBL,MCKBF,MCKBR,ITLQB,IFWQB,ITRQB
   203 FORMAT(/10X'CLOCK'3I10/10X'L-F-R'3I10)
       WRITE(3,204) CLKA,MAXA,CLKB,MAXB
   204 FORMAT(///10X'MAX VOLUMNS FROM A TO B'/10X'CLOCK'I10,
      $10X'MAX VOL.'I10//10X'MAX VOLUMNS FROM B TO A'/10X,
      $'CLOCK'I10,10X'MAX VOL.'I10)
       WRITE(3,205) NINPT,NOUTP
   205 FORMAT(//10X'TOTAL INPUT VEHICLES / 2HRS. PERIOD'//10X
      $'FROM A TO B ='I8/10X'FROM B TO A ='I8//10X'TOTAL OUT'
      $,'PUT VEHICLES / 2 HRS. PERIOD'//10X'FROM A TO B ='I8/
      $10X'FROM B TO A ='I8)
       WRITE(3,206) ((IPROB(I2,J2),J2=1,3),I2=1,2),NVEHC,KLANE
   206 FORMAT(///10X'ACCORDING TO THE FOLLOWING ASSUMPTIONS'/
      $/10X'PROB. RATIO OF L-F-R FOR A TO B = /'3(I3' /')/10X,
      $'PROB. RATIO OF L-F-R FOR B TO A = /'3(I3' /')//10X,
      $'(NOTE)  FOR NVEHC ='I3,5X'AND  NO. OF LANES ='I3)
       IF(K01-4) 170,171,171
```

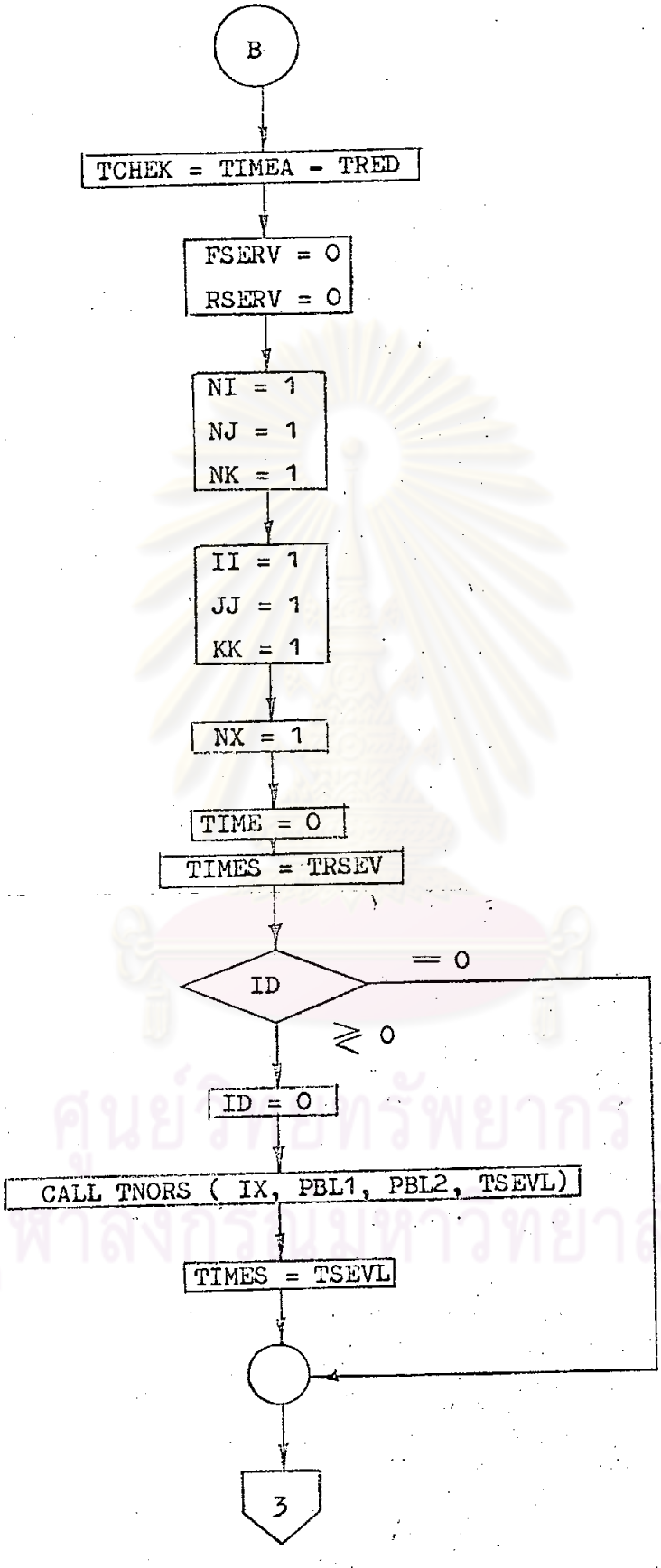
```
PAGE   8     (TRAF3)

  170 CALL LINK(TRAF3)
  171 CALL LINK(TRAF1)
      END

FEATURES SUPPORTED
 ONE WORD INTEGERS
 IOCS

CORE REQUIREMENTS FOR TRAF3
 COMMON       6  VARIABLES    1152  PROGRAM    2214

END OF COMPILATION
```

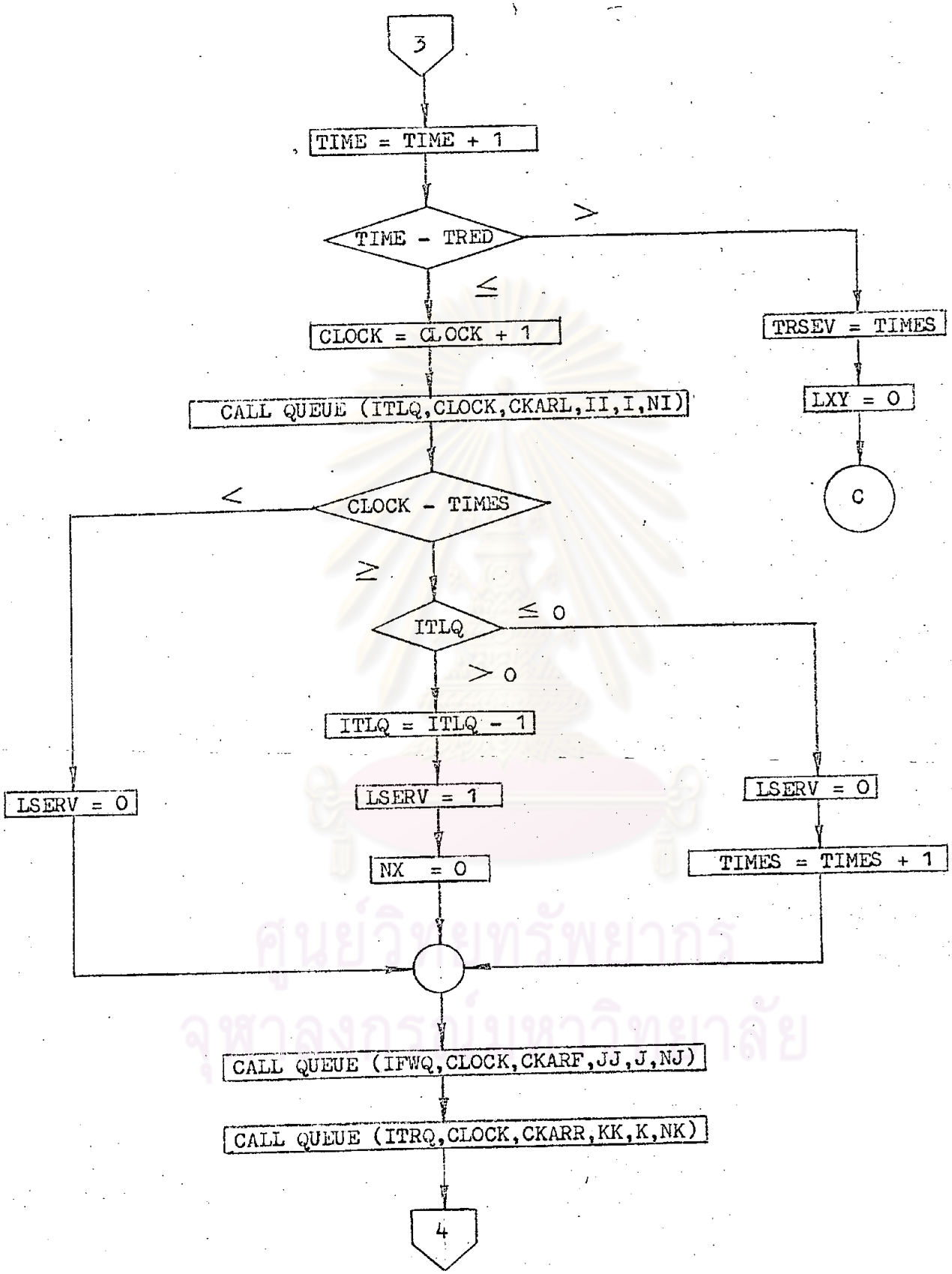
APPENDIX D

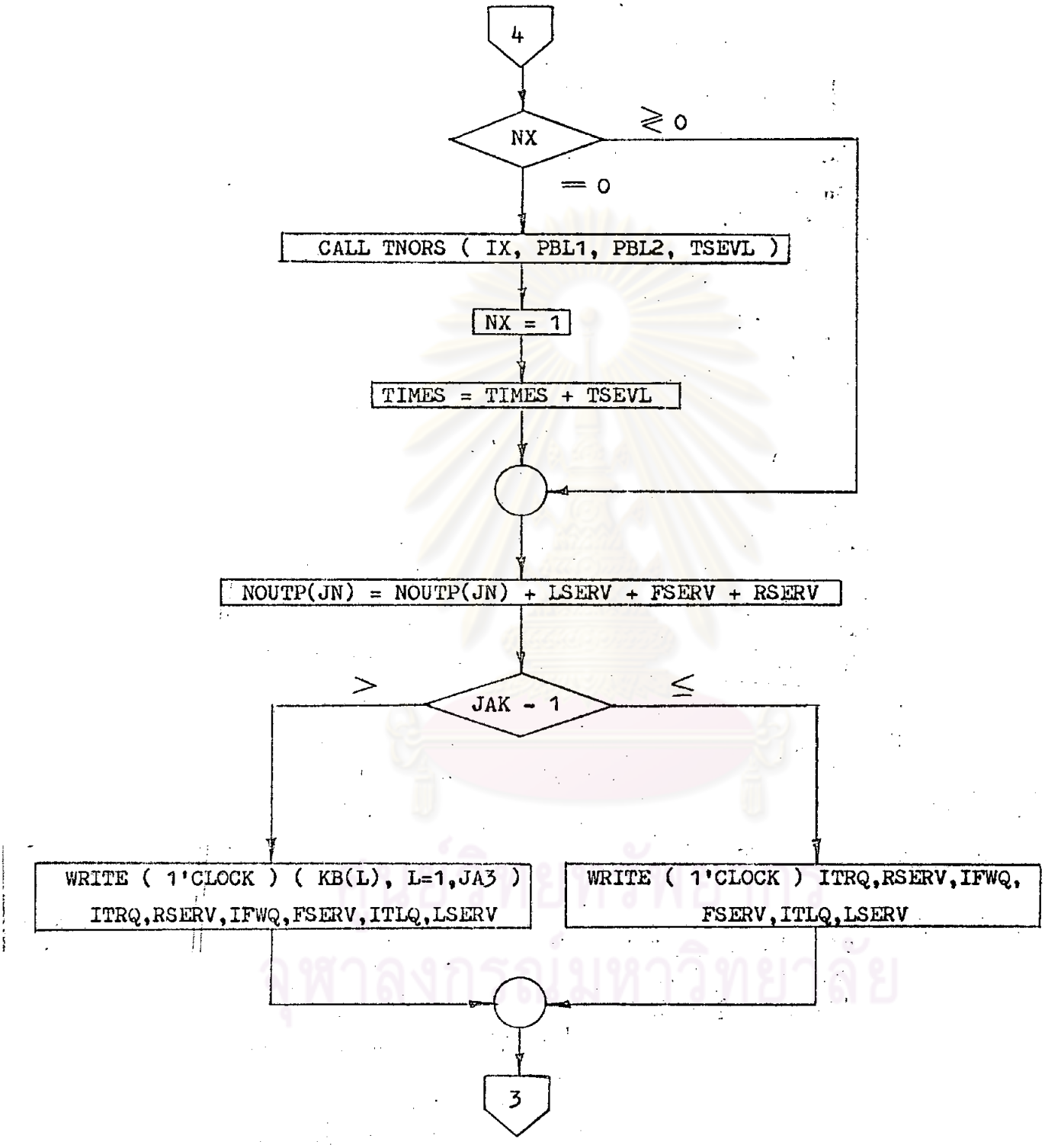


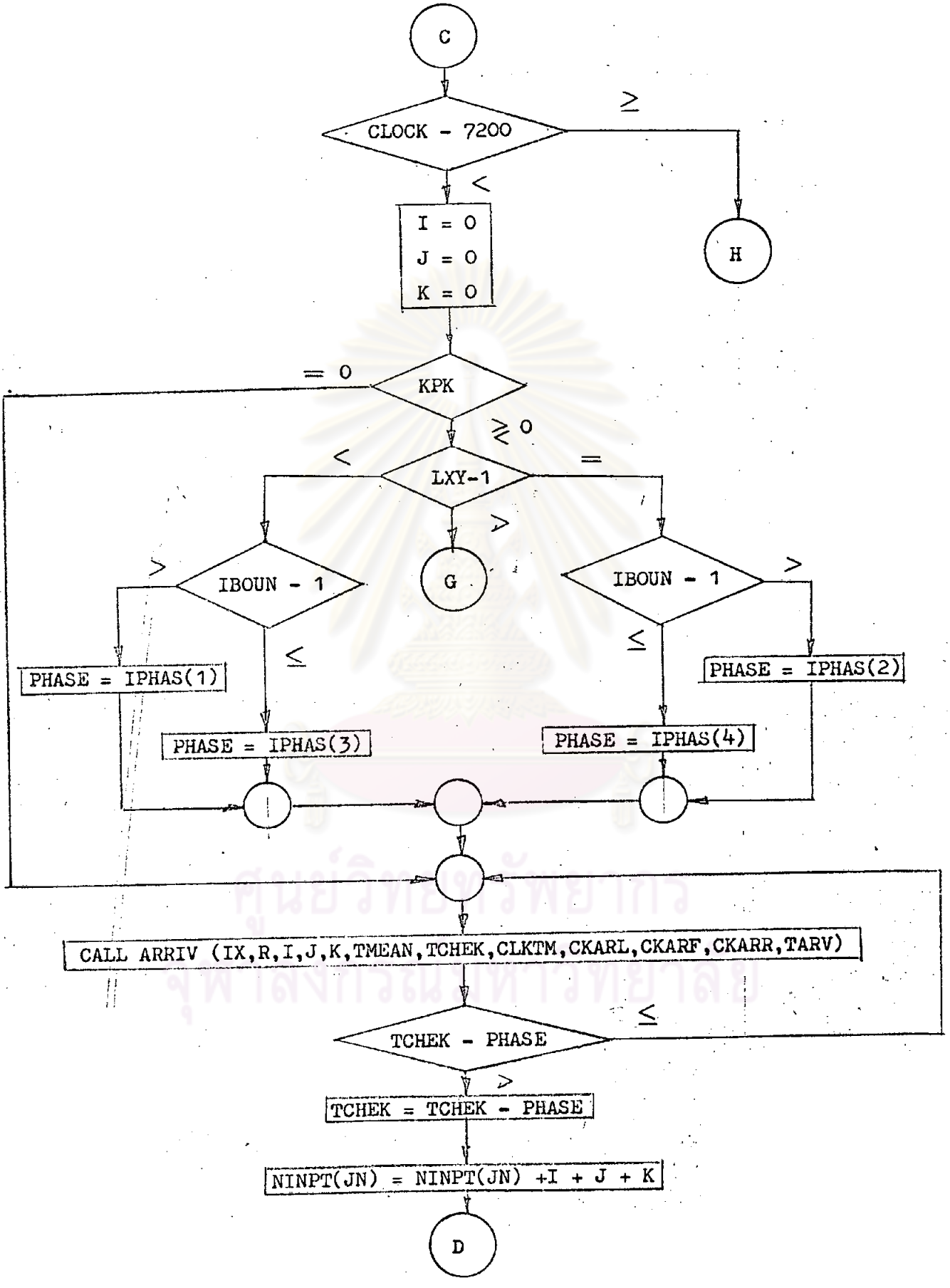


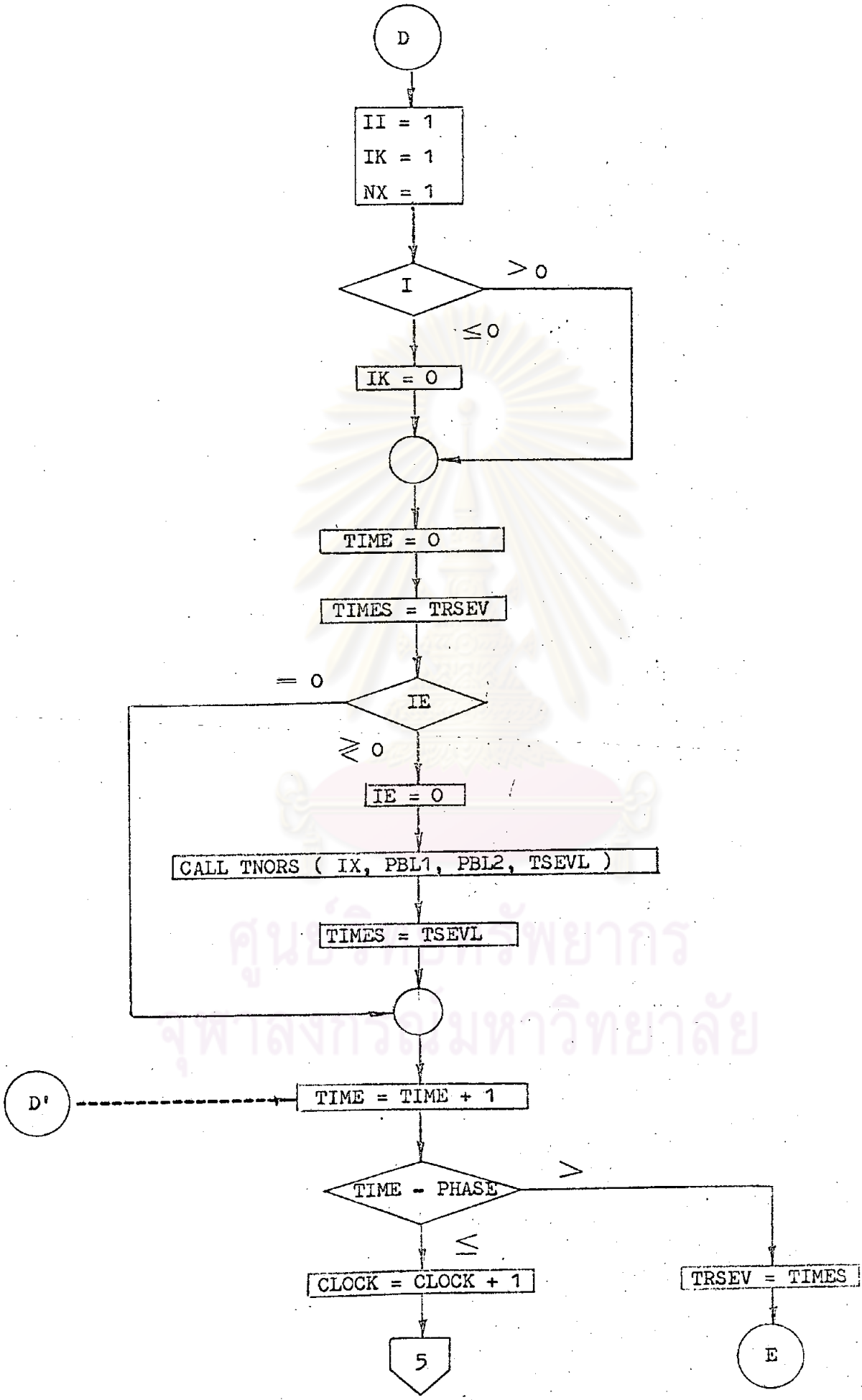


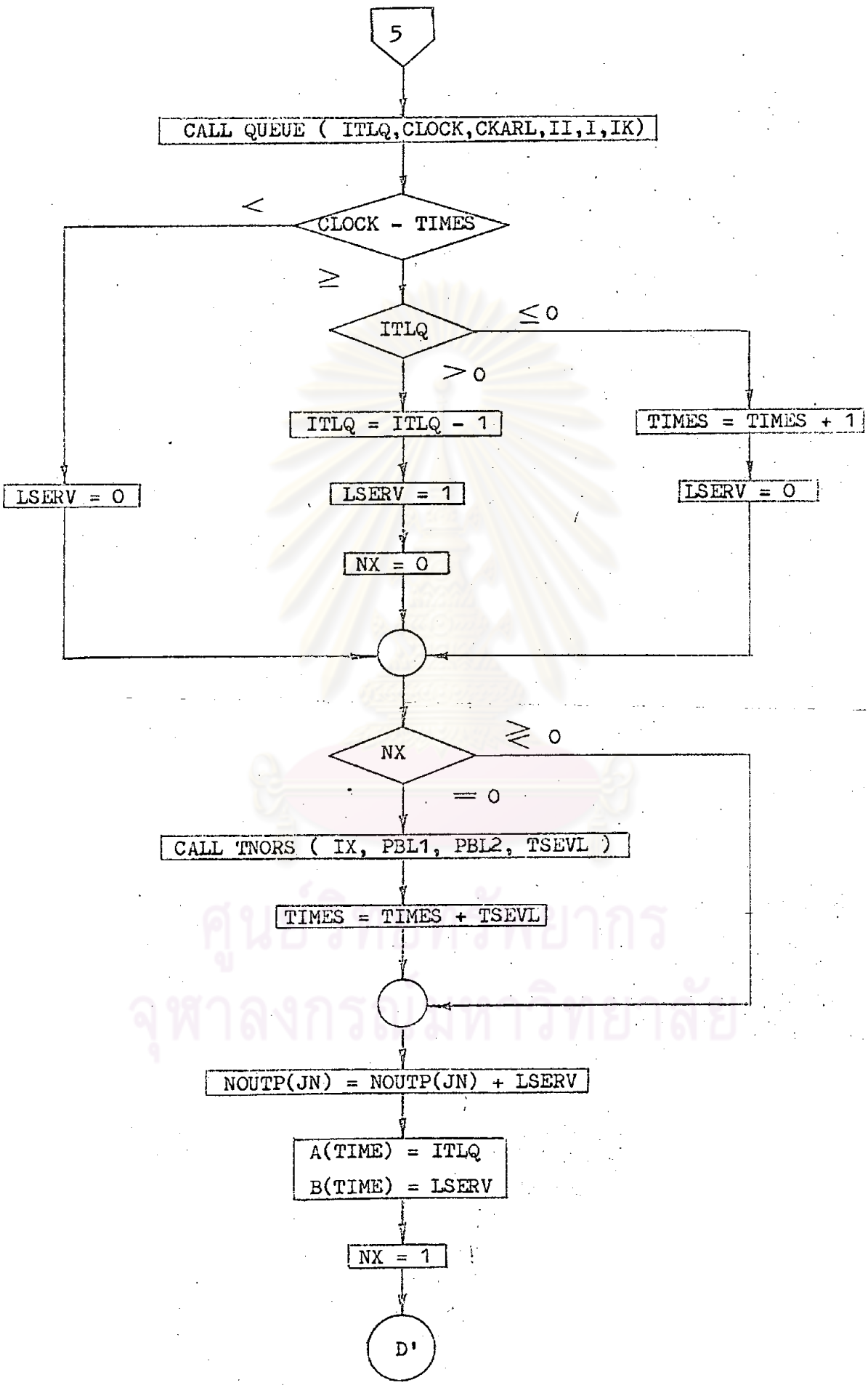


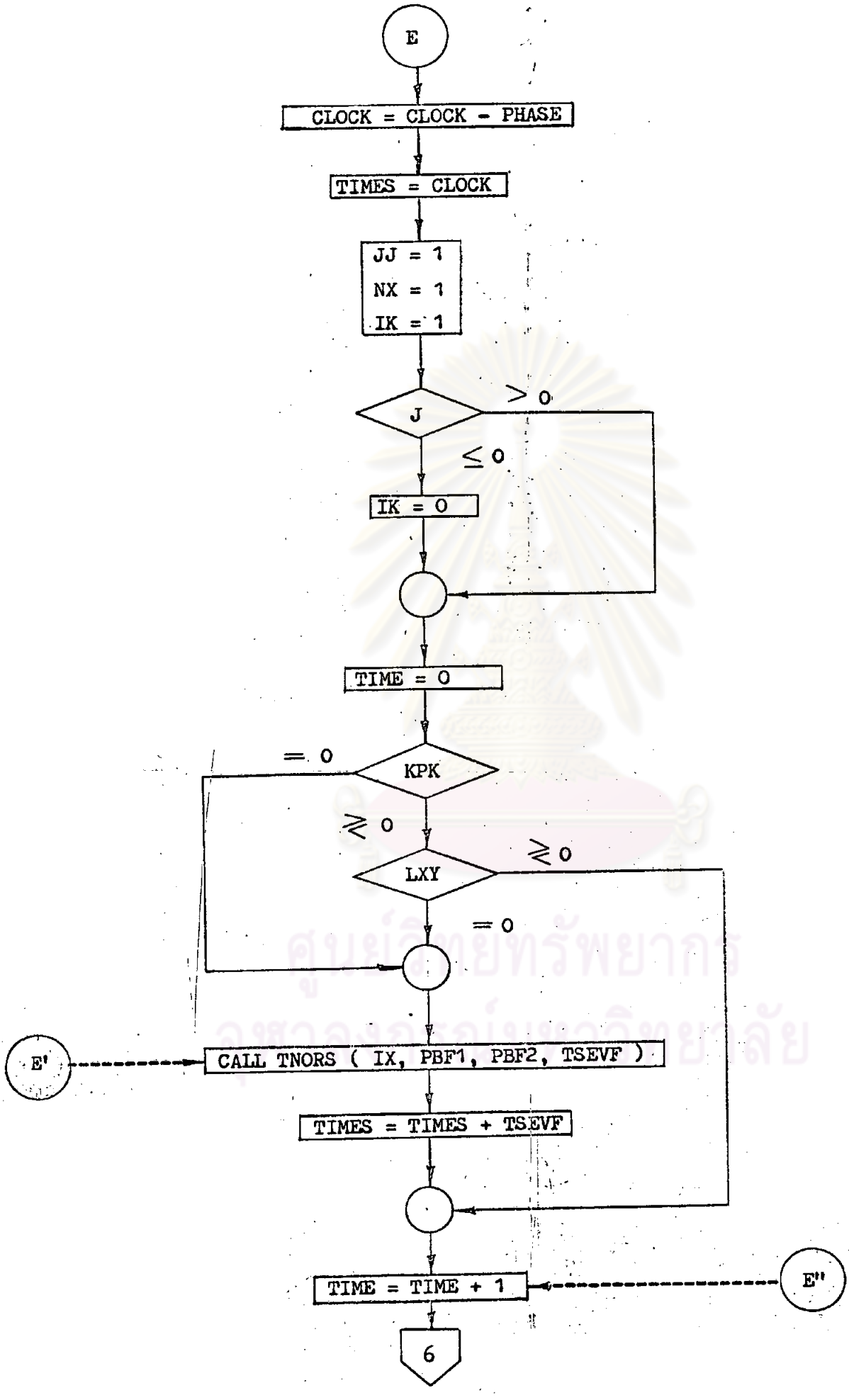


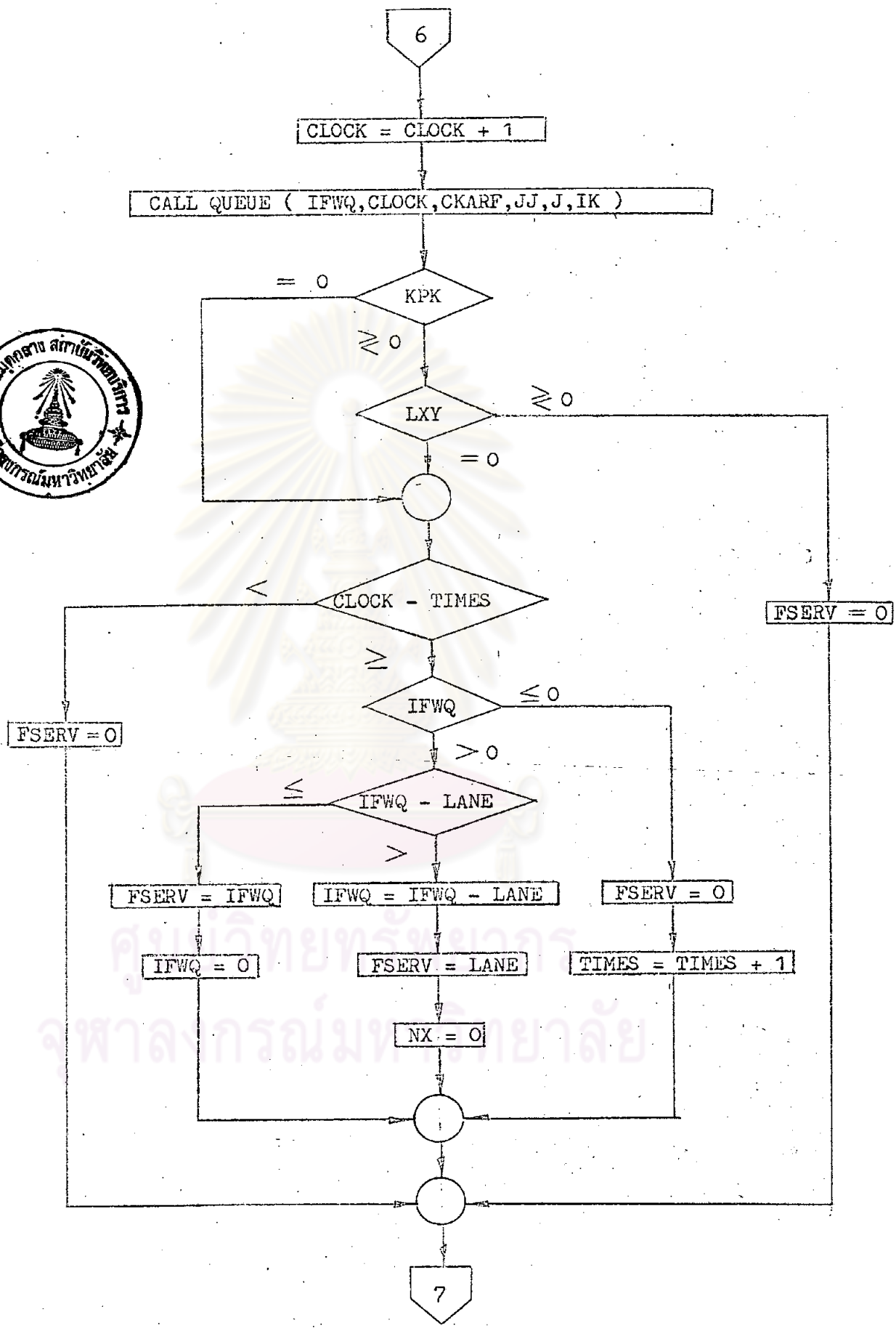

4
NX
≥ 0
= 0
CALL TNORS (IX, PBL1, PBL2, TSEVL)
NX = 1
TIMES = TIMES + TSEVL
NOUTP(JN) = NOUTP(JN) + LSERV + FSERV + RSERV
>
JAK - 1
≤
WRITE (1'CLOCK) (KB(L), L=1,JA3)
ITRQ,RSERV,IFWQ,FSERV,ITLQ,LSERV
WRITE (1'CLOCK) ITRQ,RSERV,IFWQ,
FSERV,ITLQ,LSERV
3

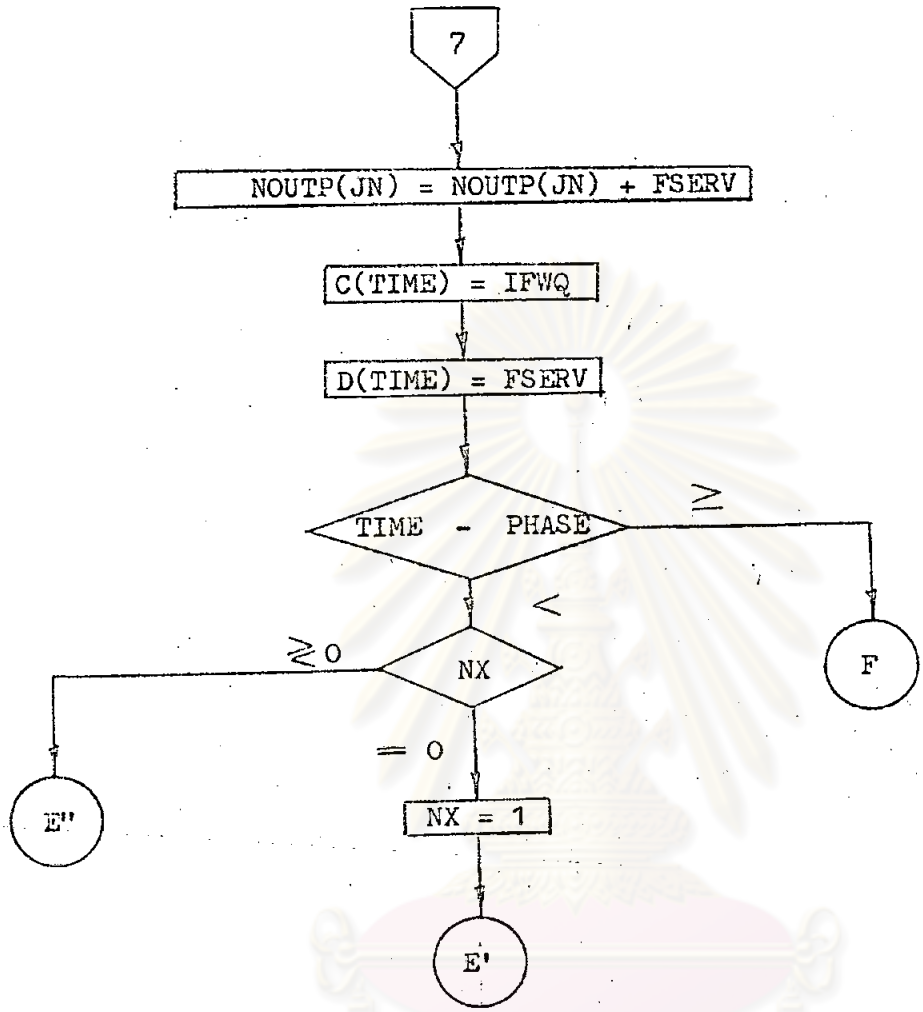

C
CLOCK - 7200
≥
H
<
I = 0
J = 0
K = 0
KPK
= 0
≧ 0
<
LXY-1
=
>
G
IBOUN - 1
>
≤
PHASE = IPHAS(1)
PHASE = IPHAS(3)
IBOUN - 1
>
≤
PHASE = IPHAS(2)
PHASE = IPHAS(4)
CALL ARRIV (IX,R,I,J,K,TMEAN,TCHEK,CLKTM,CKARL,CKARF,CKARR,TARV)
TCHEK - PHASE
≤
>
TCHEK = TCHEK - PHASE
NINPT(JN) = NINPT(JN) +I + J + K
D

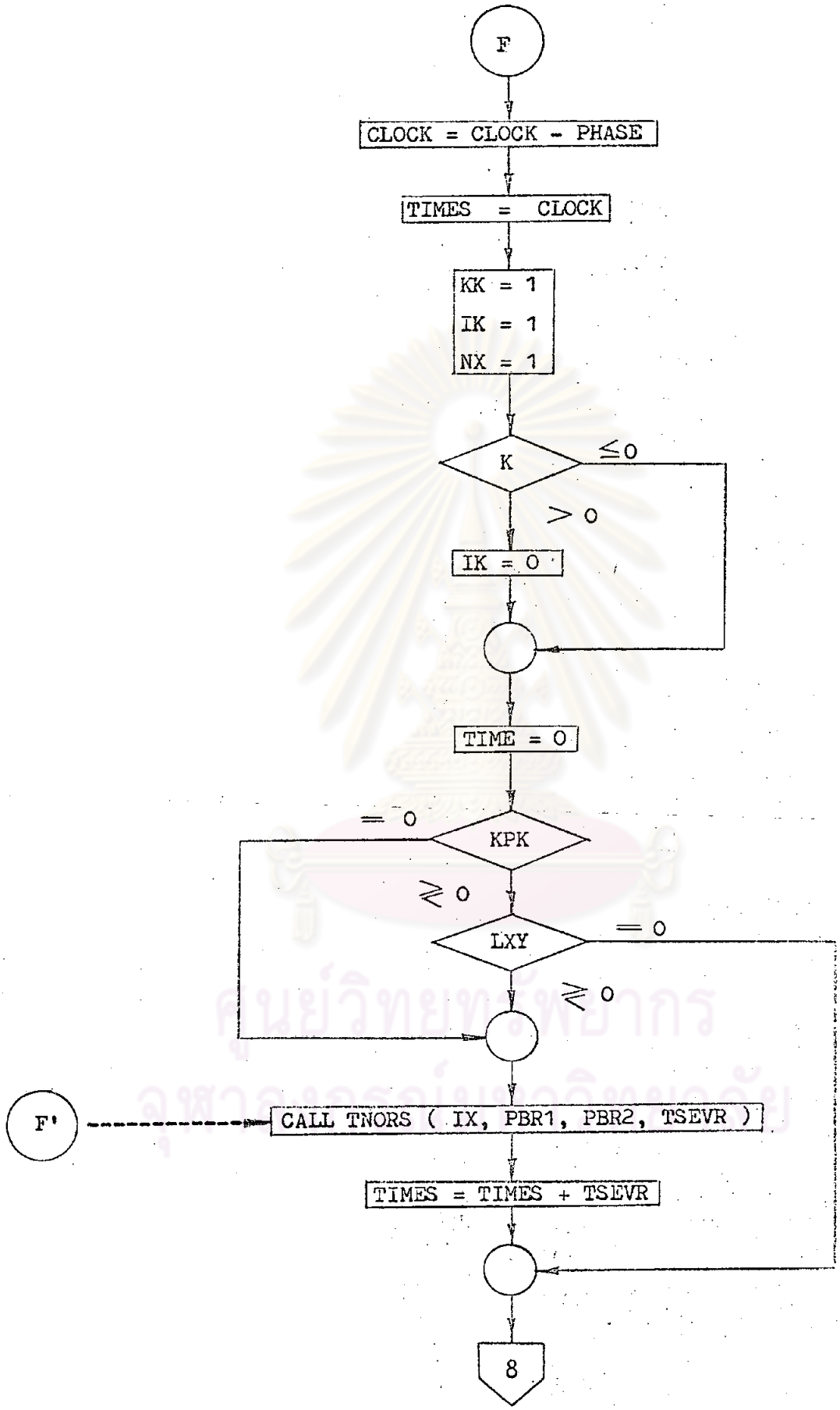


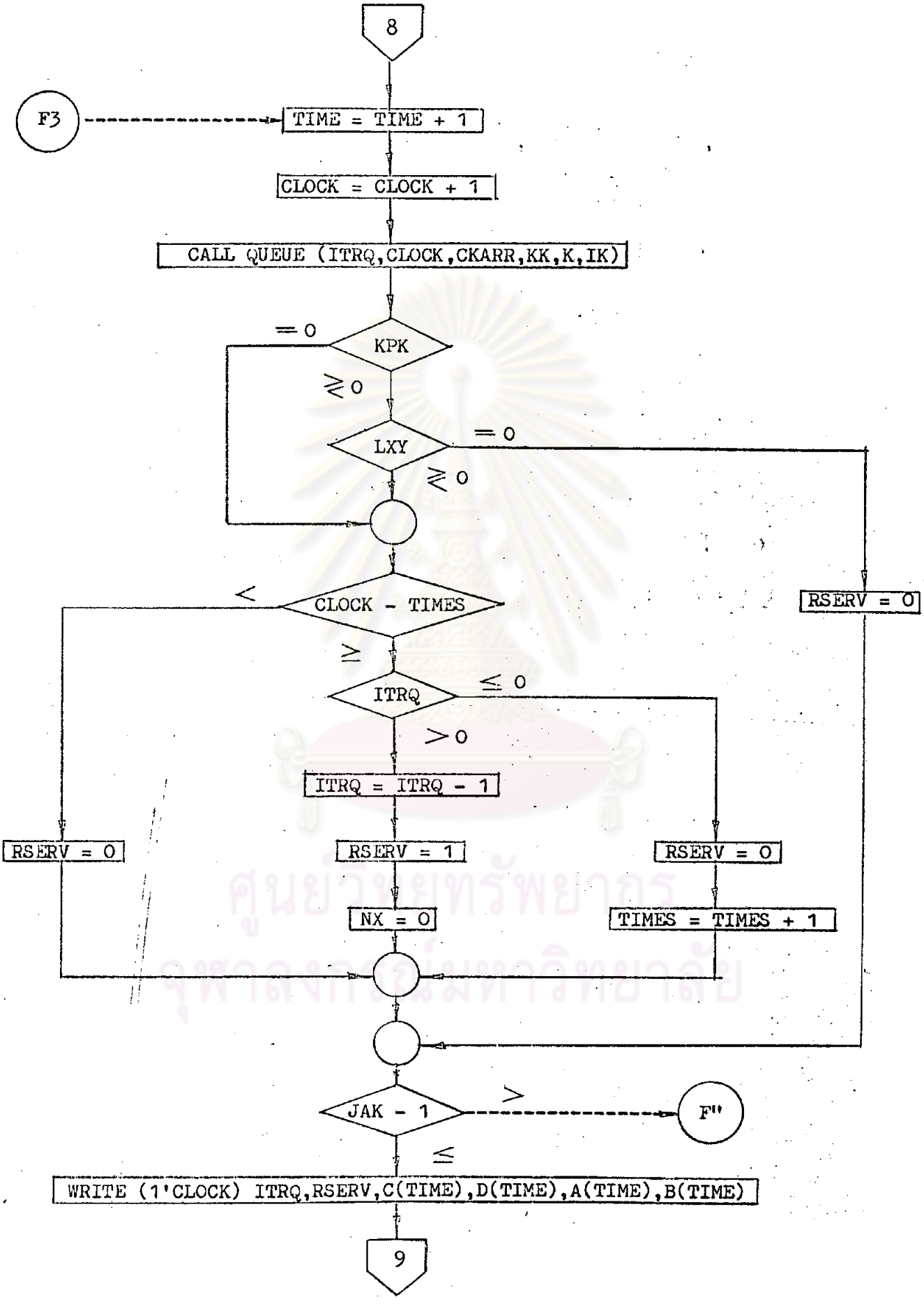


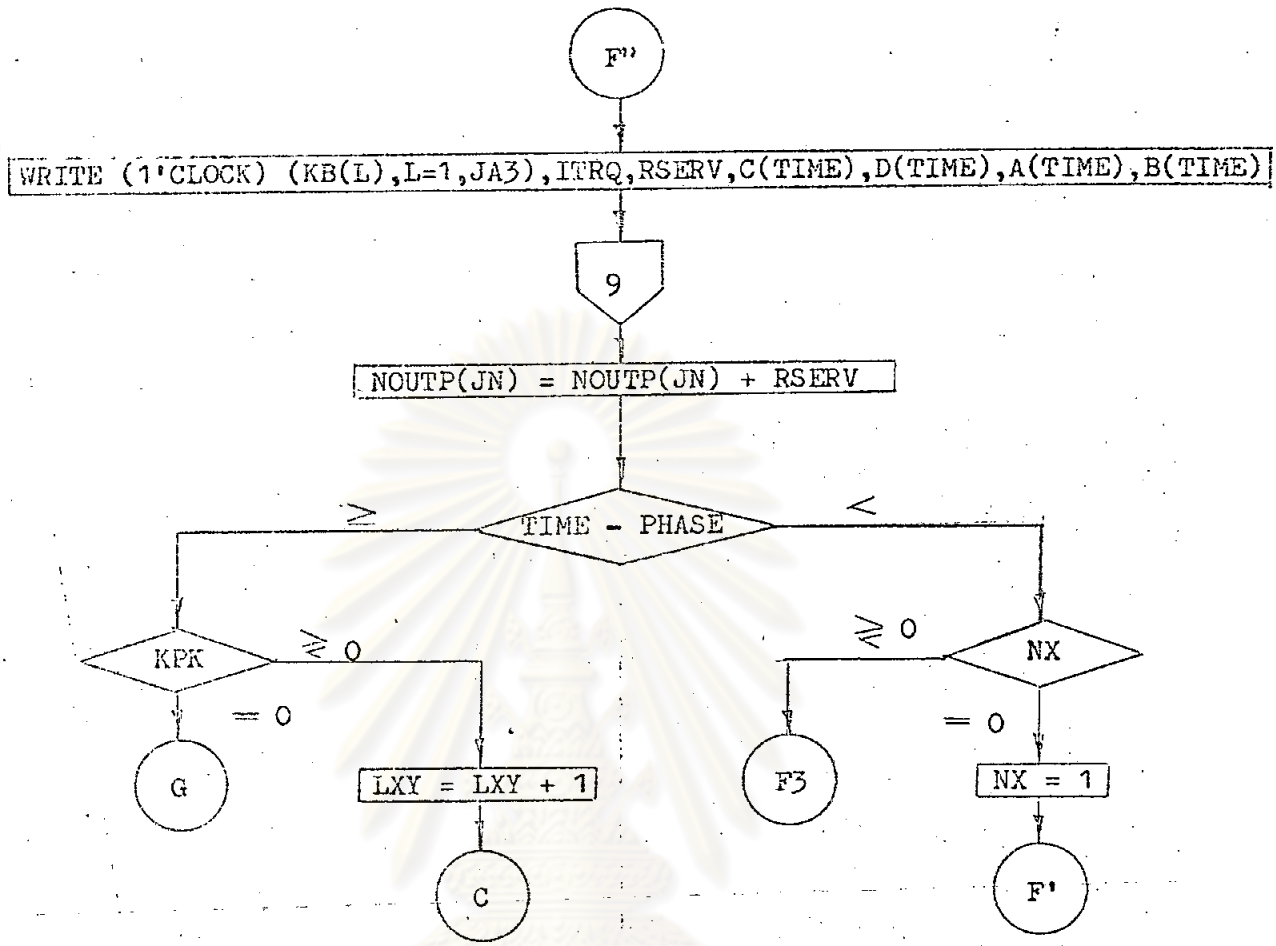

E
CLOCK = CLOCK - PHASE
TIMES = CLOCK
JJ = 1
NX = 1
IK = 1
J
> 0
≤ 0
IK = 0
TIME = 0
KPK
= 0
≷ 0
LXY
≷ 0
= 0
E'
CALL TNORS (IX, PBF1, PBF2, TSEVF)
TIMES = TIMES + TSEVF
TIME = TIME + 1
E''
6

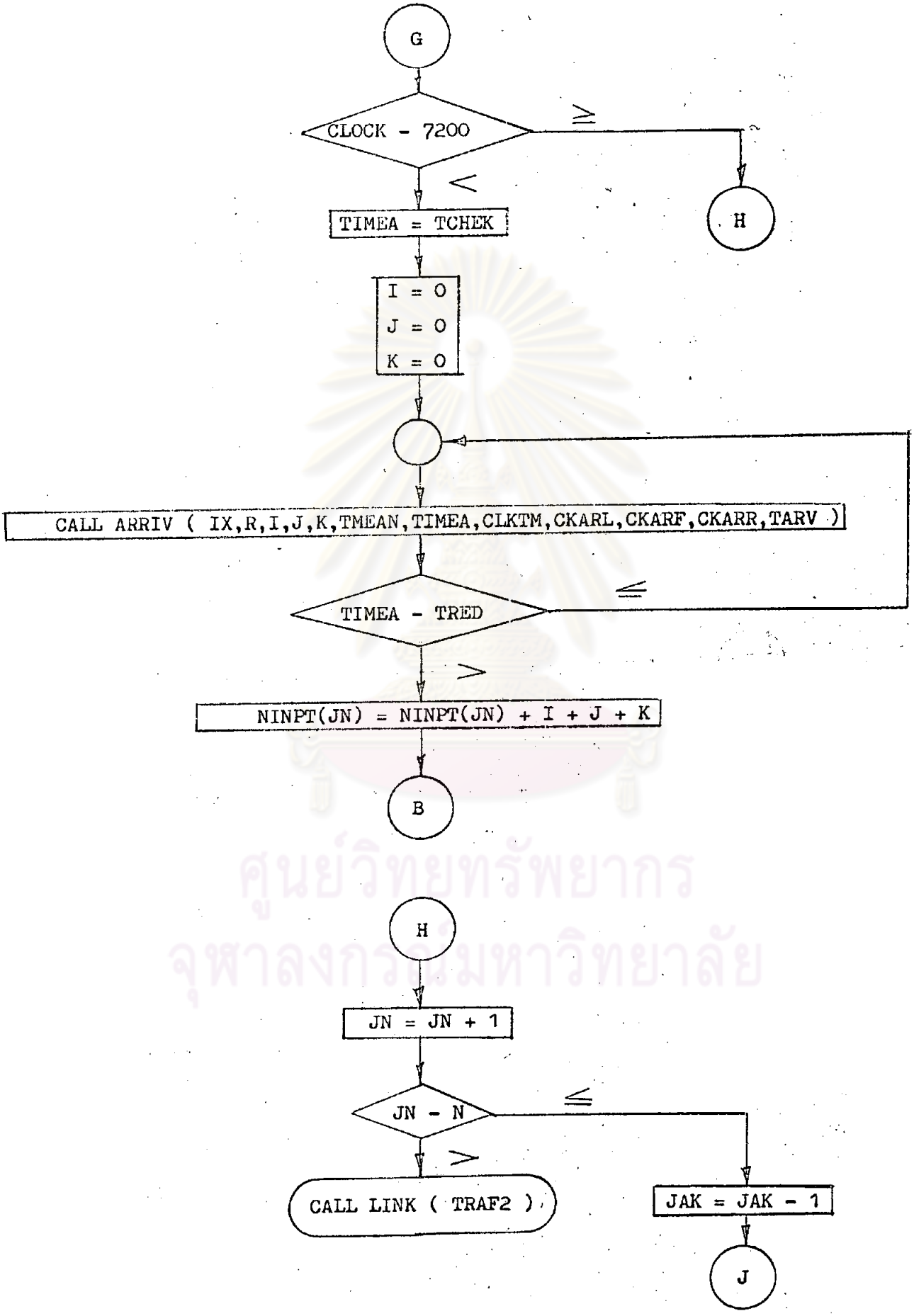

6
CLOCK = CLOCK + 1
CALL QUEUE (IFWQ,CLOCK,CKARF,JJ,J,IK)
KPK
= 0
≥ 0
LXY
≥ 0
= 0
CLOCK - TIMES
<
≥
FSERV = 0
IFWQ
≤ 0
> 0
FSERV = 0
IFWQ - LANE
≤
>
FSERV = IFWQ
IFWQ = IFWQ - LANE
FSERV = 0
IFWQ = 0
FSERV = LANE
TIMES = TIMES + 1
NX = 0
7

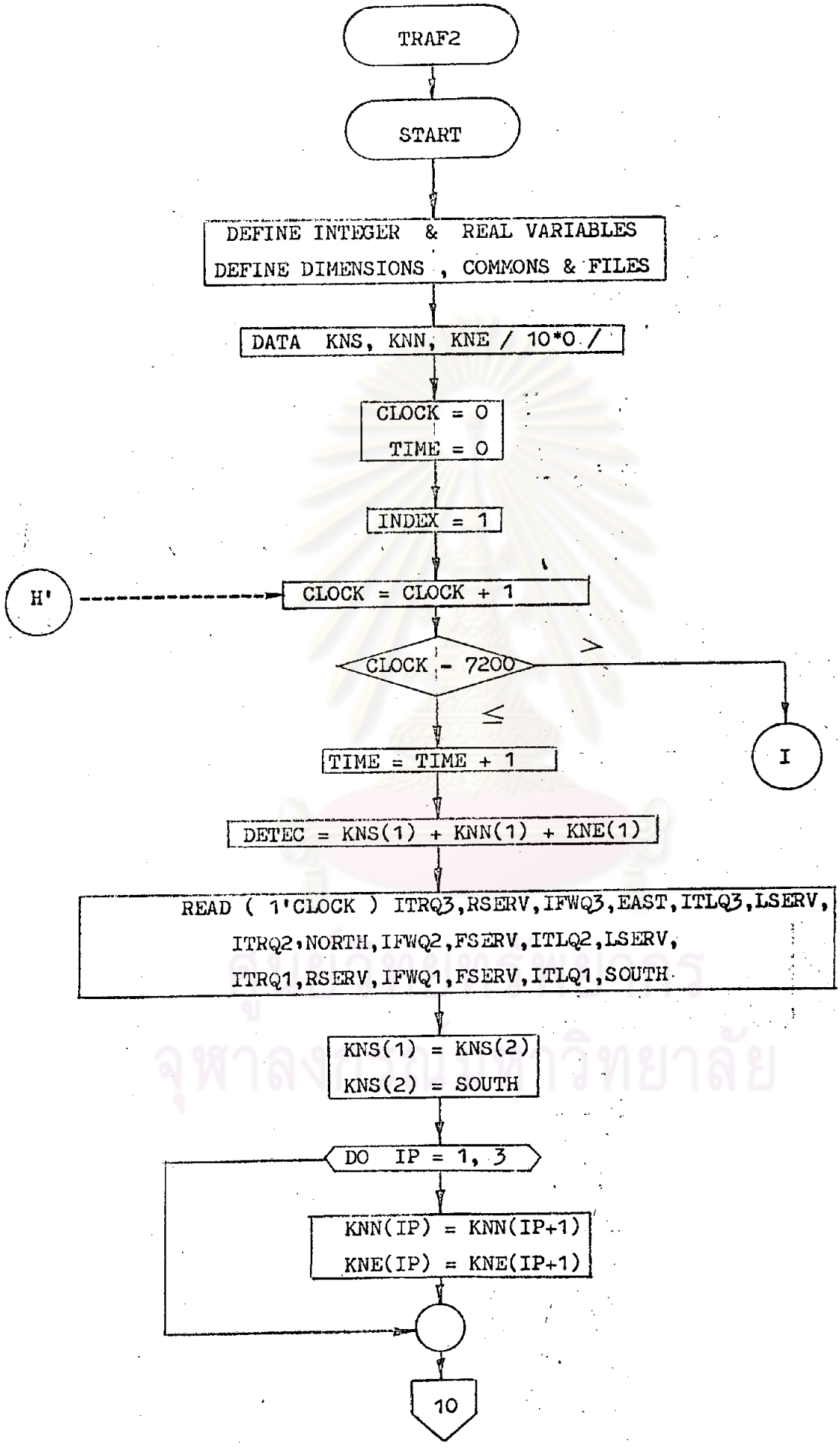


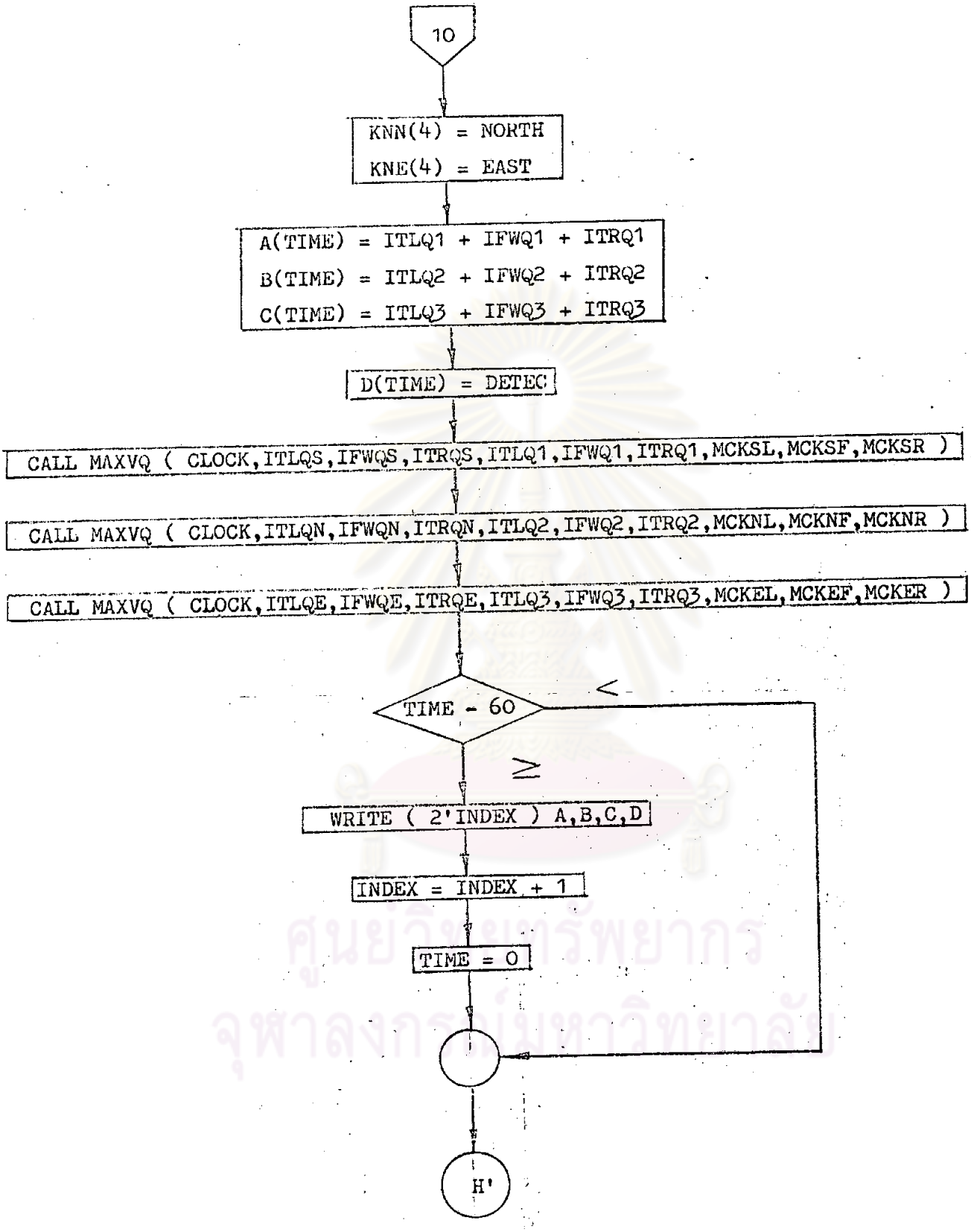


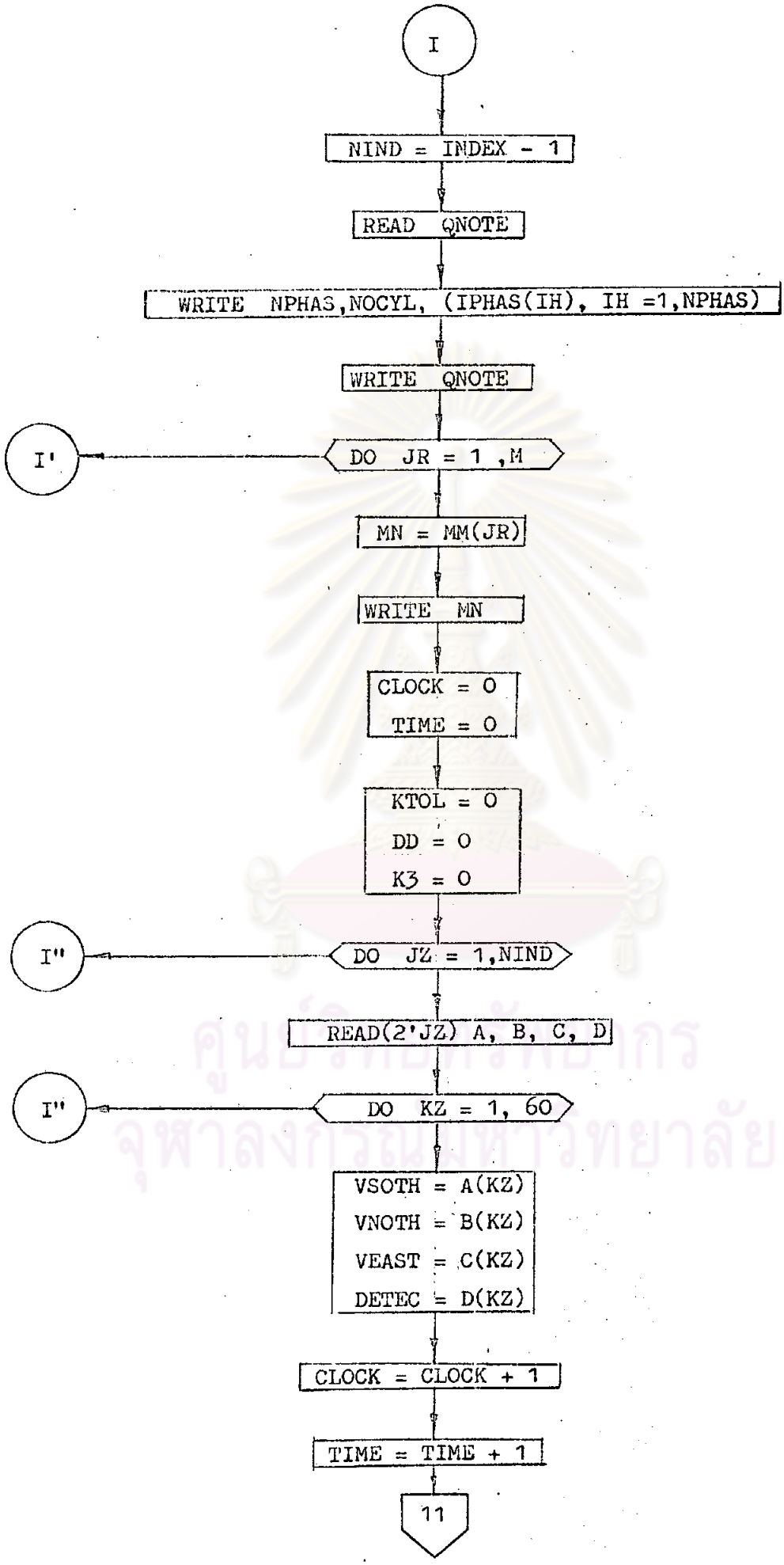


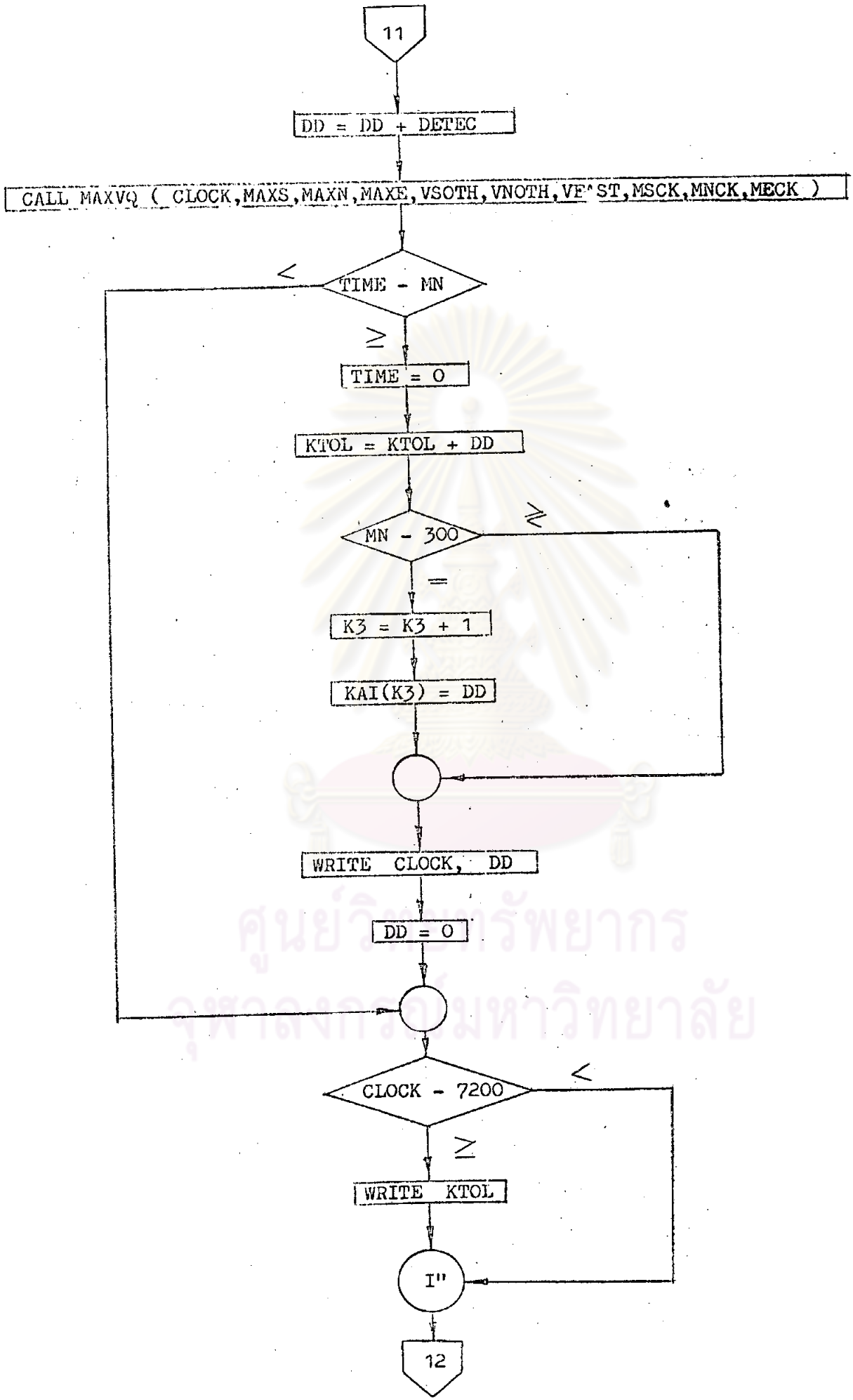


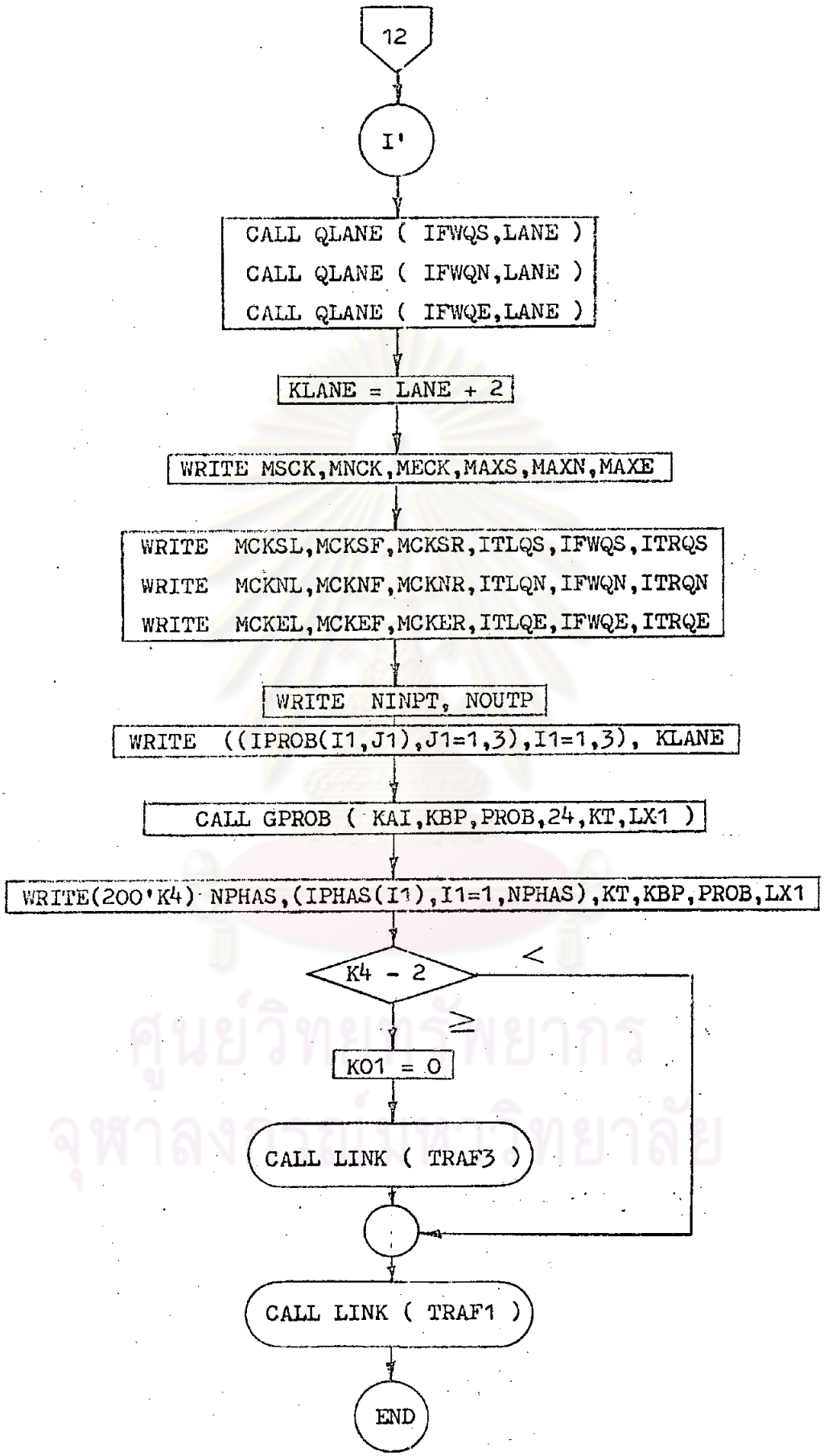


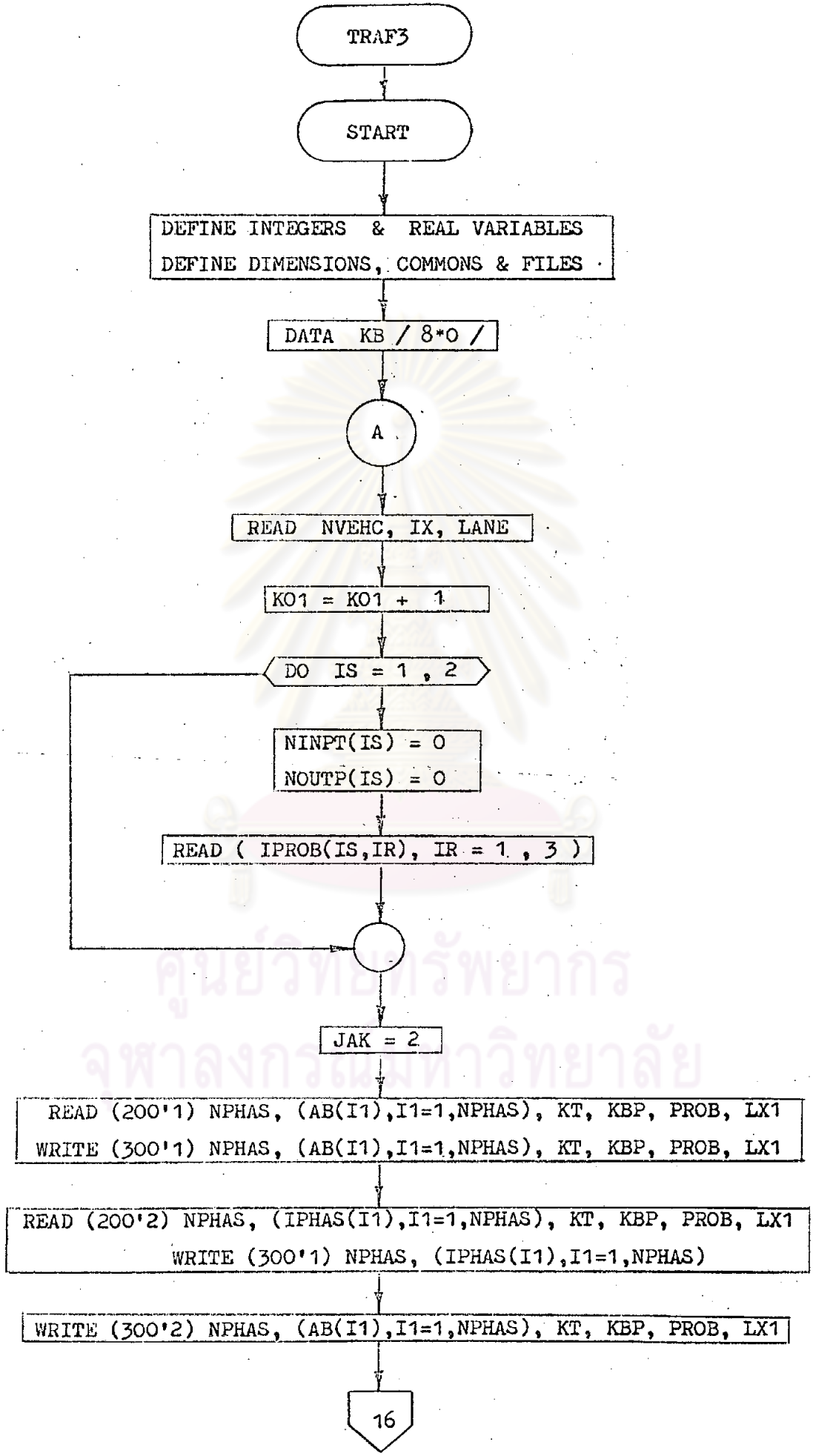

TRAF2
START
DEFINE INTEGER & REAL VARIABLES
DEFINE DIMENSIONS , COMMONS & FILES
DATA KNS, KNN, KNE / 10*0 /
CLOCK = 0
TIME = 0
INDEX = 1
H'
CLOCK = CLOCK + 1
CLOCK - 7200
>
≤
I
TIME = TIME + 1
DETEC = KNS(1) + KNN(1) + KNE(1)
READ (1'CLOCK) ITRQ3,RSERV,IFWQ3,EAST,ITLQ3,LSERV,
ITRQ2,NORTH,IFWQ2,FSERV,ITLQ2,LSERV,
ITRQ1,RSERV,IFWQ1,FSERV,ITLQ1,SOUTH
KNS(1) = KNS(2)
KNS(2) = SOUTH
DO IP = 1, 3
KNN(IP) = KNN(IP+1)
KNE(IP) = KNE(IP+1)
10

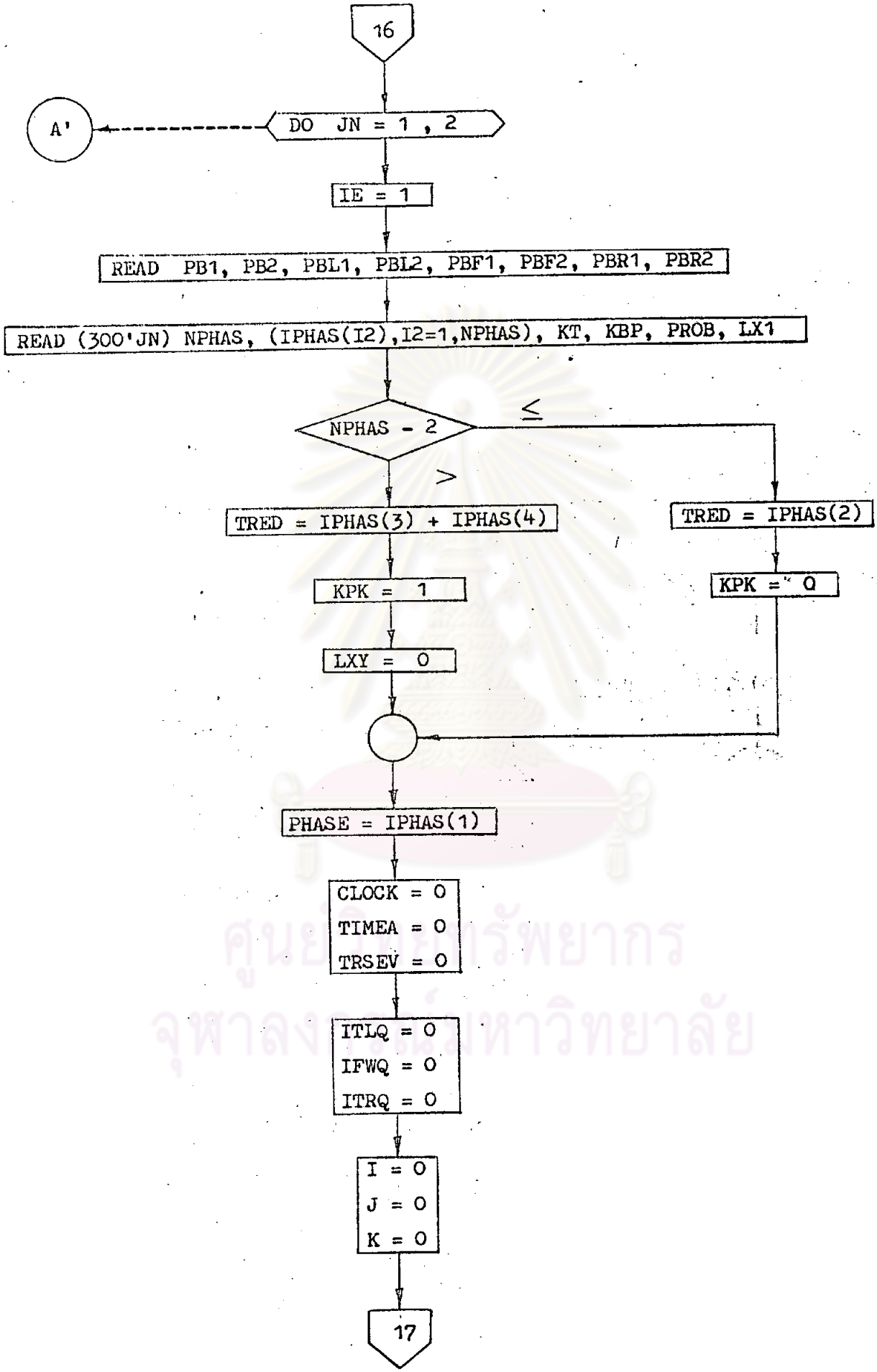


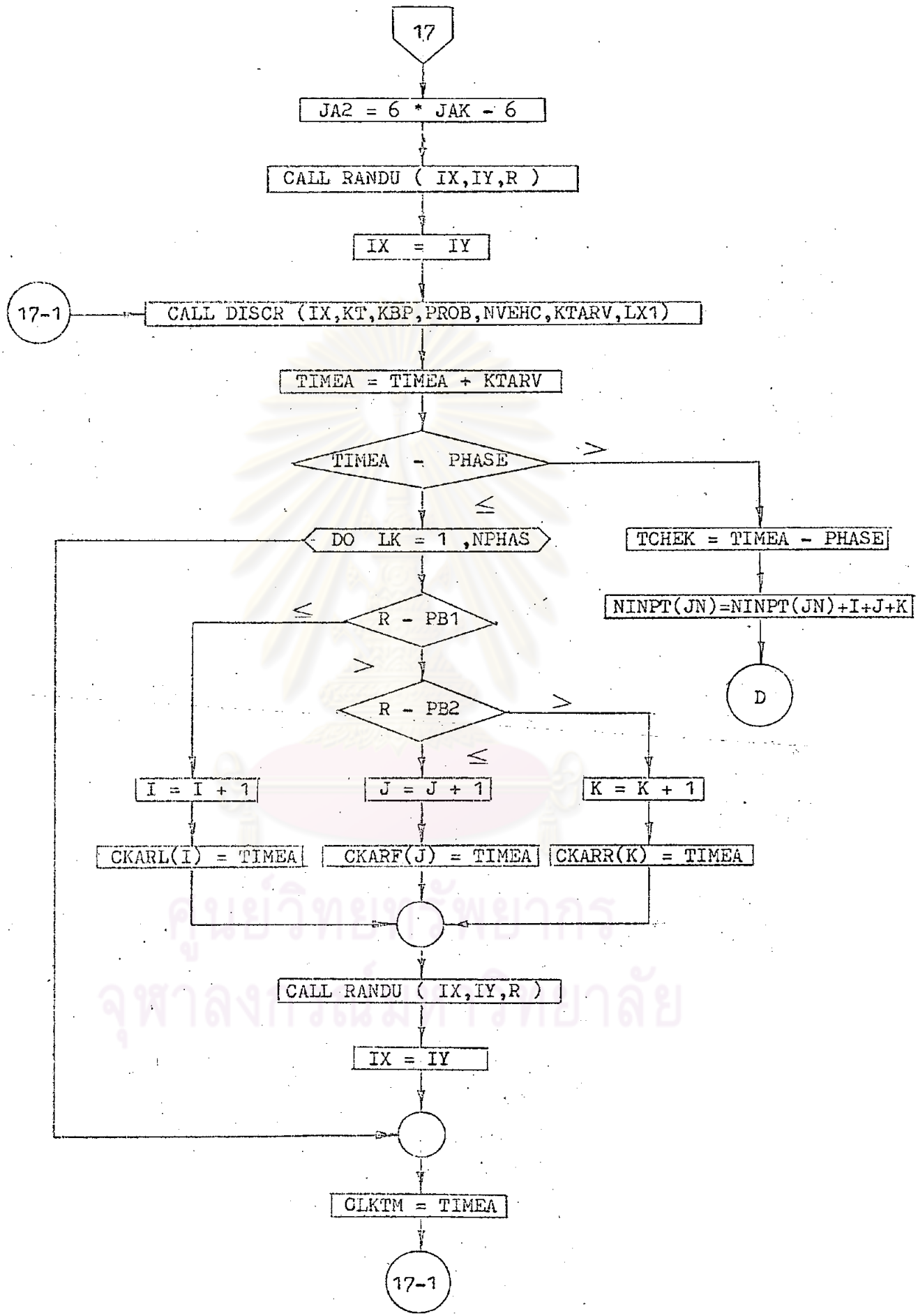


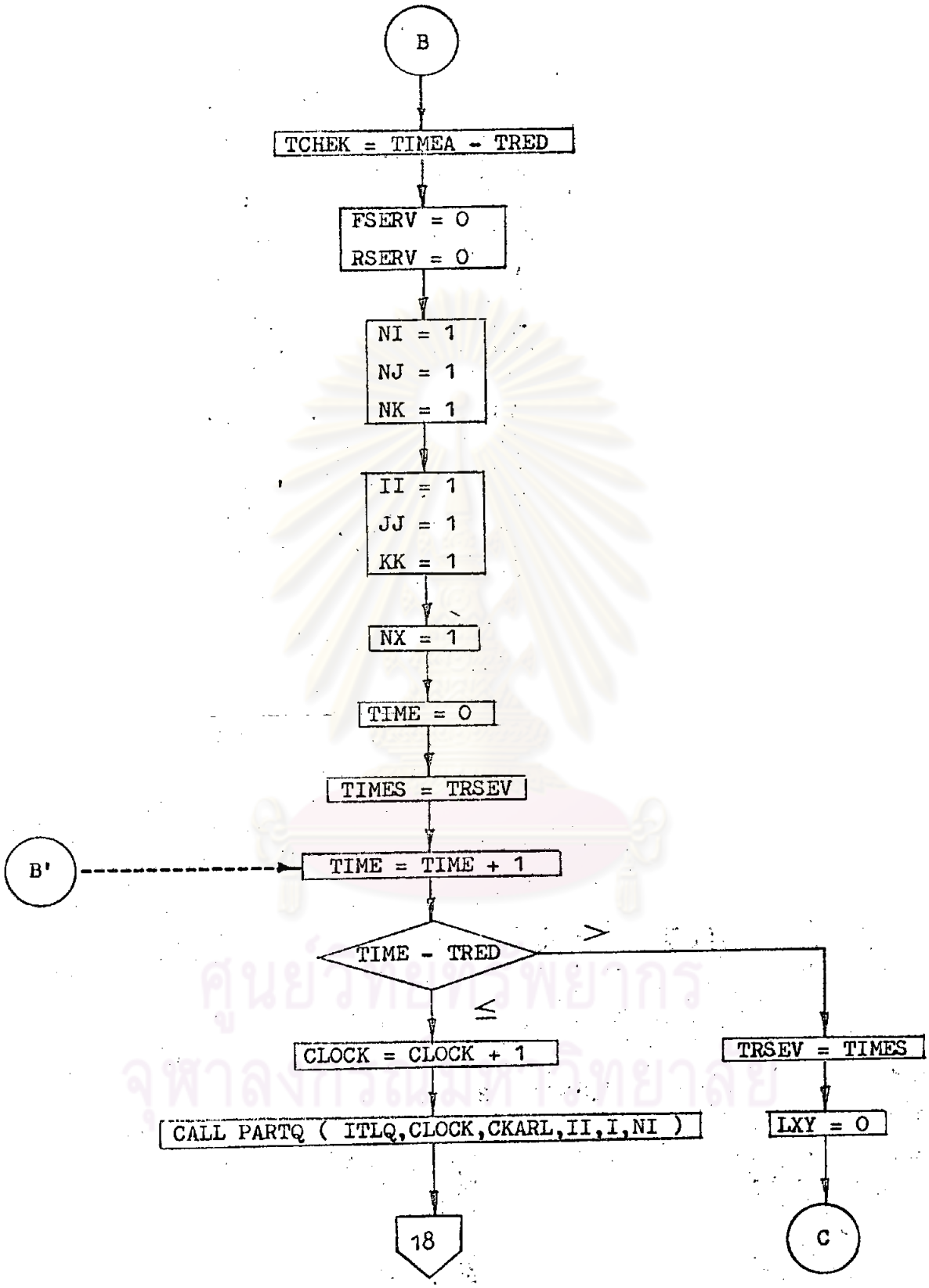


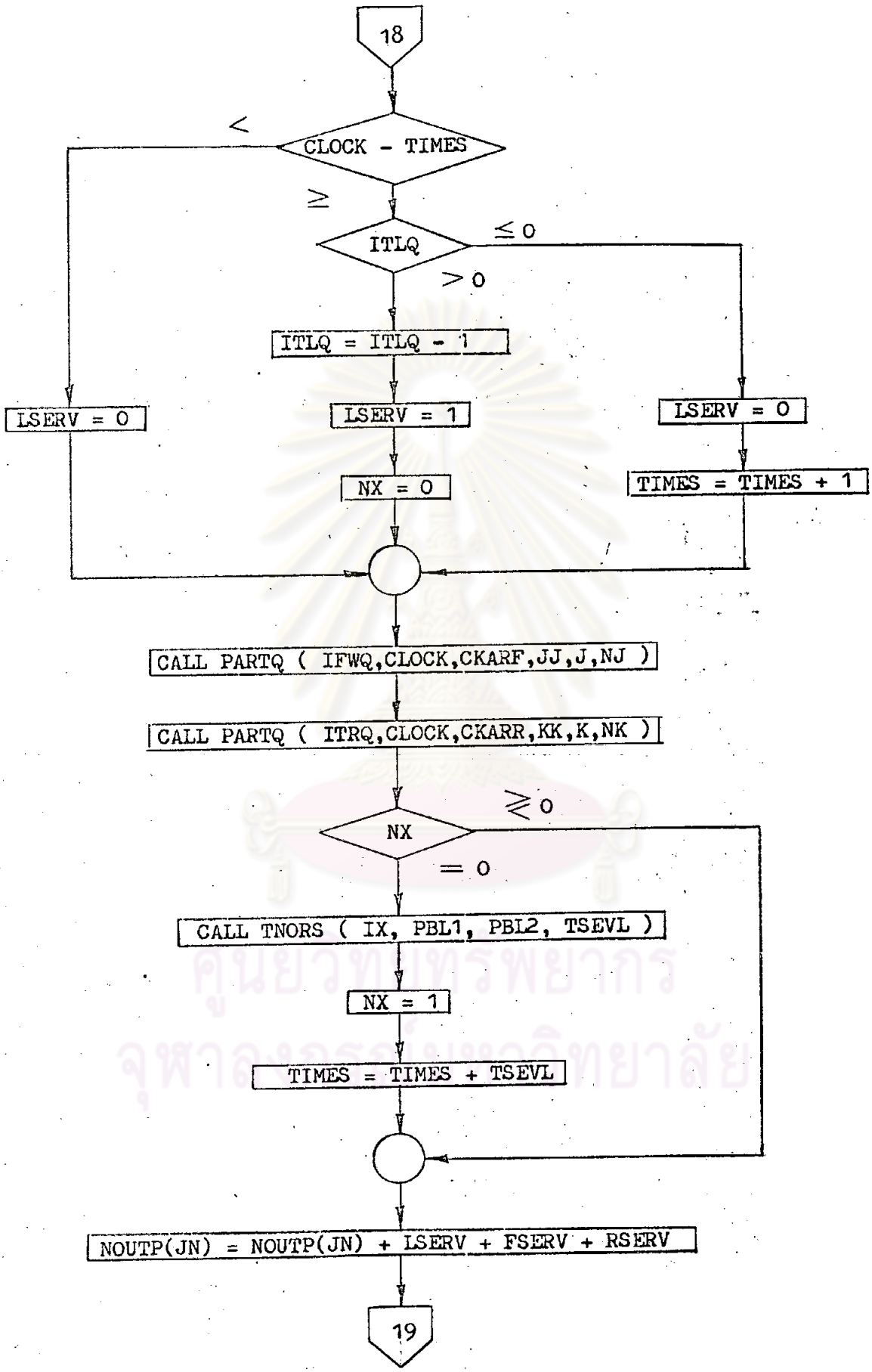

12
I'
CALL QLANE (IFWQS,LANE)
CALL QLANE (IFWQN,LANE)
CALL QLANE (IFWQE,LANE)
KLANE = LANE + 2
WRITE MSCK,MNCK,MECK,MAXS,MAXN,MAXE
WRITE MCKSL,MCKSF,MCKSR,ITLQS,IFWQS,ITRQS
WRITE MCKNL,MCKNF,MCKNR,ITLQN,IFWQN,ITRQN
WRITE MCKEL,MCKEF,MCKER,ITLQE,IFWQE,ITRQE
WRITE NINPT, NOUTP
WRITE ((IPROB(I1,J1),J1=1,3),I1=1,3), KLANE
CALL GPROB (KAI,KBP,PROB,24,KT,LX1)
WRITE(200'K4) NPHAS,(IPHAS(I1),I1=1,NPHAS),KT,KBP,PROB,LX1
K4 - 2
<
≥
KO1 = 0
CALL LINK (TRAF3)
CALL LINK (TRAF1)
END

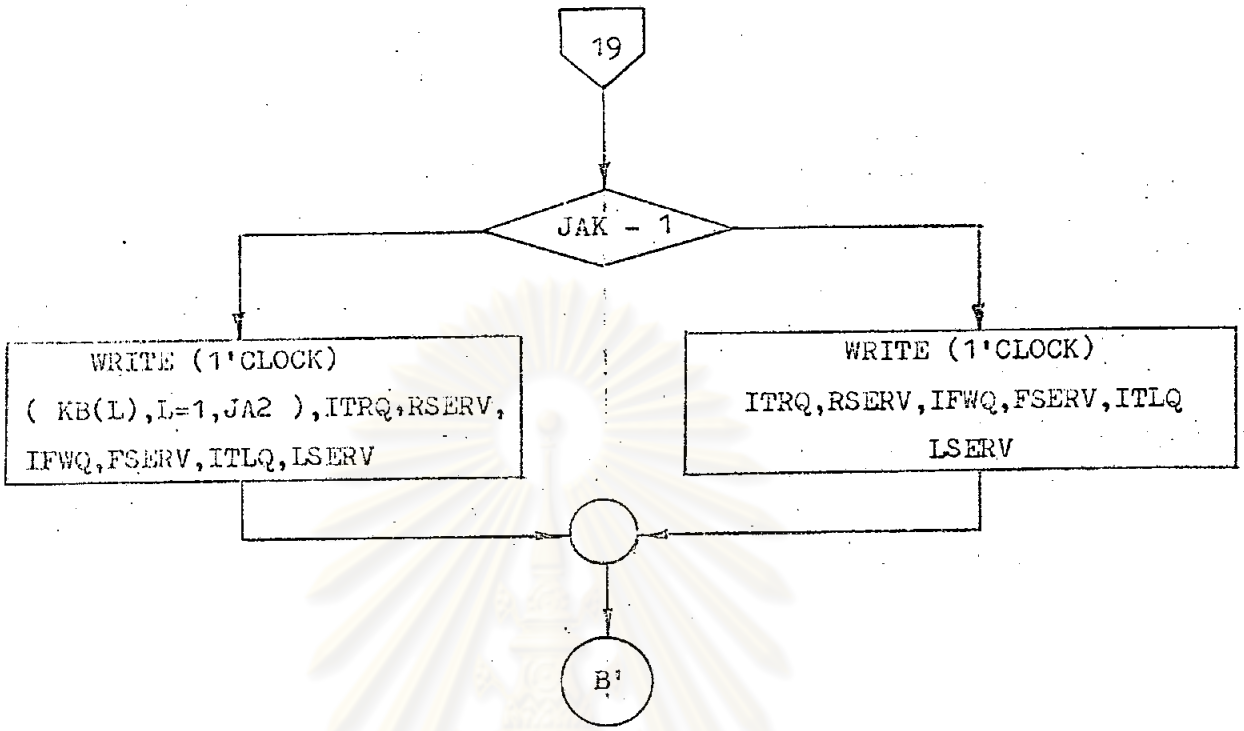

TRAF3
START
DEFINE INTEGERS & REAL VARIABLES
DEFINE DIMENSIONS, COMMONS & FILES
DATA KB / 8*0 /
A
READ NVEHC, IX, LANE
KO1 = KO1 + 1
DO IS = 1 , 2
NINPT(IS) = 0
NOUTP(IS) = 0
READ (IPROB(IS,IR), IR = 1 , 3)
JAK = 2
READ (200'1) NPHAS, (AB(I1),I1=1,NPHAS), KT, KBP, PROB, LX1
WRITE (300'1) NPHAS, (AB(I1),I1=1,NPHAS), KT, KBP, PROB, LX1
READ (200'2) NPHAS, (IPHAS(I1),I1=1,NPHAS), KT, KBP, PROB, LX1
WRITE (300'1) NPHAS, (IPHAS(I1),I1=1,NPHAS)
WRITE (300'2) NPHAS, (AB(I1),I1=1,NPHAS), KT, KBP, PROB, LX1
16

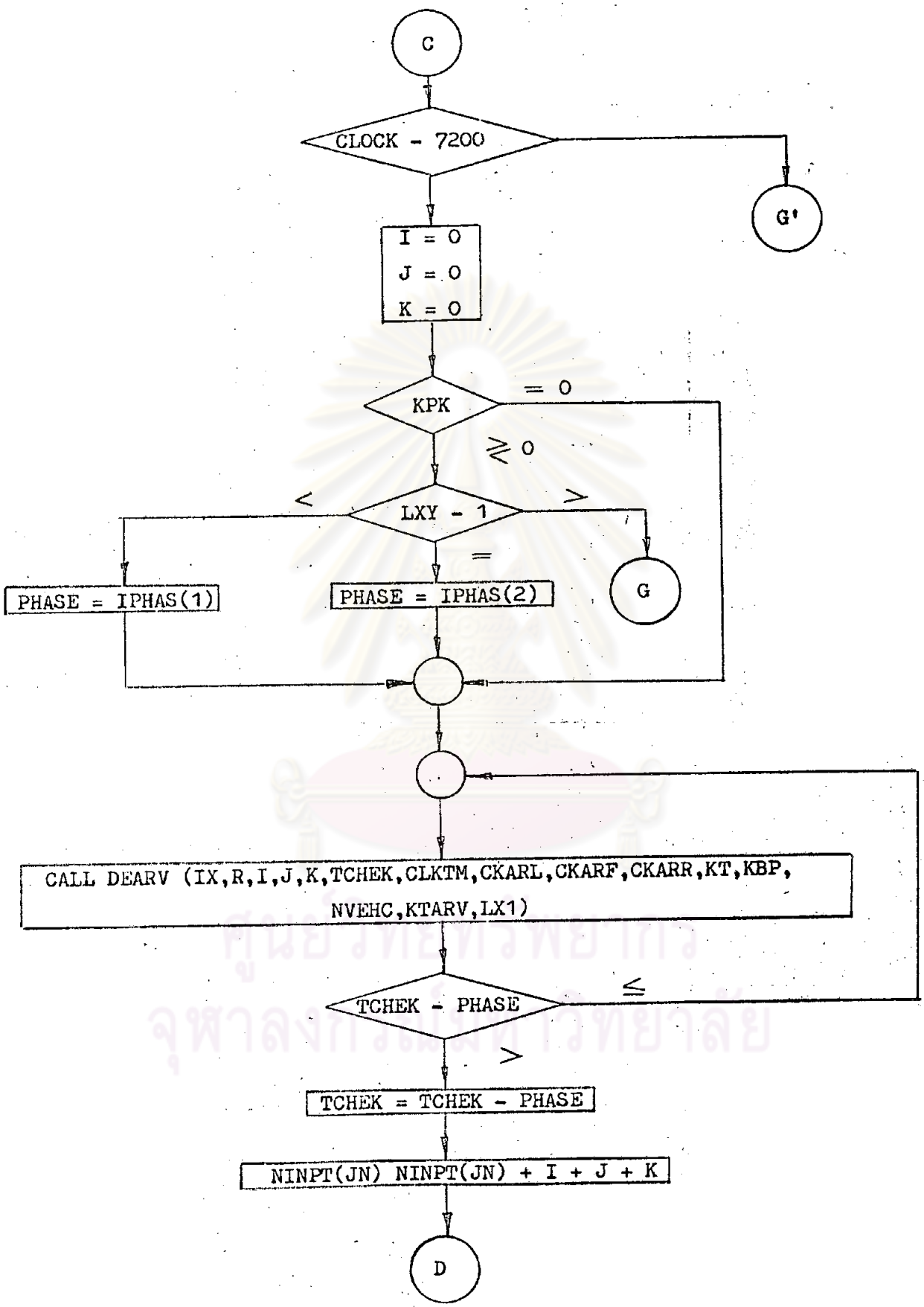


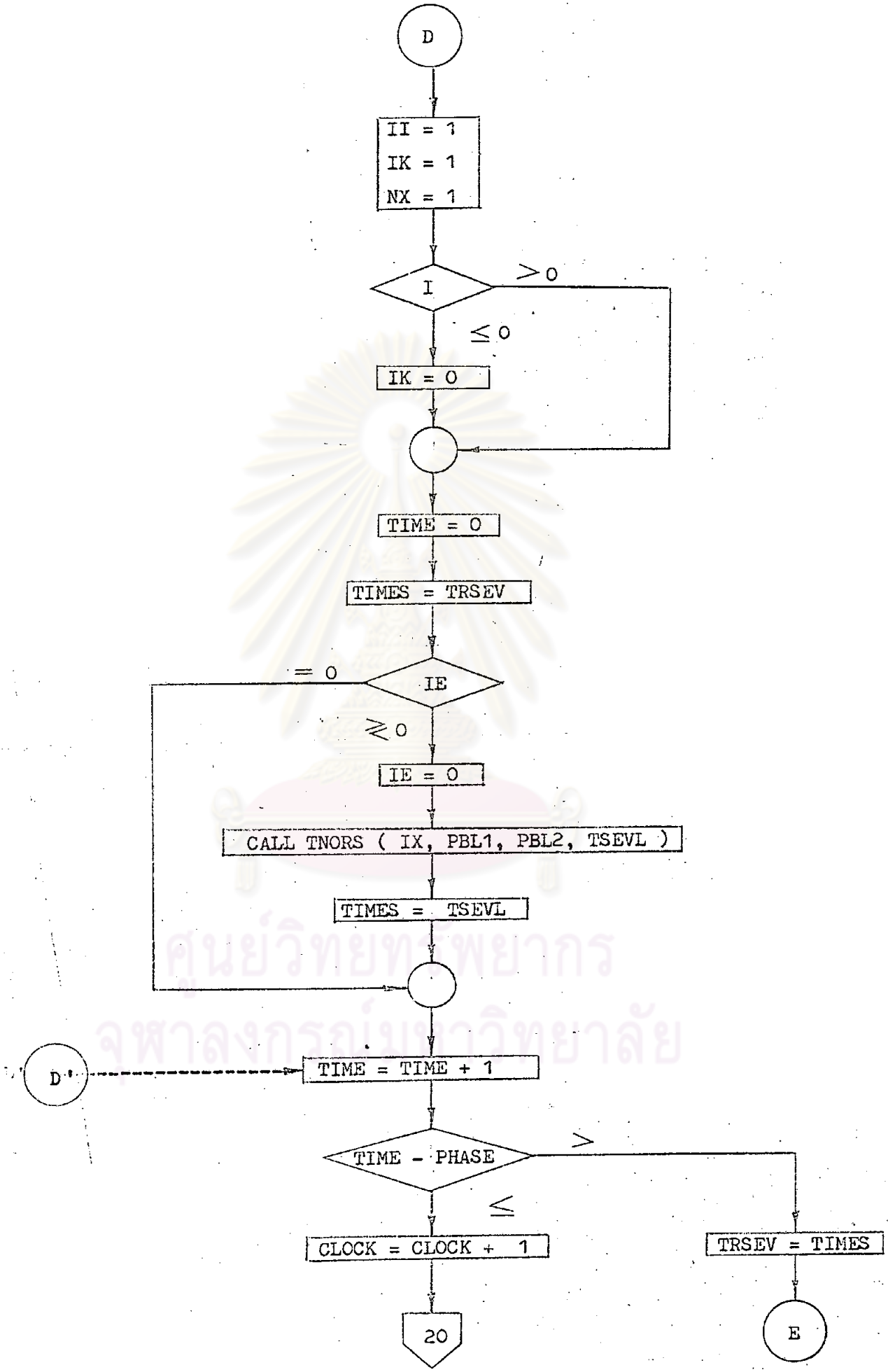


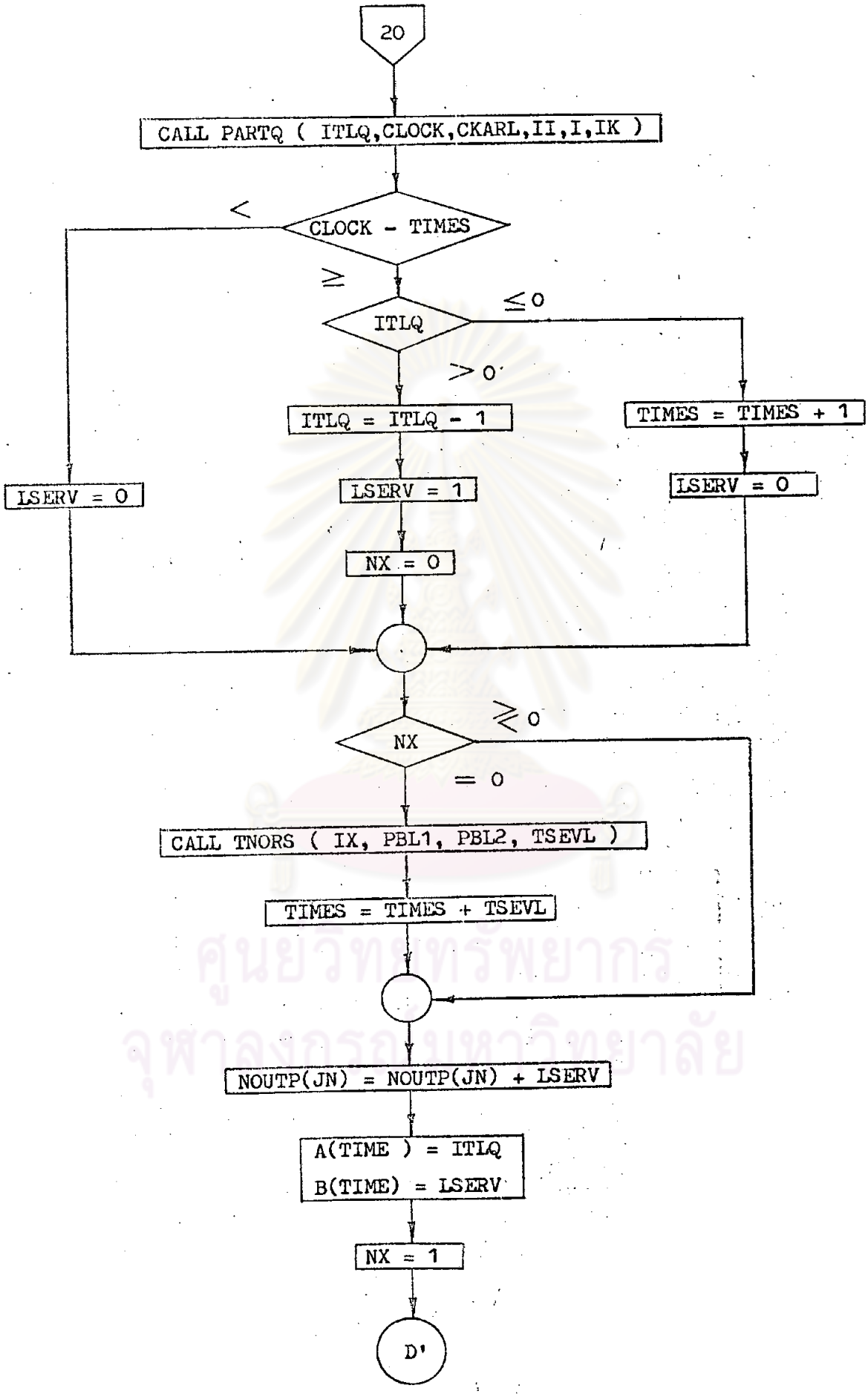


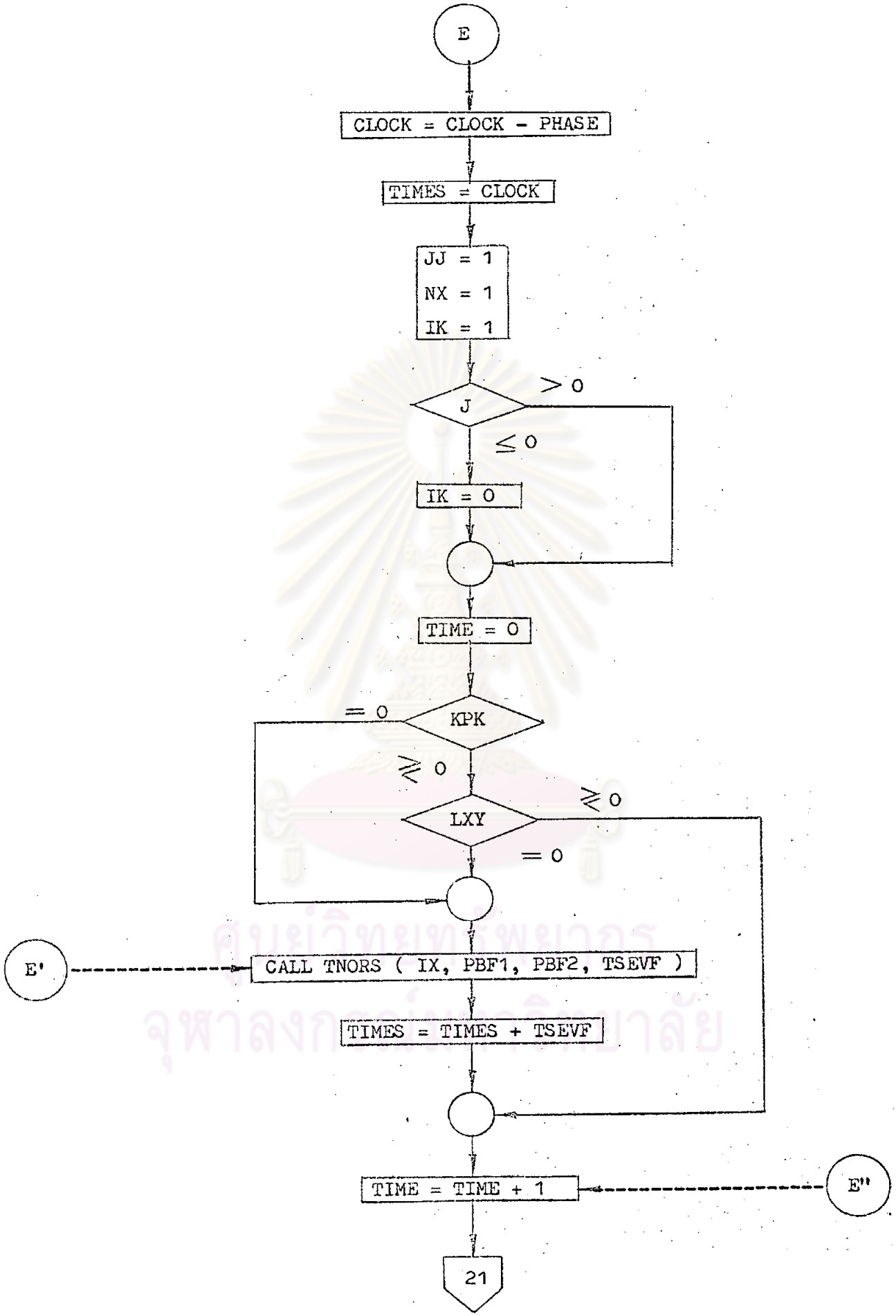

18
CLOCK - TIMES
<
≥
ITLQ
≤ 0
> 0
ITLQ = ITLQ - 1
LSERV = 0
LSERV = 1
LSERV = 0
NX = 0
TIMES = TIMES + 1
CALL PARTQ (IFWQ,CLOCK,CKARF,JJ,J,NJ)
CALL PARTQ (ITRQ,CLOCK,CKARR,KK,K,NK)
NX
≷ 0
= 0
CALL TNORS (IX, PBL1, PBL2, TSEVL)
NX = 1
TIMES = TIMES + TSEVL
NOUTP(JN) = NOUTP(JN) + LSERV + FSERV + RSERV
19

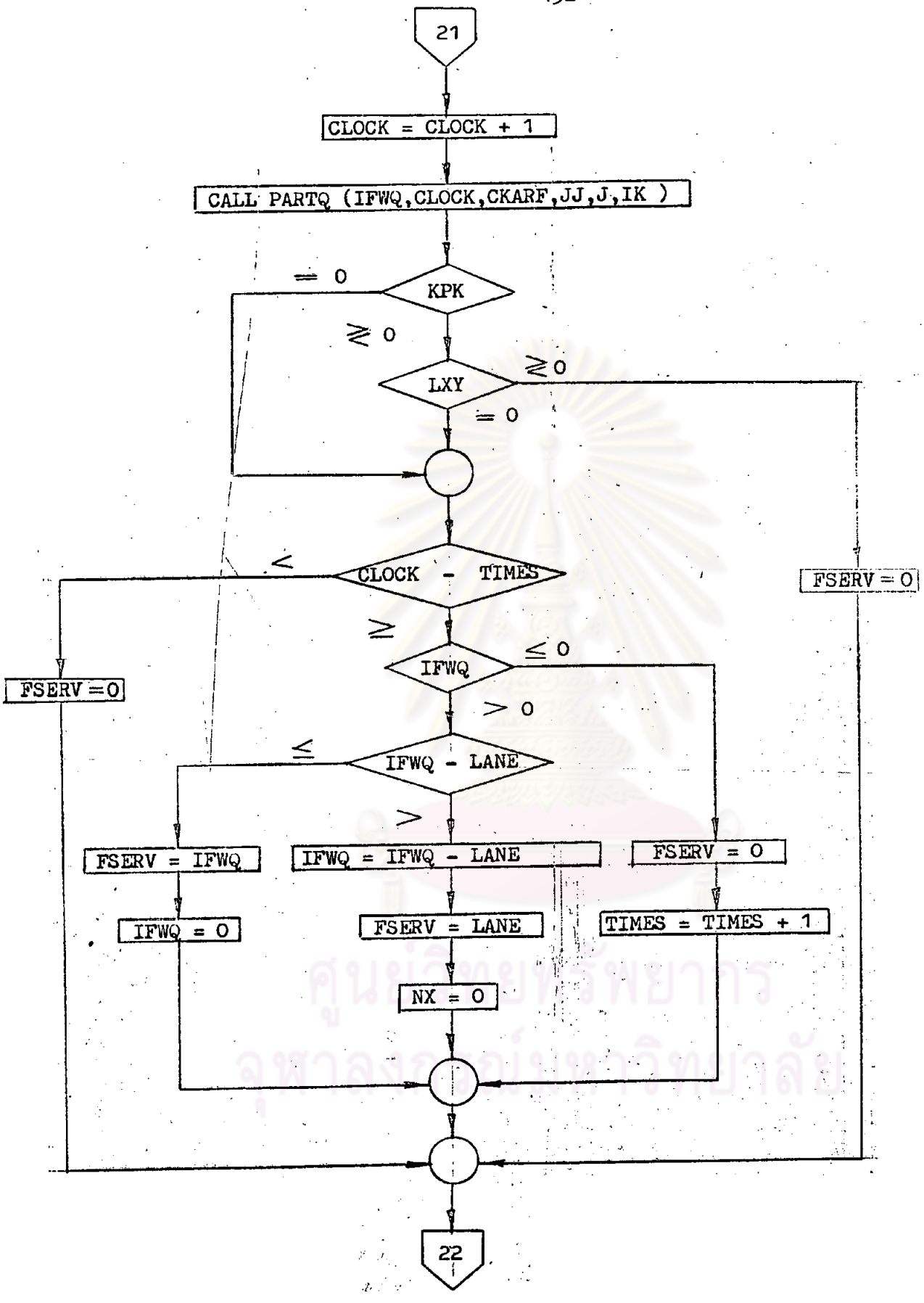


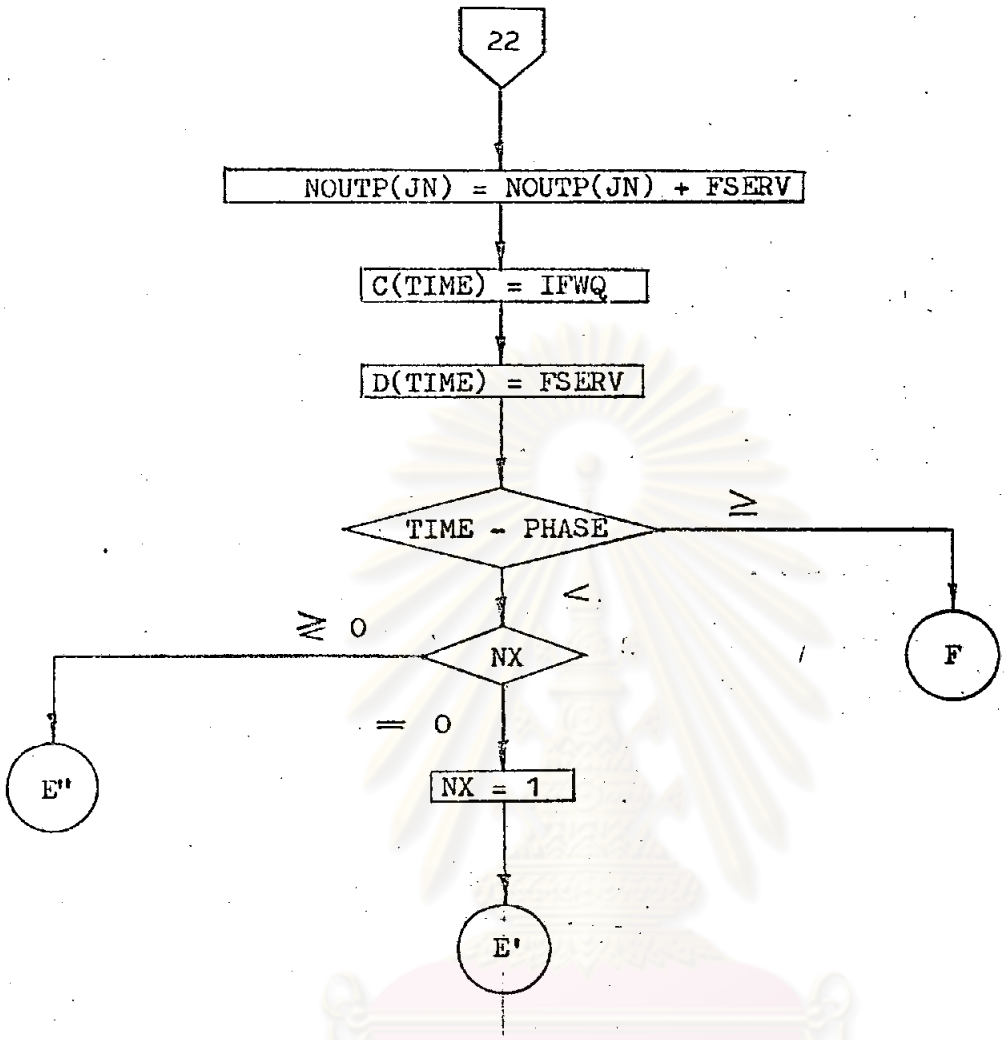

C
CLOCK - 7200
G'
I = 0
J = 0
K = 0
KPK
= 0
≷ 0
LXY - 1
<
>
=
PHASE = IPHAS(1)
PHASE = IPHAS(2)
G
CALL DEARV (IX,R,I,J,K,TCHEK,CLKTM,CKARL,CKARF,CKARR,KT,KBP,
NVEHC,KTARV,LX1)
TCHEK - PHASE
≤
>
TCHEK = TCHEK - PHASE
NINPT(JN) NINPT(JN) + I + J + K
D

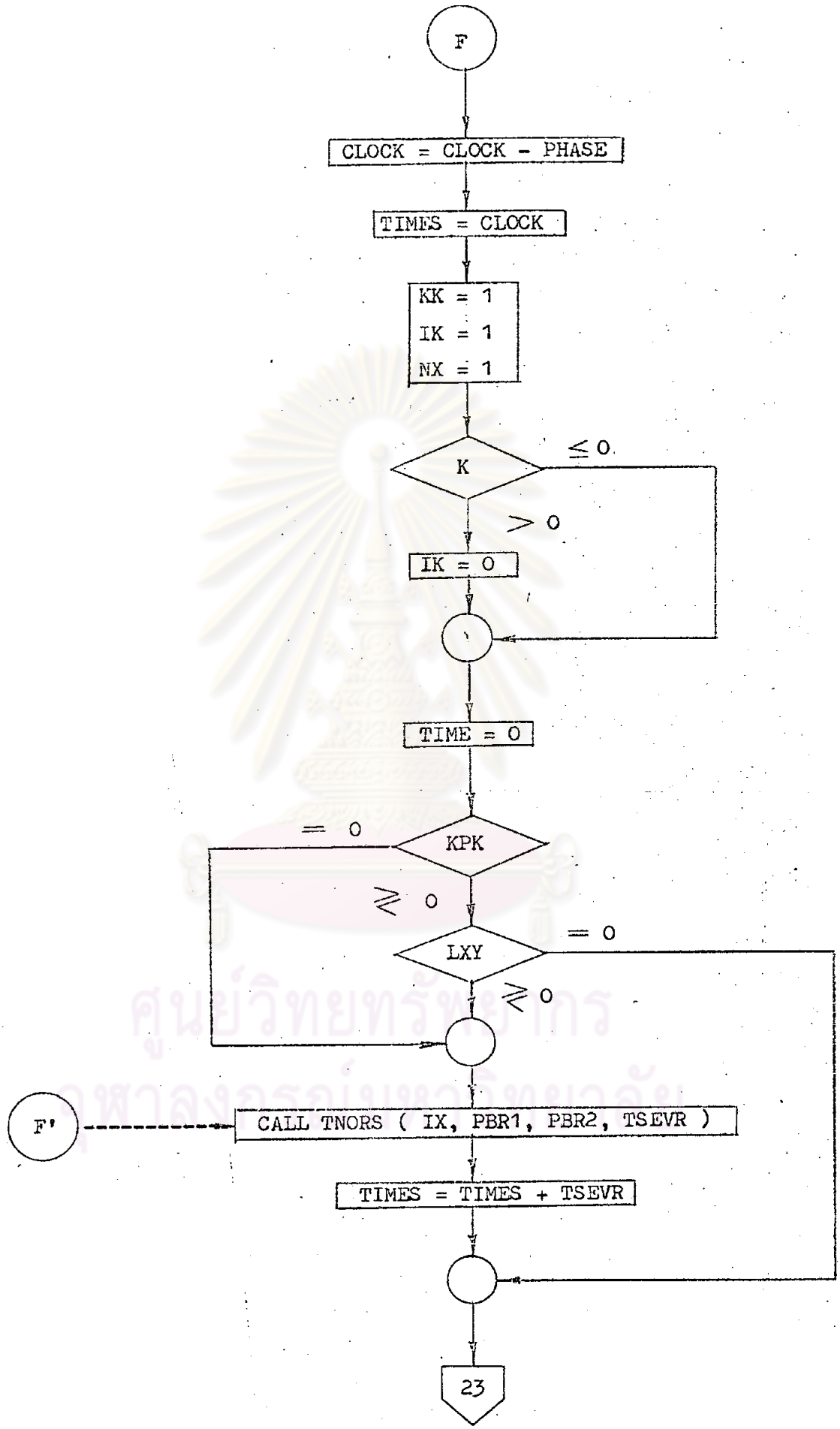


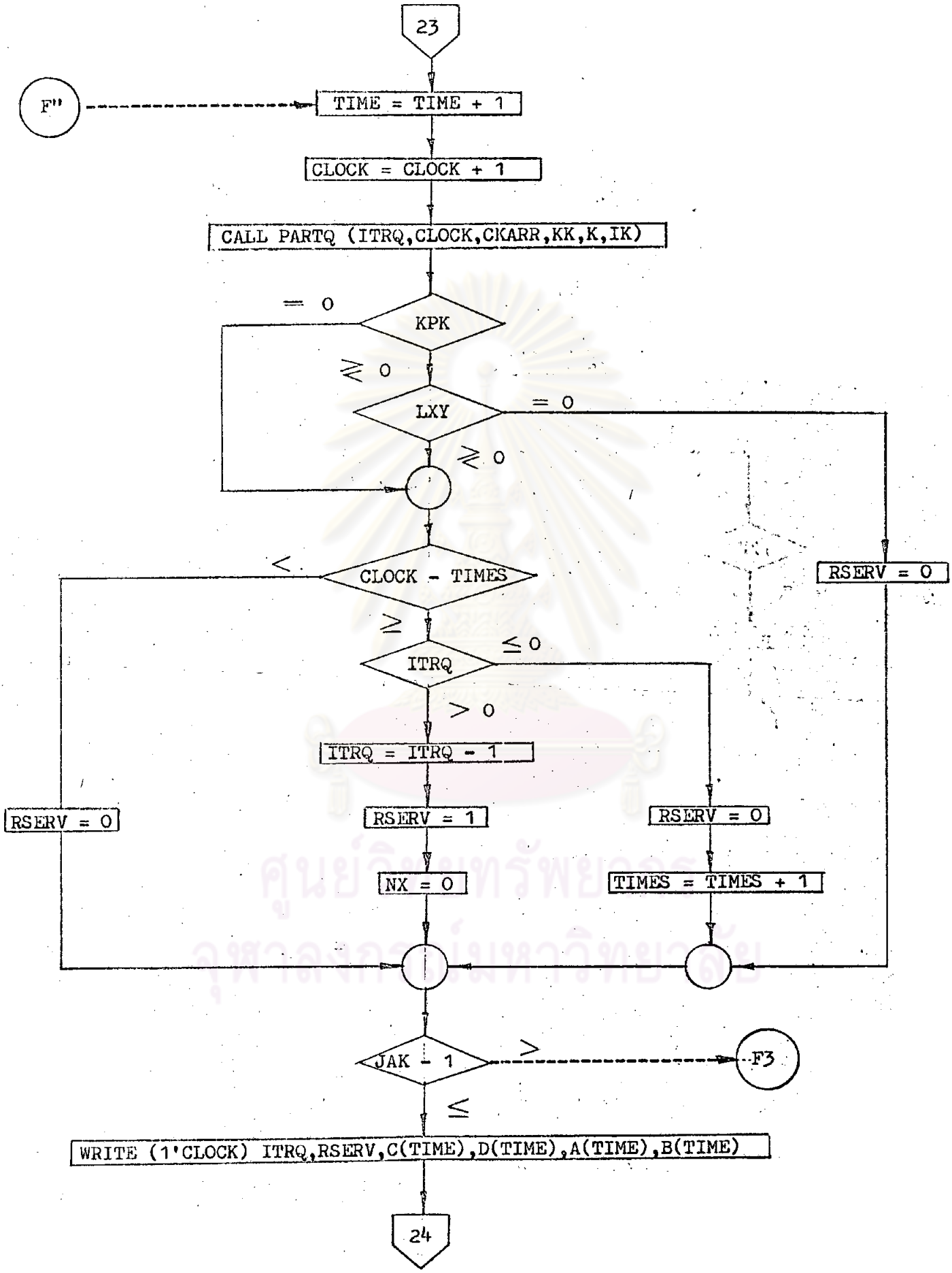


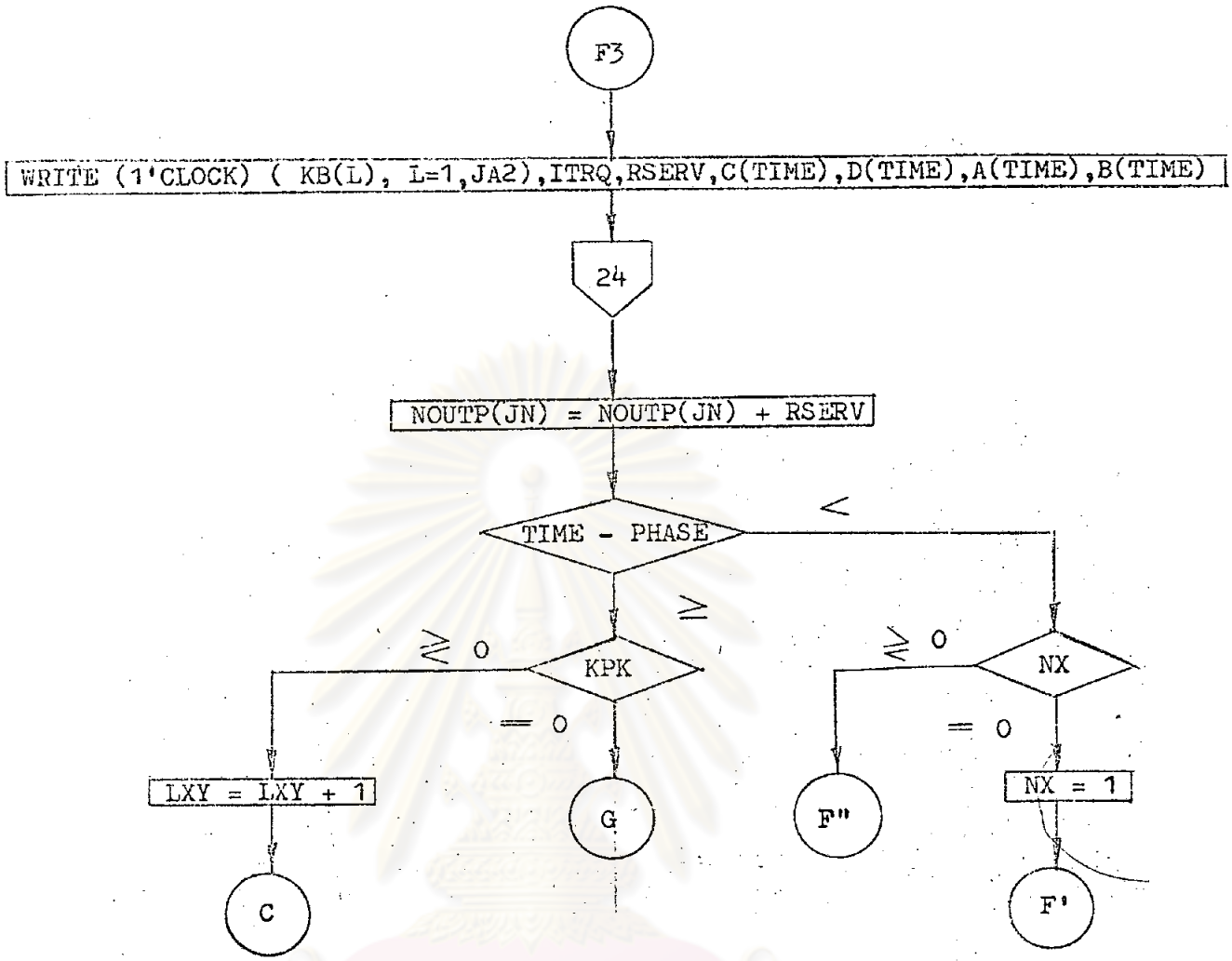


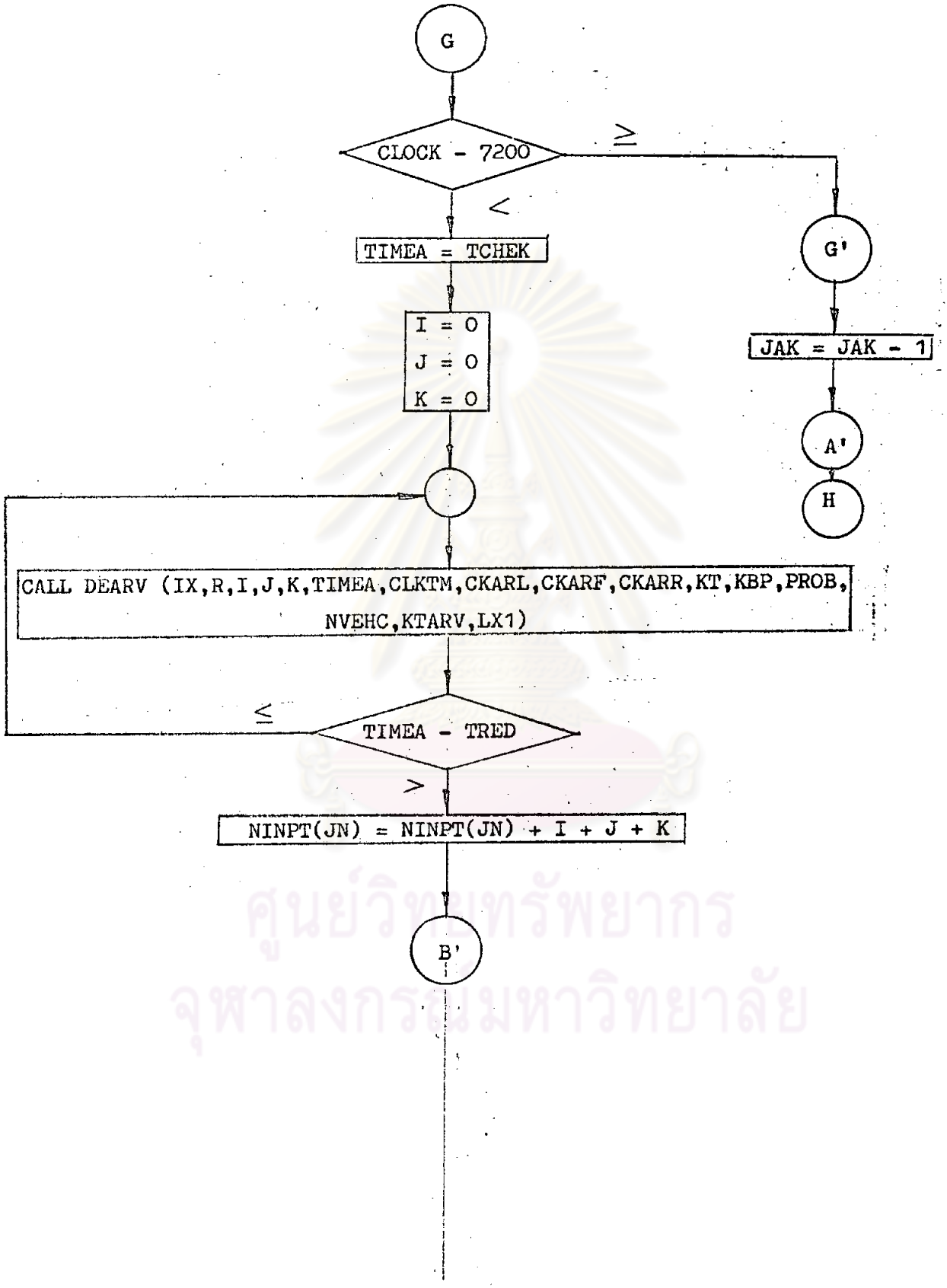


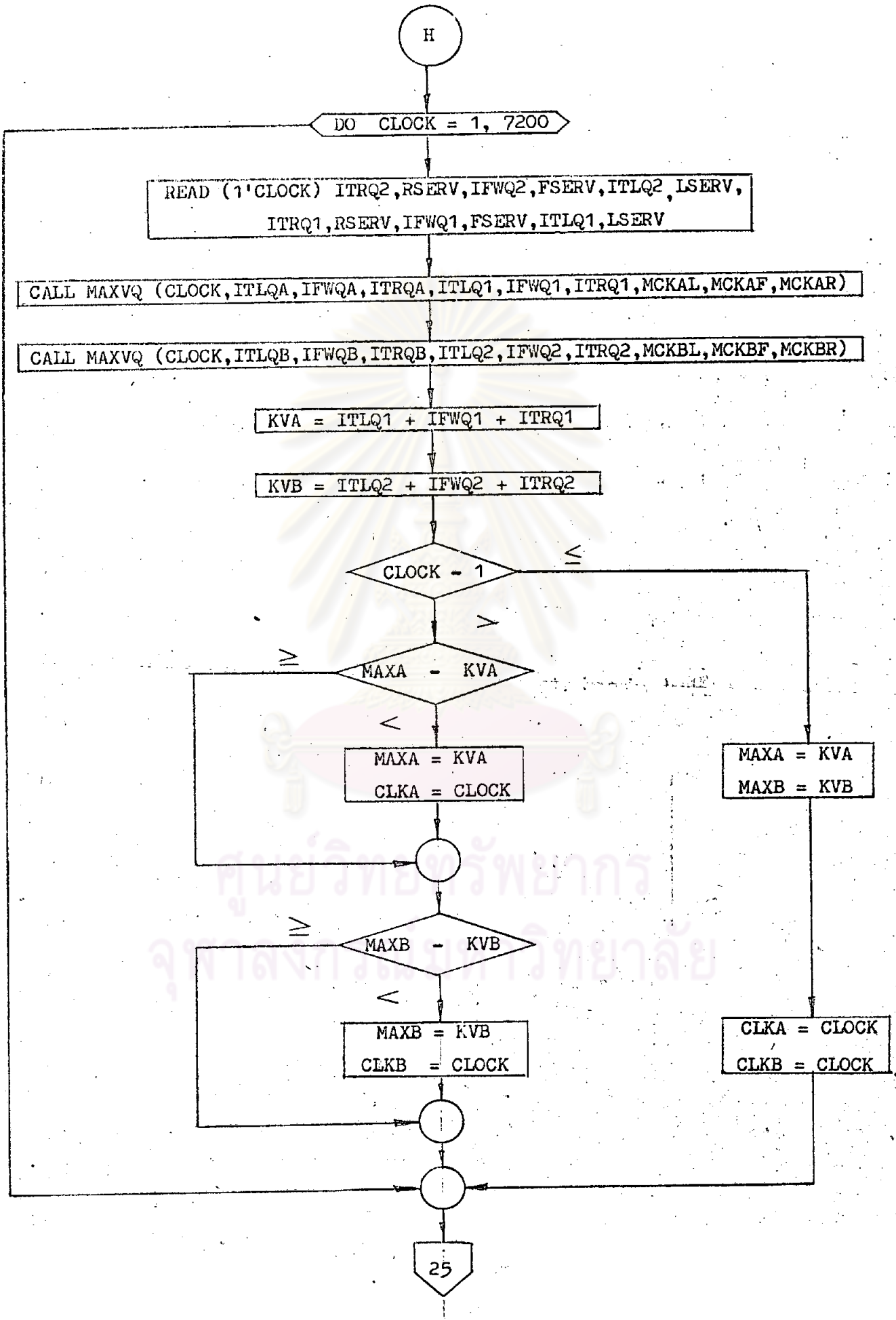


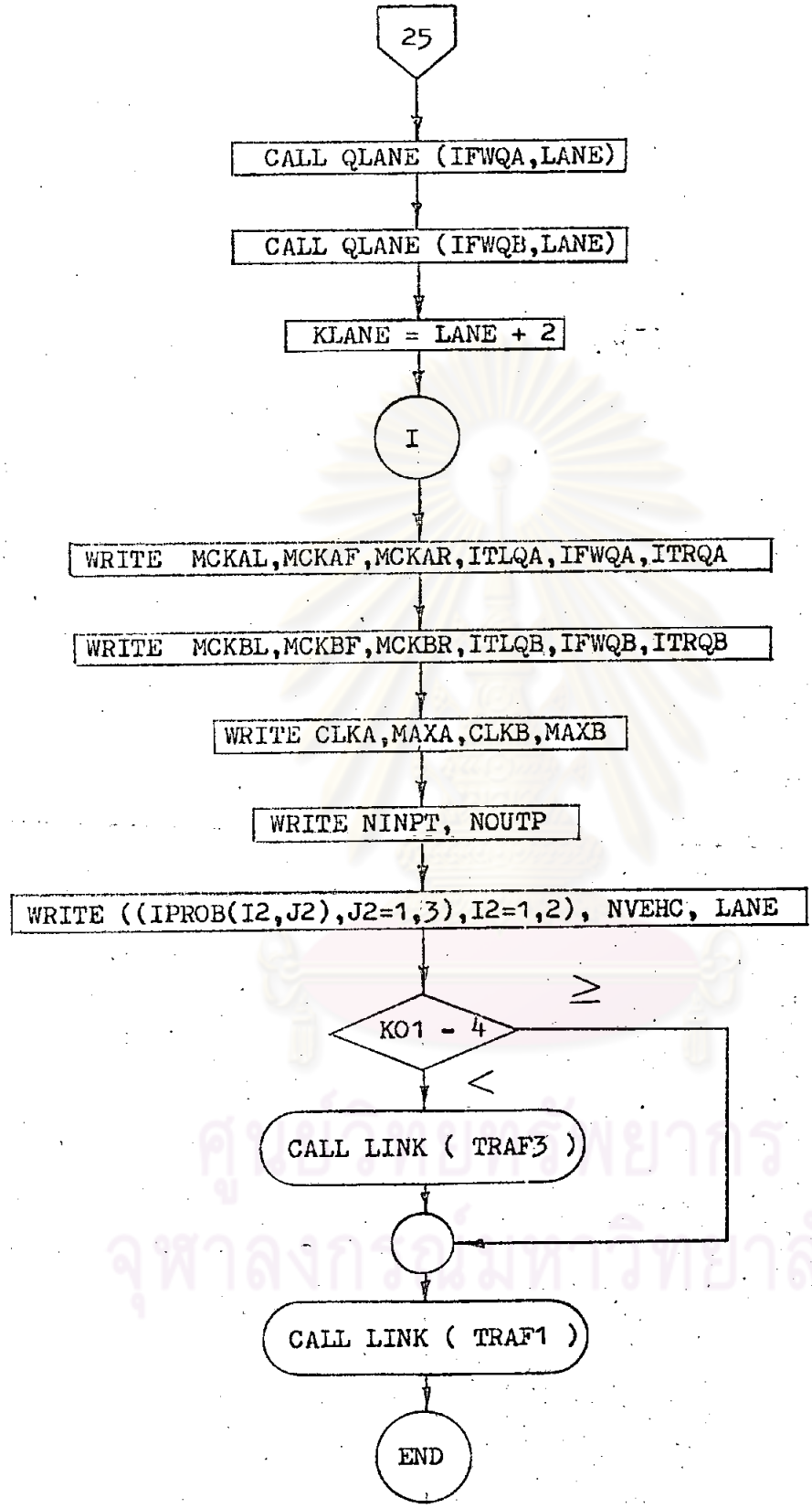


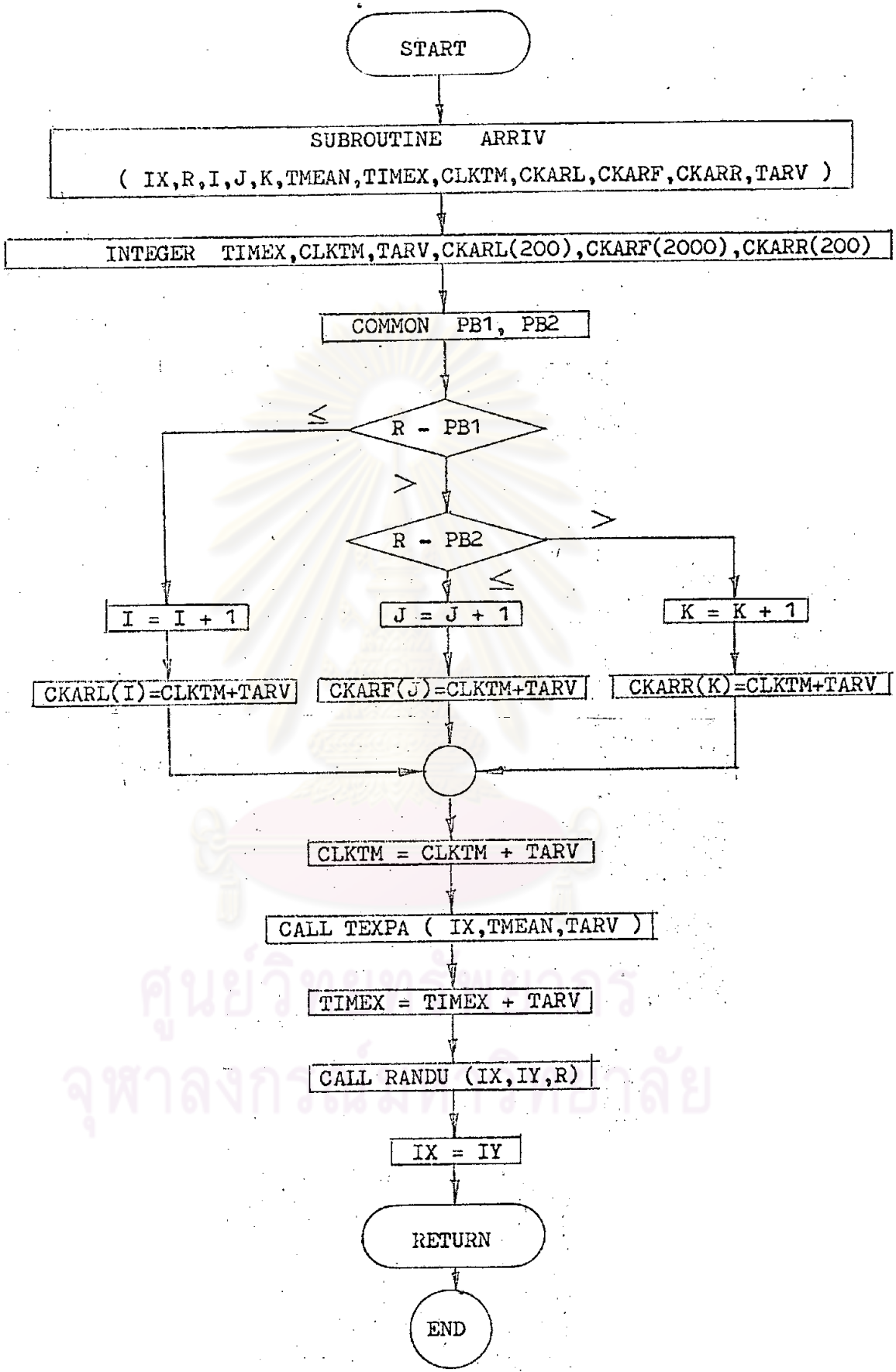

23
F''
TIME = TIME + 1
CLOCK = CLOCK + 1
CALL PARTQ (ITRQ,CLOCK,CKARR,KK,K,IK)
= 0
KPK
≠ 0
LXY
= 0
≠ 0
RSERV = 0
<
CLOCK - TIMES
≥
≤ 0
ITRQ
> 0
ITRQ = ITRQ - 1
RSERV = 0
RSERV = 1
RSERV = 0
NX = 0
TIMES = TIMES + 1
JAK - 1
>
F3
≤
WRITE (1'CLOCK) ITRQ,RSERV,C(TIME),D(TIME),A(TIME),B(TIME)
24

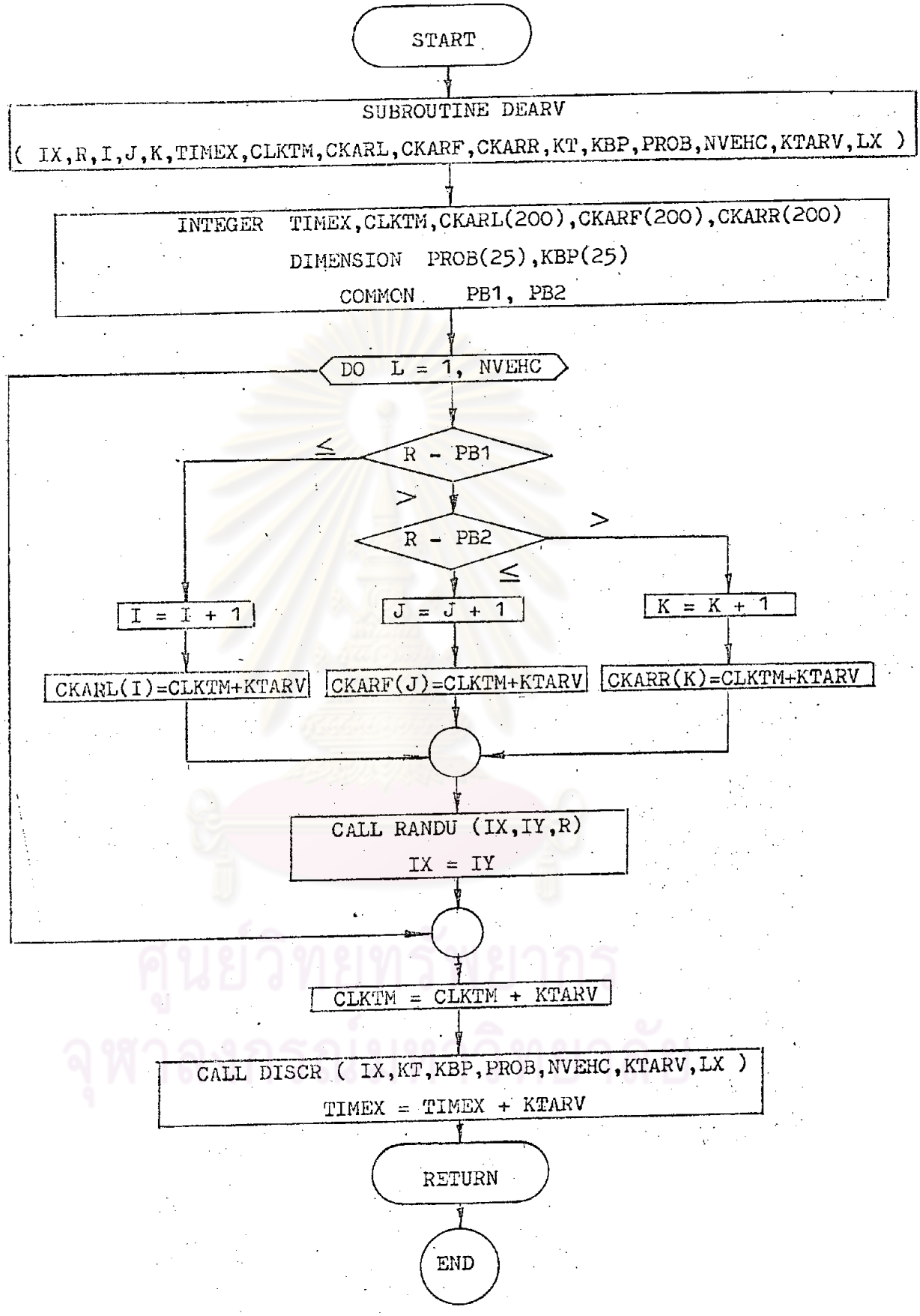


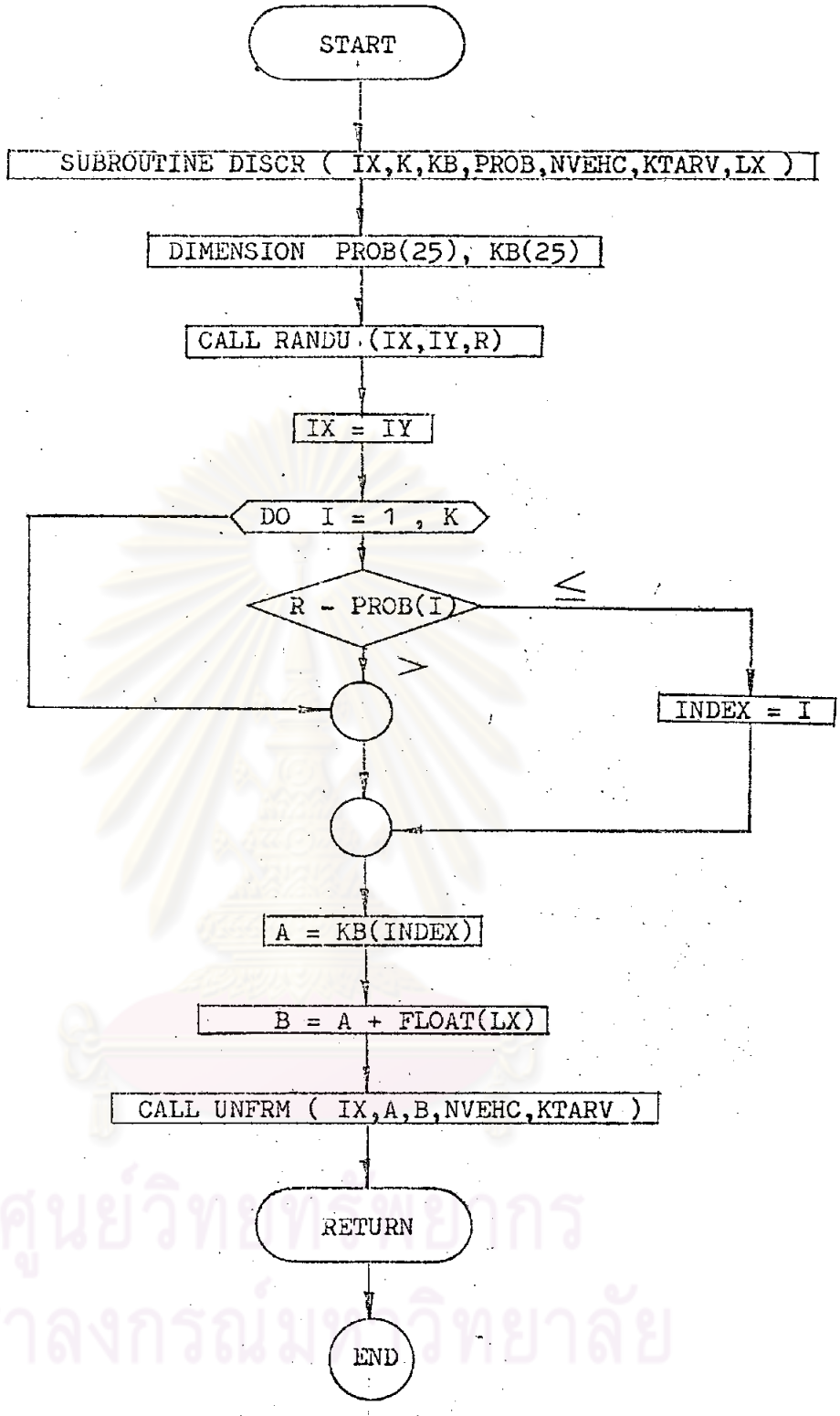


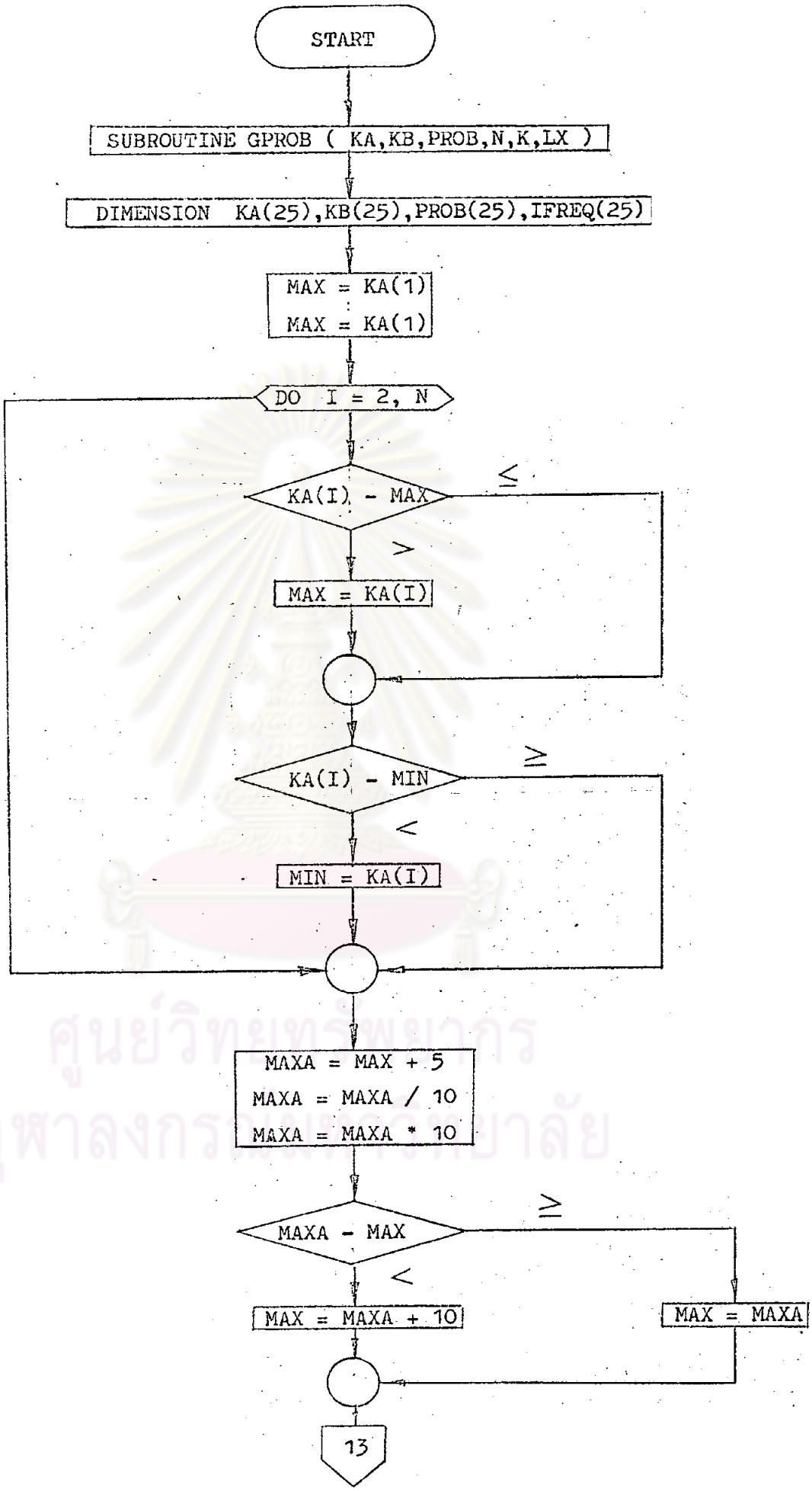

H
DO CLOCK = 1, 7200
READ (1'CLOCK) ITRQ2,RSERV,IFWQ2,FSERV,ITLQ2,LSERV,
ITRQ1,RSERV,IFWQ1,FSERV,ITLQ1,LSERV
CALL MAXVQ (CLOCK,ITLQA,IFWQA,ITRQA,ITLQ1,IFWQ1,ITRQ1,MCKAL,MCKAF,MCKAR)
CALL MAXVQ (CLOCK,ITLQB,IFWQB,ITRQB,ITLQ2,IFWQ2,ITRQ2,MCKBL,MCKBF,MCKBR)
KVA = ITLQ1 + IFWQ1 + ITRQ1
KVB = ITLQ2 + IFWQ2 + ITRQ2
CLOCK - 1
≤
>
MAXA - KVA
≥
<
MAXA = KVA
CLKA = CLOCK
MAXA = KVA
MAXB = KVB
MAXB - KVB
≥
<
MAXB = KVB
CLKB = CLOCK
CLKA = CLOCK
CLKB = CLOCK
25

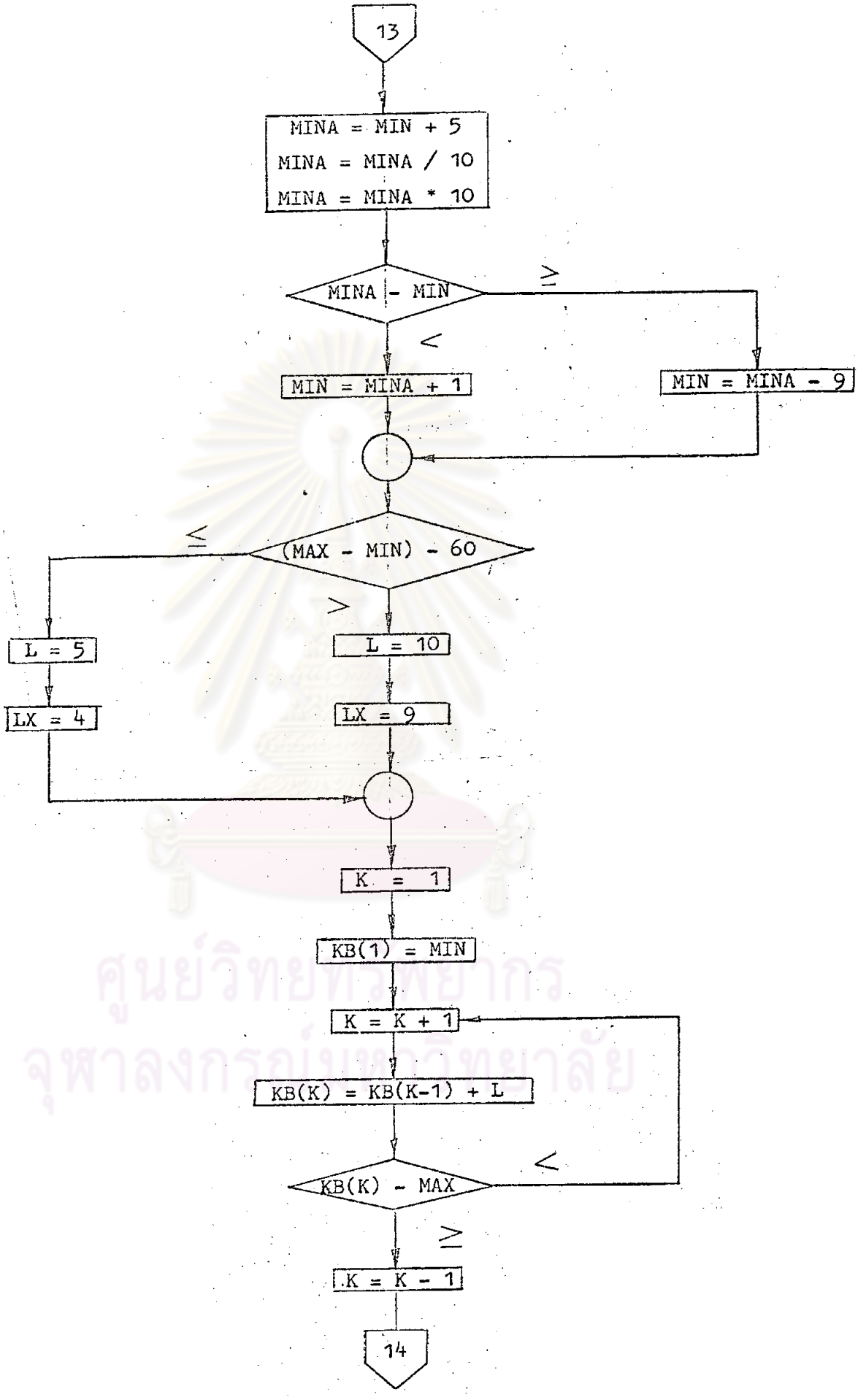

25
CALL QLANE (IFWQA,LANE)
CALL QLANE (IFWQB,LANE)
KLANE = LANE + 2
I
WRITE MCKAL,MCKAF,MCKAR,ITLQA,IFWQA,ITRQA
WRITE MCKBL,MCKBF,MCKBR,ITLQB,IFWQB,ITRQB
WRITE CLKA,MAXA,CLKB,MAXB
WRITE NINPT, NOUTP
WRITE ((IPROB(I2,J2),J2=1,3),I2=1,2), NVEHC, LANE
≥
KO1 - 4
<
CALL LINK (TRAF3)
CALL LINK (TRAF1)
END

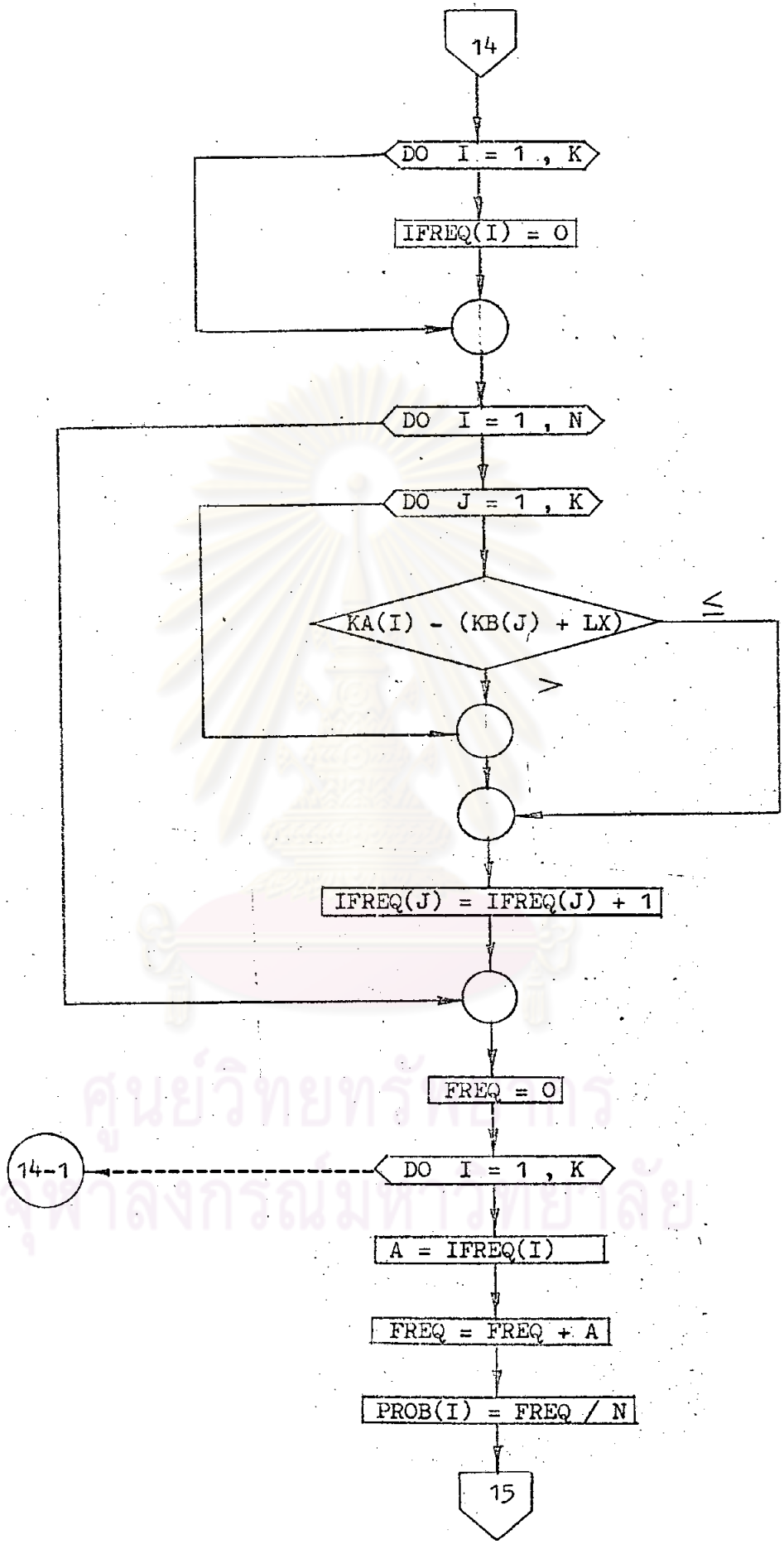

START
SUBROUTINE ARRIV
(IX,R,I,J,K,TMEAN,TIMEX,CLKTM,CKARL,CKARF,CKARR,TARV)
INTEGER TIMEX,CLKTM,TARV,CKARL(200),CKARF(2000),CKARR(200)
COMMON PB1, PB2
R - PB1
≤
>
R - PB2
>
≤
I = I + 1
J = J + 1
K = K + 1
CKARL(I)=CLKTM+TARV
CKARF(J)=CLKTM+TARV
CKARR(K)=CLKTM+TARV
CLKTM = CLKTM + TARV
CALL TEXPA (IX,TMEAN,TARV)
TIMEX = TIMEX + TARV
CALL RANDU (IX,IY,R)
IX = IY
RETURN
END

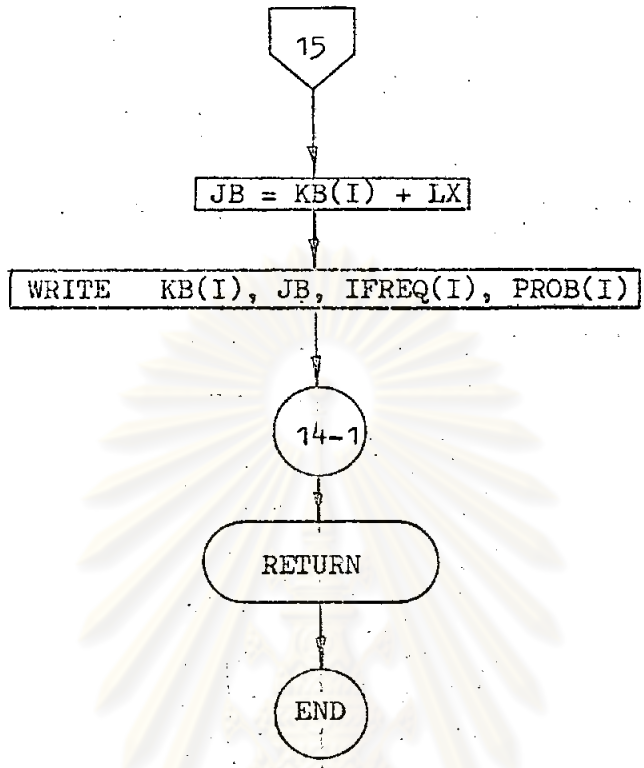

START
SUBROUTINE DEARV
(IX,R,I,J,K,TIMEX,CLKTM,CKARL,CKARF,CKARR,KT,KBP,PROB,NVEHC,KTARV,LX)
INTEGER TIMEX,CLKTM,CKARL(200),CKARF(200),CKARR(200)
DIMENSION PROB(25),KBP(25)
COMMON PB1, PB2
DO L = 1, NVEHC
R - PB1
≤
>
R - PB2
>
≤
I = I + 1
J = J + 1
K = K + 1
CKARL(I)=CLKTM+KTARV
CKARF(J)=CLKTM+KTARV
CKARR(K)=CLKTM+KTARV
CALL RANDU (IX,IY,R)
IX = IY
CLKTM = CLKTM + KTARV
CALL DISCR (IX,KT,KBP,PROB,NVEHC,KTARV,LX)
TIMEX = TIMEX + KTARV
RETURN
END

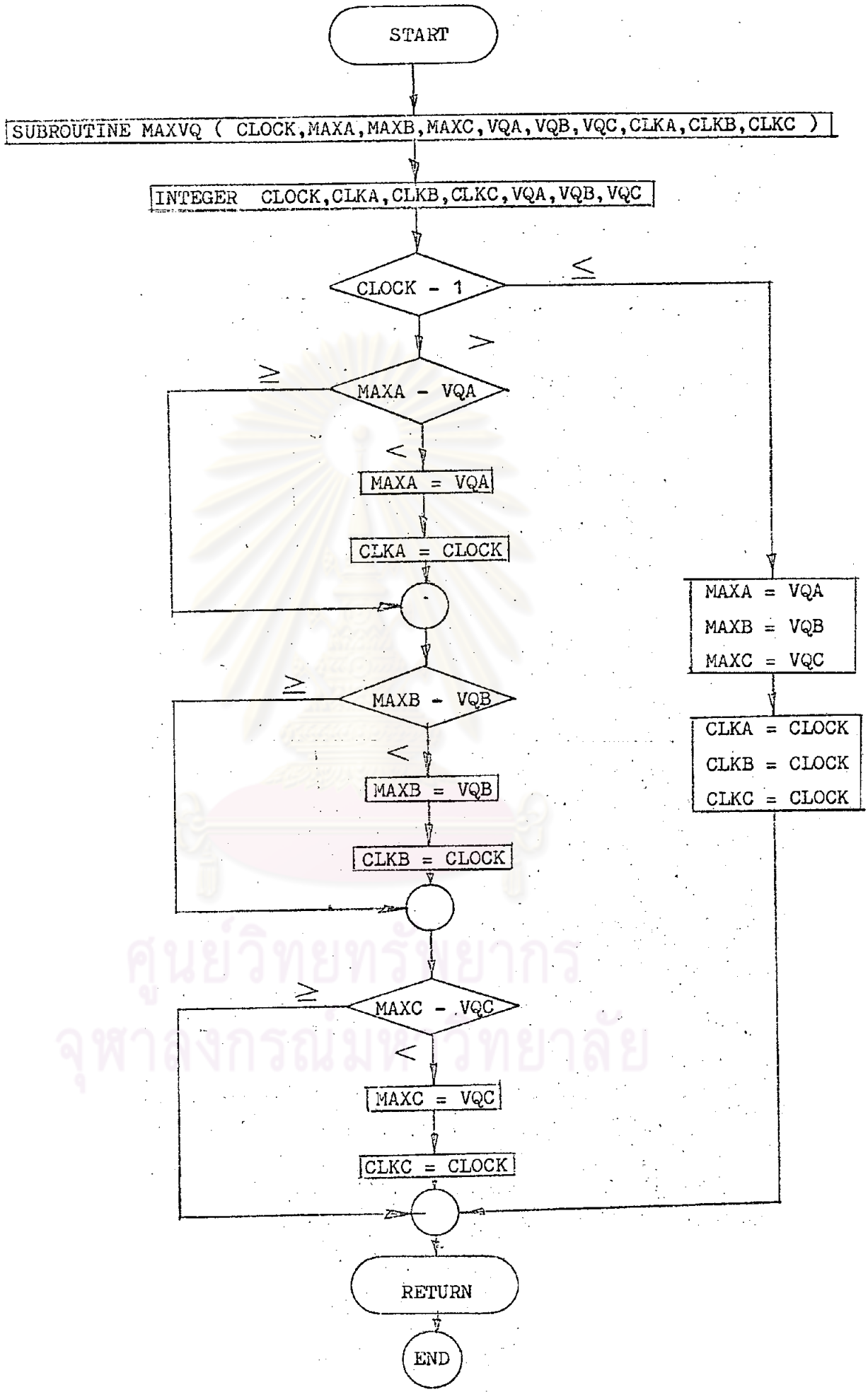


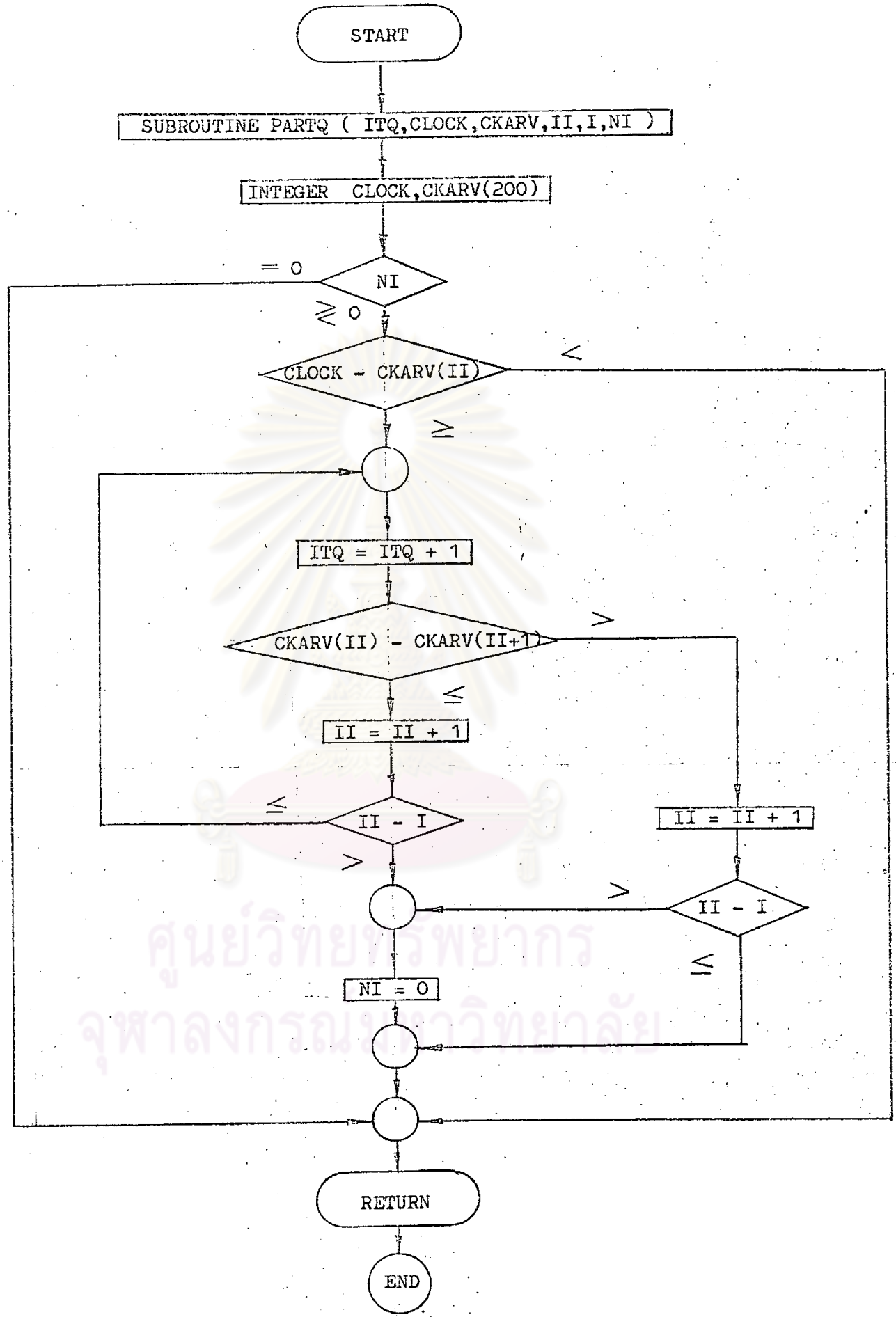


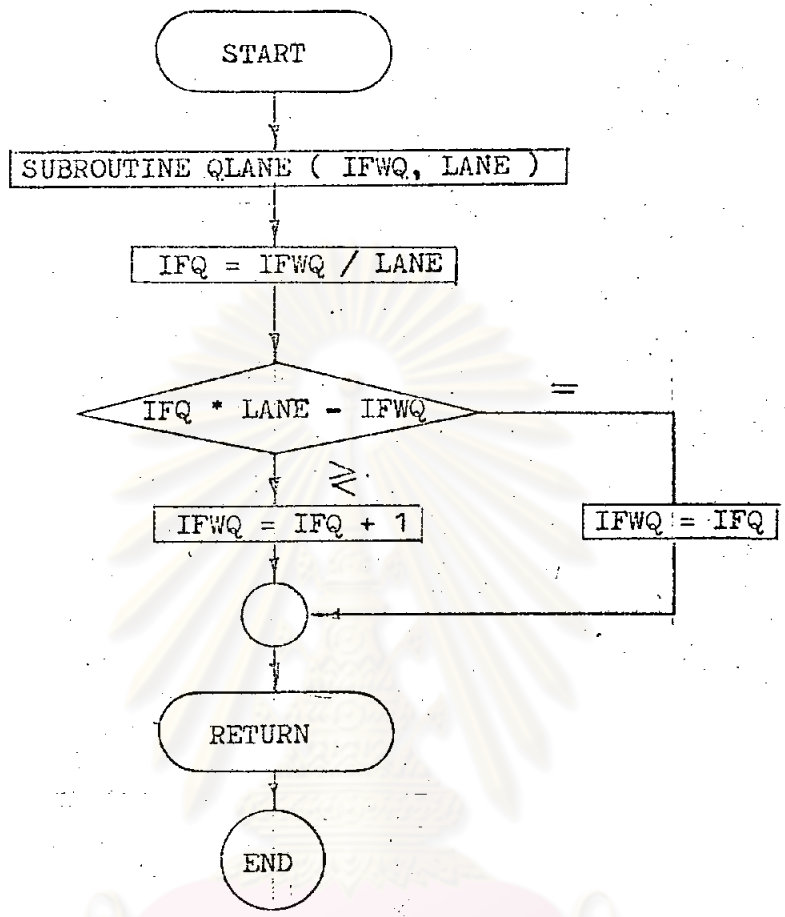


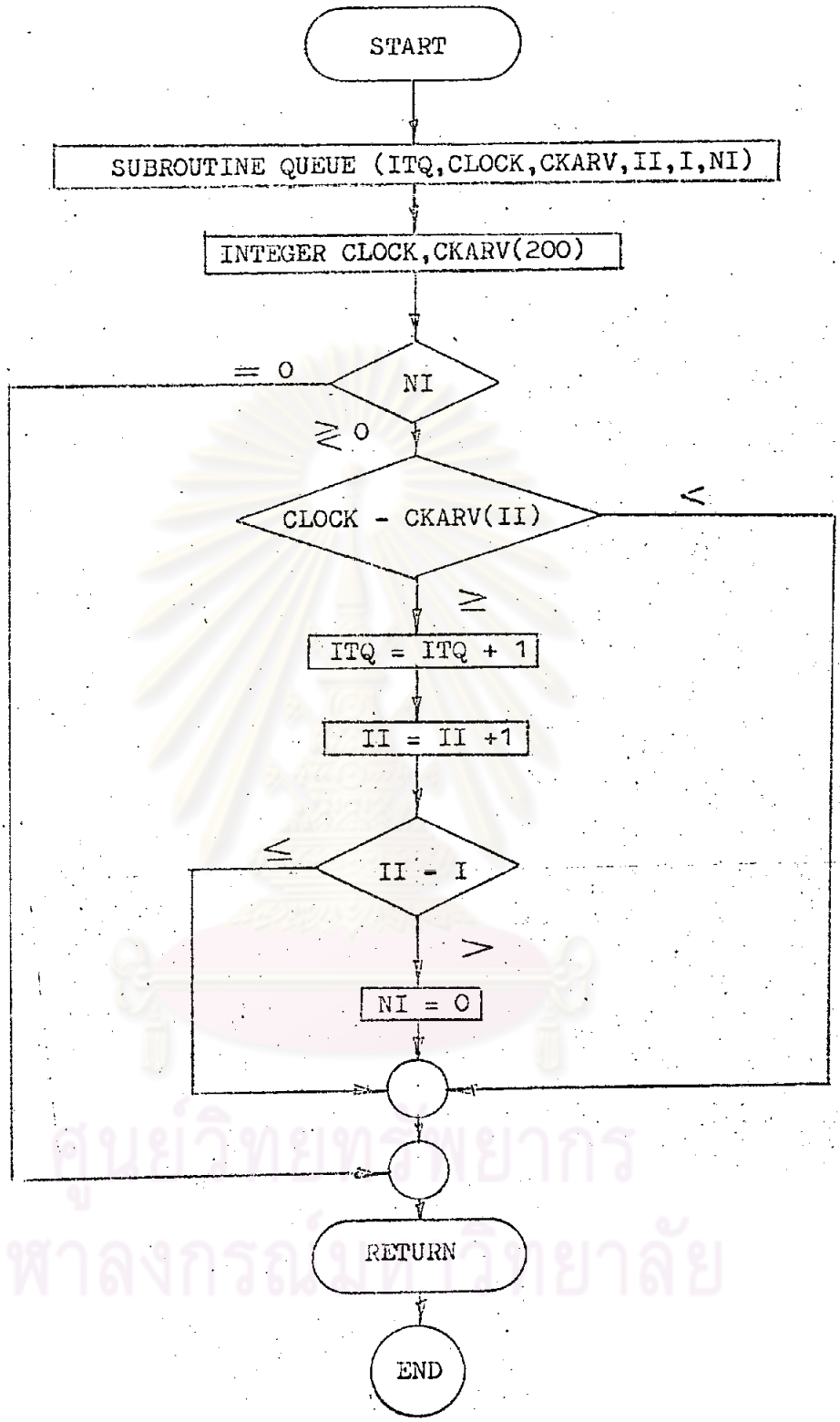


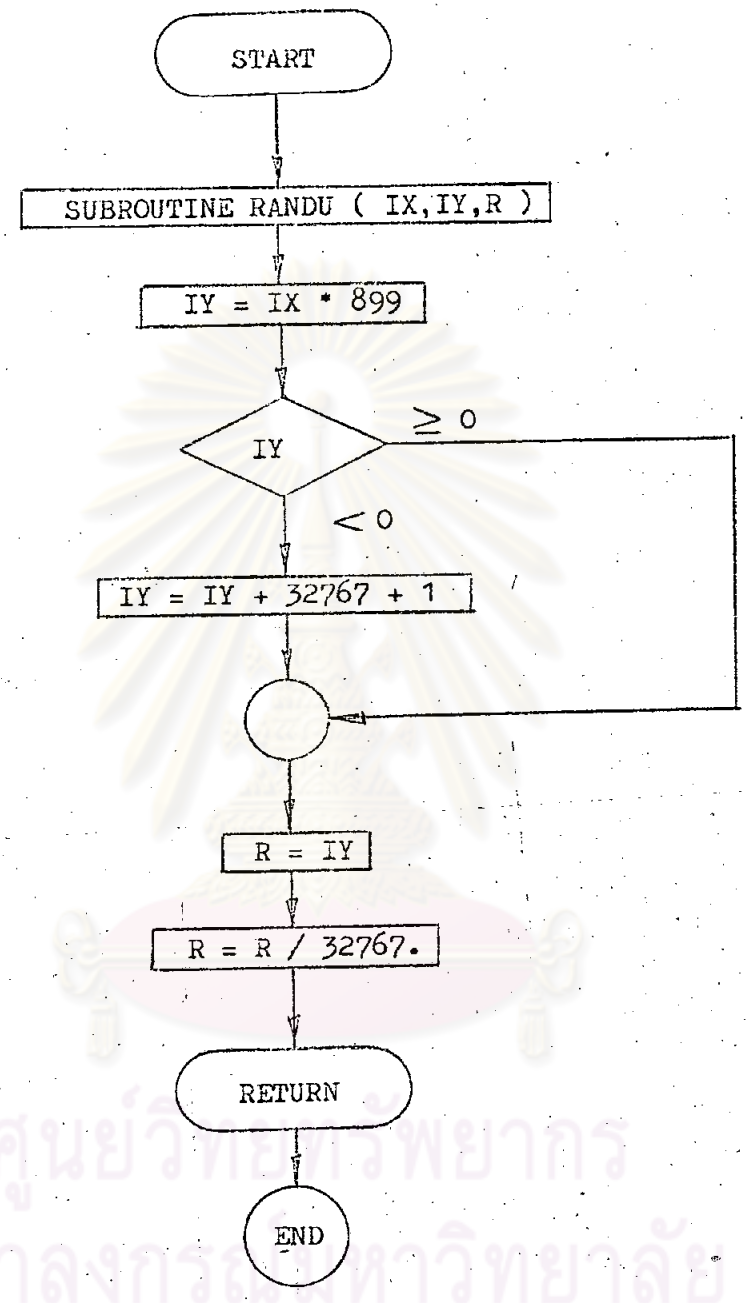


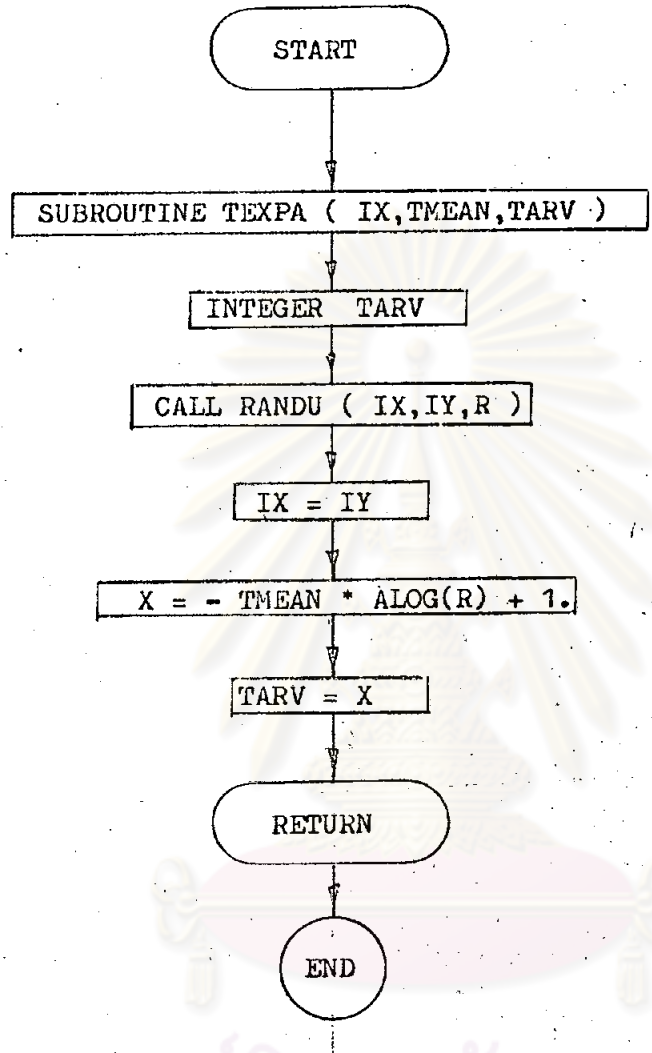


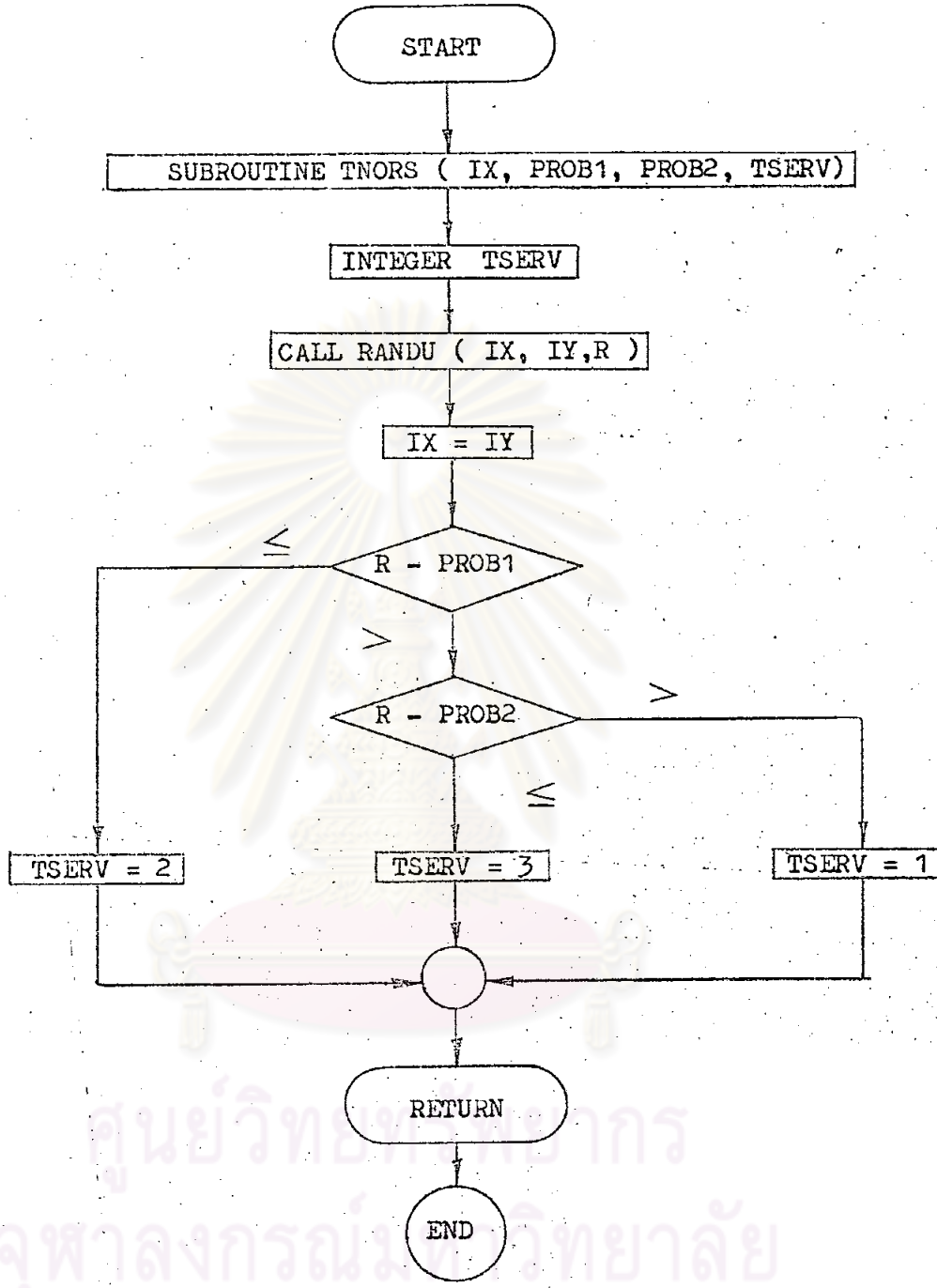


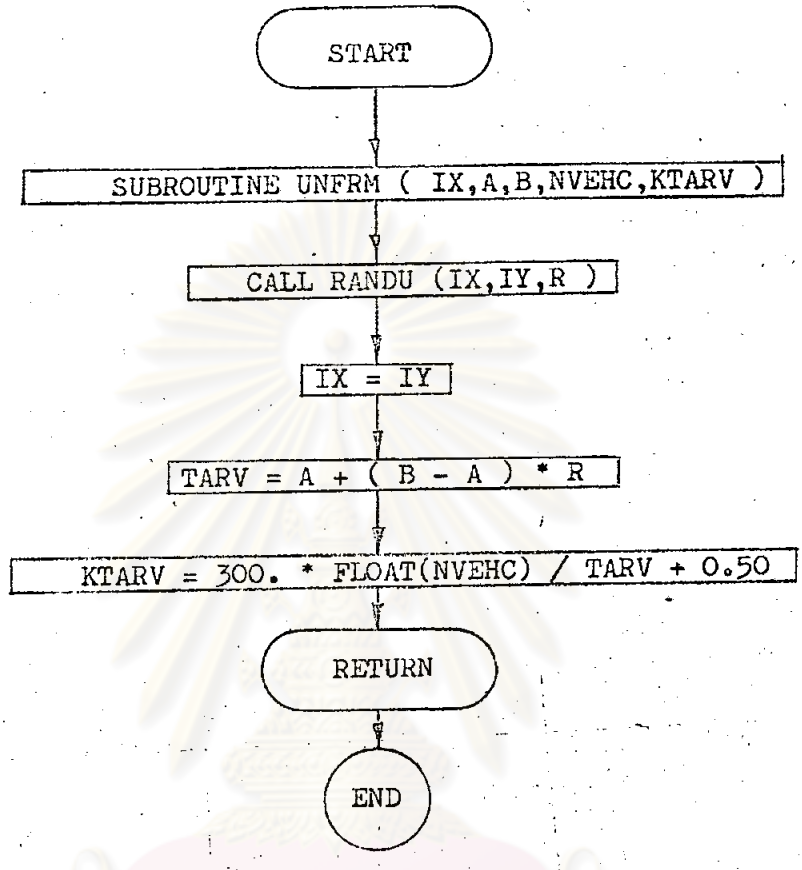












APPENDIX E

VARIABLES	DESCRIPTIONS
A	INTEGER ARRAY-VARIABLES FOR RECORDING THE VOLUME OF VEHICLES WAITING IN QUEUE
AA	NAME OF THE BOUND
AB	DUMMY-ARRAY VARIABLES FOR BEING THE PERIOD OF PHASES
B	INTEGER ARRAY-VARIABLES FOR RECORDING THE VOLUME OF VEHICLES WAITING IN QUEUE
C	INTEGER ARRAY-VARIABLES FOR RECORDING THE VOLUME OF VEHICLES WAITING IN QUEUE
CKARL	INTEGER ARRAY-VARIABLES FOR INDICATING THE CLOCK TIME OF TURN-LEFT ARRIVALS
CKARF	INTEGER ARRAY-VARIABLES FOR INDICATING THE CLOCK TIME OF STRAIGHTFORWARD ARRIVALS
CKARR	INTEGER ARRAY-VARIABLES FOR INDICATING THE CLOCK TIME OF TURN-RIGHT ARRIVALS
CLKTM	INTEGER VARIABLE USED FOR TRANSFERRING THE CLOCK TIME OF ARRIVING VEHICLES FROM CYCLE TO CYCLE
CLOCK	INTEGER VARIABLE FOR INDICATING THE NUMBER OF CLOCK TIME
D	INTEGER ARRAY-VARIABLES FOR RECORDING THE VOLUME OF VEHILCES PASSING THE DETECTOR
DATSW	THE SPECIAL SUBROUTINE USED IN THE IBM 1130 COMPUTING SYSTEM, IT IS PROVIDED FOR MANUAL OPERATING WITH KEYBOARD AND IT IS USED IN THE PROGRAM FOR CHECKING THE STEP OF COMPUTATION IF IT IS NEEDED
DD	INTEGER VARIABLE USED FOR RECORDING THE FLOW OF VEHICLES IN A GIVEN COUNT-INTERVAL
DETEC	INTEGER VARIABLE USED FOR INDICATING THE NUMBER OF VEHICLES PASSING THE DETECTOR AT ANY CLOCK TIME
EAST	INTEGER VARIABLE, THE NUMBER OF VEHICLES WHICH HAVE BEEN SERVED IN THE STRAIGHTFORWARD LANE OF E-BOUND AT ANY CLOCK TIME
FSERV	THE NUMBER OF VEHICLES WHICH CAN BE SERVED IN STRAIGHTFORWARD LANE
I	NUMBER OF TURN-LEFT ARRIVALS PER PHASE
IBOUN	BOUND INDICATOR, FOR IBOUN = 1, IT INDICATES SOUTHBOUND AND NORTHBOUND AND IBOUN = 2, IT INDICATES EASTBOUND
ID	LOGICAL CONTROL OF PHASES AND SERVICES

	ID = 0 FOR IBOUN = 2 , AND ID = 1 FOR IBOUN = 1
IE	LOGICAL VARIABLE CONCERNING WITH PHASE AND SERVICE, WHERE IE = 0 FOR IBOUN = 1, IE = 1 FOR IBOUN = 2
IFWQ	STRAIGHTFORWARD QUEUE AT ANY CLOCK TIME
IFWQ1	STRAIGHTFORWARD QUEUE FOR SOUTHBOUND
IFWQ2	STRAIGHTFORWARD QUEUE FOR NORTHBOUND
IFWQ3	STRAIGHTFORWARD QUEUE FOR EASTBOUND
II	DUMMY VARIABLE FOR CHECKING THE NUMBER OF VEHICLES IN TURN-LEFT LANE
INDEX	THE DATA FILE'S RECORD-INDICATOR
ITLQ	TURN-LEFT QUEUE AT ANY CLOCK TIME
ITLQ1	TURN-LEFT QUEUE FOR SOUTHBOUND
ITLQ2	TURN-LEFT QUEUE FOR NORTHBOUND
ITLQ3	TURN-LEFT QUEUE FOR EASTBOUND
ITRQ	TURN-RIGHT QUEUE AT ANY CLOCK TIME
ITRQ1	TURN-RIGHT QUEUE FOR SOUTHBOUND
ITRQ2	TURN-RIGHT QUEUE FOR NORTHBOUND
ITRQ3	TURN-RIGHT QUEUE FOR EASTBOUND
IX	INPUT RANDOM NUMBER FOR SUBROUTINE RANDU
IY	OUTPUT RANDOM NUMBER FOR THE NEXT GENERATION OF RANDU SUBROUTINE
J	NUMBER OF STRAIGHTFORWARD ARRIVALS PER PHASE
JAK	CONTROL VARIABLE FOR STORING DATA IN FILE NO. 1
JA3	LIMITATION OF NUMBER OF DATA TO BE STORED IN FILE NO. 1
JJ	DUMMY VARIABLE FOR CHECKING THE NUMBER OF VEHICLES IN STRAIGHTFORWARD LANE
JN	NUMBER OF LOOP IN COMPUTATION
K	NUMBER OF TURN-RIGHT ARRIVALS PER PHASE
KAI	ARRAY-VARIABLES FOR RECORDING THE NUMBER OF VEHICLES PER 5 MIN. COUNT-INTERVAL
KB	DUMMY ARRAY-VARIABLES
KBP	ARRAY-VARIABLES FOR RECORDING THE LOWER BOUND OF 5 MIN.-COUNT CLASS INTERVALS
KK	DUMMY VARIABLE FOR CHECKING THE NUMBER OF VEHICLES IN TURN-RIGHT LANE
KPK	LOGICAL CONTROL-VARIABLE, CONCERNING WITH PHASE AND SERVICE-GENERATION
KNE	ARRAY-VARIABLES IN CONTROLLING THE DELAY TIME FOR VEHICLES TO MOVE FROM E-BOUND TO DETECTOR
KNN	ARRAY-VARIABLES IN CONTROLLING THE DELAY TIME FOR VEHICLES TO MOVE FROM N-BOUND TO DETECTOR
KNS	ARRAY-VARIABLES IN CONTROLLING THE DELAY TIME FOR VEHICLES TO MOVE FROM S-BOUND TO DETECTOR
KTOL	TOTAL VEHICLES PASSING THE DETECTOR
K3	THE VARIABLE INDICATES THE ORDER OF ARRAY KAI
K4	CONTROLLED VARIABLE FOR LINKING THE MAIN PROGRAMS
LANE	NO. OF STRAIGHTFORWARD LANES
LSERV	THE NUMBER OF VEHICLES WHICH CAN BE SERVED IN TURN-LEFT LANE

LXY	CONTROL VARIABLE ABOUT 4-PHASE GENERATION
LX1	THE LIMITATION OF CLASS INTERVAL WHICH IS THE OUTPUT PARAMETER OF SUBROUTINE GPROB
M	THE VARIABLE INDICATES THE NO. OF VARIABLE MM
MAXA	MAXIMUM VOLUME WAITING IN QUEUE, IN THE WAY FROM A TO B
MAXB	MAXIMUM VOLUME WAITING IN QUEUE, IN THE WAY FROM B TO A
MAXE	MAXIMUM VOLUME WAITING IN QUEUE FOR E-BOUND
MAXN	MAXIMUM VOLUME WAITING IN QUEUE FOR N-BOUND
MAXS	MAXIMUM VOLUME WAITING IN QUEUE FOR S-BOUND
MM	ARRAY-VARIABLES, THE PERIOD OF COUNT-INTERVAL
N	NUMBER OF BOUNDS AT INTERSECTION
NI	INDICATOR FOR THE QUEUE OF TURN-LEFT LANE
NINPT	ARRAY-VARIABLES, NO. OF TOTAL INPUT VEHICLES FOR S-N-E BOUNDS
NJ	INDICATOR FOR THE QUEUE OF STRAIGHTFORWARD LANE
NK	INDICATOR FOR THE QUEUE OF TURN-RIGHT LANE
NOCYL	THE PERIOD OF TIMING CYCLE
NORTH	THE NUMBER OF VEHICLES WHICH HAVE BEEN SERVED IN TURN-RIGHT LANE OF N-BOUND AT ANY CLOCK TIME
NOUTP	ARRAY-VARIABLES, NO. OF TOTAL OUTPUT VEHICLES FOR S-N-E BOUNDS
NPHAS	NUMBER OF PHASES FOR TIMING SIGNAL
NX	THE CONTROLLED VARIABLE OF SERVICES
PBF1	THE LOWER LIMIT OF STRAIGHTFORWARD SERVICE PROBABILITY
PBF2	THE UPPER LIMIT OF STRAIGHTFORWARD SERVICE PROBABILITY
PBL1	THE LOWER LIMIT OF TURN-LEFT SERVICE PROBABILITY
PBL2	THE UPPER LIMIT OF TURN-LEFT SERVICE PROBABILITY
PBR1	THE LOWER LIMIT OF TURN-RIGHT SERVICE PROB-ABILITY
PBR2	THE UPPER LIMIT OF TURN-RIGHT SERVICE PROB-ABILITY
PB1	THE LOWER LIMIT OF LANE-DISTRIBUTION OF THE ARRIVALS
PB2	THE UPPER LIMIT OF LANE-DISTRIBUTION OF THE ARRIVALS
PHASE	THE PERIOD OF PHASE IN TIMING
QNOTE	THE INPUT COMMENT STATEMENT FOR INDICATING THE NUMBER OF DATA SET
R	THE GENERATED RANDOM NUMBER WITHIN THE LIMIT OF 0.0 TO 1.0
RSERV	THE NUMBER OF VEHICLES WHICH CAN BE SERVED IN TURN-RIGHT LANE
SOUTH	INTEGER VARIABLE, THE NUMBER OF VEHICLES WHICH HAVE BEEN SERVED IN TURN-LEFT LANE OF S-BOUND AT ANY CLOCK TIME
TCHEK	INTEGER VARIABLE, THE TRANSFERRED CLOCK TIME OF ARRIVING VEHICLES WHEN THE PHASE IS CHANGED
TIME	INTEGER VARIABLE, USING FOR CHECKING THE PERIOD

	OF PHASE AT ANY CLOCK TIME
TIMEA	INTEGER VARIABLE, USING FOR CHECKING THE CYCLE OF PHASES
TIMES	INTEGER VARIABLE, THE TRANSFERRED CLOCK TIME OF SERVICING VEHICLES WHEN THE PHASE IS CHANGED
TMEAN	THE EXPECTED VALUE OF EXPONENTIAL DISTRIBUTION
TRED	THE RED PHASE PERIOD
TRSEV	INTEGER VARIABLE, USING FOR TRANSFERRING THE SERVICE-TIME FROM ONE PHASE TO ONE PHASE
TSEVF	GENERATED SERVICE-VARIATE OF STRAIGHTFORWARD VEHICLES
TSEVL	GENERATED SERVICE-VARIATE OF TURN-LEFT VEHICLES
TSEVR	GENERATED SERVICE-VARIATE OF TURN-RIGHT VEHICLES
VEAST	THE VOLUME OF VEHICLES WAITING IN QUEUE FOR E-BOUND
VNOTH	THE VOLUME OF VEHICLES WAITING IN QUEUE FOR N-BOUND
VSOTH	THE VOLUME OF VEHICLES WAITING IN QUEUE FOR S-BOUND

APPENDIX F

NO. OF PHASES = 2 PERIOD OF CYCLE = 120 SECONDS

AND PHASE RATIO = / 65 / 55 /

DATA SET 1 , QUEUE FROM A TO B

VEHICLES PER 60 SECONDS

CLOCK	DETECTOR
60	20
120	11
180	31
240	9
300	29
360	12
420	28
480	18
540	34
600	12
660	34
720	15
780	31
840	13
900	34
960	12
1020	29
1080	12
1140	30
1200	14
1260	34
1320	15
1380	34
1440	17
1500	28
1560	18
1620	32
1680	16
1740	35
1800	12
1860	33
1920	14
1980	28
2040	15
2100	30
2160	17
2220	28
2280	14
2340	32
2400	9

2460	34
2520	12
2580	29
2640	16
2700	33
2760	15
2820	31
2880	14
2940	29
3000	18
3060	34
3120	15
3180	35
3240	18
3300	30
3360	15
3420	29
3480	14
3540	30
3600	15
3660	30
3720	12
3780	31
3840	13
3900	31
3960	16
4020	32
4080	14
4140	29
4200	16
4260	29
4320	14
4380	29
4440	12
4500	31
4560	14
4620	31
4680	15
4740	30
4800	16
4860	30
4920	12
4980	32
5040	10
5100	33
5160	13
5220	31
5280	18
5340	27
5400	20
5460	31
5520	14

5580	29
5640	13
5700	31
5760	19
5820	33
5880	8
5940	30
6000	18
6060	34
6120	13
6180	29
6240	9
6300	30
6360	17
6420	29
6480	13
6540	31
6600	14
6660	27
6720	15
6780	29
6840	17
6900	30
6960	13
7020	30
7080	13
7140	30
7200	13

TOTAL = 2688 VEHICLES

VEHICLES PER 300 SECONDS

CLOCK	DETECTOR
300	100
600	104
900	127
1200	97
1500	128
1800	113
2100	120
2400	100
2700	124
3000	107
3300	132
3600	103
3900	117
4200	107
4500	115
4800	106
5100	117

5400	109
5700	118
6000	108
6300	115
6600	104
6900	118
7200	99

TOTAL = 2688 VEHICLES

VEHICLES PER 900 SECONDS

CLOCK	DETECTOR
900	331
1800	338
2700	344
3600	342
4500	339
5400	332
6300	341
7200	321

TOTAL = 2688 VEHICLES

MSCK = 7144 MNCK = 7141 MECK = 7080
MAXS = 400 MAXN = 376 MAXE = 172

MAX. QUEUE FOR SOUTH BOUND

CLOCK	510	7141	3182
L-F-R	1	395	8

MAX. QUEUE FOR NORTH BOUND

CLOCK	105	7139	5334
L-F-R	1	374	9

MAX. QUEUE FOR EAST BOUND

CLOCK	782	7080	2161
L-F-R	3	170	9

TOTAL INPUT VEHICLES / 2 HRS. PERIOD

FOR S-BOUND = 2809
FOR N-BOUND = 2786
FOR E-BOUND = 2893

TOTAL OUTPUT VEHICLES / 2 HRS. PERIOD

FOR S-BOUND = 2431
FOR N-BOUND = 2427
FOR E-BOUND = 2726

ACCORDING TO THE FOLLOWING ASSUMPTIONS

PROB. RATIO OF L-F-R FOR S-BOUND = / 15 / 70 / 15 /
PROB. RATIO OF L-F-R FOR N-BOUND = / 15 / 70 / 15 /
PROB. RATIO OF L-F-R FOR E-BOUND = / 15 / 70 / 15 /

(NOTE) NO. OF LANES = 3

TABLE FOR 5 MINS.

NO. OF VEHICLES	FREQUENCY	ACC. PROB.
91- 95	0	0.0000
96-100	4	0.1666
101-105	3	0.2916
106-110	5	0.5000
111-115	3	0.6250
116-120	5	0.8333
121-125	1	0.8750
126-130	2	0.9583
131-135	1	1.0000
136-140	0	1.0000

NO. OF PHASES = 2 PERIOD OF CYCLE = 120 SECONDS

AND PHASE RATIO = / 55 / 65 /

DATA SET 1 , QUEUE FROM B TO A

VEHICLES PER 60 SECONDS

CLOCK	DETECTOR
60	18
120	10
180	31
240	14
300	26
360	6
420	31
480	8
540	34
600	9
660	27
720	10
780	30
840	11
900	30
960	8
1020	33
1080	6
1140	28
1200	10
1260	32
1320	13
1380	26
1440	13
1500	33
1560	11
1620	29
1680	10
1740	30
1800	13
1860	34
1920	9
1980	30
2040	5
2100	33
2160	12
2220	28
2280	4
2340	31
2400	11

2460	35
2520	9
2580	27
2640	11
2700	32
2760	6
2820	30
2880	8
2940	31
3000	8
3060	34
3120	10
3180	36
3240	11
3300	29
3360	8
3420	36
3480	8
3540	26
3600	8
3660	30
3720	10
3780	31
3840	12
3900	33
3960	10
4020	31
4080	9
4140	31
4200	8
4260	30
4320	8
4380	27
4440	7
4500	35
4560	12
4620	29
4680	11
4740	31
4800	7
4860	30
4920	11
4980	34
5040	14
5100	33
5160	5
5220	35
5280	14
5340	33
5400	9
5460	29
5520	7

5580	30
5640	10
5700	32
5760	18
5820	27
5880	9
6000	11
6060	30
5940	31
6120	6
6180	29
6240	8
6300	29
6360	8
6420	32
6480	9
6540	28
6600	12
6660	29
6720	10
6780	32
6840	8
6900	27
6960	13
7020	29
7080	7
7140	29
7200	8

TOTAL = 2397 VEHICLES

VEHICLES PER 300 SECONDS

CLOCK	DETECTOR
300	99
600	88
900	108
1200	85
1500	117
1800	93
2100	111
2400	86
2700	114
3000	83
3300	120
3600	86
3900	116
4200	89
4500	107
4800	90
5100	122

5400	96
5700	108
6000	96
6300	102
6600	89
6900	106
7200	86

TOTAL = 2397 VEHICLES

VEHICLES PER 900 SECONDS

CLOCK	DETECTOR
900	295
1800	295
2700	311
3600	289
4500	312
5400	308
6300	306
7200	281

TOTAL = 2397 VEHICLES

MSCK = 6895 MNCK = 7136 MECK = 7199
MAXS = 147 MAXN = 113 MAXE = 424

MAX. QUEUE FOR SOUTH BOUND

CLOCK	66	6782	414
L-F-R	1	144	7

MAX. QUEUE FOR NORTH BOUND

CLOCK	326	7136	1258
L-F-R	1	112	8

MAX. QUEUE FOR EAST BOUND

CLOCK	330	7199	1673
L-F-R	1	419	10

TOTAL INPUT VEHICLES / 2 HRS. PERIOD

FOR S-BOUND = 2860
FOR N-BOUND = 2779
FOR E-BOUND = 2843

TOTAL OUTPUT VEHICLES / 2 HRS. PERIOD

FOR S-BOUND = 2741
FOR N-BOUND = 2685
FOR E-BOUND = 2422

ACCORDING TO THE FOLLOWING ASSUMPTIONS

PROB. RATIO OF L-F-R FOR S-BOUND = / 15 / 70 / 15 /
PROB. RATIO OF L-F-R FOR N-BOUND = / 15 / 70 / 15 /
PROB. RATIO OF L-F-R FOR E-BOUND = / 15 / 70 / 15 /

(NOTE) NO. OF LANES = 3

TABLE FOR 5 MINS.

NO. OF VEHICLES	FREQUENCY	ACC. PROB.
81- 85	2	0.0833
86- 90	7	0.3750
91- 95	1	0.4166
96-100	3	0.5416
101-105	1	0.5833
106-110	4	0.7500
111-115	2	0.8333
116-120	3	0.9583
121-125	1	1.0000
126-130	0	1.0000

SOLUTION FOR MAX. QUEUE FROM INTERSECTION-A-,DUE TO SIGNAL-B-

CLOCK	6416	7087	2163
L-F-R	8	293	10

SOLUTION FOR MAX. QUEUE FROM INTERSECTION-B-,DUE TO SIGNAL-A-

CLOCK	485	4564	2525
L-F-R	5	32	10

MAX VOLUMES FROM A TO B
CLOCK 6721 MAX VOL. 298

MAX VOLUMES FROM B TO A
CLOCK 4081 MAX VOL. 37

TOTAL INPUT VEHICLES / 2 HRS. PERIOD

FROM A TO B = 2648
FROM B TO A = 2366

TATAL OUTPUT VEHICLES / 2 HRS. PERIOD

FROM A TO B = 2360
FROM B TO A = 2358

ACCORDING TO THE FOLLOWING ASSUMPTIONS

PROB. RATIO OF L-F-R FOR A TO B = / 15 / 70 / 15 /
PROB. RATIO OF L-F-R FOR B TO A = / 15 / 70 / 15 /

(NOTE) FOR NVEHC = 2 AND NO. OF LANES = 3

SOLUTION FOR MAX. QUEUE FROM INTERSECTION-A-,DUE TO SIGNAL-B-

CLOCK	7141	7082	4922
L-F-R	8	303	11

SOLUTION FOR MAX. QUEUE FROM INTERSECTION-B-,DUE TO SIGNAL-A-

CLOCK	1450	6003	2761
L-F-R	8	36	10

MAX VOLUMES FROM A TO B
CLOCK 7082 MAX VOL. 306

MAX VOLUMES FROM B TO A
CLOCK 6121 MAX VOL. 44

TOTAL INPUT VEHICLES / 2 HRS. PERIOD

FROM A TO B = 2667
FROM B TO A = 2397

TATAL OUTPUT VEHICLES / 2 HRS. PERIOD

FROM A TO B = 2380
FROM B TO A = 2389

ACCORDING TO THE FOLLOWING ASSUMPTIONS

PROB. RATIO OF L-F-R FOR A TO B = / 15 / 70 / 15 /
PROB. RATIO OF L-F-R FOR B TO A = / 15 / 70 / 15 /

(NOTE) FOR NVEHC = 3 AND NO. OF LANES = 3

SOLUTION FOR MAX. QUEUE FROM INTERSECTION-A-,DUE TO SIGNAL-B-

CLOCK	7084	7084	2287
L-F-R	8	356	12

SOLUTION FOR MAX. QUEUE FROM INTERSECTION-B-,DUE TO SIGNAL-A-

CLOCK	4696	6363	1563
L-F-R	7	36	8

MAX VOLUMES FROM A TO B
CLOCK 7084 MAX VOL. 365

MAX VOLUMES FROM B TO A
CLOCK 6363 MAX VOL. 38

TOTAL INPUT VEHICLES / 2 HRS. PERIOD

FROM A TO B = 2688
FORM B TO A = 2364

TATAL OUTPUT VEHICLES / 2 HRS. PERIOD

FROM A TO B = 2343
FROM B TO A = 2359

ACCORDING TO THE FOLLOWING ASSUMPTIONS

PROB. RATIO OF L-F-R FOR A TO B = / 15 / 70 / 15 /
PROB. RATIO OF L-F-R FOR B TO A = / 15 / 70 / 15 /

(NOTE) FOR NVEHC = 4 AND NO. OF LANES = 3

SOLUTION FOR MAX. QUEUE FROM INTERSECTION-A-,DUE TO SIGNAL-B-

CLOCK	776	6965	2402
L-F-R	8	303	13

SOLUTION FOR MAX. QUEUE FROM INTERSECTION-B-,DUE TO SIGNAL-A-

CLOCK	5226	3601	6601
L-F-R	7	37	10

MAX VOLUMES FROM A TO B
CLOCK 6965 MAX VOL. 308

MAX VOLUMES FROM B TO A
CLOCK 3601 MAX VOL. 43

TOTAL INPUT VEHICLES / 2 HRS. PERIOD

FROM A TO B = 2665
FROM B TO A = 2360

TATAL OUTPUT VEHICLES / 2 HRS. PERIOD

FROM A TO B = 2373
FROM B TO A = 2352

ACCORDING TO THE FOLLOWING ASSUMPTIONS

PROB. RATIO OF L-F-R FOR A TO B = / 15 / 70 / 15 /
PROB. RATIO OF L-F-R FOR B TO A = / 15 / 70 / 15 /

(NOTE) FOR NVEHC = 5 AND NO. OF LANES = 3

APPENDIX G

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
2	0	1	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0
3	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0
4	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0
5	0	0	0	1	0	0	0	0	2	0	0	0	0	0	1	0	0	0
6	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	2	0	0	0	1	0	2	0	0	0
8	0	0	0	0	0	0	0	0	2	0	0	0	1	0	2	0	0	0
9	0	0	0	1	0	0	0	0	2	0	0	0	1	0	2	0	0	0
10	0	0	0	0	0	0	0	0	2	0	0	0	1	0	2	0	0	0
11	0	0	0	1	0	0	0	0	3	0	0	0	1	0	2	0	0	0
12	0	0	1	0	0	0	0	0	3	0	0	0	1	0	2	0	0	0
13	0	0	0	1	0	0	0	0	3	0	0	0	1	0	2	0	0	0
14	0	0	0	0	0	0	0	0	4	0	0	0	1	0	2	0	0	0
15	0	0	0	1	0	0	0	0	5	0	0	0	1	0	2	0	0	0
16	0	0	0	0	0	0	0	0	5	0	0	0	1	0	3	0	0	0
17	0	0	0	0	0	0	0	0	5	0	0	0	1	0	3	0	0	0
18	0	0	0	0	0	0	0	0	6	0	0	0	1	0	3	0	0	0
19	0	0	0	1	0	0	0	0	6	0	0	0	1	0	3	0	0	0
20	0	0	0	0	0	0	0	0	6	0	0	0	1	0	3	0	0	0
21	0	0	0	0	0	0	0	0	6	0	0	0	2	0	3	0	0	0
22	0	0	0	0	0	0	0	0	7	0	0	0	2	0	3	0	0	0
23	0	0	0	0	0	0	0	0	7	0	0	0	2	0	3	0	0	1
24	0	0	0	1	0	0	0	0	8	0	0	0	2	0	3	0	0	0
25	0	0	0	0	0	0	0	0	9	0	0	0	2	0	3	0	0	0
26	0	0	0	0	0	0	0	0	10	0	0	0	2	0	3	0	0	0
27	0	0	0	0	0	0	1	0	10	0	0	0	2	0	3	0	0	0
28	0	0	0	0	0	1	1	0	10	0	0	0	2	0	3	0	0	0
29	0	0	0	1	0	0	1	0	10	0	0	0	2	0	3	0	0	0
30	0	0	1	0	0	0	1	0	10	0	0	0	2	0	3	0	0	1
31	0	0	0	1	0	0	1	0	10	0	0	0	2	0	3	0	0	0
32	0	0	0	0	0	0	1	0	10	0	0	0	2	0	3	0	0	0
33	0	0	0	0	0	0	1	0	10	0	0	0	2	0	4	0	0	0
34	0	0	0	0	0	1	2	0	10	0	0	0	2	0	4	0	0	0
35	0	0	0	1	0	0	2	0	11	0	0	0	2	0	4	0	0	0
36	0	0	0	0	0	0	2	0	12	0	0	0	2	0	4	0	0	1

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
37	0	0	0	0	0	0	2	0	13	0	0	0	2	0	4	0	0	0
38	0	0	0	0	0	0	2	0	13	0	0	0	2	0	4	0	0	0
39	0	0	0	1	0	0	2	0	14	0	0	0	2	0	4	0	0	0
40	0	0	0	1	0	0	2	0	14	0	0	0	2	0	4	0	0	0
41	0	0	1	0	0	0	2	0	14	0	0	0	2	0	4	0	0	0
42	0	0	0	1	0	0	2	0	15	0	0	0	2	0	4	0	0	0
43	0	0	0	0	0	0	2	0	15	0	0	1	2	0	4	0	0	0
44	0	0	0	1	0	0	2	0	16	0	0	0	3	0	4	0	0	0
45	0	0	0	0	0	0	2	0	16	0	0	0	3	0	4	0	0	0
46	0	0	0	1	0	0	2	0	16	0	0	0	4	0	4	0	0	0
47	0	1	0	0	0	0	2	0	17	0	0	0	4	0	4	0	0	0
48	0	0	0	0	0	0	2	0	17	0	0	1	4	0	4	0	0	0
49	0	1	0	0	0	0	2	0	17	0	0	0	4	0	4	0	0	0
50	0	0	0	0	0	0	2	0	17	0	0	0	4	0	4	0	0	1
51	0	0	0	0	0	0	2	0	17	0	0	0	4	0	4	0	0	0
52	0	0	0	0	0	0	2	0	17	0	0	0	4	0	4	0	0	0
53	0	0	0	0	0	0	2	0	17	0	0	0	4	0	5	0	0	0
54	0	0	0	0	0	0	2	0	17	0	0	0	4	0	5	0	0	0
55	0	0	0	0	0	0	2	0	17	0	0	0	4	0	6	0	0	0
56	0	0	0	0	0	0	2	0	18	0	0	0	4	0	6	0	0	0
57	0	1	0	0	0	0	2	0	18	0	0	0	4	0	6	0	0	0
58	0	0	0	0	0	0	2	0	18	0	0	1	4	0	7	0	0	0
59	0	0	0	1	0	0	2	0	18	0	1	0	4	0	7	0	0	0
60	0	0	0	0	0	0	2	0	18	0	0	1	4	0	8	0	0	0
61	0	0	0	0	0	0	2	0	18	0	0	0	4	0	8	0	0	0
62	0	0	0	0	0	0	1	1	17	1	0	0	3	1	7	1	0	0
63	0	0	0	0	0	0	1	0	18	0	0	0	3	0	7	0	0	0
64	0	0	0	0	0	1	0	1	17	1	0	0	2	1	8	0	0	0
65	0	0	1	0	0	0	1	0	17	0	0	0	2	0	8	1	0	0
66	0	0	1	0	0	0	0	1	17	0	0	0	1	1	8	0	0	0
67	0	0	1	0	0	0	0	0	17	1	0	0	1	0	8	1	0	0
68	0	0	1	0	0	0	0	0	17	0	0	0	0	1	9	0	0	0
69	0	0	2	0	0	0	0	0	17	1	0	0	1	0	8	1	0	0
70	0	0	2	0	0	0	0	0	18	0	0	0	0	1	8	0	0	0
71	1	0	2	0	0	0	0	0	17	1	0	0	0	0	7	1	0	1
72	1	0	2	0	0	0	0	0	18	0	0	0	0	0	8	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
73	1	0	3	0	0	0	0	0	17	1	0	0	0	0	8	1	0	0
74	1	0	4	0	0	0	0	0	17	0	0	1	0	0	8	0	0	0
75	1	0	4	0	0	0	0	0	16	1	0	0	0	0	7	1	0	0
76	1	0	5	0	0	0	0	0	16	0	0	0	0	0	7	0	0	0
77	1	0	5	0	0	1	0	0	15	1	0	0	0	0	6	1	0	0
78	1	0	5	0	0	0	0	0	15	0	0	0	0	0	6	0	0	0
79	1	0	5	0	0	0	0	0	16	0	0	0	0	0	5	1	0	0
80	1	0	6	0	0	0	0	0	16	1	0	0	0	1	5	0	0	0
81	1	0	6	0	0	0	0	0	16	0	0	0	0	0	5	1	0	0
82	1	0	6	0	0	0	0	0	15	1	0	0	0	1	5	0	0	0
83	1	0	6	0	0	0	0	1	15	0	0	0	0	0	4	1	0	0
84	1	0	7	0	0	0	0	0	14	1	0	0	0	0	4	0	0	0
85	1	0	8	0	0	0	0	0	14	0	0	0	0	0	4	1	0	0
86	1	0	8	0	0	1	0	0	13	1	0	0	0	0	4	0	0	0
87	1	0	8	0	0	0	0	0	14	0	0	0	0	0	3	1	0	0
88	1	0	9	0	0	0	0	0	13	1	0	0	0	0	3	0	0	0
89	1	0	9	0	0	0	0	0	13	0	0	0	0	0	4	0	0	0
90	1	0	10	0	0	0	0	0	12	1	0	0	0	0	4	1	0	0
91	1	0	10	0	0	0	0	0	12	0	0	0	0	0	4	0	0	0
92	2	0	10	0	0	0	0	0	11	1	0	0	0	0	3	1	0	0
93	2	0	10	0	0	0	0	0	11	0	0	0	0	0	3	0	0	0
94	2	0	10	0	0	0	0	0	10	1	0	0	0	0	2	1	0	0
95	2	0	11	0	0	0	0	0	11	0	0	0	0	0	2	0	0	0
96	2	0	12	0	0	0	0	0	11	1	0	0	0	0	1	1	0	0
97	2	0	12	0	0	0	0	0	11	0	0	0	0	0	1	0	0	0
98	2	0	12	0	0	0	0	0	11	0	0	0	0	0	0	1	0	0
99	2	0	12	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0
100	2	0	12	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0
101	2	0	12	0	0	0	0	0	9	1	0	0	0	0	0	0	0	0
102	2	0	12	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0
103	2	0	12	0	0	0	0	0	9	1	0	0	0	0	0	0	0	0
104	2	0	12	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0
105	2	0	13	0	0	0	0	0	9	1	0	0	0	0	0	1	0	0
106	2	0	13	0	0	0	0	0	9	0	0	0	0	0	1	0	0	0
107	2	0	14	0	0	0	0	0	9	1	0	0	0	0	0	1	0	0
108	2	0	14	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
109	2	0	15	0	0	0	0	0	8	1	0	0	0	0	0	0	0	0
110	2	0	16	0	0	0	0	0	8	0	0	0	0	0	0	1	0	0
111	2	0	16	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0
112	2	0	17	0	0	0	0	0	7	0	0	0	0	1	0	0	0	0
113	2	0	17	0	0	0	0	0	6	1	0	0	0	0	0	0	0	0
114	2	0	17	0	0	0	0	1	6	0	0	0	0	0	0	1	0	0
115	2	0	17	0	0	0	0	0	5	1	0	1	0	0	0	0	0	0
116	2	0	17	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
117	2	0	17	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0
118	2	0	18	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0
119	2	0	18	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0
120	2	0	18	0	0	0	0	0	4	0	0	0	0	0	0	0	0	1
121	2	0	18	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0
122	1	1	18	1	0	0	1	0	4	0	0	0	0	0	0	0	0	1
123	1	0	19	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0
124	0	1	18	1	0	0	1	0	4	0	0	0	0	0	0	0	0	1
125	0	0	18	0	0	0	1	0	4	0	0	0	0	0	1	0	0	0
126	0	0	17	1	0	0	1	0	5	0	0	0	0	0	1	0	1	0
127	0	0	18	0	0	0	1	0	6	0	0	0	0	0	1	0	0	1
128	0	0	17	1	0	0	1	0	6	0	0	0	0	0	1	0	0	0
129	0	0	18	0	0	0	1	0	6	0	0	0	0	0	1	0	0	0
130	0	1	17	1	0	0	1	0	6	0	0	0	0	0	1	0	0	0
131	1	0	17	0	0	0	1	0	6	0	0	0	0	0	1	0	0	0
132	0	1	16	1	0	0	1	0	6	0	0	0	0	0	1	0	0	0
133	0	0	17	0	0	0	1	0	7	0	0	0	0	0	2	0	0	0
134	0	0	16	1	0	0	1	0	7	0	0	1	0	0	2	0	0	1
135	0	0	17	0	0	0	1	0	7	0	0	0	0	0	3	0	0	0
136	0	0	17	1	0	0	1	0	7	0	0	0	0	0	4	0	0	0
137	0	0	17	0	0	0	1	0	7	0	0	0	0	0	5	0	0	0
138	0	0	16	1	0	1	1	0	7	0	0	0	1	0	5	0	0	0
139	0	0	16	0	0	0	1	0	7	0	0	0	1	0	6	0	0	0
140	0	0	15	1	0	0	2	0	7	0	0	0	1	0	6	0	0	0
141	0	0	15	0	0	0	2	0	7	0	0	0	1	0	6	0	0	0
142	0	0	14	1	0	0	2	0	7	0	0	0	1	0	6	0	0	1
143	0	1	14	0	0	0	2	0	8	0	0	0	1	0	6	0	0	0
144	0	0	13	1	0	0	2	0	8	0	0	0	1	0	6	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
145	0	0	13	0	0	0	2	0	8	0	0	0	1	0	6	0	0	0
146	0	0	13	0	0	0	2	0	8	0	0	0	1	0	6	0	0	0
147	0	0	12	1	0	0	2	0	8	0	0	0	1	0	6	0	0	0
148	0	0	12	0	0	0	2	0	8	0	0	1	1	0	6	0	0	0
149	0	0	11	1	0	0	2	0	9	0	0	0	1	0	6	0	0	0
150	0	0	12	0	0	0	2	0	9	0	0	0	1	0	6	0	0	0
151	0	0	11	1	0	0	2	0	9	0	0	0	1	0	7	0	0	0
152	0	0	12	0	0	0	2	0	9	0	0	0	1	0	7	0	0	0
153	0	0	11	1	0	0	2	0	9	0	0	0	1	0	7	0	0	0
154	0	0	12	0	0	0	2	0	9	0	0	0	1	0	7	0	0	0
155	0	0	11	1	0	0	2	0	9	0	0	0	1	0	7	0	0	0
156	0	0	11	0	0	0	2	0	9	0	0	0	1	0	7	0	0	0
157	0	1	10	1	0	0	3	0	9	0	0	0	2	0	7	0	0	0
158	0	0	10	0	0	0	3	0	9	0	0	0	2	0	7	0	0	0
159	0	0	10	1	0	0	4	0	9	0	0	0	2	0	7	0	0	0
160	0	0	10	0	0	0	4	0	9	0	0	1	2	0	7	0	0	0
161	0	0	9	1	0	0	4	0	9	0	0	0	2	0	7	0	0	0
162	0	0	10	0	0	0	4	0	9	0	0	0	2	0	7	0	0	0
163	0	0	9	1	0	1	4	0	9	0	0	0	2	0	7	0	0	1
164	0	0	9	0	0	0	4	0	10	0	0	0	3	0	7	0	0	0
165	0	0	8	1	0	0	4	0	10	0	0	0	3	0	8	0	0	0
166	0	0	8	0	0	0	4	0	10	0	0	0	4	0	8	0	0	0
167	0	0	7	1	0	0	4	0	10	0	0	0	4	0	8	0	0	0
168	0	0	8	0	0	0	4	0	10	0	0	0	4	0	8	0	0	0
169	0	0	8	1	0	0	4	0	10	0	0	0	4	0	8	0	0	1
170	0	0	8	0	0	0	4	0	10	0	0	1	4	0	8	0	0	0
171	0	0	7	1	0	0	4	0	11	0	0	0	4	0	8	0	0	0
172	0	0	8	0	0	0	4	0	12	0	0	0	4	0	9	0	0	0
173	0	0	7	1	0	0	4	0	13	0	0	0	4	0	9	0	0	0
174	0	0	7	0	0	0	4	0	13	0	0	0	4	0	9	0	0	0
175	0	0	7	0	0	0	4	0	13	0	0	0	4	0	9	0	0	1
176	0	0	6	1	0	0	4	0	13	0	0	0	5	0	9	0	0	0
177	0	0	6	0	0	0	4	0	14	0	0	0	5	0	10	0	0	0
178	0	0	6	1	0	0	4	0	15	0	0	0	5	0	10	0	0	0
179	0	0	6	0	0	0	4	0	16	0	0	0	5	0	11	0	0	0
180	0	1	5	1	0	0	5	0	16	0	0	0	5	0	11	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
181	0	0	5	0	0	0	5	0	16	0	0	0	5	0	12	0	0	0
182	0	0	6	0	0	0	4	1	16	1	0	0	4	1	11	1	0	0
183	0	0	6	0	0	0	4	0	16	0	0	0	5	0	11	0	0	0
184	0	0	6	0	0	0	4	0	16	1	0	0	4	1	11	1	0	0
185	0	0	6	0	0	0	3	1	17	0	0	0	4	0	11	1	0	0
186	0	0	6	0	0	1	3	0	16	1	0	0	3	1	11	0	0	0
187	0	0	6	0	0	0	2	1	16	0	0	0	3	0	10	1	0	0
188	0	0	7	0	0	0	2	0	16	1	0	0	2	1	11	0	0	0
189	0	0	8	0	0	0	1	1	16	0	0	0	2	0	10	1	0	0
190	0	0	8	0	0	0	1	0	16	0	0	0	1	1	10	0	0	1
191	0	0	8	0	0	1	0	1	15	1	0	0	1	0	9	1	0	0
192	0	0	9	0	0	0	0	0	16	0	0	0	1	1	9	0	0	0
193	0	0	9	0	0	0	0	0	15	1	0	0	1	0	8	1	0	0
194	0	0	10	0	0	0	0	0	14	1	0	0	0	1	8	0	0	1
195	0	0	10	0	0	0	0	0	14	0	0	0	0	0	8	0	0	0
196	0	0	10	0	0	0	0	0	13	1	0	0	0	0	7	1	0	0
197	0	0	10	0	0	0	0	0	14	0	0	0	0	0	7	0	0	0
198	0	0	10	0	0	0	0	0	13	1	0	0	0	1	6	1	0	0
199	0	0	11	0	0	0	0	0	13	0	0	0	0	0	7	0	0	0
200	0	0	11	0	0	0	0	0	12	1	0	0	0	0	6	1	0	0
201	0	0	12	0	0	0	0	0	12	0	0	1	0	0	6	0	0	0
202	0	0	12	0	0	0	0	0	12	1	0	0	0	0	6	1	0	0
203	0	0	12	0	0	0	0	0	13	0	0	0	0	0	6	0	0	0
204	0	0	12	0	0	1	0	0	12	1	0	0	0	0	5	1	0	0
205	0	0	12	0	1	0	0	0	12	0	0	0	0	0	5	0	0	0
206	1	0	12	0	0	1	0	0	11	1	0	0	0	0	4	1	0	0
207	1	0	13	0	0	0	0	0	11	0	0	1	0	0	4	0	0	0
208	1	0	13	0	0	0	0	0	11	1	0	0	0	0	3	1	0	0
209	1	0	13	0	0	1	0	0	11	0	0	0	0	0	3	0	0	1
210	2	0	13	0	0	0	0	0	10	1	0	0	0	0	2	1	0	0
211	2	0	14	0	0	0	0	0	10	0	0	0	0	0	3	0	0	0
212	2	0	14	0	0	0	0	0	11	0	0	0	0	0	3	1	0	0
213	2	0	14	0	0	0	0	0	11	1	0	0	0	0	3	0	0	0
214	2	0	14	0	0	0	0	0	12	0	0	0	0	0	2	1	0	0
215	2	0	14	0	0	0	0	0	12	0	0	0	0	0	2	0	0	0
216	2	0	14	0	0	0	0	0	11	1	0	0	0	0	1	1	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
217	2	0	14	0	0	0	0	0	12	0	0	0	0	1	1	0	0	0
218	2	0	14	0	0	0	0	0	11	1	0	0	0	0	0	1	0	0
219	2	0	15	0	0	0	0	0	12	0	0	0	0	0	1	0	0	0
220	2	0	15	0	0	0	0	1	11	1	0	0	0	0	2	0	0	0
221	2	0	16	0	0	0	0	0	11	0	0	0	0	0	2	1	0	0
222	2	0	16	0	0	0	0	1	10	1	0	0	0	0	1	1	0	0
223	2	0	16	0	0	0	0	0	10	0	0	0	0	0	1	0	0	0
224	2	0	16	0	0	0	0	0	9	1	0	0	0	0	0	1	0	0
225	2	0	16	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0
226	2	0	16	0	0	0	0	0	8	1	0	0	0	0	0	0	0	0
227	2	0	16	0	0	1	0	0	8	0	0	0	0	1	0	0	0	0
228	2	0	16	0	0	0	0	0	8	0	0	0	0	0	0	1	0	0
229	2	0	16	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0
230	2	0	16	0	0	0	0	1	7	0	0	0	0	0	0	0	0	0
231	2	0	16	0	0	0	0	0	6	1	0	0	0	0	0	1	0	0
232	2	0	16	0	0	0	0	0	7	0	0	0	0	0	1	0	0	0
233	2	0	17	0	0	0	0	0	6	1	0	0	0	0	0	1	0	0
234	2	0	18	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
235	2	0	18	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
236	2	0	18	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0
237	2	0	18	0	0	1	0	0	5	0	0	1	0	0	0	1	0	0
238	2	0	18	0	0	0	0	0	4	1	0	0	0	0	1	0	0	0
239	2	0	18	0	0	0	0	0	5	0	0	0	0	0	0	1	0	0
240	2	0	19	0	0	0	0	0	5	1	0	0	0	0	0	1	0	0
241	2	0	19	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1
242	1	1	20	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0
243	1	0	19	1	0	0	0	0	6	0	0	1	0	0	1	0	0	0
244	0	1	19	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0
245	0	0	19	1	0	0	0	0	7	0	0	0	0	0	2	0	0	0
246	0	0	19	0	0	1	0	0	7	0	0	0	0	0	2	0	0	0
247	0	0	18	1	0	0	0	0	8	0	0	0	0	0	2	0	0	0
248	0	1	18	0	0	0	0	0	8	0	0	0	0	0	2	0	0	0
249	0	0	18	1	0	0	1	0	8	0	0	0	0	0	3	0	0	0
250	0	0	19	0	0	0	1	0	8	0	0	0	0	0	3	0	0	0
251	0	0	19	1	0	0	1	0	8	0	0	0	0	0	3	0	0	0
252	0	0	19	0	0	0	1	0	9	0	0	0	0	0	3	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
253	0	0	18	1	0	0	1	0	10	0	0	0	0	0	3	0	0	0
254	0	0	19	0	0	0	1	0	10	0	0	0	0	0	3	0	0	0
255	0	0	18	1	0	0	1	0	10	0	0	0	1	0	3	0	0	0
256	0	0	18	0	0	0	1	0	10	0	0	0	1	0	4	0	0	0
257	0	0	17	1	0	0	1	0	10	0	0	0	1	0	5	0	0	0
258	0	1	17	0	0	0	1	0	10	0	0	0	1	0	5	0	0	0
259	0	0	16	1	0	0	1	0	10	0	0	0	1	0	5	0	0	0
260	0	0	17	0	0	0	1	0	10	0	0	0	1	0	6	0	0	0
261	0	0	16	1	0	0	1	0	10	0	0	0	1	0	7	0	0	0
262	0	0	16	0	0	0	1	0	11	0	0	0	1	0	8	0	0	0
263	0	0	15	1	0	0	1	0	11	0	0	0	1	0	8	0	0	0
264	0	0	15	1	0	0	1	0	12	0	0	0	1	0	9	0	0	0
265	0	0	15	0	0	0	1	0	12	0	0	0	1	0	10	0	0	0
266	0	0	15	1	0	0	1	0	13	0	0	0	1	0	11	0	0	0
267	0	0	16	0	0	0	1	0	14	0	0	0	1	0	11	0	0	0
268	0	0	16	1	0	0	1	0	14	0	0	0	1	0	12	0	0	0
269	0	0	16	0	0	0	1	0	15	0	0	0	1	0	12	0	0	0
270	0	0	16	1	0	0	1	0	15	0	0	0	1	0	12	0	0	0
271	0	0	16	0	0	1	1	0	15	0	0	0	1	0	12	0	0	0
272	0	0	15	1	0	0	1	0	15	0	0	0	1	0	13	0	0	0
273	0	0	15	0	0	0	1	0	15	0	0	0	1	0	13	0	0	0
274	0	0	16	0	0	0	1	0	15	0	0	0	1	0	14	0	0	0
275	0	0	15	1	0	0	1	0	16	0	0	0	1	0	15	0	0	0
276	0	0	15	0	0	0	1	0	16	0	0	0	1	0	15	0	0	0
277	0	0	14	1	0	0	1	0	16	0	0	0	1	0	15	0	0	0
278	0	0	13	1	0	0	1	0	16	0	0	0	1	0	15	0	0	0
279	0	0	14	0	0	0	1	0	17	0	0	0	1	0	15	0	0	0
280	0	0	13	1	0	0	1	0	17	0	0	0	1	0	15	0	0	0
281	0	0	13	0	0	0	1	0	17	0	0	0	1	0	15	0	0	0
282	0	0	12	1	0	0	1	0	17	0	0	0	1	0	16	0	0	0
283	0	0	13	0	0	0	1	0	17	0	0	0	1	0	16	0	0	0
284	0	0	13	1	0	0	1	0	17	0	0	0	1	0	16	0	0	0
285	0	0	14	0	0	0	1	0	17	0	0	0	1	0	17	0	0	0
286	0	0	14	0	0	0	1	0	17	0	0	1	1	0	18	0	0	0
287	0	0	13	1	0	0	1	0	17	0	0	0	1	0	19	0	0	0
288	0	0	13	0	0	0	1	0	17	0	0	0	1	0	19	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
289	0	0	13	1	0	0	1	0	17	0	0	0	1	0	19	0	0	1
290	0	0	13	0	0	0	1	0	18	0	0	0	1	0	19	0	0	0
291	0	0	13	1	0	0	1	0	18	0	0	0	1	0	19	0	0	0
292	0	1	13	0	0	0	1	0	19	0	0	0	1	0	19	0	0	0
293	0	0	13	1	0	0	1	0	19	0	0	0	1	0	19	0	0	0
294	0	0	13	0	0	0	1	0	20	0	0	0	1	0	19	0	0	0
295	0	0	12	1	0	0	1	0	20	0	0	0	1	0	20	0	0	0
296	0	0	12	0	0	0	1	0	21	0	0	0	1	0	20	0	0	0
297	0	0	11	1	0	0	2	0	21	0	0	0	1	0	20	0	0	0
298	0	0	12	0	0	0	2	0	22	0	0	0	1	0	20	0	0	0
299	0	0	11	1	0	0	2	0	22	0	0	0	2	0	20	0	0	0
300	0	0	12	0	0	0	2	0	23	0	0	0	2	0	21	0	0	0
301	0	0	12	0	0	0	2	0	23	0	0	0	2	0	21	0	0	1
302	0	0	12	0	0	0	1	1	23	1	0	0	1	1	21	0	0	0
303	0	0	12	0	0	0	1	0	23	0	0	0	1	0	20	1	0	0
304	0	0	13	0	0	0	0	1	22	1	0	0	1	0	20	0	0	0
305	0	0	14	0	0	0	0	0	22	0	0	0	0	1	19	1	0	0
306	0	0	14	0	0	0	0	0	21	1	0	0	0	0	19	0	0	0
307	0	0	15	0	0	0	0	0	21	0	0	1	0	0	18	1	0	0
308	0	0	15	0	0	0	0	0	20	1	1	0	0	0	19	0	0	0
309	0	0	15	0	0	0	0	0	21	0	0	1	0	0	18	1	0	0
310	0	0	15	0	0	1	0	0	21	1	0	0	0	0	18	0	0	0
311	0	0	16	0	0	0	0	0	21	0	0	0	0	0	18	1	0	0
312	0	0	16	0	0	0	0	0	20	1	0	0	0	0	19	0	0	0
313	0	0	16	0	0	0	0	0	20	0	0	0	0	0	18	1	0	0
314	0	0	16	0	0	0	0	0	20	1	0	0	0	0	18	0	0	0
315	0	0	17	0	0	0	0	0	21	0	0	0	0	0	18	1	0	0
316	0	0	18	0	0	0	0	0	20	1	0	0	0	0	18	0	0	0
317	0	0	18	0	0	0	0	0	20	0	0	0	0	0	17	1	0	0
318	0	0	18	0	0	0	0	0	20	1	0	0	0	0	17	0	0	0
319	0	0	18	0	0	0	0	0	21	0	0	0	0	0	17	1	0	0
320	0	0	18	0	0	0	0	0	21	0	0	0	0	0	17	0	0	0
321	0	0	19	0	0	0	0	0	20	1	0	0	0	0	17	1	0	0
322	0	0	20	0	0	0	0	0	20	0	0	0	0	0	18	0	0	0
323	0	0	20	0	0	0	0	0	19	1	0	0	0	0	18	1	0	0
324	0	0	20	0	0	0	0	0	19	0	0	0	0	1	18	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
325	0	0	20	0	0	0	0	0	18	1	0	0	0	0	17	1	0	0
326	0	0	20	0	0	0	0	0	18	0	0	1	0	0	17	0	0	0
327	0	0	20	0	0	0	0	0	18	1	0	0	0	0	16	1	0	0
328	0	0	20	0	0	0	0	0	18	0	0	0	0	0	16	0	0	0
329	1	0	20	0	0	0	0	0	17	1	0	0	0	0	15	1	0	0
330	1	0	20	0	0	0	0	0	18	0	0	0	0	0	15	0	0	0
331	1	0	21	0	0	0	0	0	17	1	0	1	0	1	14	1	0	0
332	1	0	22	0	0	0	0	0	18	0	0	0	0	0	15	0	0	0
333	2	0	22	0	0	0	0	0	18	1	0	0	0	0	15	1	0	0
334	2	0	22	0	0	0	0	0	18	0	0	0	0	0	16	0	0	0
335	2	0	22	0	0	0	0	0	18	1	0	0	0	0	16	0	0	0
336	2	0	23	0	0	0	0	0	18	0	0	0	0	0	16	1	0	0
337	2	0	23	0	0	0	0	0	18	0	0	0	0	0	16	0	0	0
338	2	0	23	0	0	0	0	0	17	1	0	0	0	0	15	1	0	0
339	2	0	23	0	0	0	0	0	17	0	0	0	0	0	16	0	0	0
340	2	0	24	0	0	0	0	0	16	1	0	0	0	0	15	1	0	1
341	2	0	24	0	0	0	0	0	16	0	0	0	0	0	16	0	0	0
342	2	0	24	0	0	0	0	0	15	1	0	0	0	0	15	1	0	0
343	2	0	25	0	0	0	0	0	15	0	0	0	0	0	15	0	0	0
344	3	0	25	0	0	0	0	0	14	1	0	0	0	0	15	1	0	0
345	3	0	26	0	0	0	0	0	14	0	0	0	0	0	15	0	0	1
346	4	0	26	0	0	0	0	0	14	1	0	0	0	0	14	1	0	0
347	4	0	27	0	0	0	0	0	14	0	0	0	0	0	14	0	0	0
348	4	0	28	0	0	0	0	0	13	1	0	0	0	0	13	1	0	0
349	4	0	29	0	0	0	0	0	14	0	0	0	0	0	13	0	0	0
350	4	0	30	0	0	0	0	0	14	1	0	0	0	0	12	1	0	0
351	4	0	31	0	0	0	0	0	14	0	0	0	0	0	12	0	0	0
352	4	0	31	0	0	0	0	0	13	1	0	0	0	0	11	1	0	0
353	4	0	31	0	0	0	0	0	13	0	0	0	0	0	12	0	0	0
354	4	0	32	0	0	0	0	0	12	1	0	0	0	0	11	1	0	0
355	4	0	32	0	0	1	0	0	13	0	0	0	0	0	11	0	0	1
356	4	0	33	0	0	0	0	0	12	1	0	0	0	0	10	1	1	0
357	4	0	34	0	0	0	0	0	12	0	0	0	0	0	10	0	0	1
358	4	0	34	0	0	0	0	0	12	1	0	0	0	0	9	1	0	0
359	5	0	34	0	0	0	0	0	13	0	0	0	0	0	9	0	0	0
360	5	0	34	0	0	0	0	0	12	1	0	0	0	0	9	1	0	0

APPENDIX H

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0
10	0	0	0	0	0	0	1	0	0	0	0	0	2	0	1	0	0	0
11	0	0	0	0	0	0	1	0	0	0	0	0	2	0	1	0	0	0
12	0	0	0	0	0	0	1	0	0	0	0	0	2	0	2	0	0	0
13	0	0	0	0	0	0	1	0	1	0	0	0	2	0	2	0	0	1
14	0	0	0	0	0	0	1	0	1	0	0	0	2	0	2	0	0	0
15	0	0	0	1	0	0	1	0	1	0	0	0	2	0	2	0	0	0
16	0	0	0	0	0	1	1	0	1	0	0	0	2	0	2	0	0	0
17	0	0	0	0	0	0	1	0	1	0	0	0	2	0	3	0	0	0
18	0	0	0	0	0	0	1	0	1	0	0	0	2	0	4	0	0	0
19	0	0	0	0	0	0	1	0	2	0	0	0	2	0	4	0	0	0
20	0	0	0	0	0	0	1	0	2	0	0	0	2	0	4	0	0	0
21	0	0	0	1	0	0	1	0	2	0	0	0	2	0	4	0	0	0
22	0	0	0	0	0	0	1	0	3	0	0	0	2	0	4	0	0	0
23	0	0	0	0	0	0	1	0	3	0	0	0	2	0	4	0	0	0
24	0	0	0	1	0	0	1	0	4	0	0	0	2	0	5	0	0	0
25	0	0	0	0	0	0	1	0	4	0	0	0	2	0	6	0	0	0
26	0	0	0	0	0	0	1	0	4	0	0	0	2	0	6	0	0	0
27	0	0	0	0	0	0	1	0	5	0	0	0	3	0	6	0	0	0
28	0	0	0	0	0	0	1	0	5	0	0	0	3	0	7	0	0	0
29	0	0	0	0	0	0	1	0	5	0	0	0	3	0	7	0	0	0
30	0	0	0	0	0	0	1	0	5	0	0	0	3	0	7	0	0	0
31	0	0	0	0	0	0	1	0	5	0	0	0	3	0	7	0	0	0
32	0	0	0	0	0	0	2	0	5	0	0	0	3	0	7	0	0	0
33	0	0	0	0	0	0	2	0	5	0	0	0	4	0	7	0	0	0
34	0	0	0	0	0	0	2	0	5	0	0	0	4	0	7	0	0	0
35	0	0	0	0	0	0	2	0	6	0	0	0	4	0	7	0	0	1
36	0	0	1	0	0	0	2	0	7	0	0	0	4	0	7	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
37	0	0	2	0	0	0	2	0	8	0	0	0	4	0	8	0	0	0
38	0	0	2	0	0	0	2	0	8	0	0	0	4	0	8	0	0	0
39	0	0	2	0	0	0	2	0	9	0	0	0	4	0	8	0	0	1
40	0	0	2	0	0	0	2	0	9	0	0	0	4	0	8	0	0	0
41	0	0	2	0	0	0	2	0	9	0	0	0	4	0	9	0	0	0
42	0	0	2	0	0	0	3	0	9	0	0	0	4	0	9	0	0	0
43	0	0	3	0	0	0	3	0	10	0	0	0	4	0	9	0	0	1
44	0	0	3	0	0	0	3	0	10	0	0	0	4	0	9	0	0	0
45	0	0	3	0	0	0	3	0	10	0	0	0	4	0	10	0	0	0
46	0	0	4	0	0	0	3	0	10	0	0	0	4	0	10	0	0	0
47	0	1	4	0	0	0	3	0	11	0	0	0	4	0	10	0	0	0
48	0	0	4	0	0	0	3	0	11	0	0	0	5	0	10	0	0	0
49	0	0	4	0	0	0	3	0	11	0	0	0	5	0	10	0	0	0
50	0	0	5	0	0	0	3	0	11	0	0	0	5	0	10	0	0	0
51	0	0	6	0	0	0	3	0	12	0	0	0	5	0	10	0	0	0
52	0	0	6	0	0	0	3	0	12	0	0	0	5	0	10	0	0	0
53	0	0	7	0	0	0	3	0	13	0	0	0	5	0	10	0	0	0
54	0	0	7	0	0	0	3	0	14	0	0	0	5	0	10	0	0	0
55	0	0	8	0	0	0	3	0	14	0	0	0	5	0	11	0	0	0
56	0	0	9	0	0	0	3	0	14	0	0	0	5	0	11	0	0	0
57	0	0	9	0	0	0	3	0	14	0	0	0	5	0	11	0	0	0
58	0	0	9	0	0	0	3	0	14	0	0	0	5	0	12	0	0	0
59	0	1	9	0	0	0	3	0	14	0	0	0	5	0	12	0	0	0
60	0	0	9	0	0	0	3	0	14	0	0	0	5	0	12	0	0	0
61	1	0	9	0	0	0	3	0	14	0	0	0	5	0	12	0	0	0
62	1	0	9	0	0	0	3	0	12	2	0	0	5	0	10	2	0	0
63	1	0	9	0	0	0	3	0	12	0	0	0	5	0	10	0	0	0
64	1	0	9	0	0	0	3	0	10	2	0	0	5	0	8	2	0	0
65	1	0	9	0	0	0	3	0	10	0	0	1	5	0	8	0	0	0
66	1	0	10	0	0	0	3	0	9	2	0	0	5	0	6	2	0	0
67	1	0	10	0	0	0	3	0	9	0	0	0	5	0	7	0	0	0
68	1	0	11	0	0	0	3	0	7	2	0	0	5	0	8	0	0	0
69	2	0	11	0	0	0	3	0	8	0	0	0	5	0	6	2	0	0
70	2	0	12	0	0	0	3	0	6	2	0	0	5	0	6	0	0	0
71	2	0	12	0	0	1	3	0	6	0	0	0	5	0	4	2	0	0
72	2	0	12	0	0	0	3	0	4	2	0	0	5	0	4	0	0	1

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
73	2	0	12	0	0	0	3	0	4	0	0	0	5	0	2	2	1	0
74	2	0	12	0	0	0	3	0	2	2	0	0	5	0	2	0	0	1
75	2	0	13	0	0	0	3	0	1	2	0	0	5	0	1	2	0	0
76	2	0	13	0	0	0	3	0	1	0	0	0	5	0	1	0	0	0
77	2	0	13	0	0	0	3	0	0	2	0	0	5	0	0	1	0	0
78	2	0	13	0	0	0	3	0	0	0	0	0	5	0	0	1	0	0
79	2	0	14	0	0	0	3	0	0	0	0	0	5	0	0	0	0	0
80	2	0	14	0	0	0	3	0	0	0	0	0	5	0	0	0	0	0
81	2	0	15	0	0	0	3	0	0	0	0	0	5	0	0	0	0	0
82	2	0	15	0	0	0	3	0	0	0	0	0	6	0	0	0	0	0
83	2	0	15	0	0	0	3	0	0	0	0	0	6	0	0	1	0	0
84	2	0	15	0	0	0	3	0	0	0	0	0	6	0	0	0	0	0
85	2	0	15	0	0	1	3	0	0	0	0	1	6	0	0	0	0	0
86	2	0	15	0	0	0	3	0	0	0	0	0	6	0	0	0	0	0
87	2	0	15	0	0	0	3	0	0	1	0	0	6	0	0	1	0	0
88	2	0	16	0	0	0	3	0	0	0	0	0	6	0	1	0	0	0
89	2	0	16	0	0	0	3	0	0	0	0	0	6	0	1	0	0	0
90	2	0	16	0	0	0	3	0	0	1	0	0	7	0	0	1	0	0
91	2	0	16	0	0	0	3	0	0	0	0	0	7	0	0	0	0	0
92	2	0	16	0	0	0	2	1	1	0	0	0	6	1	0	0	0	0
93	2	0	17	0	0	0	2	0	1	0	0	0	6	0	0	0	0	0
94	2	0	17	0	0	0	2	0	1	0	0	0	5	1	1	0	0	0
95	2	0	17	0	0	0	1	1	1	0	0	0	5	0	2	0	0	0
96	2	0	17	0	0	0	1	0	2	0	0	0	4	1	2	0	0	0
97	2	0	17	0	0	0	0	1	3	0	0	0	4	0	3	0	0	0
98	2	0	18	0	0	0	0	0	3	0	0	0	3	1	3	0	0	0
99	2	0	18	0	0	1	0	0	4	0	0	0	3	0	3	0	0	0
100	2	0	19	0	0	0	0	0	4	0	0	1	2	1	3	0	0	0
101	2	0	19	0	0	0	0	0	5	0	0	0	2	0	3	0	0	0
102	2	0	20	0	0	0	0	0	6	0	0	0	1	1	3	0	0	0
103	2	0	20	0	0	0	0	0	6	0	0	0	1	0	3	0	0	0
104	2	0	20	0	0	1	0	0	6	0	0	0	0	1	3	0	0	0
105	2	0	20	0	0	0	0	0	7	0	0	0	0	0	3	0	0	0
106	2	0	20	0	0	0	0	0	8	0	0	0	0	0	4	0	0	0
107	2	0	21	0	0	0	0	0	8	0	0	0	0	0	4	0	0	0
108	2	0	21	0	0	0	0	0	8	0	0	0	0	0	4	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
109	2	0	21	0	0	0	0	1	8	0	0	0	0	1	4	0	0	0
110	2	0	22	0	0	0	0	0	8	0	0	1	0	0	4	0	0	0
111	2	0	22	0	0	0	0	0	8	0	0	0	0	0	4	0	0	0
112	2	0	23	0	0	0	0	0	8	0	0	0	0	0	5	0	0	0
113	3	0	23	0	0	0	0	0	8	0	0	0	0	0	5	0	0	0
114	3	0	24	0	0	0	0	0	8	0	0	0	0	0	5	0	0	1
115	3	0	24	0	0	0	0	0	8	0	0	0	0	0	6	0	0	0
116	3	0	24	0	0	0	0	0	8	0	0	1	0	1	6	0	0	0
117	3	0	24	0	0	0	0	0	9	0	0	0	0	0	6	0	0	1
118	3	0	25	0	0	0	0	0	9	0	0	0	0	0	6	0	0	0
119	3	0	25	0	0	0	0	0	9	0	0	0	0	0	6	0	0	1
120	3	0	25	0	0	0	0	1	9	0	0	0	0	0	6	0	1	0
121	3	0	25	0	0	0	0	0	9	0	0	0	0	0	6	0	1	1
122	3	0	23	2	0	0	0	0	9	0	0	0	0	0	6	0	1	0
123	3	0	24	0	0	0	0	0	10	0	0	0	0	0	6	0	1	0
124	3	0	22	2	0	0	1	0	10	0	0	0	0	0	6	0	0	1
125	3	0	23	0	0	0	1	0	10	0	0	0	1	0	6	0	0	0
126	3	0	21	2	0	0	1	0	10	0	0	0	1	0	6	0	0	0
127	3	0	21	0	0	0	1	0	10	0	0	0	1	0	7	0	0	0
128	3	0	19	2	0	0	1	0	10	0	0	0	1	0	7	0	0	0
129	3	0	20	0	0	0	1	0	10	0	0	0	1	0	7	0	0	0
130	3	0	18	2	0	0	1	0	10	0	0	0	1	0	8	0	0	0
131	3	0	18	0	0	0	1	0	10	0	0	0	1	0	8	0	0	0
132	3	0	17	2	0	0	1	0	10	0	0	0	1	0	8	0	0	0
133	3	0	17	0	0	0	1	0	10	0	0	0	1	0	8	0	0	0
134	3	0	15	2	0	0	1	0	10	0	0	0	1	0	9	0	0	0
135	3	0	16	0	0	0	1	0	10	0	0	0	1	0	9	0	0	0
136	3	0	15	2	0	0	1	0	11	0	0	0	2	0	9	0	0	0
137	3	0	16	0	0	0	1	0	11	0	0	0	2	0	9	0	0	0
138	3	0	15	2	0	0	1	0	11	0	0	0	2	0	10	0	0	0
139	3	0	15	0	0	0	1	0	11	0	0	0	2	0	10	0	0	0
140	3	0	13	2	0	0	1	0	11	0	0	0	2	0	10	0	0	0
141	3	0	13	0	0	0	1	0	11	0	0	0	2	0	11	0	0	0
142	3	0	11	2	0	0	1	0	11	0	0	0	2	0	11	0	0	0
143	3	0	11	0	0	0	1	0	11	0	0	0	2	0	11	0	0	0
144	3	0	9	2	0	0	1	0	12	0	0	0	3	0	11	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
145	4	0	9	0	0	0	1	0	12	0	0	0	3	0	11	0	0	0
146	4	0	8	2	0	0	1	0	12	0	0	0	3	0	12	0	0	0
147	4	0	6	2	0	1	1	0	12	0	0	0	3	0	13	0	0	0
148	4	0	6	0	0	0	1	0	13	0	0	0	3	0	13	0	0	0
149	4	0	4	2	0	0	1	0	13	0	0	0	3	0	14	0	0	0
150	4	0	4	0	0	0	1	0	13	0	0	0	3	0	14	0	0	1
151	4	0	4	0	0	0	1	0	13	0	0	0	3	0	14	0	0	0
152	3	1	4	0	0	0	1	0	13	0	0	0	3	0	14	0	0	0
153	3	0	5	0	0	0	1	0	13	0	0	0	3	0	14	0	0	0
154	2	1	5	0	0	0	1	0	13	0	0	0	3	0	14	0	0	1
155	2	0	5	0	0	0	1	0	13	0	0	0	3	0	14	0	0	0
156	1	1	5	0	0	0	1	0	13	0	0	0	3	0	14	0	0	0
157	1	0	5	0	0	0	1	0	14	0	0	0	3	0	14	0	0	0
158	0	1	6	0	0	0	1	0	14	0	0	0	3	0	14	0	0	0
159	0	0	6	0	0	0	1	0	14	0	0	1	3	0	14	0	0	0
160	0	0	6	0	0	0	1	0	15	0	0	0	3	0	15	0	0	0
161	0	0	6	0	0	0	1	0	16	0	0	0	3	0	15	0	0	0
162	0	0	7	0	0	0	1	0	16	0	0	0	3	0	15	0	0	0
163	0	0	8	0	0	0	1	0	16	0	0	0	3	0	15	0	0	0
164	0	0	8	0	0	0	1	0	16	0	0	0	3	0	15	0	0	0
165	0	0	8	0	0	0	2	0	16	0	0	0	3	0	15	0	0	0
166	0	0	9	0	0	0	2	0	16	0	0	1	3	0	16	0	0	0
167	0	0	9	0	0	0	2	0	16	0	0	0	3	0	16	0	0	0
168	0	0	9	0	0	0	2	0	16	0	0	0	3	0	16	0	0	0
169	0	0	9	0	0	0	2	0	16	0	0	0	3	0	16	0	0	0
170	0	0	9	0	0	0	2	0	16	0	0	0	3	0	16	0	0	0
171	0	0	9	0	0	0	2	0	17	0	0	0	3	0	16	0	0	0
172	0	0	9	0	0	0	2	0	17	0	0	0	3	0	16	0	0	0
173	0	0	9	0	0	0	3	0	17	0	0	0	3	0	16	0	0	0
174	0	0	10	0	0	0	3	0	17	0	0	0	3	0	16	0	0	0
175	0	0	10	0	0	0	4	0	17	0	0	0	3	0	16	0	0	0
176	0	0	10	0	0	0	4	0	18	0	0	0	3	0	16	0	0	0
177	0	0	11	0	0	0	4	0	18	0	0	0	3	0	16	0	0	0
178	0	1	11	0	0	0	4	0	18	0	0	0	4	0	16	0	0	0
179	0	0	11	0	0	1	4	0	18	0	0	0	4	0	16	0	0	1
180	0	0	11	0	0	0	4	0	18	0	0	0	4	0	16	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
181	0	0	11	0	0	0	4	0	16	2	0	0	4	0	16	0	0	0
182	0	0	11	0	0	0	4	0	17	0	0	0	4	0	15	2	0	0
183	0	0	11	0	0	0	4	0	15	2	0	1	4	0	15	0	0	0
184	0	0	11	0	0	0	4	0	16	0	0	0	4	0	14	2	0	0
185	0	0	11	0	0	0	4	0	14	2	0	0	5	0	14	0	0	0
186	0	0	12	0	0	0	4	0	15	0	0	0	5	0	12	2	0	0
187	0	0	12	0	0	0	4	0	13	2	0	0	6	0	12	0	0	0
188	0	0	12	0	0	0	4	0	13	0	0	0	6	0	10	2	0	0
189	0	0	12	0	0	0	4	0	11	2	0	0	6	0	10	0	0	0
190	0	0	12	0	0	0	4	0	12	0	0	0	6	0	9	2	0	0
191	1	0	12	0	0	0	4	0	10	2	0	0	6	0	9	0	0	0
192	1	0	13	0	0	0	4	0	10	0	0	0	6	0	7	2	0	0
193	1	0	13	0	0	0	4	0	9	2	0	0	6	0	7	0	0	1
194	1	0	13	0	0	0	4	0	10	0	0	0	6	0	5	2	0	0
195	1	0	13	0	0	0	5	0	8	2	0	0	6	0	5	0	0	0
196	1	0	13	0	0	0	5	0	8	0	0	0	6	0	4	2	0	0
197	1	0	13	0	0	1	5	0	6	2	0	0	6	0	5	0	0	0
198	1	0	14	0	0	0	5	0	6	0	0	0	6	0	3	2	0	1
199	1	0	15	0	0	0	5	0	4	2	0	0	6	0	3	0	0	0
200	1	0	15	0	0	0	5	0	4	0	0	0	6	0	1	2	0	0
201	1	0	16	0	0	0	6	0	2	2	0	0	6	0	2	0	0	0
202	1	0	17	0	0	0	6	0	3	0	0	0	6	0	0	2	0	1
203	1	0	18	0	0	0	6	0	1	2	0	0	6	0	0	0	0	0
204	1	0	19	0	0	0	6	0	1	0	0	0	6	0	0	0	0	0
205	1	0	19	0	0	1	6	0	0	2	0	0	7	0	0	0	0	0
206	1	0	19	0	0	0	6	0	0	0	0	0	7	0	0	0	0	0
207	1	0	20	0	0	0	6	0	0	1	0	0	7	0	0	0	0	0
208	1	0	20	0	0	1	6	0	0	0	0	0	7	0	0	0	0	0
209	1	0	20	0	0	0	6	0	0	0	0	0	7	0	0	0	0	0
210	1	0	20	0	0	0	6	0	0	1	0	0	7	0	0	0	0	0
211	1	0	20	0	0	0	6	0	0	0	0	0	7	0	1	0	0	0
212	1	0	20	0	0	1	5	1	1	0	0	0	6	1	1	0	0	0
213	1	0	21	0	0	0	5	0	1	0	0	0	6	0	2	0	0	0
214	2	0	21	0	0	0	5	0	2	0	0	0	6	1	2	0	0	0
215	2	0	22	0	0	0	4	1	2	0	0	0	6	0	3	0	0	0
216	2	0	23	0	0	0	4	0	2	0	0	0	6	0	4	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
217	2	0	23	0	0	0	3	1	2	0	0	0	5	1	4	0	0	0
218	2	0	23	0	0	0	3	0	3	0	0	0	5	0	4	0	0	1
219	2	0	23	0	0	0	2	1	4	0	0	0	4	1	4	0	0	0
220	3	0	23	0	0	0	2	0	5	0	0	0	4	0	4	0	0	0
221	3	0	24	0	0	0	1	1	5	0	0	0	3	1	4	0	0	0
222	3	0	24	0	0	0	0	1	5	0	0	1	3	0	5	0	0	0
223	3	0	24	0	0	0	0	0	5	0	0	0	2	1	5	0	0	0
224	3	0	24	0	0	0	0	0	5	0	0	0	2	0	6	0	0	0
225	3	0	24	0	0	0	0	0	6	0	0	0	1	1	6	0	0	0
226	3	0	24	0	0	0	0	0	6	0	0	0	0	1	6	0	0	0
227	3	0	24	0	0	1	0	0	6	0	0	1	0	0	7	0	0	0
228	3	0	24	0	0	0	0	0	7	0	0	0	0	0	7	0	0	0
229	3	0	25	0	0	0	0	0	7	0	0	0	0	0	7	0	0	0
230	3	0	25	0	0	0	0	0	7	0	0	0	0	1	7	0	0	0
231	3	0	25	0	0	0	0	1	7	0	0	0	0	0	8	0	0	0
232	3	0	25	0	0	0	0	0	8	0	0	0	0	1	8	0	0	0
233	3	0	25	0	0	1	0	0	8	0	0	0	0	0	8	0	0	0
234	3	0	26	0	0	0	0	1	8	0	0	0	0	0	8	0	0	0
235	3	0	26	0	0	0	0	0	8	0	0	0	0	0	8	0	0	0
236	3	0	26	0	0	0	0	0	8	0	0	0	0	1	8	0	0	0
237	3	0	26	0	0	0	0	0	8	0	0	0	0	0	8	0	0	1
238	3	0	27	0	0	0	0	0	8	0	0	0	0	0	8	0	0	0
239	4	0	27	0	0	0	0	0	8	0	0	0	0	0	8	0	0	0
240	5	0	27	0	0	0	0	0	9	0	0	0	0	1	8	0	0	0
241	5	0	27	0	0	0	0	0	9	0	0	0	0	0	9	0	0	0
242	5	0	25	2	0	0	0	0	9	0	0	0	0	0	9	0	0	0
243	6	0	25	0	0	0	0	0	9	0	0	0	0	0	10	0	0	0
244	6	0	24	2	0	0	0	0	9	0	0	0	0	0	10	0	0	0
245	6	0	24	0	0	0	0	0	9	0	0	0	0	0	10	0	0	0
246	6	0	23	2	0	0	0	0	9	0	0	0	0	0	10	0	0	0
247	6	0	23	0	0	1	0	0	9	0	0	0	1	0	10	0	0	0
248	6	0	21	2	0	0	0	0	10	0	0	0	1	0	10	0	0	0
249	6	0	21	0	0	0	0	0	11	0	0	0	1	0	11	0	0	0
250	6	0	19	2	0	0	0	0	11	0	0	0	1	0	11	0	0	0
251	6	0	20	0	0	0	0	0	11	0	0	1	1	0	11	0	0	0
252	6	0	19	2	0	0	0	0	11	0	0	0	1	0	11	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
253	6	0	20	0	0	0	0	0	11	0	0	0	1	0	12	0	0	0
254	6	0	19	2	0	0	0	0	12	0	0	0	1	0	13	0	0	0
255	6	0	19	0	0	0	0	0	13	0	0	0	1	0	13	0	0	0
256	6	0	17	2	0	0	1	0	13	0	0	0	1	0	13	0	0	0
257	6	0	17	0	0	1	1	0	14	0	0	0	1	0	14	0	0	0
258	6	0	15	2	1	0	1	0	14	0	0	0	1	0	14	0	0	0
259	6	0	16	0	0	1	1	0	14	0	0	0	1	0	14	0	0	0
260	6	0	14	2	0	0	1	0	15	0	0	0	1	0	14	0	0	0
261	6	0	14	0	0	0	1	0	16	0	0	0	1	0	14	0	0	0
262	6	0	12	2	0	0	1	0	17	0	0	0	1	0	14	0	0	1
263	6	0	12	0	0	0	1	0	17	0	0	0	1	0	14	0	1	0
264	6	0	11	2	0	0	1	0	18	0	0	0	1	0	14	0	0	1
265	6	0	12	0	0	0	1	0	19	0	0	0	1	0	14	0	0	0
266	6	0	11	2	0	0	1	0	19	0	0	0	1	0	14	0	0	0
267	6	0	11	0	0	0	1	0	19	0	0	0	1	0	15	0	0	0
268	6	0	9	2	0	0	1	0	19	0	0	0	1	0	16	0	0	0
269	6	0	9	0	0	0	1	0	19	0	0	0	2	0	16	0	0	0
270	6	0	7	2	0	0	1	0	19	0	0	0	2	0	17	0	0	0
271	6	0	8	0	0	0	1	0	19	0	0	0	2	0	18	0	0	0
272	5	1	9	0	0	0	1	0	19	0	0	0	2	0	19	0	0	0
273	5	1	9	0	0	0	1	0	20	0	0	0	2	0	20	0	0	0
274	5	0	9	0	0	0	1	0	20	0	0	0	2	0	20	0	0	0
275	4	1	9	0	0	0	1	0	20	0	0	0	2	0	21	0	0	0
276	4	0	9	0	0	0	1	0	20	0	0	0	2	0	21	0	0	0
277	3	1	9	0	0	0	1	0	20	0	0	0	2	0	21	0	0	0
278	3	0	9	0	0	0	1	0	20	0	0	0	2	0	21	0	0	0
279	2	1	10	0	0	0	1	0	20	0	0	0	2	0	21	0	0	0
280	2	0	11	0	0	0	1	0	20	0	0	0	2	0	21	0	0	0
281	1	1	11	0	0	1	1	0	20	0	0	1	2	0	21	0	0	0
282	1	0	11	0	1	0	1	0	20	0	0	0	2	0	21	0	0	0
283	0	1	11	0	0	1	1	0	20	0	0	0	2	0	22	0	0	0
284	0	0	11	0	1	0	1	0	21	0	0	0	2	0	22	0	0	0
285	0	0	11	0	1	1	1	0	22	0	0	0	2	0	23	0	0	0
286	0	0	12	0	1	0	1	0	23	0	0	0	2	0	24	0	0	0
287	0	0	12	0	0	1	1	0	23	0	0	0	2	0	24	0	0	0
288	0	0	13	0	0	0	1	0	23	0	0	0	2	0	24	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
289	0	0	14	0	0	0	1	0	23	0	0	0	2	0	24	0	0	0
290	0	0	14	0	0	0	1	0	23	0	0	0	2	0	24	0	0	1
291	0	0	15	0	0	0	1	0	24	0	0	0	2	0	24	0	0	0
292	0	0	15	0	0	1	1	0	24	0	0	0	2	0	24	0	0	0
293	0	0	16	0	0	0	1	0	24	0	0	1	2	0	24	0	0	1
294	0	0	16	0	0	0	1	0	24	0	0	0	2	0	25	0	0	0
295	0	0	16	0	0	0	1	0	24	0	0	0	2	0	26	0	0	0
296	0	0	17	0	0	0	1	0	24	0	0	0	3	0	26	0	0	0
297	0	0	18	0	0	0	1	0	24	0	0	0	3	0	27	0	0	0
298	0	0	18	0	0	0	1	0	25	0	0	0	3	0	27	0	0	0
299	0	0	18	0	0	0	1	0	25	0	0	0	3	0	27	0	0	1
300	0	0	18	0	0	0	1	0	26	0	0	0	3	0	27	0	0	0
301	0	0	18	0	0	0	1	0	26	0	0	0	4	0	25	2	0	0
302	0	0	19	0	0	0	1	0	24	2	0	0	4	0	25	0	0	0
303	0	0	20	0	0	0	1	0	25	0	0	0	4	0	23	2	0	0
304	1	0	20	0	0	0	2	0	23	2	0	0	4	0	23	0	0	0
305	1	0	20	0	0	0	2	0	23	0	0	0	4	0	21	2	0	0
306	1	0	21	0	0	0	2	0	21	2	0	0	4	0	22	0	0	0
307	1	0	21	0	0	0	2	0	22	0	0	0	4	0	20	2	0	0
308	1	0	21	0	0	0	2	0	20	2	0	0	4	0	21	0	0	0
309	1	0	21	0	0	0	2	0	20	0	0	0	4	0	19	2	0	1
310	1	0	21	0	0	0	2	0	19	2	0	0	4	0	19	0	0	0
311	1	0	21	0	0	0	2	0	19	0	0	0	4	0	17	2	0	0
312	1	0	21	0	0	0	2	0	17	2	0	0	4	0	17	0	0	0
313	1	0	21	0	0	0	2	0	17	0	0	0	4	0	18	0	0	0
314	1	0	21	0	0	0	2	0	16	2	0	0	4	0	16	2	0	1
315	1	0	21	0	0	0	2	0	17	0	0	0	4	0	14	2	0	0
316	1	0	21	0	0	0	2	0	15	2	0	0	4	0	14	0	0	0
317	1	0	21	0	0	0	2	0	15	0	0	0	4	0	13	2	0	0
318	1	0	21	0	0	0	2	0	14	2	0	0	4	0	14	0	0	0
319	1	0	21	0	0	0	2	0	14	0	0	0	4	0	13	2	0	0
320	1	0	22	0	0	0	2	0	12	2	0	0	4	0	13	0	0	0
321	1	0	22	0	0	0	2	0	13	0	0	0	4	0	11	2	0	0
322	1	0	23	0	0	0	2	0	11	2	0	0	4	0	11	0	0	0
323	1	0	23	0	0	0	2	0	12	0	0	0	4	0	9	2	0	0
324	1	0	23	0	0	0	2	0	10	2	0	0	4	0	9	0	0	0

CLOCK	TRQE	RSEV	FWQE	FSEV	TLQE	LSEV	TRQN	RSEV	FWQN	FSEV	TLQN	LSEV	TRQS	RSEV	FWQS	FSEV	TLQS	LSEV
325	1	0	23	0	0	0	2	0	11	0	0	0	5	0	7	2	0	0
326	1	0	23	0	0	0	2	0	10	2	0	0	5	0	8	0	0	0
327	1	0	24	0	0	0	2	0	10	0	0	0	5	0	6	2	0	0
328	1	0	25	0	0	0	2	0	8	2	0	0	5	0	6	0	0	0
329	1	0	25	0	0	0	2	0	9	0	0	0	5	0	4	2	0	0
330	1	0	25	0	0	0	2	0	10	0	0	0	5	0	4	0	0	0
331	1	0	25	0	0	0	3	0	10	0	0	0	5	0	5	0	0	0
332	1	0	25	0	0	0	2	1	11	0	0	0	4	1	5	0	0	0
333	1	0	25	0	0	0	3	0	11	0	0	0	4	0	6	0	0	0
334	1	0	26	0	0	0	2	1	11	0	0	0	3	1	6	0	0	0
335	1	0	26	0	0	0	2	0	11	0	0	0	3	0	7	0	0	0
336	1	0	26	0	0	0	1	1	12	0	0	0	2	1	7	0	0	0
337	1	0	26	0	0	0	1	0	12	0	0	0	2	0	7	0	0	0
338	1	0	26	0	0	0	1	1	12	0	0	0	1	1	7	0	0	1
339	1	0	26	0	0	0	1	0	13	0	0	0	1	0	7	0	0	0
340	1	0	26	0	0	0	0	1	13	0	0	0	1	0	7	0	0	0
341	1	0	26	0	0	0	0	0	13	0	0	0	0	1	8	0	0	0
342	1	0	26	0	0	0	0	0	13	0	0	0	0	0	8	0	0	0
343	1	0	26	0	0	0	0	0	13	0	0	0	0	0	8	0	0	0
344	1	0	27	0	0	0	0	0	13	0	0	0	0	0	8	0	0	0
345	2	0	27	0	0	0	0	0	13	0	0	0	0	0	9	0	0	0
346	2	0	27	0	0	0	0	0	14	0	0	0	0	0	9	0	0	0
347	2	0	27	0	0	0	0	0	15	0	0	0	0	0	9	0	0	0
348	3	0	27	0	0	0	0	0	15	0	0	0	0	0	9	0	0	0
349	3	0	27	0	0	0	0	0	15	0	0	0	0	0	10	0	0	0
350	3	0	27	0	0	0	0	0	15	0	0	0	0	1	10	0	0	0
351	3	0	28	0	0	0	0	0	16	0	0	0	0	0	10	0	0	0
352	3	0	28	0	0	0	0	0	17	0	0	0	0	0	10	0	0	0
353	3	0	28	0	0	0	0	0	17	0	0	0	0	0	10	0	0	0
354	3	0	29	0	0	0	0	1	17	0	0	0	0	0	11	0	0	0
355	3	0	29	0	0	0	0	0	17	0	0	0	0	0	11	0	0	0
356	3	0	29	0	0	0	0	0	17	0	0	0	0	0	12	0	0	0
357	3	0	29	0	0	0	0	0	18	0	0	0	0	0	12	0	0	0
358	3	0	29	0	0	1	0	0	18	0	0	0	0	0	12	0	0	0
359	3	0	29	0	0	0	0	0	19	0	0	0	0	0	12	0	0	0
360	3	0	29	0	0	0	0	0	19	0	0	0	0	0	13	0	0	0

TABLE OF RESULTS

TABLE 4-1

PHASE RATIO AT B	ACTUAL I/P FROM A TO B	GENERATED INPUT FROM A TO B				ACTUAL I/P FROM B TO A	GENERATED INPUT FROM B TO A			
		NVEHC=2	NVEHC=3	NVEHC=4	NVEHC=5		NVEHC=2	NVEHC=3	NVEHC=4	NVEHC=5
45 / 75	2688	2640	2643	2684	2670	2184	2122	2148	2172	2145
50 / 70	2688	2644	2655	2692	2655	2300	2232	2280	2272	2265
55 / 65	2688	2648	2667	2688	2665	2397	2366	2397	2364	2360
60 / 60	2688	2646	2655	2676	2650	2592	2554	2550	2540	2545
65 / 55	2688	2652	2661	2680	2640	2692	2658	2667	2708	2645
70 / 50	2688	2658	2658	2672	2640	2802	2766	2802	2804	2770
75 / 45	2688	2652	2658	2696	2650	2768	2760	2748	2756	2745

TABLE 4-1 A

Data for intersection A :

M = 3	MM(1) 60	MM(2) 300
MM(3) = 900	IX = 25	LANE = 1
TMEAN = 2.0	PBL1 = 0.8500	PBL2 = 0.9500
PBF1 = 0.8500	PBF2 = 0.9500	PBR1 = 0.8500
PBR2 = 0.9500	NPHAS = 2	N = 3
K4 = 1	IPHAS(1) = 65	IPHAS(2) = 55
NOCYL = 120		
When JN = 1		
IBOUN = 1	IPROB(1,1) = 15	IPROB(1,2) = 70
IPROB(1,3) = 15	AA = SOUTH BOUND	PB1 = 0.1500
PB2 = 0.8500		
When JN = 2		
IBOUN = 1	IPROB(2,1) = 15	IPROB(2,2) = 70
IPROB(2,3) = 15	AA = NORTH BOUND	PB1 = 0.1500
PB2 = 0.8500		
When JN = 3		
IBOUN = 2	IPROB(3,1) = 15	IPROB(3,2) = 70
IPROB(3,3) = 15	AA = EAST BOUND	PB1 = 0.1500
PB2 = 0.8500		

Data for intersection B :

All data for intersection A, except IX, IPHAS(1) , IPHAS(2) and K4, are the same as data for intersection B. For intersection B,

IX = 3 K4 = 2

and the phase ratio (IPHAS(1) / IPHAS(2)) is varied from 45/75 to 75/45 .

TABLE 4-2

PHASE RATION	NVEHC	DEVIATION FROM A TO B	DEVIATION FROM B TO A	EFFECTIVE DEVIATION
45 / 75	2	48	62	110
	3	45	36	81
	4	4	12	16
	5	18	39	57
50 / 70	2	44	68	112
	3	33	20	53
	4	4	28	32
	5	33	35	68
55 / 65	2	40	31	71
	3	21	0	21
	4	0	33	33
	5	23	37	60
60 / 60	2	42	38	80
	3	33	42	76
	4	12	52	64
	5	38	47	85
65 / 55	2	36	34	70
	3	27	25	52
	4	8	16	24
	5	48	47	95
70 / 50	2	30	36	66
	3	30	0	30
	4	16	2	18
	5	48	32	80
75 / 45	2	36	8	44
	3	30	20	50
	4	8	12	20
	5	38	23	61

TABLE 4-4

PHASE RATIO AT B	MAX. QUEUE FROM A TO B				MAX. QUEUE FROM B TO A			
	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5
45 / 75	8	8	7	7	6	5	7	6
50 / 70	6	7	8	8	7	7	7	7
55 / 65	8	8	8	8	5	8	7	7
60 / 60	7	8	7	7	7	8	7	6
65 / 55	7	8	8	7	7	6	7	6
70 / 50	8	7	8	7	6	8	7	9
75 / 45	8	8	9	8	8	7	7	8

NO. OF PHASES = 2 PERIOD OF CYCLE = 120 SECONDS

PROBABILITY RATIO OF L-F-R FOR S,N,E-BOUND = 15 / 70 / 15

NO. OF LANES = 3 (SIGNAL-A IS FIXED AT PHASE RATIO = 65 / 55)

(NOTE) TABLE FOR MAX. TURN-LEFT QUEUE .

TABLE 4-5

PHASE RATIO AT B	MAX. QUEUE FROM A TO B				MAX. QUEUE FROM B TO A			
	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5
45 / 75	566	590	570	579	30	31	30	31
50 / 70	495	409	455	395	31	34	30	37
55 / 65	293	303	356	303	32	36	36	37
60 / 60	131	124	136	129	45	39	37	38
65 / 55	57	42	44	42	45	46	51	62
70 / 50	39	37	40	39	101	90	69	63
75 / 45	39	37	41	37	104	74	69	51

NO. OF PHASES = 2 PERIOD OF CYCLE = 120 SECONDS

PROBABILITY RATIO OF L-F-R FOR S,N,E-BOUND = 15 / 70 / 15

NO. OF LANES = 3 (SIGNAL-A IS FIXED AT PHASE RATIO = 65 / 55)

(NOTE) TABLE FOR MAX. STRAIGHTFORWARD QUEUE .

TABLE 4-6

PHASE RATIO AT B	MAX. QUEUE FROM A TO B				MAX. QUEUE FROM B TO A			
	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5
45 / 75	9	9	11	10	10	10	8	8
50 / 70	11	12	11	12	9	9	10	10
55 / 65	10	11	12	13	10	10	8	10
60 / 60	9	11	13	10	9	11	11	8
65 / 55	10	8	11	11	10	12	9	14
70 / 50	10	11	11	8	11	10	11	9
75 / 45	10	11	11	10	14	10	10	11

NO. OF PHASES = 2 PERIOD OF CYCLE = 120 SECONDS

PROBABILITY RATIO OF L-F-R FOR S,N,E-BOUND = 15 / 70 / 15

NO. OF LANES = 3 (SIGNAL-A IS FIXED AT PHASE RATIO = 65 / 55)

(NOTE) TABLE FOR MAX. TURN-RIGHT QUEUE .

TABLE 4-7

PHASE RATIO AT B	MAX. VOLUME FROM A TO B				MAX. VOLUME FROM B TO A			
	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5
45 / 75	573	592	578	586	33	32	38	38
50 / 70	503	413	456	400	34	37	37	39
55 / 65	298	306	365	308	37	44	38	43
60 / 60	137	130	146	134	50	43	40	42
65 / 55	63	47	54	47	49	51	58	72
70 / 50	48	40	44	43	105	98	73	69
75 / 45	40	41	45	41	106	77	70	57

NO. OF PHASES = 2 PERIOD OF CYCLE = 120 SECONDS

PROBABILITY RATIO OF L-F-R FOR N-S-E - BOUND = 15 / 70 / 15

NO. OF LANES = 3 (SIGNAL - A IS FIXED AT PHASE RATIO = 65 / 55)

TABLE 4-7

PHASE RATIO AT B	MAX. VOLUME FROM A TO B				MAX. VOLUME FROM B TO A			
	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5	NVEHC = 2	NVEHC = 3	NVEHC = 4	NVEHC = 5
45 / 75	573	592	578	586	33	32	38	38
50 / 70	503	413	456	400	34	37	37	39
55 / 65	298	306	365	308	37	44	38	43
60 / 60	137	130	146	134	50	43	40	42
65 / 55	63	47	54	47	49	51	58	72
70 / 50	48	40	44	43	105	98	73	69
75 / 45	40	41	45	41	106	77	70	57

NO. OF PHASES = 2 PERIOD OF CYCLE = 120 SECONDS

PROBABILITY RATIO OF L-F-R FOR N-S-E - BOUND = 15 / 70 / 15

NO. OF LANES = 3 (SIGNAL - A IS FIXED AT PHASE RATIO = 65 / 55)

TABLE 4-8

PHASE RATIO	CYCLE OF TIMING (SECONDS)	MAX. QUEUE FROM A TO B	MAX. QUEUE FROM B TO A	MAX. VOLUME FROM A TO B	MAX. VOLUME FROM B TO A	TOTAL INPUT AT B
71 / 60	131	52	51	58	55	2733
65 / 55	120	44	51	54	58	2692
59 / 50	109	40	45	50	49	2691

(NOTE) IT IS TESTED AT OPTIMAL PHASE RATIO = 1.82

TABLE 4-9

PHASE RATIO	ACTUAL INPUT FROM A TO B	SERVICE OUTPUT FROM A TO B	ACTUAL INPUT FROM B TO A	SERVICE OUTPUT FROM B TO A
45 / 75	2688	2112	2184	2161
50 / 70	2688	2242	2300	2267
55 / 65	2688	2380	2397	2389
60 / 60	2688	2557	2592	2524
65 / 55	2688	2663	2692	2671
70 / 50	2688	2665	2802	2752
75 / 45	2688	2684	2768	2699

(NOTE) THE RESULTS FROM EFFECTIVE VALUE OF NVEHC

TABLE 4-10

PHASE RATIO AT B	CLOCK TIME FOR MAX. QUEUE FROM A TO B (SECOND)			CLOCK TIME FOR MAX. QUEUE FROM B TO A (SECOND)		
	L	F	R	L	F	R
45 / 75	4495	6004	1373	6004	601	5642
50 / 70	775	7085	1801	1814	6483	2881
55 / 65	7141	7082	4922	1450	6003	2761
60 / 60	182	7083	2284	4209	5765	3124
65 / 55	10	3722	5401	727	6841	3962
70 / 50	10	3244	5048	122	7084	5643
75 / 45	10	7081	3601	5470	7087	4806

(NOTE) L = TURN-LEFT LANE ; F = STRAIGHTFORWARD LANE ; R = TURN-RIGHT LANE

TABLE 4-11

PHASE RATIO AT B	CLOCK TIME FOR MAX. VOL. FROM A TO B (SECOND)	CLOCK TIME FOR MAX. VOL. FROM B TO A (SECOND)
45 / 75	7130	601
50 / 70	7085	2881
55 / 65	7082	6121
60 / 60	7083	5402
65 / 55	3963	6841
70 / 50	7083	7084
75 / 45	3601	7087

NOTE : FOR THE OPTIMAL VALUES OF NVEHC

TABLE 4-12

PHASE RATIO	MAX. TURN-LEFT QUEUE			MAX. STRAIGHT. QUEUE			MAX. TURN-RIGHT QUEUE		
	S	N	E	S	N	E	S	N	E
45 / 75	1	1	1	20	22	695	7	8	9
50 / 70	1	2	1	43	42	553	7	7	12
55 / 65	1	1	1	144	112	419	7	8	10
60 / 60	1	1	1	300	236	234	8	7	7
65 / 55	1	1	1	383	361	161	9	10	8
70 / 50	1	2	2	614	567	30	8	10	8
75 / 45	1	2	2	687	703	27	9	10	6

(NOTE) S = SOUTHBOUND ; N = NORTHBOUND ; E = EASTBOUND

TABLE 4-13

PHASE RATIO	MAX. VOLUME AT INTERSECTION B		
	SOUTH-BOUND	NORTH-BOUND	EAST-BOUND
45 / 75	23	22	699
50 / 70	45	43	558
55 / 65	147	113	424
60 / 60	303	240	239
65 / 55	387	363	166
70 / 50	616	577	31
75 / 45	689	706	29

TABLE 4-14

PHASE RATIO	TOTAL INPUT VEHICLES / 2HRS.			TOTAL OUTPUT VEHICLES / 2HRS.			W-INPUT
	S	N	E	S	N	E	VEH.
45 / 75	2895	2837	2845	2890	2837	2148	2184
50 / 70	2831	2889	2854	2831	2883	2299	2300
55 / 65	2860	2779	2843	2741	2685	2422	2397
60 / 60	2904	2822	2792	2615	2599	2555	2592
65 / 55	2810	2783	2783	2438	2435	2725	2692
70 / 50	2882	2830	2853	2284	2282	2832	2802
75 / 45	2802	2846	2795	2125	2151	2782	2768

TABLE 4-15

IX	MAX. TURN-LEFT QUEUE			MAX. STRAIGHT. QUEUE			MAX. TURN-RIGHT QUEUE		
	S	N	E	S	N	E	S	N	E
1	1	1	1	296	244	257	7	8	7
3	1	1	1	300	236	234	8	7	7
59	2	1	2	326	265	274	7	8	8
189	1	1	1	240	267	296	9	7	7

(NOTE) PHASE RATIO IS FIXED AT 60 / 60

TABLE 4-16

IX	MAX. VOLUME WAITING IN QUEUE		
	S	N	E
1	299	245	259
3	303	240	239
59	330	268	277
189	242	272	300

(NOTE) PHASE RATIO IS FIXED AT 60 / 60

TABLE 4-17

IX	TOTAL INPUT VEHICLES / 2HRS.			TOTAL OUTPUT VEHICLES / 2HRS.			W-INPUT
	S	N	E	S	N	E	VEH.
1	2906	2814	2797	2624	2588	2543	2604
3	2904	2822	2792	2615	2599	2555	2592
59	2907	2843	2876	2599	2587	2604	2599
189	2794	2832	2862	2573	2586	2566	2562

(NOTE) PHASE RATIO IS FIXED AT 60 / 60

TABLE 4-18

PROBABILITY RATIO OF L-F-R	BOUND	MAXIMUM QUEUE			INPUT FOR W-BOUND
		L	F	R	
10 / 70 / 20	S	1	224	10	2549
	N	1	237	11	
	E	1	258	10	
10 / 80 / 10	S	1	556	8	2293
	N	1	521	5	
	E	1	517	6	
15 / 70 / 15	S	1	296	7	2604
	N	1	244	8	
	E	1	257	7	

(NOTE) FOR 2-PHASE 120 SECONDS PER CYCLE

L = TURN-LEFT QUEUE

F = STRAIGHTFORWARD QUEUE

R = TURN-RIGHT QUEUE

TABLE 4-19

BOUND	NO. OF LANES	MAXIMUM QUEUE			% OF DECREASING FOR F-QUEUE
		L	F	R	
S	3	2	1114	10	0.00
	4	1	126	12	88.70
	5	1	12	12	99.00
N	3	1	1102	10	0.00
	4	2	150	10	86.30
	5	1	12	11	98.70
E	3	1	1128	13	0.00
	4	1	146	11	87.10
	5	2	13	11	98.90

(NOTE) FOR 120 SECONDS PER CYCLE

PHASE RATIO = 30 / 30 / 30 / 30

L = TURN-LEFT QUEUE

F = STRAIGHTFORWARD QUEUE

R = TURN-RIGHT QUEUE

TABLE 4-20

NO. OF LANES	MAXIMUM VOLUMES WAITING IN QUEUE					
	S	% D	N	% D	E	% D
3	1116	0.00	1102	0.00	1131	0.00
4	255	70.50	304	66.20	296	66.10
5	39	94.10	36	93.70	41	93.60

(NOTE) FOR 4-PHASE TIMING SIGNAL , 120 SECONDS PER CYCLE

PHASE RATIO = 30 / 30 / 30 / 30

S = SOUTHBOUND

N = NORTHBOUND

E = EASTBOUND

% D = % OF DECREASING

TABLE 4-21

NO. OF LANES	TOTAL INPUT VEHICLES / 2 HRS.			TOTAL OUTPUT VEHICLES / 2 HRS.			W-BOUND INPUT
	S	N	E	S	N	E	PER 2 HRS.
3	2837	2766	2838	1725	1667	1709	1721
4	2763	2836	2821	2529	2554	2537	2538
5	2862	2817	2886	2851	2811	2858	2869

(NOTE) FOR 4-PHASE TIMING SIGNAL , 120 SECONDS PER CYCLE

PHASE RATIO = 30 / 30 / 30 / 30

N = NORTHBOUND ; S = SOUTHBOUND ; E = EASTBOUND

TABLE 4-22

NO. OF LANES	% INCREASING OF OUTPUT VEHICLES			
	S	N	E	W
3	0.00	0.00	0.00	0.00
4	46.60	53.20	48.40	47.40
5	65.20	68.70	67.20	66.70

NOTE : S = SOUTHBOUND

N = NORTHBOUND

E = EASTBOUND

W = WESTBOUND

ประวัติการศึกษา

ผู้เขียนชื่อ นายวิศาล อั่งสกุล สำเร็จการศึกษา วิศวกรรมศาสตร์บัณฑิต เกียรตินิยมอันดับสอง (สาขาไฟฟ้า) จากจุฬาลงกรณมหาวิทยาลัย พ.ศ. 2512 หน้าที่การงานในปัจจุบัน เป็นนักวิชาการคอมพิวเตอร์ ประจำสถาบันเทคโนโลยีแห่งเอเชีย ในการทำวิทยานิพนธ์ฉบับนี้ ได้รับทุนวิจัยของสภาวิจัยแห่งชาติ สำหรับปี 2512 – 2514